Comunicazioni orali

Aorta and arch 1

C1

ROLE OF POLYMORPHISMS OF ANGIOTENSIN CONVERTING ENZYME GENE IN THORACIC ASCENDING ANEURYSM

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Background. Evidence underlines the involvement of renin-angiotensin system (RAS) in the pathogenesis of abdominal aortic aneurysm. Limited data exist about the RAS role in thoracic ascending aneurysm (TAA). In this study, the role of polymorphisms of one gene codifying a key member of RAS system was assessed in TAA and dissections.

Methods. Aortic specimens from 161 TAA patients (127 men and 34 women, median age 63 ± 10.7 years) and 18 patients affected by Stanford type A aortic dissection (TAD) were used for histopathological and immunohistochemical analyses. A control group of 128 subjects (61 men and 67 women, mean age 61.1 ± 5.8 years) was also enrolled. Furthermore, genotyping of polymorphisms of angiotensin converting enzyme (ACE) gene was performed.

Results. Three phenotypes were identified in case aorta samples: phenotype I (normal wall); phenotype II (moderate wall thickness); phenotype III (thin and weak wall). The phenotype III showed same aorta lesions in TAA and TAD samples. The genotyping also revealed a significant association of the D/I ACE SNP with the risk of sporadic TAA and TAD (OR=5.6 (2.1-8.8) p=0.001 and OR=3.1 (1.1-6.7) p=0.001, respectively). A significant association was also detected between this SNP and phenotype III (p=0.01), having the biological effect to determine high ACE levels.

Conclusions. The genotyping of ACE SNP might open new perspectives for the analysis of sporadic TAA and TAD susceptibility factors and prevention. In addition, the treatment of TAA patients with ACE inhibitors might be used in the prevention of catastrophic complications like rupture and dissection.

C2

EXPERIMENTAL TESTER FOR VALVE-PRESERVING AORTIC ROOT SURGERY

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Background. Functional assessment of the aortic valve following valve-sparing aortic root procedures requires a considerable degree of expertise and transesophageal echocardiography is the only reliable examination. We have conceived an experimental hydrostatic tester in order to allow evaluation under direct vision, similarly to mitral and tricuspid valve procedures.

Methods. The assembly of the tester requires a common 7Fr triple-lumen central venous catheter (CVC) and a plastic test tube. After creating a 2.4 mm (7Fr) hole on the bottom of the test tube, the triple-lumen CVC is inserted so that the three-lumen end stays inside the tube. The common line of the CVC is then cut to a length of 2 mm, in order to allow de-airing during the hydrostatic test. The CVC is finally sealed to the test tube with hot melt adhesive and the three lines are secured to the inner wall of the test tube with glue. Before reimplanting the coronary ostia, the test tube is inserted in the prosthetic ascending aorta with the bottom end down. The graft is then clenched around the test tube with a silk suture. The three lumens allow introduction of water for the hydrostatic test, de-airing maneuvers and pressure measurements under direct vision through the transparent bottom of the test tube.

Results. The device has been successfully tested in an animal model: following an aortic root reimplantation procedure, it showed that the native valve had been correctly repaired. The finding was confirmed at transesophageal echocardiogram.

Conclusions. Our device allows morpho-functional evaluation and hydrostatic test in valve-preserving aortic root surgery. It allows the immediate identification of localization, mechanism and strategy of correction of eventually residual valve regurgitation, before cardiopulmonary bypass discontinuation.

C3

BIOVALSALVA CONDUIT: A SINGLE-CENTER EXPERIENCE OF 200 CASES

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Background. Increasing patients' age undergoing Bentall procedure and improved durability of bioprosthesis have significantly increased the use of biological conduits. We evaluated our experience with the BioValsalva conduit.

Methods. Between 2007 and 2013, 200 patients underwent Bentall operation with BioValsalva conduit (81.5% males; mean age 70 ± 7 years). Indication for surgery included degenerative aneurysm (n=119; 59.5%), bicuspid aortic valve (n=49; 24.5%), and acute type A aortic dissection (n=24; 12.0%). Amount of reoperation was 8%. Concomitant procedures were performed in 21% of patients; in 16.5% of cases arch surgery was associated using antegrade selective cerebral perfusion.

Results. Overall hospital mortality was 6%, 25% in emergent/urgent procedures and 3.4% in elective procedures. Causes of hospital death were cardiac failure (2%; n=4) or multiple organ failure (4%; n=8).Main post-operative complications were: bleeding (13.5%; n=27), respiratory failure (11.5%; n=23), renal failure requiring dialysis (3.5%; n=7). Echocardiographic at discharge showed any case of valvular insufficiency and mean trans-valvular gradient of 14 ± 5 mmHg. Mean follow-up was 42.2±23.7 months. The overall survival at 1, 3 and 5 years was 96.6±1.4%, 93.0±2.1% and 87.3±3.4% respectively. At time of follow-up, 81.7% of patients stopped anticoagulation. Freedom from reoperation at 5 year was 94.4±2.3. Four patients were re-operated after a mean follow up of 21.2 ± 16.6 months. Two cases of valve deterioration were solved by replacing the valve inside the conduit. Re-Bentall procedure was necessary in the two cases of endocarditis.

Conclusions. The BioValsalva conduit is a good biological option for Bentall procedure when oral anticoagulation wants to be avoided with excellent hemodynamic performance. Its design offers technical benefits during the operation but also in case of reoperation. Even if we routinely use this device, further follow-up is mandatory.

C4

RISULTATI A BREVE-MEDIO TERMINE DELL'INTERVENTO DI "SLEEVE" PER IL TRATTAMENTO DEGLI ANEURISMI DELLA RADICE AORTICA

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Background. La tecnica "sleeve" è stata recentemente introdotta per il trattamento "sparing valve" degli aneurismi/ectasie della radice aortica, con o senza insufficienza valvolare, come alternativa di più facile esecuzione rispetto agli interventi di Yacoub e David. Sono qui presentati i risultati della nostra esperienza, accumulata da un solo chirurgo in due centri diversi.

Metodi. La "sleeve" consiste nel rivestimento/rimodellamento della radice aortica dilatata mediante una protesi in Dacron in cui sono ritagliati dei "key-hole" per accogliere gli osti coronarici, che non vengono staccati. Il tubo viene fissato a livello della giunzione ventricolo-aortica con tre punti, ed a livello sino-tubulare con sutura continua. Nel periodo 2006-2012, abbiamo trattato 90 pazienti (età 61.5 ± 12.5, 76% maschi) con aneurisma della radice aortica (diametro 53.1 ± 5.3 mm, range 45-65), 74 con valvola tricuspide di normale morfologia e 16 bicuspidi, di cui 8 prolassanti. Preoperatoriamente il rigurgito aortico era assente in 17/90 (19%), lieve in 26/90 (29%), moderato in 37/90 (41%), severo in 10/90 (11%).

Risultati. Abbiamo utilizzato una protesi Valsalva in 68 pazienti (75%), e Cardioroot in 22 (25%). Il clampaggio aortico è stato 70 ± 15 minuti. In 8/16 valvole bicuspidi è stata praticata una plastica. Non abbiamo osservato decessi ospedalieri; a 34 ± 19 mesi di follow-up (100% completo), 2 pazienti sono deceduti per cause non cardiache. Al follow-up ecocardiografico (18 ± 9 mesi, completo al 93%), l'insufficienza aortica è risultata assente, lieve, moderata e severa rispettivamente nel 61%, 37%, 1%, ed 1% dei pazienti (quest'ultimo rioperato). I diametri medi di anulus, giunzione sino-tubulare e seni di Valsava sono risultati rispettivamente pari a 27.3 ± 2.1, 30.6 ± 3.1, 37.1 ± 3.4 mm.

Conclusioni. Questa esperienza mostra che la "sleeve" è una tecnica valve-sparing rapida, affidabile con risultati a breve-medio termine promettenti, da validare a lungo termine.

C5

DIRECT ASCENDING AORTA CANNULATION IS ASSOCIATED WITH IMPROVED NEUROLOGIC OUTCOMES DURING TYPE A ACUTE AORTIC DISSECTION REPAIR

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Background. The aim of this study was to evaluate the impact of direct ascending aorta vs peripheral cannulation during type A acute aortic dissection repair.

Methods. We reviewed 117 consecutive patients (age 62 ± 12 years) who underwent TAAD repair from 2007 to 2013 at our institution. Arterial perfusion was central (ascending aorta cannulation) in 32% (n=40) and

peripheral in 67% (n=77), either by means of the right axillary artery (n=8) or through the femoral artery (n=69).
Results. Mean age was not significantly different between patients undergoing central vs peripheral perfusion (63 ± 13 vs 62 ± 12 years; p=0.48). Preoperative patient characteristics were similar between groups. Similarly, there were no differences in intraoperative parameters including cerebral protection strategies and percentage of aortic root (82% vs 90%, p=0.32) and total arch replacement (77% vs 85%; p=0.43). In-hospital mortality was 7.6% (n=9) and did not differ significantly between the groups (5.6% vs 11.8% p = 0.497). Postoperative stroke was significantly lower in patients undergoing central cannulation (3% vs 9%; p=0.02). No other differences in postoperative morbidity were observed. Survival at 5 years after discharge was 75% versus 78% (p=0.863). Retrograde perfusion was identified to be an independent risk factor for stroke at multivariate analysis (hazard ratio 2.6; p=0.01).
Conclusions. Direct ascending aorta cannulation in patients with acute aortic dissection type A can be a safe alternative to peripheral artery cannulation. Antegrade perfusion to the true lumen appears to be associated with a lower incidence of postoperative stroke.

C6

LATE REOPERATIONS AFTER ACUTE TYPE A AORTIC DISSECTION REPAIR: A SEVEN-YEAR SINGLE-CENTER EXPERIENCE

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Background. After successful primary repair for acute type A aortic dissection (ATAAD), several aortic complications can develop and one or more reoperations might be necessary. With our retrospective study, we want to assess early and late outcomes in this cohort of redo patients.
Methods. From September 2005 to July 2012, 21 consecutive patients who were previously operated for ATAAD underwent 27 redo aortic surgical procedures (6 patients receiving two-staged procedures). Patients' mean age was 59.48 ± 11.49 years (range 37-77 years) and 17 patients (81%) were men. Indications for redo procedures were: progressive enlargement of the false lumen in the aortic arch and/or in the descending or thoraco-abdominal aorta (18 events), severe aortic valve regurgitation with or without aneurysmal dilatation of aortic root (8 events), suture dehiscence and pseudoaneurysm at the proximal or distal aortic graft anastomosis (5 events) or at the coronary button anastomosis in patients previously operated of Bentall procedure (1 patient). Full median resternotomy was the surgical approach in 14 procedures, while non-sternotomy approaches (left thoracothomy or thoraco-phreno-laparotomy) were used in the remaining 13 procedures. In all cases, total or partial cardiopulmonary bypass (CPB) was used. Hypothermic cardiocirculatory arrest (HCCA) was needed in 22 procedures (81%).
Results. Hospital mortality was 3.7% (1 out of 27), re-exploration for bleeding and paraplegia rates were 7.4% and 7.4% respectively. Marfan patients received 3.2 procedures per patients vs 1.5 procedures in non-Marfan patients (p<0.01). At a mean 6.5-year follow-up, 2 aortic events, 1 aortic death and an additional aortic redo surgery occurred.
Conclusions. Open redo aortic surgery following repair for ATAAD can be performed with good early and late outcomes, whenever surgery is carried out on elective basis. Marfan patients are more prone to show several complications, with a more rapid evolution. Close, long life clinical and instrumental follow-up should be mandatory.

C7

LONG-TERM FOLLOW-UP OF ACUTE AORTIC EMERGENCIES TREATED WITH ENDOVASCULAR OR OPEN SURGICAL TREATMENT

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Background. Endovascular treatment has been accepted as the gold standard for blunt aortic injury because of low perioperative mortality and morbidity. However, less is known about long-term outcome. The purpose of this study is to compare the long-term results between open and endovascular repair of traumatic rupture of the aorta.
Methods. We evaluated 71 consecutive patients treated for blunt aortic injury at our institution since 1978, 48 patients underwent open repair (OR) and 23 patients underwent endovascular repair (ER). We evaluated demographics, intraoperative and postoperative findings, long term survival and major aortic complications.
Results. Mean age 35 ± 14 years in OR group vs 45 ± 14 years in ER group (p<0.02), there was thoracic involvement in 48% vs 82% (p<0.02), abdominal involvement 31% vs 15% (p=0.29) cerebral involvement 31% vs 15% (p=0.26%) skeletal involvement in 73% vs 39% (p<0.02). In OR group mean CPB time was 85 ± 40 min and left bypass was employed in 83% of cases, 2 patients (4%) developed paraplegia, 4 patients major neurological complications (8%) and 4 patients (8%) needed dialysis. In ER group 2 patients (9%) needed multiple stents, 12 patients (52%) covered subclavian artery, 2 patients (9%) needed dialysis. Median follow up was in OR group 271 (1-409) months and 78 (1-146) month in ER group (p<0.02).Mortality was not different in the 2 groups (p=0.27). Survival at 1 month, 5 years and 10 years was 87%, 80% and 78% in OR group and 95%, 90% and 90% in ER group, respectively. During follow-up 2 patients in OR group needed stent implantation because of a pseudoaneurysm and 1 patient in ER group because of a type 3 leak.
Conclusions. There were no significant differences in morbidity or mortality between the two groups at long-term follow-up suggesting that ER is at least as safe as OR to treat blunt aortic injury.

Surgery for heart failure 1

C8

SYSTEMIC INFLAMMATION IN END-STAGE HEART FAILURE PATIENTS UNDERGOING LVAD IMPLANTATION

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Background. We evaluated the inflammatory responses after axial-pump placement and the impact of different devices on systemic inflammation and early outcomes.
Methods. From 2005 to 2013, 70 ESHF-patients received a VAD at our department. Biochemical analysis was performed preoperatively, at 1, 3, 7 and 30 days post-LVAD for assessment of plasma interleukin (IL)-6, IL-8, sICAM-1, sP-selectin, and urinary neopterin levels. As clinical outcomes we considered: multi-organ failure, evaluated by total sequential organ failure assessment (tSOFA) score, ICU stay, hospitalization and 1-month survival.
Results. IL-6 levels showed a concentration peak 1 day after LVAD implantation and remained higher after 3 and 7 days. Neopterin and IL-8 levels increased from day 1 until 1 month after surgery. The sICAM-1 levels significantly increased only during the first postoperative week, whilst sP-selectin levels showed only a concentration peak at 1 day with 1-month levels lower than baseline. Following matching for pre-implant clinical and inflammatory characteristics, 35 patients were divided in two groups (A-Group, 14 patients: 6 Incor and 8 DeBakey; B-Group, 21 HeartMate-II). In-hospital mortality was 21% in A- vs 19% in B-group (p=1.000). Hospitalization was shorter in B- than in A-group (p=0.040). Total-SOFA score at 3 days was higher in A- than in B-group (p=0.019), and at 1 week was higher than baseline only in A-group (p=0.002). At 1 day, IL-6 levels were higher in A-group; IL-6 and IL-8 levels were higher in A- than in B-group at 7 and 30 days. During the first week, neopterin levels increased more in A-group, while sICAM-1 and sP-selectin levels remained higher in A- than in B-group, even at 30 days.
Conclusions. Systemic inflammation increases early after LVAD implantation. HeartMate-II is associated with reduced systemic inflammation, a minor expression of monocyte-attracting chemokines and attenuated activation of monocytes and endothelium. Further investigations are needed in the prolonged phase of support.

C9

HEART TRANSPLANTATION FOLLOWED BY AUTOLOGOUS STEM CELL TRANSPLANTATION FOR PATIENTS AFFECTED BY AL AMYLOIDOSIS AND HEART FAILURE

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Background. Patients affected by amyloidosis with severe heart failure due to cardiac involvement rarely survive more than 6 months. Solid organ transplantation is contentious because of the multisystem nature of this disease and risk of recurrence.
Methods. Four patients (2 males, median age 54 ± 8 years) affected by restrictive cardiomyopathy due to AL amyloidosis underwent heart transplantation (HT). In 3 patients the heart was the only organ affected, in one even kidney and peripheral fat were involved. All patients had evidence of plasma cell clonality with a median of 17% bone marrow plasma cells and serum immunofixation positive for lambda light chains. Two cases received bortezomib-based induction therapy before chemotherapy, while in the other 2 cases chemotherapy was contraindicated due to the severe heart failure. Three of these patients underwent collection of peripheral blood stem cells mobilized by cyclophosphamide followed by high dose of melphalan (140-200 mg/m^2) and autologous stem cell transplantation after a median of 8 ± 2 months after HT.
Results. After HT one patient needed temporary IABP support and 1 pericardiocentesis. At a median follow-up of 33 months (1-42 months) after HT, two patients had an acute rejection >2R that was treated in one case with steroid and with steroid and photopheresis in a second one. All patients engrafted after stem cell transplantation without any grade 3-4 extrahematological complications. At 6 months after stem cell transplantation, 2 patients achieved a complete hematologic remission and 1 a partial remission. One patient developed an hematological relapse 10 months after stem cell transplantation, and he was effectively treated with 6 cycles of bortezomib-dexamethasone-cyclophosphamide. All patients are asymptomatic with no organ impairment.

Conclusions. Our limited experience demonstrates that HT followed by autologous stem cell transplantation is feasible in selected patients with amyloidosis and heart failure, and that such a strategy may lead to improved overall survival.

C10

HOW TO TRANSFORM PERIPHERAL EXTRACORPOREAL MEMBRANE OXYGENATION IN THE SIMPLEST MID-TERM PARACORPOREAL VENTRICULAR ASSIST DEVICE

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Background. Extracorporeal membrane oxygenation (ECMO) provides excellent support to circulation. However, ECMO capacity to effectively assist the left ventricle (LV) is limited. We report our method of minimally invasive LV drainage while the patient is in ECMO support and subsequent switched to paracorporeal LVAD without the need of median sternotomy.

Methods. After ECMO implantation though femoral cannulation, a left anterior minithoracotomy is performed in the fifth or sixth intercostal space, depending on the LV shape. The apex of LV is exposed and an apical cannula is transcutaneously inserted after a cross-blade incision. The position of the cannula must be verified by TEE (no more than 3 cm in the axis of mitral valve). After de-airing, the cannula is connected to the venous line of the ECMO circuit using a Y-shaped connector. LV drainage can be started by draining blood from the LV apex and completely venting the left heart.

Results. As the pulmonary congestion progressive ameliorates, the venous return to the left heart rises. The progressive recovery of LV function contributes to increase the flow from the LV cannula, until complete switched from arteriovenous ECMO to LVAD. Progressive clamping of the venous line is performed until complete exclusion of the oxygenator and of the femoral venous drainage from the circuit.

Conclusions. The proposed apicoarterial cannulation ensures complete drainage of the LV and provides an effective LV assistance. The easy of adoption and the optimal cost-effectiveness of the described approach may potentially allow the use of ventricular assistance therapy even in primary care centers. A further potential advantage is the possibility of allowing partial mobilization and autonomy of the patient, an element of major relevance in case of medium-term bridge strategy.

C11

EXTRACORPOREAL MEMBRANE OXYGENATION SUPPORT IN REFRACTORY CARDIOGENIC SHOCK: TREATMENT STRATEGIES AND ANALYSIS OF RISK FACTORS

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Background. The RotaFlow and Levitronix CentriMag veno-arterial extracorporeal membrane oxygenation (ECMO) support systems have been investigated as treatment strategies for refractory cardiogenic shock (CS).

Methods. Between January 2004 and April 2014, 155 consecutive adult patients were supported on RotaFlow (n=135) or CentriMag (n=20) ECMO, at our institution (99 men; age 57.4 ± 12.6 years, range: 19-78 years). The new compact Cardiohelp system was adopted in 20 cases of RotaFlow population. Indications for support were: failure to wean from cardiopulmonary bypass in the setting of postcardiotomy (n=74) and primary graft failure (n=28); post-acute myocardial infarction CS (n=13); acute myocarditis (n=4); and CS on chronic heart failure (n=36).

Results. A central ECMO setting was established in 84 (54.1%) patients while peripherally in 71 (45.8%). Overall mean support time was 10.9 ± 8.8 days (range: 1-43 days). Fifty-five (35.4%) patients died on ECMO. Overall success rate, in terms of survival on ECMO (n=98), weaning from mechanical support (n=68; 43.8%) and bridge to heart transplantation (n=30; 19.3%), was 63.2%. Eighty-seven (56.1%) patients were successfully discharged. Stepwise logistic regression identified blood lactate level and CK-MB relative index at 72 h after ECMO initiation, and number of packed red blood cells (PRBCs) transfused on ECMO as significant predictors of mortality on ECMO [p=0.010, odds ratio (OR) 3.94; 95% confidence interval (CI) 1.10–3.14; p=0.012, OR 2.62, 95% CI 1.014-3.721; and p=0.010, OR 3.69; 95% CI 1.06-4.16; respectively]. At follow-up, persistent heart failure with left ventricle ejection fraction (LVEF) ≤40% resulted to be a risk factor after hospital discharge.

Conclusions. Patients with a poor hemodynamic status may benefit by rapid insertion of ECMO. The blood lactate level, CK-MB relative index and PRBCs transfused should be strictly monitored during ECMO support. In addition, early ventricular assist device (VAD) placement or urgent listing for heart transplantation should be considered in patients with persistent impaired LVEF after ECMO.

C12

OUTCOME OF PATIENTS WITH FULLY IMPLANTABLE HEARTWARE LEFT VENTRICLE ASSIST DEVICE: A SINGLE CENTER EXPERIENCE

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Background. Selection of patients eligible for mechanical support greatly influences outcome and the efficacy of therapy itself.

Methods. We retrospectively collected data of patients included in our VAD program in order to identify clinical, echocardiographic and hemodynamic variables predictive of death and right heart failure.

Results. Since implementation of our VAD program, 20 patients have been implanted with HeartWare L-VAD: 10 (50%) for post-ischemic heart failure; 7 (35%) for idiopathic dilated cardiomyopathy; 2 (10%) for hypertrophic cardiomyopathy; and 1 (5%) for post-chemotherapy cardiomyopathy. The mean age was 56.8 years (7.4). The strategy was bridge to transplant (BTT) for 14 patients (70%), bridge to candidacy (BTC) for 3 patients (15%) and destination therapy (DT) for 3 patients (15%). At the time of implantation, 10 patients (50%) were INTERMACS Class II, 8 in Class III (40%) and 2 (10%) were in class IV. Mean life expectancy calculated by Seattle Score was 1.5 years (1.2). The Kaplan-Meier estimate for survival was 64% at one year, and 48% at two years. Higher pulmonary capillary wedge pressure (PCW) (29 ± 3 vs 23 ± 7 mmHg, p=0.01) and lower transpulmonary gradient (TPG) (10 ± 4.4 vs 14.5 ± 6.5 mmHg, p=0.008, OR 0.69) were significantly associated with death. A greater indexed left ventricular end-diastolic diameter (iLVEDD) (42 ± 2 vs 37 ± 4 mm, p=0.03) and left atrial volume (iLAV) (101 ± 17 vs 67 ± 30 ml, p=0.02) were significantly associated with right heart failure. Lower Seattle Score (1 ± 0.6 vs 1.9 ± 1.4 years, p=0.048) and TPG (10 ± 4 vs 15 ± 7 mmHg, p=0.01) and higher PCW (28.5 ± 4 vs 23 ± 7 mmHg, p=0.04) were all significantly associated with combined endpoint (death and right heart failure).

Conclusions. In our HeartWare L-VAD recipients PCW and TPG were significantly associated with death. Beside PCW and TPG, also Seattle Score was significantly associated with combined endpoint (death and right heart failure). However, our results are likely limited by the relatively short follow-up time and small sample size.

C13

PREDICTORS OF FOLLOW-UP SURVIVAL IN PATIENTS UNDERGOING ECLS/ECMO THERAPY IN A TERTIARY REFERRAL CENTER: DEVELOPMENT OF AN INSTITUTIONAL PROGRAM

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Background. Extracorporeal life support (ECLS) is an emerging option to rescue selected patients with cardiac arrest refractory to advanced cardiopulmonary resuscitation. We aimed to clarify the survival and the quality-of-life among survivors after hospital discharge.

Methods. We analysed the prospectively collected data of 49 patients who were rescued from refractory cardiac arrest through implantation of veno-arterial ECLS during external cardiac massage (18.1% of the 2005-2013 ECLS activity within our Institution). Average SAPS score was 61.7 ± 29. In-hospital results and a prospective follow-up with administration of the SF-36 questionnaire were performed.

Results. Etiology was primary cardiac disease in 61.2% of cases (acute myocardial infarction in 28.6%), trauma in 14.3%, sepsis in 2%, and miscellaneous in 22.5%. Survival at ECLS explantation and hospital discharge was 42.9% and 36.7%; brain death occurred in 24.5%. Increased SAPS score, higher serum lactates and lower body temperature at implantation predicted 30-days mortality. Bridge to heart transplantation or implantation of long-term ventricular assist device was performed in 8.2%. No patient deceased during the post-discharge follow-up (36.7% survival; average duration was 15.6 ± 19.2 months). At the end of follow-up, average SF-36 scores were: Physical activity, 70.8 ± 27.4; Role limitation: 63.6 ± 23.2; Physical pain: 81.3 ± 23.6; General Health: 62.7 ± 16; Vitality: 56.5 ± 18.8, Social activity: 74 ± 23; Mental Health: 71.4 ± 17; Physical Component Summary: 45.2 ± 6.8; Mental Component Summary: 48.3 ± 7.7.

Conclusions. ECLS is a viable treatment for selected patients affected by cardiac arrest refractory to cardiopulmonary resuscitation. About one-third of patients rescued with ECLS for failed cardiopulmonary resuscitation are alive at the average 6-month follow-up, and display satisfactory health-related quality-of-life. Rational selection of candidates is crucial to achieve adequate results. ECLS is a heavily demanding treatment whose place in the healthcare systems is still to be defined.

C14

DEVELOPMENT AND VALIDATION OF A RISK SCORE FOR PREDICTING OPERATIVE MORTALITY IN HEART FAILURE PATIENTS UNDERGOING SURGICAL VENTRICULAR RECONSTRUCTION

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Background. Different risk models have been introduced and refined in the past in order to improve standards of care. However, the predictive power of

any risk algorithms can decline over time due to changes in surgical practice and population's risk profile. The present study aimed to develop and validate a risk model for predicting operative mortality in patients with ischemic heart failure (HF) undergoing surgical ventricular reconstruction (SVR).
Methods. The study population included 525 patients with previous myocardial infarction and left ventricular remodeling referred to our Center for SVR. All patients underwent SVR. Operative mortality was defined as death within 30 days after surgery. All patients received an operative risk assessment using the logistic EuroSCORE and the ACEF score.
Results. The best accuracy was achieved by the ACEF score (0.771) compared to the EuroSCORE (0.747). At the multivariable logistic regression analysis, forcing the ACEF score in the model, three additional factors remained as independent predictors of operative mortality: atrial fibrillation, NYHA class 3-4, and mitral valve surgery (OR 2.2, 2.6 and 2.1, respectively) and were computed in the ACEF-SVR. The ACEF-SVR score demonstrated an improved accuracy in respect of the ACEF score (from 0.771 to 0.792) and a better calibration (Hosmer-Lemeshow chi-square of 5.40, p=0.714).
Conclusions. The ACEF-SVR score, starting from a simplified model of risk, allowed to improve the accuracy and calibration of the model, tailoring the risk on a specific HF population of patients undergoing a specific surgical procedure. This new model meets the current need for procedure-specific models to be applied on specific subsets of patients, avoiding the error to roughly assign a probability of outcome of a population.

Miscellaneous 1

C15
LA STERNOTOMIA TRASVERSALE AL IV SPAZIO INTERCOSTALE PER IL POSIZIONAMENTO DEGLI ELETTRODI EPICARDICI DESTRI
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Background. L'approccio cardiochirurgico in sternotomia mediana per il posizionamento degli elettrodi epicardici è noto. Noi presentiamo la nostra esperienza con un approccio mini-invasivo, la sternotomia trasversale al quarto spazio intercostale.
Metodi. Dal gennaio 2012 al febbraio 2014, 10 pazienti consecutivi sono stati trattati in sternotomia trasversale. Tutti i pazienti avevano elettrodi mal funzionanti ed erano già stati sottoposti a tentativi di re-posizionamento percutaneo. In anestesia generale, si procedeva con una sternotomia trasversale (circa 6 cm) al quarto spazio intercostale. Le arterie mammarie e le cavità pleuriche venivano in genere preservate. Dopo aver divaricato i monconi sternali (circa 5 cm), l'auricola destra ed il ventricolo destro erano sotto diretta visione (Fig. 1). Un elettrodo epicardico (Medtronic® Capsure leads) veniva suturato sull'auricola destra. Successivamente, un elettrodo bipolare a vite (MyoPore sutureless myocardial pacing lead, Boston Scientific) veniva fissato sulla porzione muscolare del ventricolo destro. Gli elettrodi venivano tunnellizzati nel sottocute fino alla tasca sotto-claveare o addominale. Infine, si posizionava un drenaggio 28Fr in pericardio e si accostava lo sterno con punto ad X.
Risultati. La durata dell'intervento era <40 minuti. Il sanguinamento era contenuto (<200 ml) e nessun paziente ha ricevuto trasfusioni. La degenza media era di 3 giorni. Dopo 15.7 ± 8.3 mesi, non sono riportati casi di sposizionamento o disfunzione degli elettrodi. Un paziente è deceduto 3 mesi dopo l'intervento per scompenso cardiaco (paziente precedentemente trattato con TAVI). La soglia di stimolazione è stabile (1.1 ± 0.5 V a 0.5 ms in sala operatoria; 1.1 ± 0.6 V a 0.5 ms prima della dimissione; 1.1 ± 0.5 V a 0.5 ms dopo 15.7 ± 8.3 mesi di follow-up).
Conclusions. La sternotomia trasversale è un approccio mini-invasivo che permette di posizionare facilmente gli elettrodi epicardici destri. La procedura è sicura poiché la visione diretta permette di evitare e/o gestire eventuali complicanze. Le soglie di stimolazione si mantengono basse.

C16
RELATIONSHIP BETWEEN ACUTE AORTIC DISSECTION, PSYCHIATRIC DISORDERS AND MENTAL HEALTH STATUS DURING MID-TERM FOLLOW-UP
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Background. Although relationships between ischemic heart disease and psychiatric disorders (PD) have been highlighted, a link between PD and acute aortic dissection (AAD) has not been shown. Aim of this study was to define the psychological profile of patients treated for AAD and analyze the impact of PD postoperatively and at mid-term follow-up.
Methods. From March 2005 to August 2013 207 consecutive patients underwent surgery for AAD. Of them 42 patients (mean age 59 ± 13 years; 32 males; arterial hypertension 98%), who represented the object of our study, underwent psychiatric consultation for evaluation of their psychiatric profile postoperatively. Data were retrospectively analyzed. Ascending aorta replacement was performed in 17 patients, ascending aorta+arch replacement in 14, Bentall+/-arch replacement in 11. Follow-up was completed in 38/42 patients (mean duration 36 ± 29 months).
Results. Postoperatively in 21 patients (50%) a diagnosis of PD (Group PD) was made as: major depression (n=9), bipolar disorder type 2 (n=5), anxious-depressive syndrome (n=4), panic attacks (n=2), paranoid schizophrenia (n=1). Clinical manifestations of PD were evident in 20 patients (87%) in Group PD vs. 3 patients (14.3%) without diagnosis of PD (Group non-PD) who developed symptoms (p<0.0001). During follow-up neither deaths nor suicide attempts occurred; only 5 patients of Group PD showed PD requiring treatment (p<0.0001 vs. early postoperative findings); 2 more cases were affected by PD. Therefore, freedom from PD requiring therapy at 1, 3 and 4 years was 79%, 69%, 60% in Group PD vs. 88%, 88%, 88% in Group non-PD (p<0.05).
Conclusions. Our findings suggest a strong relationship between PD and AAD. Since the psychiatric conditions appeared to be comfortably stable after surgery, treatment of AAD for patients affected by PD seemed to represent a first step to detect psychiatric pathology, and to start a correct medical therapy for a better control of mental health. Following these encouraging preliminary results, the study is continuing in a prospective manner.

C17
OUTCOME OF STERNAL WOUND DEHISCENCES IN DIABETIC PATIENTS: CAN VAC THERAPY PLAY A ROLE?
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Objective. Diabetes is a well established risk factor for wound complication. We sought to evaluate outcomes of SWD in diabetic patients and results of the vacuum-assisted closure (VAC) therapy in this particular population.
Methods. We retrospectively collected data on 8153 patients who underwent cardiac surgery at our Institution between January 2002 and December 2013. A total of 185 (2.3%) patients had a sternal wound dehiscence; among these, 67 were diabetic: 32 were treated with conventional treatments (Group A), 35 were managed with the VAC therapy (Group B). The two groups were comparable for preoperative risk factors and type of SWD. A cost analysis was also performed.
Results. Overall analysis showed a SWD related mortality of 4%; incidence of sepsis was 4% and mediastinitis occurred in 9% of patients. Comparing the two groups SWD related mortality was higher in Group A, though not significantly (9% vs 0%; p=0.1). Incidence of mediastinitis (p=0.4), sepsis (p=0.9), surgical sternal revision (p=0.6), surgical superficial revision (p=0.9) and other complications (p=0.05) were all similar. Delayed SWD infection occurred more frequently in Group A (p=0.04). Mean patient cost was € 26494 in Group A and € 26614 in Group B.
Conclusions. Sternal wound dehiscence in diabetic patients showed a considerable incidence of mediastinitis and sepsis, leading to a high SWD related mortality. The VAC therapy prevents progression of infection and seems to improve survival.

C18
PROSPECTIVE, RANDOMIZED CLINICAL TRIAL OF THE HEMOPATCH TOPIC HEMOSTATIC IN CARDIAC SURGERY: INITIAL EXPERIENCE
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Background. A new topical hemostatic agent composed of a porous collagen matrix, coated on one side with a thin protein bonding layer has been reported to be extremely effective, in addition to traditional means, in terminating bleeding during cardiac operations with control rates as high as 97,5%. We compared such hemostatic agent (Hemopatch; Baxter Inc, Deerfield, IL) with traditional optimized hemostasis routine in a prospective, randomized trial.
Methods. Following sample size calculation, in a prospective randomized study design, 40 patients were treated with Hemopatch and 44 patients received traditional treatment. To make the two cohorts as comparable as possible we restricted enrollment to moderately bleeding vascular anastomosis of Dacron grafts to ascending aorta or moderately bleeding transversal aortotomy. Study endpoints were the following: rate of successful intraoperative hemostasis (cessation of bleeding in less than 3 minutes from application) and time required for hemostasis; overall postoperative bleeding; rate of transfusion; rate of surgical revision for bleeding; postoperative morbidity; intensive care unit stay.
Results. Statistically higher rates of successful hemostasis and shorter time-to-hemostasis were observed in the Hemopatch group (p<0.001 both) with 98% rate of successes in Hemopatch group vs 67% in control group. Postoperative bleeding and rate of transfusion were statistically slightly decreased in the Hemopatch group (p<0.001 both). Rates of revision for bleeding and of minor complications were decreased in the Hemopatch Group though not statistically significant. The advantages observed in the Hemopatch group were not offset in patients undergoing systemic hypothermia.
Conclusions. The topical hemostatic agent Hemopatch looks promising in terminating intraoperative bleeding as an adjunct to traditional surgical methods. Its use seems associated with lesser need for transfusion of blood products thus not affecting rate of revision for bleeding. Its cost-utility profile should be addressed in dedicated trials.

C19

HYBRID SEQUENTIAL APPROACH TO PERSISTENT AND LONG-STANDING PERSISTENT ATRIAL FIBRILLATION

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Background. Persistent and long-standing persistent atrial fibrillation ablation is a challenging procedure. Aim of this study is to evaluate feasibility, safety and mid-term efficacy of a hybrid sequential approach to persistent ad long-standing persistent AF consisting in a combination of thoracoscopic surgical ablation plus left appendage exclusion and a subsequent transcatheter EP ablation.

Methods. This is a retrospective study of prospectively collected data. Between April 2010 and June 2013, 24 patients (60.3 ± 7.6 years) with persistent or long-standing persistent AF (60.3 ± 7.6 months), mean left atrial diameter 46.4 ± 5.5 mm and mean LVEF 53.2 ± 11.1% underwent to closed-chest, video-assisted thoracoscopic epicardial anatomical pulmonary veins isolation or box lesion performance with bipolar or unipolar radiofrequency and left appendage closure with external clip. Subsequently, after a mean period of 2 months, we proceeded to transcatheter EP evaluation for electro-anatomical mapping, gaps touch-up, adjunctive substrate reduction and possible right side cavo-tricuspid isthmus line. Follow-up was prospectively conducted with clinical evaluation and 24 hours Holter ECG at 3, 6, 9, 12, 18 and 24 months.

Results. There were no major complications, nor deaths. After a mean period of 15.4 ± 8 months, 18 (75%) patients were in stable SR and 13 (54.2%) were free from oral anticoagulant drugs. Transcatheter gaps touch-up of surgical lines was required in 8 (33.3%) patients. In 18 (75%) patients left appendage was successfully excluded. At the end of follow-up period significant improvement in LVEF was noticed (53.2 ± 11.1 vs 61.9 ± 9.2, p=0.001).

Conclusions. Hybrid sequential ablation for persistent and LS persistent AF can be safely performed with satisfying success rate at mid-term follow-up. Improvement in cardiac performance seems to characterize the clinical result. Left appendage exclusion can be safely performed in the setting of minimally invasive lone atrial fibrillation surgical ablation.

C20

SURGICAL VENTRICULAR RESTORATION: A COMMON TERM FOR DIFFERENT SURGICAL TECHNIQUE

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Background. Different techniques have been introduced for surgical ventricular restoration (SVR) for left ventricular post-ischemic aneurysm (LVPA) to preserve normal elliptical shape and reduce ventricular volume improving pump function, functional class (NYHA) and survival. In order to avoid a box-like shape of the left ventricle and to achieve an elliptical shape in the remodeled dilated heart, we used a diamond-shaped patch oblique and parallel to interventricular septum, avoiding Fontan stitch and creating a new apex by plication of inferior dilated wall.

Methods. Since September 2009, 24 consecutive patients with LVPA were treated with our technique. Concomitant procedures included myocardial revascularization (62.5%), ventricular septal defect closure (20.8%) and mitral valve repair (8.3%). Preoperatively and early postoperatively an echocardiography and magnetic resonance imaging (MRI) study of left ventricular geometry was performed. In the follow-up functional class and survival were evaluated.

Results. Patients' mean age was 68.3 ± 10.7 (15 males; 9 females) and follow-up 2.6 ± 1.4 patient-year. Echocardiograms and MRIs performed demonstrated a significantly improved ejection fraction and decreased end-diastolic and end-systolic volume indexes. Good surgical results allowed excellent NYHA class improvement with 100% one-year survival.

Conclusions. The study shows significantly improvement of left ventricular function and excellent restoration of left ventricular shape. The surgical technique used achieved good results in terms of improved functional status and survival. The creation of a new apex, ventricular volume reduction and the use of a longer and narrow diamond-shaped patch oblique and parallel to interventricular septum are the key of our successful technique.

C21

PARACORPOREAL ASSIST DEVICE IN ACUTE HEART FAILURE: PAST OR PRESENT?

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Background. Totally implantable VAD overcome paracoporal devices because of better quality of life morbidity and mortality. Moreover paracorporeal VADs allow biventricular support, are less expensive than implantable devices and can be employed for long-term and outclinic support resulting attractive for critical patients with uncertain prognosis.

Methods. Between 1995 and 2014, we retrospectively evaluate 29 consecutive patients (96% male, mean age 52 ± 13 years) affected by acute heart failure or biventricular heat failure who received paracorporeal ventricular assist devices as "bridge to transplant" and "bridge to recovery". Etiology of heart failure was myocardial infarction in 6 patients, ischemic cardiomyopathy in 8, dilated cardiomyopathy in 9, early graft failure in 1, myocarditis in 4, restrictive cardiomyopathy in 1.

Results. Twenty-three patients were implanted with BiVAD and 6 patients vith L-VAD. The median support time was 34.14 (1-146) days. Three patients (10%) affected by myocarditis were weaned from assist device support because a complete recovery after a mean support of 14 ± 2 days. Seventeen patients (59%) were successfully transplanted after a median support time of 37 (5-121) days. In these transplanted patients 30-day, 1, 5 and 10 year survival was 82%, 82%, 74%, 53%, respectively. Nine patients (31%) died after a median support of 16 (1-146) days.

Conclusions. In our experience the use of paracorporeal ventricular assist devices is an effective tool for the treatment of acute and biventricular heart failure, allowing the recovery of adequate biventricular function or long-term support to bridge the patient to heart transplantation.

Congenital 1

C22

EXTRACELLULAR MATRIX GRAFT FOR PULMONARY AND AORTIC VALVE REPAIR IN CHILDREN. A WORD OF CAUTION AFTER MID TERM RESULTS

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Background. Porcine extracellular matrix (ECM) has been used in the clinical setting to repair different types of congenital heart disease (CHD). We report our clinical experience and midterm outcomes with semilunar (pulmonary, PV and aortic valve, AV) repair with ECM patch in children.

Methods. Since December 2009, ECM patch was utilized in 19 consecutive selected patients with complex CHD. Repair of PV was performed in 15 patients (Group 1) while AV repair in 4 (Group 2). Serial echocardiographic studies were performed at discharge and twice a year after surgery. Primary endpoints were reoperation or reintervention on semilunar valves, and echocardiographic evidence of regurgitation or stenosis greater than mild.

Results. There were no deaths at operation, and all patients were discharged home after a mean hospitalization time of 13 ± 7.3 days. At discharge PV regurgitation was mild in 50% of patients, moderate in 40%, severe in 10%; AV regurgitation was mild in 50%, moderate in the remaining 50%. At a mean follow-up of 53 ± 30 months, there were no late deaths; reoperation for AV replacement was necessary in 2 patients in Group 2 (50%). In Group 1, right ventricular outflow tract obstruction (RVOTO) was mild in 1, moderate (>50 mmHg) in 3, severe requiring interventional treatment in 2 patients with TOF. Absent or mild pulmonary regurgitation was recorded in 5 patients (4 with TOF), moderate in 2, severe in 6. In Group 2, AV regurgitation is mild in 2 patients, while 2 had AVR.

Conclusions. Functional late performance of ECM patch on reconstruction of PV and AV leaflets is suboptimal. Whenever ECM patch is included in vital tissue, functional results are better. Further clinical experience and longer follow up are needed to assess which is the optimal indication for ECM patch utilization in valve reconstruction in children with CHD.

C23

ROSS UPGRADE: MAKING VIRTUE OUT OF NECESSITY?

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Background. To review the outcome of Ross procedure in patients with previous aortic valve replacement (AVR).

Methods. Patients undergoing Ross procedure, preceded by an AVR, between June 1997 and March 2014 were identified from the departmental data base. A retrospective case note analysis of these patients was undertaken.

Results. Of 124 patients undergoing Ross procedure 12 (3 female) had undergone at least one previous AVR (one patient 2 previous AVRs, one patient 3 previous AVRs). Mean age at last AVR was 16.1 ± 9.4 years, mean age at Ross was 30.3 ± 15.0 years, mean time from last AVR to Ross was 14.1 ± 7.7 years. AVR type at the time of Ross was 2 aortic homografts, 8 mechanical valves and 2 bio-prostheses. Indications to Ross were: patient-prosthesis mismatch (n=4), cerebral haemorrhage/embolic events related to mechanical valves (n=4), degeneration of homograft or bio-prosthesis (2), endocarditis (n=2). At a median post Ross follow-up of 5.5 years (0.1-16 years) two further procedures were required. One right ventricular outflow tract replacement with pulmonary homograft and an autograft repair with neoaortic valve bicuspidalization. There was one late sudden death presumed due to arrhythmias 3 months post Ross. The other 11 subjects are in NYHA I with good biventricular function, none of them showing a pulmonary and/or aortic incompetence/stenosis more than mild.

Conclusions. Upgrading to Ross procedure after previous AVRs is an

appealing surgical strategy for patients with complications relating to previous AVRs or in those whose previous AVR has deteriorated sufficiently to require further aortic surgery.

C24

MODIFIED KABBANI PROCEDURE FOR COMPLEX CONGENITAL MITRAL VALVE STENOSIS IN SHONE SYNDROME

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Background. To assess feasibility of modified Kabbani (mKabb) procedure for complex congenital mitral stenosis (cMS) in patients with Shone syndrome, when neither repair nor standard valve implant is possible.

Methods. Retrospective study on 4 patients (mean age 13.6 months, mean weight 6.8 kg) treated with this technique: a Hancock II conduit is positioned inside left atrium and wrapped with heterologous patch.

Results. Four patients (mean age 13.6 months, mean weight 6.8 g) were treated with this technique. Indication was cMS in Shone syndrome. Mean trans-mitral gradient was 18 mmHg, mean annulus size 11.2 mm. All patients had previous MV plasty surgery attempt. The first patient received a mKabb-Hancock 12 mm at 14 months, a mKabb-Hancock 14 mm after 6 months and a 16 mm mechanical valve in a Goretex tube in supra-annular position at 3 years of age. The second patient received a mKabb-Hancock 14 mm at 18 months. The third patient underwent a Ross-Konno procedure then a mKabb-Hancock 12 mm implant at 20 months and a 16 mm mechanical prosthesis in supra-annular position two years later. The last patient was treated with a nKabb-Hancock 12 mm at 12 months; a 16 mm mechanical prosthesis after 9 months, and finally a 18 mm mechanical prosthesis after 4 years: all the procedures were in supra-annular position. At a mean follow-up of 6.5 years all patients are in good clinical condition with a trans-mitral gradient less than 8 mmHg in 3 and 16 mmHg in one.

Conclusions. Kabbani modification technique for cMS in Shone syndrome is a valid surgical option when no other surgical alternatives are available with the intent to bridge these patients into future staged procedures.

C25

SUPRA-ANNULAR MITRAL VALVE IMPLANTATION IN CHILDREN YOUNGER THAN THREE YEARS OLD

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Background. Supra-annular mitral valve replacement (SMVR) may be a secondary surgical option when mitral valvuloplasty is not feasible/successful. Our aim is to review our initial experience on MVR in very young children.

Methods. From July 2004 to January 2014, 7 children (mean age 13.3 ± 11.2 months, range 4-35 months; mean body weight 6.0 ± 2.2 kg) underwent MVR with mechanical prosthesis in supra-annular position. In all the cases MVR was performed after unsuccessful mitral valvuloplasty or when the valve was judged unsuitable for plasty. Six patients had congenital defects of the mitral valve and one a rheumatic disease. Six patients had undergone previous cardio-surgical procedures, 4 in others cardio-surgical departments. The MV was exposed through a bi-atrial incision according to Guiraudon in 6 patients, while in other through an atrial septectomy.

Results. All patients were implanted with a CarboMedics (CarboMedics, Austin, TX) mechanical prosthesis. Mean prosthesis size was 19.0 ± 3.1 mm (range 16-25). There were no cases of operative or late mortality. No patient developed postoperative complete heart block due to supra annular prosthesis implantation, neither signs of coronary ischemia. Intensive care unit and total hospital stay were 6.7 ± 7.6 and 11.2 ± 34.6 days, respectively (range 2-24 and 11-108 days). At follow-up (mean 67.1 ± 34.8 months; range 25-108 months) two patients (28.6%) required reoperation, both for thrombotic pannus formation over the disc at 2 and 3 months from first operation respectively. A home service for anticoagulation therapy was created with a high grade of parent's satisfaction.

Conclusions. Supra-annular MVR may be considered a feasible secondary surgical option in children with a small annulus when mitral valvuloplasty is unsuccessful/unsuitable. Early and mid-term outcomes are acceptable but complications are not uncommon, especially related to thrombotic events. Development of an adequate post-operative home service for anticoagulation is advised in order to avoid serious complications.

C26

SURGICAL IMPLANTATION OF A MODIFIED STENTED BOVINE JUGULAR VEIN GRAFT FOR MITRAL VALVE REPLACEMENT IN INFANTS AND CHILDREN: FIRST EXPERIENCE IN EUROPE WITH MELODY VALVE

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Background. Options for mitral valve replacement (MVR) in small children are limited to Ross-Kabbani procedure or stented mechanical or bioprosthetic valves that are not available in small sizes, precluding intra-annular implantation, forcing to supra-annular implantation with bad outcomes. The available prostheses have fixed diameters, and early reoperations will be necessary according to somatic growth. We implanted a modified stented bovine jugular vein graft (Melody valve, Medtronic, Minneapolis, MN) in mitral position with the idea of a subsequent expansion in the catheterization laboratory as the child grows.

Methods. Four children with diagnosis of Shone's complex (2/4) and congenital mitral valve stenosis (2/4) have undergone Melody valve implantation at a median age of 3 years (range 1-6). The Melody prostheses were modified by adding a bovine pericardial sewing cuff and by trimming the distal crown in 1 case to prevent left ventricular outflow tract obstruction (LVOTO). Mitral valve was approached transeptally. The valves were anchored to the annulus by 4 interrupted stitches and 2 concentric running purse-string sutures, and fixation of the distal stent to the inferior left ventricle was done, to prevent LVOTO. Then the valves underwent balloon expansion (1 to 14 mm, 2 to 18 mm, 1 to 20 mm) with knots tying of the running sutures after dilatation. The atrial septum was closed by a fenestrated bovine patch to provide an easy access to the left atrium for the subsequent catheterizations.

Results. Valves were all competent, with low postoperatively gradients. No paravalvular leaks and LVOTO were reported. No pacemaker implantation was done. The postoperative course was uneventful in all patients.

Conclusions. The modified Melody valve in mitral position has demonstrated acceptable immediate results, without paravalvular leaks and LVOTO. The Melody can be theoretically percutaneously expanded as the child grows, so it could be a viable option for MVR in infants and children who cannot undergo mitral valve repair.

C27

NEONATAL PULMONARY BI-BANDING AS PART OF "RAPID TWO-STAGE PALLIATION" IN HIGH RISK PATIENTS WITH HYPOPLASTIC LEFT HEART SYNDROME

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Background. Neonatal pulmonary bi-banding maintaining PGE1 infusion is a useful and attractive procedure for the initial palliation of high-risk patients with hypoplastic left heart syndrome (HLHS). The aim of this procedure is to achieve clinical and hemodynamic stability before the Norwood stage I palliation, minimizing in this way the perioperative morbidity and mortality.

Methods. Four patients with pre-natal diagnosis of extreme HLHS (AA/MA) underwent neonatal pulmonary bi-banding at our institution. Indication was acute cardiorespiratory failure with signs and symptoms of pulmonary overflow in low birth weight (≤2.5 kg) and with evidence of A-V valve regurgitation. One patient underwent fetal PFO dilatation and stenting for severe restrictivity. We performed pulmonary bi-banding through median sternotomy using two rings of Gore-tex obtained from a 3.5 mm shunt tube. The banding procedure was considered satisfactory when a drop in systemic saturation of about 10% was observed with a concomitant 10 mmHg increase in systolic systemic pressure. A final arterial saturation of 75-80% was considered optimal.

Results. Post-operative course was uneventful in all patients with progressive improvement of metabolic state and good balance of systemic and pulmonary circulations. The median interval between pulmonary bi-banding and Norwood procedure was 10 days. All 4 patients underwent Norwood-Sano procedure with no perioperative mortality and no hemodynamic instability in the immediate post-operative period.

Conclusions. Early neonatal pulmonary bi-banding followed by Norwood stage I palliation is a good option in high risk patients with HLHS. This "rapid two-stage palliation" allows to reach hemodynamic stability and complete resolution of neonatal metabolic acidosis secondary to pulmonary overflow and congestive heart failure. Then, in our experience, it is possible to perform Norwood procedure in high risk patients with the same perioperative mortality and morbidity of the low risk population.

C28

EVOLVING TECHNICAL APPROACH AND RESULTS IN HYPOPLASTIC HEART SYNDROME WITH INTACT OR HIGHLY RESTRICTIVE ATRIAL SEPTUM

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Background. Variants of hypoplastic left heart syndrome (HLHS) with intact atrial septum (IAS) or highly restrictive interatrial communication (HRIC) still represent a challenging management and have long been recognized as predictors of poor survival after first-stage palliation. The purpose of this study is to describe our current approach from foetal assessment to Norwood palliation and report inter-stage results.

Methods. A retrospective review, since the institutional HLHS program started in 2005 to date, was conducted to identify neonates with HLHS associated with IAS/HRIC, requiring emergent/urgent left atrial decompression. All the babies had fetal assessment demonstrating absence of atrial communication or prominent flow reversal in the pulmonary veins. Our technical approach evolved during the time so that nowadays delivery is accommodated in hybrid

theatre: via median sternotomy, attempt of interventional defect creation/enlargement is performed, otherwise surgical septectomy with inflow occlusion technique is quickly viable as backup plan.
Results. Nine neonates required left atrial decompression within the first 48 hours of life (5 immediately after birth). Four and 5 had IAS and HRIC, respectively. Three neonates with HRIC had immediate clinical deterioration post failed septostomy, 2 required ECMO and all 3 died before Norwood operation. Of the other 6, 3 had successful inflow occlusion septectomy, 2 transatrial stent placement and 1 transatrial balloon septostomy. 5/6 underwent concomitant bilateral PAB. All 6 patients reached Norwood procedure after 27 ± 21 days and 50% required ECMO postoperatively. There was no hospital mortality after Norwood and current inter-stage survival is 100%: 5 patients underwent successfully second-stage palliation, 1 of them had heart transplantation after Fontan completion.
Conclusions. Our experience suggests that effective post-natal left atrial decompression can improve the outcome of HLHS patients with IAS and HRIC. Systematic multidisciplinary approach and mechanical cardiac support facility are mandatory and effective to cut down hospital mortality after Norwood palliation and guarantee excellent inter-stage survival.

Multicenter trials 1

C29

OFF-PUMP CORONARY ARTERY BYPASS GRAFTING IS ASSOCIATED WITH HIGHER RATE OF PERCUTANEOUS CORONARY INTERVENTION AT 8-YEAR FOLLOW-UP. RESULTS FROM THE PRIORITY STUDY

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Background. The debate on the advantages and limitations of off-pump vs on-pump coronary artery bypass grafting (CABG) has not still arrived to a conclusion and concerns still exist on graft patency. This study was designed to compare the impact on mortality and morbidity of off-pump and on-pump CABG, with a specific focus on mid-term need for percutaneous cardiac intervention (PCI).
Methods. The PRIORITY project was designed to evaluate the mid-long term outcomes of 2 large prospective multicenter cohort studies on CABG conducted between 2002-2004 and 2007-2008. Data on isolated CABG performed both on-pump and off-pump was derived from clinical dataset and follow-up information was derived from administrative datasets. Time-to event analyses were performed to evaluate the potential role of surgical techniques on outcomes.
Results. The population consisted of 11020 patients who underwent isolated CABG (27.2% performed off-pump). Several risk factor but surgical technique independently affected in-hospital mortality. The incidence of postoperative PCI was significantly higher in off-pump CABG group ($p<0.05$) and the multivariate logistic regression demonstrated that on-pump CABG was the only factor that protects from PCI after surgery (OR 0.61). The follow-up time ranged from 4 to 8 years. Although unadjusted long-term survival was significantly worst for off-pump surgery (Log-rank p=0.00), the adjustment for factors found significant in the univariate analysis did not confirm off-pump CABG as a risk factor for mortality (hazard ratio 0.96 ± 0.05, p=0.407). On the contrary, the significantly worst cumulative incidence function of hospitalization for PCI at follow-up (Gray test p=0.00) in the off-pump group was confirmed even by the adjustment for confounding factors (p=0.00) and off-pump CABG was demonstrated to be an independent risk factor for PCI with an hazard that is 42% higher than ONCABG.
Conclusions. This study demonstrated that OPCABG does not affect short and long-term mortality. Nonetheless, it is a risk factor for re-hospitalization for PCI.

C30

TWENTY-YEAR OUTCOME AFTER RVOT REPAIR USING ORTHOTOPIC PULMONARY HOMOGRAFTS IN CHILDREN: RESULTS FROM THE ITALIAN PEDIATRIC ROSS MULTI-CENTER STUDY

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Objective. To determine whether orthotopic implantation may be associated with longer durability compared with heterotopic, late results in Ross homografts (orthotopic) were analysed.
Methods. Two-hundred and eighty-one children underwent orthotopic homograft implant during Ross operation in 11 Paediatric Units between 1990-2012. Age at surgery was 9.1 ± 5.8 years (2 days-18 years). One-hundred sixteen (41%) patients had prior cardiac intervention, while 89 (32%) required associated procedures during Ross operation. Ross technique was mostly (88%) root replacement/Ross-Konno. Descriptive and Kaplan-Meier analysis defined outcome, while Cox regression identified risk factors. Comparison with historical heterotopic implants was done.
Results. There were 8 (2.8%) hospital and 12 late deaths (median follow-up 8.7 years). Survival was 93 ± 2% and 85 ± 8% and freedom from any reoperation was 76 ± 3% and 42 ± 10%, at 10 and 20 years. Twenty-four children had a total of 28 redo homograft procedures, with only 19 (79%) replacements. There was no mortality at reintervention. Freedom from any homograft reintervention was 94 ± 2% and 70 ± 8%, while freedom from (trans-catheter or surgical) homograft replacement was 94 ± 2% and 77 ± 9% at 10 and 20 years, respectively. Historical estimates for heterotopic homografts range from 31-52% at 15 years. Infant age (p=0.016) and associated procedures (p=0.005) were risk factor for right-heart reoperation. Majority (87%) of late survivors were in NYHA class I, 68% free from medication and 6 women had pregnancies.
Conclusions. Reintervention in orthotopic pulmonary homografts has lower prevalence than originally expected and than previously reported for heterotopic implants. Transcatheter approaches, well suited in orthotopic position, may further limit morbidity of homograft replacement.

C31

SHORT-TERM ANTITHROMBOTIC PROPHYLAXIS IN PATIENTS UNDERGOING MITRAL VALVE REPAIR WITHOUT ATRIAL FIBRILLATION: COMPARISON BETWEEN TEMPORARY POSTOPERATIVE ORAL ANTICOAGULATION AND ANTIPLATELET THERAPY

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Background. Antithrombotic prophylaxis is invariably prescribed in patients undergoing mitral valve repair to prevent thrombus formation and systemic embolization at short term. However whether oral anticoagulation should be preferred to antiplatelet therapy is still debated. No study has specifically addressed this issue and current guidelines are discordant. The aim of the present study was to verify the rate of thromboembolic and hemorrhagic complications during the first 6 months after mitral valve repair for degenerative mitral regurgitation and whether the type of antithrombotic therapy influenced the clinical outcome.
Methods. Data related to patients submitted to mitral valve repair were retrospectively collected from 16 centers. Inclusion criteria were any type of isolated mitral valve repair and ring implantation, whether exclusion criteria were history of ongoing or past atrial fibrillation (AF) and any other intra-operative associated surgical procedures. Primary outcome (efficacy) was the incidence of arterial thrombo-embolic events (cerebrovascular accidents, transient ischemic attack, limb or mesenteric ischemia) within 6 months from valve repair. Primary outcome (safety) was the incidence of major bleeding until 3 months after mitral valve repair or the stop of warfarin-based anticoagulation + 1 day, whichever comes first. Univariate logistic regression analyses were used to assess the association with the primary outcomes. The baseline characteristics associated with treatment on univariate analyses with $p<0.05$ were included in the adjusted model.
Results. Study cohort consisted of 1698 patients (61 ± 15 years; 34.7% females), and included 1511 treated with anticoagulant and 187 with antiplatelet drug, respectively. No differences were detected in terms of arterial embolic complications between the 2 groups (overall 1.4%, 1.4% vs 1.6% in the anticoagulant and antiplatelet groups respectively, p=0.74). Patients treated with antiplatelet drugs had a lower incidence of bleeding complications (overall 3.1%, 3.4% vs 0.5% in the anticoagulant and antiplatelet groups, respectively, p=0.02). Postoperative mortality at 6-months was not different between anticoagulant and antiplatelet-treated patients. The association between drug and post-operative outcome was estimated by an OR 1.16 (0.34-3.92; p=0.815) for arterial embolic complications and an OR 0.15 (0.02-1.09; p=0.062) for bleeding complications (antiplatelet vs anticoagulant). At multivariate analysis adjusted for variables significantly different between the two groups, the OR

was 2.15 (0.48-9.76; p=0.323) for arterial embolic complications and 0.36 (0.05-2.68; p=0.318) for bleeding complications.

Conclusions. Antiplatelet therapy is apparently not inferior to oral anticoagulation in antithrombotic prophylaxis after mitral valve repair. Our data suggest that oral anticoagulation carries a higher bleeding risk compared to antiplatelet therapy although these results should be confirmed in a large randomized controlled trial.

C32

ITALIAN MULTICENTER STUDY FOR ACUTE AORTIC DISSECTION TYPE A: PRELIMINARY REPORT

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Background. Acute aortic dissection type A requires emergent surgical intervention. In-hospital mortality after treatment varies in published series as well as the incidence of reoperations which significantly decreases over time due to modern surgical techniques. The objective of this retrospective, multicenter study is to report in a large series of patients the long-term results and incidence of reoperations.

Methods. We analyzed the perioperative, intraoperative, and postoperative conditions of 842 patients surgically treated for acute aortic dissection type A in large referral centers from 1981 to 2012.

Results. Mean age was 61 ± 13 years, 65% were male, 12% had Marfan syndrome or other connective tissue disease, and 9% had bicuspid aortic valve; the ascending aorta diameter was <40 mm in 18% and >50 mm in 31% of patients. In 67% the native aortic valve was preserved; a resuspension by a commissuroplasty was performed in 31%, resuspension together with remodeling in 4%, and David procedure in 2%. Between patients with aortic valve replacement, 37% underwent bioprosthesis implantation. The overall thirty-day mortality was 14.5%; 15% had severe neurological deficit at the hospital discharge. During the available follow-up of hospital survivors (mean duration 6.2 years, range 0.2-21.2 years), cardiac-related death was 18%. Freedom from re-operation was 71%; severe aortic regurgitation requiring aortic valve replacement is the most frequent cause of re-operation (88%).

Conclusions. The surgery for acute aortic dissection type A can be performed with adequate perioperative risk and good long-term follow-up, although it remains one of the most demanding cardiovascular emergencies.

C33

FROM BENCH TO BEDSIDE: HOW LVAD DESIGN IMPROVEMENT CAN REDUCE ADVERSE EVENTS AND INCREASE SURVIVAL RATE?

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Purpose. In vitro tests showed that the recent cone bearing configuration of Jarvik 2000 LVAD exhibits greater flow rates and hydraulic efficiency than the earlier pin bearing design. We investigated long-term outcomes of patients implanted with Jarvik 2000 LVAD and enrolled in the Italian Registry (IR), depending on device mechanical configuration.

Materials. From May 2008 to September 2013, 104 consecutive end-stage heart failure patients: 90 males, 99 adult (mean age 61 ± 9 years, median 63 years, 51% ischemic cardiomyopathy, 82% ineligible for heart transplantation, 95% with post auricular drive-line) were enrolled in the Jarvik 2000 IR. Up to June 2010, 40 patients were implanted with pin bearing pump (Group A) and from July 2010 to September 2013 59 adult patients received cone bearing pump (Group B) implantation. Relevant pre-operative data, long-term outcomes and major adverse events were analyzed by comparing retrospectively the two groups.

Results. 30/39 patients (Group A1) and 46/60 patients (Group B1) were discharged home. No significant differences in etiology, pre-operative hemodynamics, pre-implant INTERMACS mean class (3.5 and 3.0 respectively) were found between the two groups. No pump failure occurred in both groups. Antithrombotic therapy related ischemic and hemorrhagic stroke, RHF, GI bleeding events per patient year decreased in B1 vs A1 by 49%, 80%, 100% and 28%, respectively. Driveline and device infection remained negligible in both groups. Late death and CV death significantly decreased by 26 and 90%, respectively (p<0.001). Cox analysis of survival showed 80% (SD9) in B1 group compared to 63% (SD9) in group A1 (p=0.04). Pin bearing (HR 1.8) as risk variable and better clinical status according to INTERMACS Class (HR 0.6) were independent variables for survival and event-free survival.

Conclusions. In our experience, the new pump configuration confers better survival and reduced thromboembolic and hemorrhagic risk. Further studies are needed to draw conclusions on the impact of pump enhanced fluid dynamics in minimizing complications and offering improved results in long-term follow-up.

C34

THE ITALIAN TRANSCATHETER BALLOON-EXPANDABLE VALVE REGISTRY (ITER) RESEARCH GROUP

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Background. Transcatheter aortic valve implantation (TAVI) has been proposed as a therapeutic option for patients with severe symptomatic aortic valve stenosis who cannot undergo standard aortic valve replacement (AVR) because of contraindications or because considered high surgical risk. Aim of this multicenter study is to report the Italian experience with the balloon-expandable prostheses.

Methods. From November 2007 to December 2012, 1904 consecutive patients were enrolled at 33 centers in the Italian Transcatheter balloon-Expandable valve Registry (ITER). A minimum follow-up of one year was required to be part of the Registry. Outcomes were assigned according to the updated Valve Academic Research Consortium (VARC-2) definitions.

A.O. Cesare Biagio e Arrigo	Alessandria
Ospedali Riuniti	Bergamo
AOU S. Orsola	Bologna
Spedali Civili	Brescia
AO Brotzu	Cagliari
Osp Ferrarotto	Catania
Sant'Anna	Catanzaro
Careggi	Firenze
AOU San Martino	Genova
Città di Lecce (VMH)	Lecce
Monzino	Milano
Columbus	Milano
Sant'Ambrogio	Milano
Niguarda	Milano
San Donato	Milano
San Raffaele	Milano
Hesperia Hospital	Modena
AOUP Federico II	Napoli
Clinica Mediterranea	Napoli
Azienda Ospedaliera	Padova
Ospedale Maggiore	Parma
IRCCS Policlinico S. Matteo	Pavia
AOU Pisana	Pisa
San Camillo	Roma
Umberto I	Roma
Humanitas	Rozzano
Ospedale Le Scotte	Siena
Molinette	Torino
Ospedale S. Chiara	Trento
Ospedale Cattinara	Trieste
AOU S. Maria Misericordia	Udine
AOU Verona	Verona
Clinica S. Maria	Bari

Results. Mean age was 81.6 ± 6.2 and 1147 (60.2%) patients were female; 352 (18.5%) patients had at least one previous cardiac intervention, of which 49 (2.6%) underwent valve-in-valve TAVI. Mean Logistic EuroSCORE, EuroSCORE II and STS Score were 22.4 ± 14.6%, 7.3 ± 6.7% and 9.2 ± 7.6%, respectively. The procedural accesses were: trans-femoral, 1252 patients; trans-apical, 629; trans-aortic, 19; trans-axillary, 4. The reported mortality at 30 days (or longer if the patient was not discharged from the treatment hospital or a secondary convalescent facility) was 7.2%. Incidence of pacemaker implantation was 6.1%. Perioperative strokes were disabling in 18 (1.0%) and not-disabling in 36 (1.9%) patients. "Device success" rate was reported in 84.3% and "early safety (at 30-day)" 74.5%. At discharge mean trans-prosthetic gradient was 10.7 ± 4.5 mmHg. Incidence of post-operative mild, moderate or severe perivalvular leaks were respectively: 32.1%, 5.0% and 0.4%. Overall 1, 2 and 3 year survival was 84.5%, 76.4% and 68.2%, respectively.

Conclusions. TAVI with balloon expandable prosthesis provides good results in terms of early and mid-term outcomes and appears to be a safe and effective alternative treatment for patients who cannot undergo AVR. Incidence of pacemaker implantation is comparable to AVR. In this series incidence of perivalvular regurgitation remains significantly higher than in AVR.

C35

PACEMAKER DEPENDENCY FOLLOWING CARDIAC SURGERY PROCEDURES: A COMPREHENSIVE LONG-TERM POSTOPERATIVE EVALUATION OF 1158 IN-HOSPITAL IMPLANTS FROM A MULTICENTER ITALIAN EXPERIENCE

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Background. Permanent pacemaker (PPM) implantation is not commonly required after cardiac surgery, with a higher incidence in patients undergoing aortic valve replacement. However, few information is available on the postoperative PPM dependency. This multicenter retrospective study was designed to evaluate the PPM dependency at late follow-up.

Methods. Data on 11568 patients who had a PPM during hospitalization following cardiac surgery from 2000 to 2013 were retrospectively collected from 16 Italian cardiac surgery units and stored in a dedicated dataset. Follow-up was performed by direct visit, and PPM dependency was analyzed by ECG and pacemaker check during periodic examinations. The identification of potential predictors of PPM dependency at follow-up was evaluated with a multivariate logistic regression. **Results.** The mean age of the study group was 68.9±12.2 and 46.6% were female. Preoperative ECG showed first degree AV block in 11.0% of patients, left bundle branch block in 11.1%, right bundle branch block in 11.0%, Atrial fibrillation was present in 22.8% of the study group. Most of the patients underwent isolated aortic valve replacement (25.8%). Pacemakers were implanted after a median of 11 days following surgery. At follow-up, 43.6% of the patients did not displayed PPM dependency. The OR of right bundle branch block and mitral valve repair were respectively 1.801 (95%CI 1.053-3.081) and 1.812 (95%CI 1.051-3.125). The multivariate logistic regression demonstrated that only preoperative right bundle branch block (p=0.031) and mitral valve repair (p=0.032) were independent risk factor for PPM dependency at follow-up.

Conclusions. Pacemaker dependency is not present at follow-up in more than 40% of patients receiving the implant shortly after cardiac surgery. Wide variability of indications and PM implant timing are currently applied in routine practice highlighting the need of refinement and standardization of current guidelines based also on predictors of permanent conduction abnormalities.

Coronary 1

C36

PREOPERATIVE ANTI-PLATELET THERAPY AND POST-CABG BLEEDING: CAN ASPIRIN TEST RESPONSIVENESS GUIDE WITHDRAWAL DECISION-MAKING? PRELIMINARY EVALUATION

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Background. This pilot observational study compared post-operative bleeding rates between CABG patient groups under different anti-platelet protocols, also controlling for responsiveness to aspirin and adenosine-diphosphate (ADP) tests.

Methods. Eighty-one consecutive elective two-vessel or three-vessel coronary artery disease patients were prospectively included and divided into three groups: A, aspirin only (n=15); B, aspirin and clopidogrel (n=45); C, aspirin and ticagrelor (n=21). Anti-platelet therapy was withdrawn 5 days pre-operatively. Blood losses at 6, 12 and 24 hours postoperatively were compared among groups, stratifying for test responsiveness.

Results. There was no difference among groups in terms of operative characteristics (mean number of grafts: 2.4 ± 7 in group A, 2.2 ± 7 in group B, 2.2 ± 8 in group C; p=0.55). There was no significant difference in terms of bleeding between aspirin-responsive and aspirin-resistant group A patients. This difference was significant only at 6 hours in group B patients (280 ± 137 vs 441 ± 291 ml; p=0.03), with no difference at 12 and 24 hours. Group C patients showed significant differences in blood loss amounts at all three time-points according to aspirin test responsiveness (at 6 hours: 210 ± 121 vs 397 ± 186 ml, p=0.025; at 12 hours: 296 ± 139 vs 571 ± 215 ml, p=0.017; at 24 hours: 441 ± 180 vs 915 ± 388 ml, p=0.015). There was no significant difference in total bleeding between ADP-test responders and non-responders within both group B and group C. The percentage of ADP-test responders did not differ between group B and C.

Conclusions. This pilot study suggested that in patients under aspirin+ticagrelor, an aspirin-test can predict the amount of postoperative bleeding: this is not greater than with aspirin+clopidogrel if the patient is responder to the test, however it is as low as with aspirin alone if the patients show aspirin resistance. Given the present encouraging results even in a small population, prospective validation is warranted and ongoing.

C37

POLARIZING-MICROPLEGIA ENHANCES MYOCARDIAL PROTECTION IN DIABETICS UNDERGOING REVASCULARIZATION FOR UNSTABLE ANGINA

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Objective. Current techniques of cardioplegic arrest (CA) result in increased myocardial apoptosis and necrosis in the diabetics, especially when unstable angina (UA) increases the risk for ongoing ischemia and ischemia/reperfusion injury. No study investigated the effects of microplegia addition with polarizing-arresting substrates (MAPAS) in this setting.

Methods. Sixty UA-diabetics undergoing CABG were randomized to adenosine/lidocaine MAPAS (30 patients) or 4:1-Buckberg cardioplegia (30 patients; Buck-Group). Troponin-I and lactate were sampled from coronary sinus at reperfusion (T1), and from peripheral blood preoperatively (T0), at 6 (T2), 12 (T3) and 48 (T4) hours. Hemodynamic monitoring derived cardiac index (CI), left ventricular dP/dt, cardiac-cycle efficiency (CCE), indexed systemic vascular resistances (ISVR) and central venous pressure (CVP) preoperatively (T0), at ICU-arrival (T1), after 6 (T2) and 24 (T3) hours. Echocardiographic wall motion score index (WMSI) investigated the systolic function, E-wave (E), A-wave (A), E/A, peak early-diastolic TDI-mitral annular-velocity (Ea), E/Ea the perioperative diastolic function preoperatively (T0) and at 96 hours (T1).

Results. MAPAS attenuated troponin-I and lactate release at T1 ($p<0.001$); postoperative troponin-I values were lessened by MAPAS (between-groups p=0.001), with an improved overall hemodynamic profile (between-groups p=0.0001, p=0.002, 0.0001, 0.0001 for CI, CCE, dP/dt and peripheral lactate) at similar preload and afterload values (between-groups p=NS for ISVR and CVP). Systolic and diastolic function improved only in MAPAS-Group (T0 vs T1-$p\leq0.01$ for WMSI, E, A, E/A and Ea; p=NS in Buck-Group). Transfusions of red-packed cells and fresh-frozen plasma, ICU-stay and hospital-stay were all reduced by MAPAS ($p\leq0.0001$).

Conclusions. MAPAS improved myocardial protection in diabetics referred to CABG for UA.

C38

COMPUTATIONAL STUDY OF CORONARY ARTERY BYPASS GRAFTS

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Objective. The aim of this study is to better understand the fluid dynamics in coronary artery bypass grafts (CABGs) using computational fluid dynamics methods. A computational study is performed for some representative cases and quantities of clinical interest are computed.

Methods. A postoperative contrast-enhanced CT scan is acquired and a computational model of the coronary artery tree and the grafts is constructed. Internal mammary artery, radial artery and saphenous vein grafts are considered. Each patient was also compared to a healthy case, for which stenosis are artificially removed from the computation model. A finite element simulation on both computational models is performed. Finally, results are analyzed through visual inspection of the resulting flow patterns and the computation of fluid dynamics indicators such as wall shear stress and oscillatory shear index.

Results. A detailed study of the fluid dynamics is performed. We found that for each patient with severe stenosis the zones where wall shear stress and oscillatory shear index assumed high values were located upstream and downstream of the stenosis and near the anastomoses: these are the areas where intimal thickening may occur. In the healthy cases we found that the bypass can greatly worsen blood flow producing high oscillatory shear index values and perturbed flow confirming the current clinical practice that surgery is necessary only for high stenosis severity. A different behaviour between arterial and venous grafts is also highlighted.

Conclusions. The computational methodology has proven to be a useful tool in the analysis of haemodynamics in CABGs, providing in particular the possibility of comparing surgery in the patient's diseased coronary tree with a

(fictitious) healthy one. The proposed comparison is a first step towards a quantitative analysis of the influence of stenosis severity over surgical outcome.

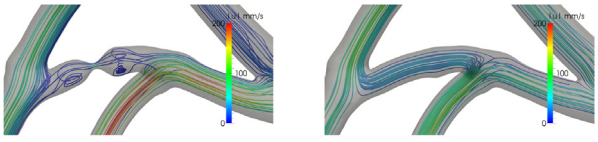

Figure 1. Comparison between the streamlines in diseased and healthy cases.

C39

MEDIUM TERM PATENCY OF CORONARY VENOUS AND ARTERIAL GRAFTS: ROLE OF BIOMARKERS

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Background. Graft failure is a common event after coronary artery bypass surgery not only in venous but also in arterial grafts. In this prospective study we assessed the role of clinical variables and of circulating biomarker levels in graft occlusion at mid term.

Methods. In this prospective, observational study 330 patients scheduled for elective coronary artery bypass surgery were enrolled from November 2006 to February 2010. Upon enrollment, patients underwent blood collection (before surgery and upon discharge from the hospital) and coronary bypass surgery. All patients were then contacted to undergo coronary CT scan 15 to 21 months after surgery. Univariate and multivariate analysis were performed to identify independent predictors for graft occlusion. Concerning multivariate logistic regression analysis three different models were assessed: a model assessing predictors of graft occlusion overall and two separate models assessing risk factors for arterial vein occlusion, respectively.

Results. One hundred seventy-nine patients (54%) underwent follow-up CT-scan. There were 46/503 (9.1%) occluded grafts for a total of 43 out of 179 (24%) patients who had at least one occluded graft. Logistic regression analysis identified D-dimer levels at baseline (OR=3.3, p<0.001), haptoglobin phenotype 11 (OR=4.2, p=0.009) and total protein content at discharge (OR=1.18, p=0.02) as independent predictors of overall graft occlusion at follow-up, along with lower body weight. Preoperative D-dimer levels and haptoglobin phenotype 11 were also independent predictors in multivariable models that were separately developed for arterial and venous graft occlusions, respectively.

Conclusions. In the coming years, biomarkers will definitely play a significant role in determining the risk of graft occlusion. In this study, we have identified two novel biomarkers that are associated with both arterial and venous graft occlusion. This may allow to stratify patients at risk and to identify new molecular targets to prevent this complication and to improve durability of coronary artery bypass surgery.

C40

INTRAOPERATIVE GRAFT VERIFICATION IN CORONARY SURGERY

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Objective. The aim of this study is to evaluate the added value of intraoperative high resolution epicardial ultrasonography (HR-ECUS) for improved graft patency verification. Transit-time flow measurement (TTFM) allows intraoperative functional assessment of grafts in coronary artery bypass grafting (CABG). The major limitation is the low specificity. Imaging assessment is supposed to increase specificity leading to higher diagnostic accuracy.

Methods. From November 2009 to September 2012, 333 patients underwent isolated CABG. A total number of 717 grafts were performed; all the grafts were intra-operatively verified by means of both TTFM and HR-ECUS.

Results. After TTFM evaluation 39 (5.4%) grafts were classified as "likely dysfunctioning" and 678 (94.5%) grafts as "likely functioning". At HR-ECUS analysis 37 (5.1%) grafts initially considered as failing were reclassified as functioning grafts (false positives). Therefore the rate of dysfunctioning grafts significantly decreased from 5.4% after TTFM evaluation alone to 0.3% adding HR-ECUS verification (p<0.001). Three out of 678 "likely functioning" grafts at TTFM (0.4%) were reclassified as failing by means of HR-ECUS (false negatives). Six (1.1%) patients (8 grafts) were reoperated within first 12 postoperative months after first procedure. The use of TTFM and HR-ECUS led to an increased specificity of intraoperative graft verification procedure up to 94.7%. The failure rate of true prediction using HR-ECUS decreased significantly across the periods: November 2009-December 2010: 2.2%; January 2011-December 2011: 1.3%; January 2012-September 2012: 0 (p=0.040).

Conclusions. HR-ECUS should be considered as complimentary to TTFM. Simultaneous use of the two methods during CABG provides morphological and functional information pushing diagnostic accuracy of intraoperative graft verification procedure close to 100%.

C41

ROUTINE USE OF BILATERAL INTERNAL THORACIC ARTERY GRAFTS FOR LEFT-SIDED MYOCARDIAL REVASCULARIZATION: THE IMPACT OF DIABETES ON EARLY OUTCOMES

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Background. Increased risk of sternal complications limits the use of bilateral internal thoracic artery (BITA) grafts for myocardial revascularization, particularly in diabetic patients. In the present study, the authors' experience in the routine use of BITA grafts was reviewed. The focus was placed on the impact of diabetes on early outcomes.

Methods. Among the 4160 consecutive patients with multivessel coronary artery disease who underwent isolated coronary bypass surgery at the authors' Institution from 1999 throughout 2013, BITA grafts were used for left-sided myocardial revascularization in 2936 (70.6%) patients, 865 (29.5%) diabetic and 2071 (70.5%) non-diabetic. The two groups were compared according to preoperative risk profiles, operative data, early mortality, perioperative complications, and length of hospital stay.

Results. Risk profiles of diabetic patients were superior to those of non-diabetic patients mainly due to higher mean age (67.3 ± 8.4 vs 65.9 ± 9.2 years, p<0.001), rates of severe renal impairment (14.7% vs 11.5%, p=0.017), extracardiac arteriopathy (20.5% vs 9.9%, p<0.001), and left ventricular dysfunction (32.8% vs 24.7%, p<0.001). Between the two groups of patients there were no differences in the mean number of coronary anastomoses (3.8 ± 1.0 vs 3.7 ± 1.1, p=0.248) and hospital mortality (2.1% vs 1.9%, p=0.718). Age >75 years (p=0.011), chronic lung disease (p=0.016), severe renal impairment (p=0.006), dialysis (p=0.016), and prolonged (>120 min) cardiopulmonary bypass (p=0.003) were predictors of hospital death. Prolonged (>48 h) mechanical ventilation (10.4% vs 7.7%, p=0.018), the use of packed red blood cells (40.8% vs 36.2%, p=0.018), and deep sternal wound infection (DSWI, 7.3% vs 3.6%, p<0.001) were more common in diabetic patients. A preoperative scoring system to predict DSWI was generated. The median hospital stay was longer in diabetic patients (10 vs 9 days, p<0.001).

Conclusions. BITA grafts may be routinely used even in diabetic patients despite higher risk profiles. The increased postoperative complications prolong hospital stay but do not impact on early mortality.

C42

ENDOSCOPIC VEIN HARVEST: A VALID ALTERNATIVE TO THE OPEN TECHNIQUE

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Background. The internal mammary artery remains the primary conduit for myocardial revascularization. However, saphenous vein continues to be largely used in specific clinical and anatomical conditions. Endoscopic saphenous vein harvest (EVH) is widely used as an alternative to open harvest and seems associated with decreased wound complications, improved patient satisfaction, shorter hospital stay, and reduced postoperative pain.

Methods. From January 2006 to March 2014, 854 patients (70 ± 9 years) were submitted to EVH for myocardial revascularization. We reviewed our experience in EVH in order to highlight the technical aspects, outcomes and concerns.

Results. The patients' principal co-morbidities were diabetes (43%), hypertension (74%), peripheral vascular disease (31%). Their mean body mass index was 27 ± 4 kg/m^2. 33% had a main left coronary artery significant stenosis and 81% had three vessel coronary disease. The grafts were harvested mainly from the thigh (93%). Occasionally, the leg vein was harvested (0.7%) and in 54 cases (6.3%) multiple harvests were performed. The mean length of grafts harvested was 42 ± 7 cm. The mean harvesting time was 53 ± 20 min. The mean number of repair needed for graft was 2 ± 2. In 10 cases, conversion to open technique was required, but in 5 it was not dependent on EVH. The 30-day mortality was 2.2% (19 patients). Death was never caused by early venous occlusion. The median length of stay was 9 days. We noticed only one infection of the skin incision (0.11%).

Conclusions. In our experience, tEVH is a reliable method; the harvested veins are of good quality and their length appropriate to the needs of revascularization. Complications related to the technique are minimal and the benefits considerable both in psychological and clinical aspects. However, long-term patency of grafts remains an open question that can be addressed only by longitudinal studies.

C43

MULTIVESSEL BYPASS GRAFTING WITH OR WITHOUT CARDIOPULMONARY BYPASS: 15-YEAR FOLLOW-UP IN A PROPENSITY MATCHED COHORT

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Background. The aim of this study was to evaluate very long-term results of off-pump coronary bypass (OPCAB) versus on-pump (ONCAB).

Methods. From November 1994 to December 2001, 2914 patients undergoing isolated coronary artery bypass (CAB) for grafting 2 or 3 territories. A cohort of 1922 (66%) patients has been selected using propensity-score (961 each group). The propensity-matched groups were comparable. Median follow-up was 176 months. Deaths, new revascularizations, new myocardial infarctions were considered as events.
Results. Thirty-day mortality was 1.4% in OPCAB vs 3.2% in ONCAB (p=0.010); 15-year survival was 87.4 ± 1.2 OPCAB vs 82.3 ± 1.3 ONCAB (p=0.002); 15-year event-free survival was 83.0 ± 1.3 OPCAB vs 76.7 ± 1.4 ONCAB (p=0.001). To reduce the impact of first-month outcome due to different surgical approach, deaths occurring within the first 30 days were excluded: 15-year survival was 88.6 ± 1.1 OPCAB vs 85.4 ± 1.2 ONCAB (p=0.040); 15-year event-free survival was 84.1 ± 1.2 OPCAB vs 79.5 ± 1.4 ONCAB (p=0.020). These findings were confirmed also at multivariate analysis. Cumulative incidence of new revascularization at 15-year follow-up was 5% OPCAB vs 5.5% ONCAB (p=0.711); considering only new revascularization on a grafted area: 3.7% OPCAB vs 3.1% ONCAB (p=0.550).
Conclusions. OPCAB seems to provide clinical beneficial not only in early postoperative period but also in very long-term follow-up, without paying the price of a higher revascularization failure. This result is likely due to a dedicated team, expert in OPCAB surgery, in a historical cohort of patients, applying always the quality control of the anastomoses.

C44

COMPLETE MYOCARDIAL REVASCULARIZATION WITHOUT CARDIOPULMONARY BYPASS AND THROUGH A MINISTERNOTOMY

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Background. We describe our experience using a minimally invasive approach in coronary artery bypass grafting, without cardiopulmonary bypass.
Methods. From June 2013 to April 2014, 95 consecutive patients underwent minimally invasive bypass surgery. Mean age was 62.7 ± 9.3 years and 68 patients were male. Thirty-five patients have had a recent myocardial infarction and mean ejection fraction was 47.3%. After a 9-14 cm longitudinal median skin incision, a left reversed "J-shaped" or a "T-shaped" ministernotomy from the second intercostal space to the xiphoid cartilage were performed in 81 patients and 14 patients, respectively. "J-shaped" approach was preferred in case of left internal thoracic artery (ITA) harvesting, while "T-shaped" approach when required the right ITA too.
Results. Six patients (6.1%) had a single graft on the left anterior descending artery (LAD), 32 (33.3%) had a double graft on the LAD and the right coronary or diagonal or obtuse marginal (OM) branches, 40 (42.4%) had a triple graft and 17 (18.2%) had a quadruple or quintuple graft. Two patients (2.1%) needed conversion to total sternotomy due to the difficult access to the OM arteries. Conversion to on-pump surgery due to hemodynamic instability was necessary in one patient. Intraoperative assessment of graft flow by transit-time flow measurement was performed: mean flow >20.2 ml/min and a pulsatility index <2.8 were achieved in all patients. Operative mortality was 0%. No patients had postoperative troponin elevation. All patients were transferred from the intensive care unit within 24 hours and two patients required soft tissue wound revisions.
Conclusions. Through a ministernotomy approach, all coronary arteries can be revascularized safely off-pump, without compromising the accuracy of the anastomosis. We believe that ministernotomy results in a less painful incision and the ease of conversion to conventional surgery make this technique preferable to the antero-lateral approach.

C45

SCORING SYSTEM TO GUIDE DECISION MAKING FOR THE USE OF BILATERAL INTERNAL MAMMARY ARTERIES: THE BIMA SCORE

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Background. Decision making for the use of bilateral internal mammary artery (BIMA) over single internal mammary artery (SIMA) grafting in coronary artery bypass surgery has traditionally been an area free from a compelling evidence base. We developed and validate a scoring system to predict whether the survival benefit from BIMA outweighs the increased risk for deep sternal wound infection (DSWI).
Methods. The study population consisted of 5275 patients of which a total of 973 (18.4%) received BIMA and the remaining 4302 (81.6%) underwent conventional strategy using SIMA. Fast backward elimination on predictors was performed using Lawless and Singhal method. BIMA score was reported as a partial nomogram that can be used to manually obtain predicted individual risk of DSWI and 10 year survival probability from the regression models. Bootstrapping validation of the regression models was performed.
Results. A total of 177 patients experienced DSWI (3.3%) (BIMA=44, SIMA=133). A total of 505 late deaths were recorded (BIMA=42, SIMA=931). BIMA was found to have effect on both risk of DSWI and 10 year survival probability and was included into partial nomograms. Bootstrapping validation confirmed a good discriminative power of the models.
Conclusions. The present BIMA score provides an impartial assessment of the decision making process for clinicians to establish the optimum revascularization strategy for individual patients.

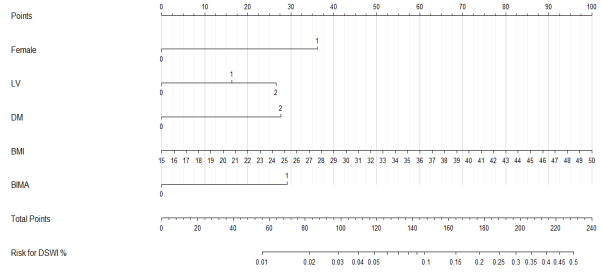

Figure. Nomogram for predicting risk of deep sternal wound infection (DSWI).
BMI, body mass index; BIMA, bilateral internal mammary arteries; DM, diabetes mellitus on insulin.
Female=1 *36 points*
LV=1(moderate) *16 points*
LV=2 (poor) *27 points*
DM=2 (diabetes on insulin) *28 points*
BIMA=1 *29 points*

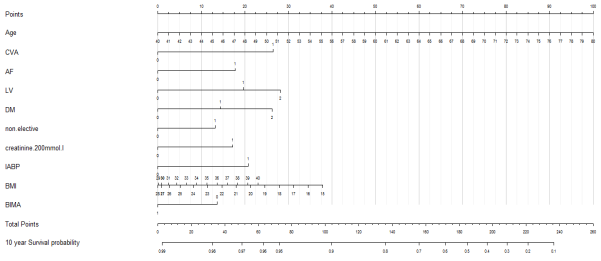

Figure. Nomogram for predicting 10 year survival probability.
CVA, cerebrovascular accident; AF, atrial fibrillation; LV, left ventricular function; DM, diabetes mellitus; IABP, intraaortic balloon pump; BMI, body mass index; BIMA, bilateral internal mammary arteries.
non elective=1 *13 points*, creatinine ≥200 mmol/l=1 17 points, CVA=1 *26 points*, AF=1 *18 points*, LV=1 (moderate) *20 points*, LV=2 (poor) *28 points*, DM=1 (diabetes on oral therapy) *14 points*, DM=2 (diabetes on insulin) *26 points*, IABP=1 *21 points*, BIMA=0 BIMA not used *14 points*.

Aortic valve 1

C46

TISSUE ENGINEERING OF HEART VALVES – IN VITRO EXPANSION OF ENDOTHELIAL CELL BY DIFFERENT VESSELS REVEALS THE BETTER AUTOLOGOUS CELLULAR SOURCE FOR TISSUE REPLACEMENT

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Background. Consistent expansion of primary human endothelial cells in vitro is critical in the development of engineered tissue. A variety of complex culture media and techniques developed from different basal media have been reported with alternate success. Incongruous results are further confounded by donor-to-donor variability and cellular source of derivation. Our results demonstrate the overcome of these limitations using soluble CD54 (sCD54) as additive to conventional culture medium.
Methods. Isolated primary fragment of different vessel types were expanded in Ham's F12 DMEM, enriched with growth factors, foetal calf serum and conditioned medium of human umbilical vein endothelial cells (HUVEC) collected at different passages. Cytokines content of culture media were analysed in order to identify the soluble factors correlating with better proliferation profile.
Results. sCD54 was found to induce the in vitro expansion of human endothelial cells (HEC) independently from the vessels source and even in the absence of HUVEC-conditioned medium. The HECs cultivated in presence of sCD54 (50ng/ml), resulted positive for the expression of CD146 and negative for CD45, and lower fibroblast contamination. Cells were capable to proliferate with an S phase of 25%, to produce VFGF (10 ng/ml) and to give origin to vessel-like tubule in vitro.
Conclusions. Our results demonstrate that sCD54 is essential factor for the in-vitro expansion of HEC without donor and vessels-source variability. Resulting primary cultures can be useful, for tissue engineering in regenerative medicine (e.g. artificial micro tissue generation, coating artificial heart valve etc.) and bio-nanotechnology applications.

C47

BICUSPID AORTIC VALVE DISEASE IN 600 PATIENTS: SINGLE CENTRE EXPERIENCE

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Objective. Bicuspid aortic valve (BAV) has many phenotypic expressions in terms of ascending aorta dilatation. The aim of our retrospective study is to recognize the population with BAV at risk of aortic event and to define the timing of surgery.

Methods. From January 2002 through January 2013, 600 patients (465 male) with BAV underwent cardiac surgery. Twenty-two of them were reoperations and nineteen was affected from endocarditis. Mean age was 56.9 ± 14.7 years. Principal indication for surgery was aortic valve insufficiency associated with aneurysm of ascending aorta (29.8%),while in patients undergoing isolated aortic valve replacement, aortic valve stenosis was the cause of most frequently detected. Bentall operation was performed in 58.8% of cases, aortic valve replacement (AVR) in 28.3% and AVR plus ascending aorta replacement in 8.5%. In less cases sparing procedures and cusps repairs were performed. Anatomic and histological data as well as clinical records were analyzed.

Results. Hospital mortality was 1.3% (8 patients) and major complications occurred in 14.8% of the population. Patients with isolated valvulopathy had diameters of ascending aorta and of aortic root lower compared with patients who underwent surgery of ascending aorta. There were no differences between two groups in hospital mortality and morbidity. At follow-up mortality was 5.4%, while freedom from reoperations was 98.7, 97.2 and 94.6% at 1, 2 and 5 years, respectively. Histological analysis confirmed that younger patients had more aggressive aortopathy.

Conclusions. Patients with BAV and dilatation of ascending aorta were younger compared with patients with isolated valvulopathy. This is corroborated by histology. Aggressive surgery could be justified in this young population.

C48

AORTIC VALVE REPAIR: OUR 10-YEAR EXPERIENCE

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Objective. Optimal hemodynamic conditions, absence of prosthetic material, no need of anticoagulation and normal annulus growth in young people made aortic valve repair a good alternative to valve replacement. In the last years, a good standardization level in aortic valvuloplasty techniques has been reached so it is time to analyze the medium and long-term results. We present our experience in terms of freedom from significant aortic valve regurgitation and reoperation.

Methods. We prospectively identified 235 patients who underwent, from January 2003 to January 2013, an aortic valve repair procedure because of insufficiency due to leaflet pathology or root dilation. We considered eligible in this study 218 patients. They were submitted to pre- and post-operative trans-thoracic and trans-esophageal echocardiography and periodically contacted for echocardiographic and clinical follow-up.

Results. Mean cross clamp time was 101.94 ± 40.22 minutes and mean hospital stay was 10 ± 6.69 days. 8 patients (3.40%) died before discharge. Median echocardiographic and clinical follow-up was 1075.00 [515.25-1975.25] days. Kaplan-Meier freedom from aortic regurgitation >2 and from aortic valve replacement were respectively 92.9 ± 2.8% and 94.5 ± 2.5% at 9.24 years; 6 patients (2.75%) were reoperated with aortic valve replacement for severe aortic valve regurgitation. We highlighted a positive effect of aortic valvuloplasty on the left ventricle: the end diastolic volume decreased from 137.89 ± 50.23 ml in the pre-op to 105.17 ± 31.19 ml at the follow-up time.

Conclusions. A deep comprehension of the aortic root anatomy and of the pathogenetic mechanisms at the base of the aortic regurgitation led to very good long-term results in aortic valve repair, making it a good and feasible option for selected patients both alone or associated with an aortic valve sparing technique.

C49

AORTIC VALVE REPLACEMENT WITH SMALLER PROSTHESES: FACTORS DETERMINING A SUBOPTIMAL HEMODYNAMIC PERFORMANCE

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Background. The impact of patient-prosthesis mismatch (PPM) after aortic valve replacement (AVR) on short- and long-term mortality remains controversial. The objective of this study was to evaluate the incidence and severity of PPM in a large cohort of patients treated with stented biological AVR in a single institution.

Methods. We analyzed retrospectively data of 1600 consecutive patients with aortic stenosis (AS) undergoing isolated stented biological AVR with 19, 21 and 23 mm prosthesis between October 2004 and October 2013. PPM was defined as an indexed effective-orifice-area ≤0.85 cm^2/m^2. In our data, 61 patients (24%) received a 19 mm, 99 (39%) a 21 mm and 90 (36%) a 23 mm. The mean age was 72 ± 9 years. Based on mid-term echocardiographic data, we identified which patient had real higher-peak-gradient (PG) and mean gradient (MG) for each model and size of bioprosthesis, based on threshold values described on AES guidelines for the bioprosthetic evaluation.

Results. The median echocardiographic follow-up was 526 days. The expected-PPM was 5.0% and moderate 25%. Instead the frequency of higher MG and PG value was 21% and 43%, respectively. We observed that expected moderate or severe PPM was not a predictor factor for real higher post-operative gradient and a predictor of EOA reduction. BSA, pre-operative EF and bioprosthesis size were the parameters associated with a higher MG at mid-term echocardiographic follow-up.

Conclusions. Our study suggests that higher post-operative MG is not correlated with expected PPM based on BSA. There are other factors that affect the hemodynamic performance of bioprosthetic valves.

C50

CLINICAL OUTCOMES IN HIGH-RISK PATIENTS WITH SEVERE AORTIC VALVE STENOSIS UNDERGOING DIFFERENT TREATMENT STRATEGIES: A SINGLE-CENTER EXPERIENCE

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Background. We investigated clinical outcomes in high-risk patients with severe aortic valve stenosis (AVS) undergoing surgical aortic valve replacement (SAVR), trans-catheter aortic valve implantation (TAVI) or balloon aortic valvuloplasty (BAV).

Methods. This is a prospective observational single-center study. Patients referred to our Institution from March 2010 to March 2014 with symptomatic severe AVS were selected for TAVI if at high-risk (EuroSCORE ≥20%) or having contra-indications to surgery. Critical and inoperable patients underwent BAV first. SAVR group includes patients >80 years old. Clinical outcomes after 1 and 12 months are reported.

Results. A total of 213 patients were included. Of these, 101 patients underwent TAVI, 20 BAV (12 as stand-alone treatment, and 8 as bridge-to-TAVI), and 100 SAVR. Logistic EuroSCORE was lower in the SAVR group, compared to the TAVI and BAV (11.6 ± 6.7% vs 27.9 ± 19.4% and 35.5 ± 22.4, p<0.001). Procedural success after SAVR, TAVI and BAV was achieved in 98%, 97% and 95%, respectively. Death for any cause and stroke at 30 days occurred in 2%, 3% and 10% (p=0.21), and 1%, 3% and 5% (p=0.43). Bleeding complications at 30 days were 19%, 17.8% and 20% (p=0.95). Overall survival at one year was 92.1% after SAVR, 89.7% after TAVI and 60% in BAV patients who did not undergo TAVI (p=0.009). Stroke at one year occurred in 1.6%, 6.7% and 10% (p=0.18), in the SAVR, TAVI, and BAV group.

Conclusions. Clinical outcomes here observed show the excellent survival rate of different treatment strategies as decided by the Heart Team, according to the patients' risk profile. Indeed, despite the much higher risk of the TAVI group, one-year survival was similar to that of surgery in low-risk patients. BAV is a reasonable option for critical patients. A Heart Team assessment of the treatment strategy is desirable to offer the most suited therapy in old patients with AVS.

C51

MINIMALLY INVASIVE MITRAL AND AORTIC VALVE SURGERY THROUGH RIGHT ANTERIOR MINITHORACOTOMY

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Background. Minimally invasive surgery for either mitral or aortic valve surgery through right anterior minithoracotomy (RT) has shown excellent results in terms of mortality, morbidity and patient satisfaction. However, no study has described the combined minimally invasive mitral and aortic surgery (MIMAS) through RT. Aim of our study was to report early outcomes in patients undergoing MIMAS through RT.

Methods. From October 2005 to December 2012, 18 patients underwent MIMAS through RT. Additional procedures were: tricuspid valve repair (n=5) patients, atrial fibrillation surgery (n=5) and miectomy (n=1). A 7-8 cm skin incision was performed through the 3rd intercostal space. Cardiopulmonary bypass was achieved by direct ascending aortic cannulation and percutaneous femoral vein drainage into right atrium.

Results. No death occurred. Mean age was 66 ± 12, 12 patients (70%) were female and the median EuroSCORE was 7 (interquartile [IQ] range 3-12). The mean cardiopulmonary bypass and cross clamp time were 166 ± 41 min and 126 ± 29 min, respectively. No patient required a conversion to standard sternotomy. The median ventilation time was 7 hours (IQ range 5-16), as well as the median for intensive care unit and hospital stay was 1 day (IQ range 1-1) and 6 (IQ range 5-9). One patient had a postoperative stroke, another patient required blood transfusion and incidence of postoperative atrial fibrillation was 22% (n=4).

Conclusions. Minimally invasive mitral and aortic surgery through RT is a safe procedure associated with excellent early outcomes. More studies are required to validate our data.

C52

PREDICTORS OF PROLONGED INTENSIVE CARE UNIT STAY IN PATIENTS UNDERGOING MINIMALLY INVASIVE RIGHT THORACOTOMY VALVE SURGERY: A SINGLE INSTITUTION ANALYSIS WITH 2272 PATIENTS

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Background. To investigate preoperative variables that are independent risk factors for a prolonged ICU stay for patients undergoing minimally invasive valve surgery through a right thoracotomy.

Methods. This is a retrospective data of prospectively collected data. From 2005, 2272 consecutive adult patients (age 68 ± 11; female 1101) underwent right minithoracotomy valve surgery at our institution Mitral procedure was performed in 1594 patients (repair in 1116 70%; replacement in 478 30%) and aortic valve replacement in 678 patients. ICU stay was registered and 49 preoperative variables were collected for analysis. Prolonged ICU was defined as more than 3 days stay.

Results. In-hospital mortality was 1.1%. Prolonged ICU stay was observed in 213 patients (9.3%).At multivariable analysis eight independent preoperative predictors of prolonged ICU stay were identified: age at surgery >80 years, New York Heart Association class, chronic kidney disease, extracardiac arterial disease, active endocarditis, cardiogenic shock, non-elective procedures and redo surgery. The individual effect of every predictor on ICU stay was quantified and used to calculate a patient's risk of having an extended ICU stay. The model showed good calibration and excellent discriminative ability in predicting ICU stay >3 days (*C*-statistic of 0.75).

Conclusions. Eight independent preoperative risk factors for a prolonged ICU stay following right thoracotomy valve surgery were identified. Using this risk model, one can predict whether a patient will have a prolonged ICU stay or not. The knowledge of risk factors may facilitate organizational procedures and rational bed management.

C53

HEMODYNAMIC PERFORMANCE OF THE AORTIC VALVE LATE AFTER DAVID I: AN ECHOCARDIOGRAPHIC STUDY

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Background. Despite optimal hemodynamics at rest, the performance of the aortic valve under stress conditions late after David I is still debated.

Methods. From 2001 to 2014, 70 patients underwent reimplantation with David I technique. Aortic valve function of 13 patients (age 61.2 ± 8.72) with a follow-up of at least 5 years (6.3 ± 0.9 years) was assessed at exercise echocardiographic stress test on a stationary cycle. Patients with recurrent aortic insufficiency and/or mitral valve incompetence were excluded.

Results. At rest, EOA was 3.1 ± 0.7 cm^2 (EOAi 1.6 ± 0.3 cm^2/m^2) whereas peak and mean gradients were 12.3 ± 4.2 mmHg and 6.1 ± 2.2 mmHg, respectively. Transvalvular gradients and velocities progressively increased during the steps (p within<0.001 for all variables), with a peak at 75W (peak gradient 23.8 ± 9.3 mmHg; mean gradient 13.2 ± 5.1 mmHg; Vmax 2.4 ± 0.5 m/s; Vmean 1.7 ± 0.3 m/s) and recovered at the end of the test (p=NS vs baseline). On the contrary, EOA progressively decreased to a nadir of 2.8 ± 0.8 cm^2 at maximal physical stress (EOAi 1.4 ± 0.4 cm^2/m^2) and recovered to similar rest values at the end of the test.

Conclusions. David I procedure ensures good hemodynamics during high-flow conditions at mid and long-term follow-up. Reimplantation of the functional aortic annulus inside a rigid tube determines a paradoxical reduction of functional aortic valve area, secondary to the increased stroke volume, without any clinically relevant increase in transvalvular gradients. These data confirm the reliability of David I at long term.

C54

TRANSAPICAL AORTIC VALVE IMPLANTATION: RISK ASSESSMENT WITH THE EUROSCORE-II MODEL IN 679 PATIENTS AND IMPLICATION FOR PATIENT SELECTION

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Objective. The EuroSCORE-II model has recently been introduced and validated for accurate risk assessment in cardiac surgery. This study sought to investigate whether EuroSCORE-II is a more reliable tool for risk evaluation in transcatheter aortic valve implantation (TAVI) in comparison to older risk estimators.

Methods. Since 2008, 679 patients underwent transapical TAVI. The mean estimated risk for surgery was: EuroSCORE-II 16 ± 16% (range 1-95%), logistic EuroSCORE 35 ± 22% (2-97%), and the Society of Thoracic Surgeons predicted risk of mortality (STS-PROM) 14 ± 12% (1-90%). Discrimination ability and calibration of these scores were investigated with receiver-operating-characteristic-curve, Hosmer-Lemeshow test, and Brier score. According to allocation in quartiles of EuroSCORE-II, 4 equal subgroups were defined with low, intermediate, high, and very high surgical risk.

Results. The overall 30-day mortality rate was 4.7% (32/679) and 4.0% (26/642) in patients without cardiogenic shock. EuroSCORE-II showed a better discrimination (area under the curve 0.669) compared to other scores but was not well calibrated. The analysis per EuroSCORE-II quartiles showed a good prediction of 30-day outcome for low risk patients (observed to expected mortality [O/E-ratio]=1.1), but a marked overestimation for intermediate (O/E-ratio=0.18), high (O/E-ratio=0.36) and very high (O/E-ratio=0.22) risk patients. The cumulative survival up to 5 years was dependent on EuroSCORE-II risk quartile (hazard ratio 1.54, 95%-confidence interval 1.35-1.77, p<0.001).

Conclusions. There is no different outcome between TAVI and surgical valve replacement in patients with low risk profile (EuroSCORE-II ≤5%). For all patients with higher surgical risk, the outcome after TAVI is superior. Although EuroSCORE-II has not been developed from TAVI data, the score characterizes patient comorbidities and provides most valuable additional information in TAVI risk assessment.

Mitral valve 1

C55

OSTEOPROTEGERIN IS EXPRESSED AT HIGH CONCENTRATION IN PATIENTS WITH MITRAL VALVE PROLAPSE

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Background. Osteoprotegerin (OPG) is a secretory glycoprotein of the tumor necrosis factor receptor superfamily and is involved in the calcification processes through the OPG/RANK/RANKL axis. Interestingly, OPG has the capability to interact with another molecule (TRAIL) that is related with apoptosis and matrix-degrading metalloproteinase (MMP) regulation. In this study we aim to investigate OPG levels in patients with mitral valve prolapse (MVP), a syndrome characterized by MMP deregulation.

Methods. In all surgical patients blood collection was performed one day before and six month after the surgery while fasting. OPG plasma levels were determined in 115 patients (42 CABG [coronary aortic bypass graft]; 28 AVR [aortic valve replacement]; 45 MVR [mitral valve repair]) and from 29 healthy subjects by an immunological method. Statistical analysis was carried out using general linear models, adjusting for age and sex.

Results. At baseline OPG levels did not show any difference among healthy subjects, CABG and AVR patients. Interestingly, patients undergoing MVR had pre-operative OPG levels significantly upregulated (p<0.0001) when compared to controls. Six months after surgery OPG levels did not show any upregulation nor downregulation when compared with the respective baseline, but the MVR patients kept higher OPG levels when compared with CABG and AVR patients (p<0.0001).

Conclusions. Circulating osteoprotegerin levels has been studied in several cardiovascular diseases but no correlations have been shown with MVP. In this study, we demonstrate a pre-operative OPG upregulation in candidates for MVR. Moreover, OPG levels did not show any down or upregulation six months after surgery. Further studies are necessary to elucidate the role of OPG in MVP and to prove a direct link between OPN and MMP regulation.

C56

CHANGES IN MITRAL ANNULUS DYNAMICS AND LEFT VENTRICULAR CHAMBER VOLUMES AFTER MITRAL VALVE REPAIR WITH RIGID AND FLEXIBLE RINGS. A PROSPECTIVE THREE-DIMENSIONAL TRANSTHORACIC ECHOCARDIOGRAPHIC STUDY

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Background. The aim of this single center, prospective study was to evaluate the impact of mitral ring implantation on the dynamics of mitral annulus and on the morpho-functional variations of left cardiac chambers during cardiac cycle.

Methods. We analyzed data from 33 consecutive patients suffering from degenerative mitral regurgitation, who underwent surgery for mitral valve repair with prosthetic ring implantation using either the rigid St. Jude Saddle ring (Group R) or the flexible Medtronic Duran Ancore ring (Group F). All patients underwent real-time three-dimensional trans-thoracic echocardiographic evaluation before surgery, at discharge and 6 months after the operation.

Results. The rigid rings and the flexible rings were implanted in 16 (48.5%) and in 17 (51.5%) patients, respectively. Patients belonging to group R were more likely to have lower ejection fraction (LVEF) (59.5% vs 65%, p=0.04) and to have higher end-systolic ventricular volumes (38.1 vs 25.2 mm, p=0.05). There were no other significant baseline differences between groups. We observed a mean systolic reduction of 11.3 ± 9.2% of the mitral annulus area in group F whereas only 1.2 ± 1.1% reduction was measured in group R. Looking at follow-up data, in group F we observed a significant reduction of left atrial volume (LAVi) (60 ± 16.6 vs 38.8 ± 2.6 ml/m^2, p=0.003), left ventricular end-diastolic volume (82.1 ± 17.2 vs 67.4 ± 12.1 ml/m^2, p=0.01) and LVEF (65.6 ± 6.5% vs 61.2 ± 4.6%, p=0.003). On the other hand in group R we found a significant reduction of LVEF (59.5 ± 11.7% vs 54.9 ± 10.7, p=0.012) and of LAVi (63 ± 15.5 vs 61.9 ± 15.7 ml/m^2, p=0.02) and an

increase of left-ventricular systolic volume (38.1 ± 20.7 vs 42.3 ± 22.6 ml/m², p=0.04).
Conclusions. According to our data, the flexible mitral prosthetic ring preserves the physiologic sphincteric motion of mitral annulus during cardiac cycle. After 6 months both rings provide left cardiac chamber remodeling.

C57

MITRAL VALVE REPAIR FOR DEGENERATIVE DISEASE: PREDICTORS FOR LATE OUTCOME

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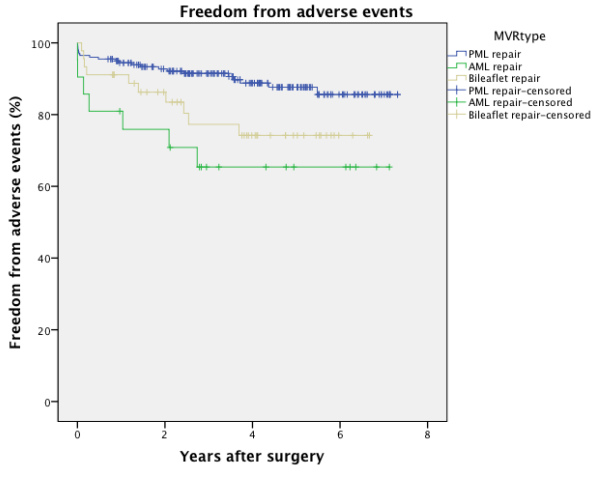
Background. Mitral valve repair is the treatment of choice for degenerative disease. Identify predictors for outcome following mitral valve repair for degenerative disease can contribute to improve the surgical results.
Methods. We identified 269 consecutive patients who underwent mitral valve repair for degenerative disease between December 2006 and July 2013. We examined clinical and echocardiographic outcomes. Follow-up was completed at a mean of 3.91 ± 1.89 years after surgery. We used Cox's regression analysis to identify features leading to an adverse outcome.
Results. 128 underwent isolated repair and 141 underwent combined procedures. 8% underwent repair of anterior leaflet repair, 74% the posterior leaflet, 17% bi-leaflet and 1.5% isolated ring annuloplasty. Overall and cardiac mortality was 5.94% and 5.20% respectively. In-hospital mortality was 1.56% for isolated, and 2.84% for combined procedures. 16 patients underwent reoperation – 5 for progression of disease, 1 for endocarditis and 10 for recurrence of regurgitation. The Kaplan-Meier estimates for cardiac survival at 7.31 years was 94.8%. Freedom from reoperation was 94.1%; freedom from moderate or worse mitral regurgitation at 5.32 years was 95.7%. Freedom from any adverse events (cardiac death, reoperation or recurrence of mitral regurgitation) for anterior, posterior and bi-leaflet repair leaflet was 66.7%, 89.4% and 77.8% respectively. Cox regression analysis showed repair of the anterior leaflet and use of artificial chordae to be significant independent risk factors for having an adverse event (HR 2.984, p=0.006; HR7.434, p<0.001).
Conclusions. Mitral valve repair for degenerative disease carries multiple benefits when compared to replacement. Although posterior leaflet repair is frequently curative, anterior leaflet repair carries an increased risk of late failure. Durable repair of all leaflets can be challenging but represents opportunities for improvement.



C58

SINGLE-SIZE MITRAL RING ACCORDING TO PATHOLOGY IS EFFECTIVE, REPRODUCIBLE AND ECONOMIC

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Background. Mitral ring has minimal length variability. Ten centimeters is its average. A single-size annuloplasty band would simplify the surgical repair in mitral regurgitation (MR). At our center MR is corrected using a single-sized PTFE band varying according to the valve pathology rather than valve or patient size. We use a partial ring placed from trigone to trigone. After all the sutures have been placed, we measure the remaining length of the intertrigone segment and we choose a band length which added to the measured intertrigone segment will give the following circumferences: in ischemic MR = 9 cm and in FED MR = 10 cm. We present our experience in the treatment of MR using this pathology-size band selection.
Methods. From February 2012 to January 2014 in 114 patients MR was corrected by a posterior trigone-to-trigone PTFE band implantation. The chosen band sizes + intertrigone distances were: in 42 ischemic MR (group I) 9 cm and in 72 FED MR (group II) 10 cm. Mean age was 66 ± 11 years and 44% were women, mean EF was 49 ± 10%. MR 4+ was present in 65%.
Results. No operative death occurred. In 57% of the patients a prolapsed posterior leaflet was corrected. At discharge none patient had MR >1+ (preoperative mean MR 3.6 vs 0.13 postoperatively) and we detected a mean valve area of 2.5 ± 0.5 cm². At short-term follow-up only 2 patients presented a new MR 1+.
Conclusions. Pathology-sized band mitral annuloplasty proved to be effective and reproducible. Moreover it is a fast and economic technique. In FED MR minor anterior leaflet prolapse can be corrected simply by this annuloplasty having some degree of favorable restriction. Long-term follow-up is needed to clarify the role of this attractive mitral annuloplasty technique.

C59

DIRECT AORTIC CANNULATION WITH ENDODIRECT FOR MINIMALLY INVASIVE MITRAL VALVE SURGERY

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Background. Endodirect aortic cannulation technique allows both antegrade arterial perfusion and insertion of an EndoClamp aortic catheter into the ascending aorta. This approach may eliminate complications associated with the standard femoral artery cannulation.
Methods. From November 2005 to March 2014, 627 consecutive minimally invasive mitral valve procedures were performed at our Institution. In 65 patients (10.4%) aortic cannulation and clamping were achieved through the Endodirect kit. Relative indications for direct aortic cannulation included: aortic and peripheral arterial disease. Relative contraindications included: significant dilation of ascending aorta (>45 mm), porcelain aorta, severe chest deformity, inability to obtain or maintain one lung ventilation and severe adhesion in redo surgery.
Results. The mean age was 69.1 ± 9.5 and 24.6% (16/65) of the patients were female. Mean logistic EuroSCORE was 9.8 ± 13.2 and 26.1% (17/65) of the patients had undergone previous cardiac surgery. Mitral valve repair was performed in 48 patients (73.8%). Seventeen patients (26.2%) underwent MV replacement. Concomitant procedures included: 2 tricuspid valve annuloplasty (3.1%) and 4 atrial septal defect closure (6.1%). Mean duration of cardiopulmonary bypass was 113.1 ± 26.0 minutes. The mean cross-clamp time was 83.6 ± 20.8 minutes. Conversion to sternotomy occurred, because of aortic tearing, only in 1 patient (1.5%). No cases of EndoClamp migration occurred during surgery.
Conclusions. Direct aortic cannulation should expand the pool of patients eligible for port-access operations also in case of absolute contraindications to peripheral artery access such as severe peripheral vascular disease. Moreover, it allows the avoidance of complications associated with retrograde perfusion and femoral artery cannulation.

C60

MINIMALLY INVASIVE VIDEO-ASSISTED MITRAL VALVE SURGERY: THE CARDIOMISS EXPERIENCE IN MORE THAN 200 CASES

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Background. Minimally invasive video-assisted mitral valve surgery (MIMVS) represents a valid alternative to the conventional sternotomic approach and has become a routine procedure. We report our experience in MIMVS and analyze mid-term results.
Methods. Between October 2009 and March 2014, 218 patients underwent port-access mitral valve operation via right mini-thoracotomy in the IV i.s. Mean age was 61.6 ± 12.6 years (range: 24 to 84 years), 44% were female and mean logistic EuroSCORE I was 5.6 ± 4.4%. Most patients were in advanced NYHA class. Concomitant procedures were tricuspid valve repair (n=26), mini-Maze procedure (n=3), interatrial defect closure (n=3). Follow-up was conducted by means of clinical and echocardiographic evaluation.
Results. We performed 185 (85%) mitral repairs and 33 (15%) replacements. Aortic cross clamping was performed with intra-aortic endoclamp in 68% (n=149) and with external aortic clamp in 32% (n=68) of cases. In-hospital mortality was 1.8% (n=4: 1 intraoperative retrograde dissection in redo patient, 3 not cardiac-related). No major post-operative complications were registered. Mean hospital stay was 7.5 ± 4.2 days (range: 4-22 days). During follow-up (100% complete, mean 25 months; range: 1-54 months) all patients improved their NYHA class; fourteen (6.5%) remained in class II. In the subgroup of mitral repairs, 169 patients (92%) had no or trivial residual mitral regurgitation and 15 patients (8%) had moderate residual mitral regurgitation. There were two late not cardiac-related deaths.
Conclusions. In our experience, minimally invasive video-assisted mitral valve surgery seems to be a safe and reproducible technique with excellent mid-term results. The endoclamp represents an important tool for this approach and its use allows to better satisfy the "minimally invasive concept". We consider this technique as the standard approach for mitral valve surgery.

C61

TRANSAPICAL VALVE IMPLANTATION FOR THE TREATMENT OF DEGENERATED MITRAL BIOPROSTHESIS: A SINGLE CENTRE EXPERIENCE

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Background. Redo operation for the treatment of degenerated mitral bioprosthesis is burdened by high mortality and morbidity among older patients with high fragility index. Transcatheter treatment may represent a novel option.

Methods. Five patients (mean age 80.2 years), with degenerated mitral bioprosthesis, NYHA III-IV class, were enrolled. Left ventricular function was preserved except in one patient. Two Edwards Perimount valves, 2 Mosaic and 1 Bioimplant valves (diameter of 27- 29 mm) were treated. Four 26 mm Edwards Sapien XT and one 29 mm Edwards Sapien XT were implanted. Through a left minithoracotomy a 6-F introducer was inserted into the cardiac apex. A standard 0.035' Medtronic guidewire catheter was positioned into the middle right pulmonary vein. Then this was exchanged with an Amplatz stiff 0.035' guidewire. The 24F Ascendra valve introducer was placed just below the degenerated bioprosthesis annulus. Without predilatation, the valve balloon was slowly inflated under rapid right ventricular pacing.

Results. All five patients achieved procedural success. One patient had thoracic wall bleeding which required surgical revision. The mean procedural time was 106 minutes, the mean fluoroscopy time was 20 minutes and the mean hospital length was 5 days. At follow-up the NYHA class was I-II in all five patients. A predischarge echocardiography showed a normal functioning valve without significant stenosis in all patients. Residual mitral regurgitation was mild in one patient and none in 4 patients. One patient showed an apical left ventricular false aneurysm. At 6-month follow-up all patients were alive.

Conclusions. Off-label treatment of degenerated mitral bioprosthesis by transapical Sapien valve is feasible, and could be a therapeutic option in old fragile patients with contraindications to open heart surgery. We recommend the use of the absorbable fibrin sealant patch for the closure of apical approach.

C62

"CHORDAE SYSTEM TECHNIQUE" NELLA RIPARAZIONE DEI PROLASSI VALVOLARI MITRALICI COMPLESSI

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Background. La riparazione mitralica è una tecnica chirurgica complessa. L'utilizzo di corde artificiali, pur essendo interessante, rappresenta una sfida. Lo studio presenta i risultati di un nuovo sistema di corde misurato ecocardiograficamente per semplificare la riparazione mitralica.

Metodi. Da settembre 2006 sino ad aprile 2014 sono stati selezionati 411 pazienti con insufficienza mitralica (MR) severa operati mediante plastica mitralica; 105 con anatomia complessa scelti per il trattamento con "Chordae System Technique" (CST). La valutazione ecocardiografica della distanza tra l'apice dei muscoli papillari (MP) ed il piano anatomico della coaptazione dei lembi valvolari permette la costruzione del CST con corde in PTFE. Ogni fascio viene ancorato all'apice del MP e la striscia suturata al margine libero del lembo posteriore (n=6) ed anteriore (n=99). Il centro del CST combacia con il centro del leaflet scelto cosicché lo stress sistolico viene equamente distribuito. Nei pazienti con prolasso di entrambi i lembi valvolari (n=74), CST è stato utilizzato sul lembo anteriore con trattamento tradizionale del posteriore e successiva anuloplastica.

Risultati. Due pazienti sono andati incontro a sostituzione valvolare intra-operatoria in quanto residuante MR moderata. Clampaggio aortico medio e tempo di circolazione extra-corporea sono stati rispettivamente 75 ± 2 e 87 ± 2 minuti. Il follow-up è stato di 8 anni (medio 44.3 mesi), i pazienti sono in classe NYHA I eccetto 2 in classe II. Segnalati due decessi per eventi non cardiovascolari e due re-interventi. Al controllo 93 pazienti presentavano nessuna MR, 6 con MR 2/4. I pazienti trattati con CST presentano adeguata superficie di coaptazione in assenza di prolasso.

Conclusioni. Il CST rappresenta un'alternativa alle corde tendinee di fronte a riparazioni mitraliche complesse, offrendo un ottimo outcome. Il follow-up conferma che il CST è stabile nel tempo. Tali risultati ci indicano che il CST può essere utilizzato anche nei pazienti meno complessi.

C63

TRANSAPICAL OFF-PUMP MITRAL VALVE REPAIR WITH NEOCHORD IMPLANTATION: THE PADUA EARLY EXPERIENCE

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Background. Transapical off-pump Neochord implantation is a new minimal invasive mitral valve repair technique used for degenerative valve prolapse or flail. We describe the initial Padua experience in a cohort of patients treated with this innovative approach.

Methods. Between November 2013 and April 2014 we treated 25 symptomatic patients with severe mitral regurgitation (MR) due to leaflet flail/prolapse and consistent leaflet tissue overlap. The procedure was considered successful when postoperative MR less than moderate was achieved. We evaluated the residual MR and the clinical conditions at 1 and 3 months after surgery.

Results. Patients had a median age of 76 years (range 31-90 years), median EuroSCORE-I was 5.98% (range 0.88-38.9%), median STS score was 1.73% (range 0.22-14.6%). Posterior mitral leaflet prolapse was present in 21 patients (84%), anterior leaflet prolapse in 3 (12%) and both prolapsing leaflets in 1 case (4%). Acute procedure success was achieved in all patients. A median of 4 Gore-Tex Neochords (range 3-6) were implanted for each patient: 8 patients (32%) received 3 sutures, 12 (48%) received 4 sutures, 4 (16%) had 5 sutures and 1 (4%) had 6 sutures. Median procedural time was 135 min (range 90-200 min). Within 30 days, no major adverse events (defined as death, acute myocardial infarction, stroke, bleeding) occurred. At 30-day follow-up, 22 patients (88%) were in good clinical conditions (NYHA ≤2) with a residual trace-mild MR in 16 patients (64%) and moderate MR in 6 (24%). Three patients (12%) were successfully reoperated due to severe residual MR. Three-month follow-up was completed in 11 patients: NYHA was ≤2 in all of them with residual trace-mild MR in 7 patients (64%) and moderate MR in 4 (36%).

Conclusions. Our initial experience showed that the Neochord procedure proved to have short-term safety, efficacy and clinical benefit.

C64

MITRACLIP THERAPY IN SURGICAL MITRAL REPAIR: A SINGLE CENTRE EARLY- AND MID-TERM EXPERIENCE

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Background. Severe mitral regurgitation (MR) is a disorder that develops gradually over many years. A large number of patients are not referred for surgery because of a predicted high-surgical-risk or comorbidities. The aim of this study was to report medium-term outcomes of MitraClip experience in our Centre.

Methods. From October 2010 and December 2013, 38 consecutive patients with MR underwent MitraClip implantation under general anesthesia (18 functional MR, 20 degenerative MR). All were judged inoperable for high-surgical-risk (Logistic EuroSCORE 22 ± 16%). Mean age was 76 ± 8 years, M/F 23/15, 29% in NYHA class IV. Comorbidities included: chronic renal failure (42%), diabetes (10%), previous cardiac surgery (16%), PVD (8%), COPD (21%), chronic atrial fibrillation (37%). Mean pre-EF was 50 ± 16% (min-max 25-80), LVEDD 95 ± 37 mm.

Results. Procedural success was 97% (one patient had a second procedure after one month for partial detachment of a clip) no conversion to conventional surgery. One clip was implanted in 21 of cases and two clips in 15. Three clips were used in two patients, one with primary MR and the other with secondary MR corresponded to challenging anatomy. In-hospital mortality was 5.2%, one patient died for sepsis and one due to cardiogenic shock. Postoperative infection occurred in two patients, no events of acute renal failure, cardiogenic shock, CVA, AMI and surgical revision. One patient had a retroperitoneal hematoma as a complication of femoral vein puncture. Mean length-of-stay in ICU was 1 days. At discharge 89% patients had MR ≤2+, mean post-EF 45.6 ± 14 mmHg, end-diastolic-diameter 85 ± 42 mm, mean-transvalvular gradient 2.8 ± 1.8 mmHg. At 6 months EF was 44 ± 16%, only one patient had a IM ≥3. Survival at one year was 87%. At last follow-up, most of the survivors were in NYHA class I-II.

Conclusions. MitraClip therapy is a safe therapeutic option in selected high-risk patients. It is associated with a lower hospital mortality and shorter length of stay.

Multicenter trials 2

C65

RECORD (REDO CARDIAC OPERATIONS RESEARCH DATABASE) INVESTIGATORS: WHAT IS THE BEST SURGICAL STRATEGY FOR AORTIC DISEASE IN REDO SCENARIOS? A COMPARISON BETWEEN TRADITIONAL AORTIC VALVE REPLACEMENT AND TRANSAPICAL TAVI FROM TWO REAL-WORLD MULTICENTER SURGICAL REGISTRIES

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[1]*RECORD (REdo Cardiac Operations Research Database) Investigators,*
[2]*ITA (Italian Registry of trans-Apical aortic valve implantation) Investigators*

Background. Redo-scenario is still a risk-factor for AVR. Indeed, trans-catheter procedures (TAVI) are preferentially used in redo contexts.

Methods. Thirty-day and follow-up outcome of 462 patients enrolled in two multicenter registries because of aortic valve stenosis in redo context or bioprosthetic dysfunction, treated with redo AVR (RAVR: 292 patients) or trans-apical TAVI (TaTAVI: 170 patients), were analyzed according to VARC-2 criteria, stratifying by overall population and propensity-matched subgroup.

Results. TaTAVI-patients were older and sicker (EuroSCORE II, NYHA class, comorbidities; p≤0.04). However, follow-up proved longer in RAVR (26.6 ± 16.7 vs 15.3 ± 9.5 months, p<0.01). TaTAVI reported higher all-cause mortality at 30-days (8.8% vs 3.1%, p<0.01) and follow-up (11.2% vs 6.0%, p=0.04), but similar cardiovascular mortality at 30 days (5.3% vs 2.7%, p=0.12) and follow-up (5.3% vs 2.8%, p=0.14). Thirty-day AMI, stroke, and follow-up acute heart failure (AHF), stroke and reinterventions were similar (p=NS). Prolonged intubation (13.2% vs 4.1%, p<0.01) and AKIN 2/3 (15.8% vs 8.8%, p=0.02) prevailed in RAVR. "Early safety" (ES) was better in RAVR–group (15.8% vs 22.9%, p=0.04), as well as NYHA class at last follow-up (RAVR-NYHA I-II: 89.8% vs 83.2%, NYHA III-IV: 10.2% vs 16.8%, p<0.01). Intermediate-risk (EuroSCORE II = RAVR: 17.1 ± 12.0 vs TA-TAVI: 15.9 ± 6.9) propensity-matched population demonstrated comparable 30-day and follow-up all-cause and cardiovascular mortality, ES, AMI, stroke, prolonged intubation, follow-up AHF, stroke, reinterventions and NYHA-class. TaTAVI reported lower AKIN 2/3 (2.2% vs 15.6%, p=0.03) and length of hospitalization (9.5±3.4 vs 12.0±7.0 days, p=0.03).
Conclusions. Outcome differences between RAVR and TaTAVI in redo-scenarios reflect methodological differences and different baseline risk profiles. Propensity-matched patients show comparable outcome data, which slightly favored TaTAVI.

C66

PROSTHETIC RING OR SUTURE-BASED ANNULOPLASTIES FOR TRICUSPID REGURGITATION? A META-ANALYSIS OF EARLY AND LONG-TERM OUTCOMES AFTER SURGERY

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Background. There is ongoing uncertainty about the long-term advantage of different annuloplasty techniques for tricuspid regurgitation. We performed a systematic review and meta-analysis of early and long-term outcomes after tricuspid repair to compare the results of suture-based and prosthetic ring annuloplasty.
Methods. Studies reporting on outcomes after tricuspid repair for tricuspid regurgitation with suture-based annuloplasty and ring annuloplasty were systematically searched in PubMed. End-points were mortality and freedom from recurrent moderate regurgitation. The retrieval of data for the KM curves was performed with a recently developed algorithm that permits to derive a close approximation to the original patient time-to-event data. The analysis was performed with non-parametric and parametric time-to-event methods.
Results. A total of 9 and 10 studies were included in the meta-analysis of early and late outcomes, respectively. There was an advantage in early but not and in long-term survival between tricuspid repair performed with and without implantation of a ring. However, the KM estimates of the freedom from moderate TR were significantly better in patients who had surgery with ring annuloplasty (78.9 ± 5.0% at 15 years vs 60.0 ± 4.2%, log-rank p=0.0107). The parametric log-logistic regression model pointed out that the use of the ring is a protective factor for recurrence of TR after surgery (OR 2.0 at each time, median freedom from recurrent TR 2.6-time higher).
Conclusions. The repair of TR with the placement of an annuloplasty ring is associated to better outcomes, being a protective factor for early mortality and long-term recurrence of TR after surgery.

C67

IN-HOSPITAL NEUROLOGIC COMPLICATIONS OF ADULT PATIENTS SUBMITTED TO VENO-VENOUS ECMO: ANALYSIS OF THE ELSO DATABASE

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Background. To assess neurologic (CNS) complications in adult patients undergoing veno-venous extracorporeal membrane oxygenation (VV-ECMO) for respiratory failure.
Methods. From 1992 to 2013, 3,604 adult patients submitted to single-run VV-ECMO had been included in the ELSO Registry and represented the study cohort. Median age was 42 years (range18-93 years), and 2706 were male. The VV-ECMO configurations consisted of double cannula in 2422 patients (67%), double-lumen cannula in 1091 (30%), and a double-lumen cannula plus a single cannula in 91 (3%), respectively. Complication features and in-hospital outcome were analysed in order to elucidate epidemiology, brain injury modalities and impact on in-hospital outcome.
Results. Neurologic complications occurred in 267 patients (7.4%) with a total number of 361 events, including 221 subjects (6.1%) having 1 event, 43 patients (1.2%) with 2 events, and 3 patients (0.1%) with 3 events (0.1%), respectively. There were 144 cases (46%) of cerebral bleeding, 76 (24%) of brain death, 57 (18%) of brain infarction, and 39 (12%) of seizures, respectively. In-hospital mortality in patients experiencing CNS complications was 79%, as compared to 36% for patients without. Besides patients with brain death, mortality was 80% in case of brain hemorrhage, 72% for cerebral infarction, and 59% for patients with seizures, respectively. In-hospital mortality in patients with 1 CNS event was 77%, while 89% for patients with 2 or more CNS adverse events.
Conclusions. Neurologic complications play a critical role on in-hospital patient outcome in adult VV-ECMO patients. The study findings underline that, besides expected modalities of brain injury, unexplained mechanisms may be elicited also during VV-ECMO, and that further research should address the poorly known brain/ECMO interaction.

C68

REDUCED ANTICOAGULATION AFTER MECHANICAL VALVE REPLACEMENT: INTERIM RESULTS FROM THE PROACT STUDY

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Background. The Prospective Randomized On-X Anticoagulation Clinical Trial (PROACT) is a multicenter trial designed to determine whether it is safe and effective to manage patients with alternative anticoagulation therapy after implantation of the On-X mechanical valve prosthesis rather than the currently recommend societal guidelines.
Methods. In the PROACT trial, patients requiring aortic valve replacement (AVR) who were high risk (HR) or mitral valve replacement (MVR) were randomized to receive either lower dose warfarin (AVR (HR) test INR 1.5-2.0 and MVR test INR 2.0-2.5) or to continue standard dose warfarin therapy (control INR 2.0-3.0 AVR and 2.5-3.5 MVR). The low risk (LR) AVR group was randomized between an aspirin/clopidogrel regimen and standard dose warfarin, three months after surgery. INR was adjusted by home monitoring and a daily aspirin was given to all patients. Adverse events were independently adjudicated according to the AATS/STS guidelines for valve studies.
Results. 749 AVR patients were randomized into control (378) and treatment (371) groups between September 2006 and February 2013. These groups break down to test – 185 HR, 90 LR and 96 MVR; control – 190 HR, 90 LR and 98 MVR. Follow-up is adequate for analysis in the AVR HR patients averaging 3.82 years (755.7 pt-yrs control and 675.2 pt-yrs treatment). Adverse event data seen in the table for the AVR high risk group show that the treatment group experienced significantly lower major and minor bleeding event rates in %/ptyr. There was no significant difference in incidence of stroke, transient ischemic attack (TIA), total neurological events or mortality. Follow-up in the other groups is shorter but data are trending toward the same conclusion in MVR and toward no difference in AVR LR.
Conclusions. INR may be maintained in the range of 1.5-2.0 in AVR patients after implantation of the On-X bileaflet mechanical prosthesis. In combination with low-dose aspirin, this therapy resulted in significantly lower risk of bleeding than customary INR 2.0-3.0, without significant increase in TE.

Adverse event	Control N (%/pt-yr)	Treatment N (%/pt-yr)	Rate ratio	Confidence limits	p
Major bleed	25 (3.31)	10 (1.48)	0.44	0.19-0.97	0.027
Minor bleed	26 (3.44)	8 (1.18)	0.34	0.13-0.78	0.006
Total bleed	51 (6.75)	18 (2.67)	0.39	0.22-0.69	0.0004
Stroke	5 (0.66)	5 (0.74)	1.12	0.26-4.86	0.859
TIA	5 (0.66)	7 (1.03)	1.31	0.38-4.70	0.630
Neurological events	10 (1.32)	12 (1.78)	1.34	0.53-3.47	0.489
Overall mortality	11 (1.46)	10 (1.48)	1.02	0.39-2.64	0.968

C69

RED BLOOD CELL TRANSFUSION IS A DETERMINANT OF NEUROLOGICAL COMPLICATIONS AFTER CARDIAC SURGERY

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Background. The relationship between red blood cell (RBC) transfusions and potential neurological complications after cardiac surgery is still controversial.
Methods. Data on 14 956 patients undergoing coronary artery bypass

grafting (CABG) and valve surgery (with or without concomitant CABG) were retrieved at 3 European university hospitals. The prognostic impact of RBC transfusion on postoperative stroke and transient ischemic attack (TIA) was investigated by logistic regression and multilevel propensity score analysis.

Results. Postoperative stroke was confirmed in 147 (1.0%) patients and combined stroke/TIA in 238 (1.6%). Of the total population, 6439 (43%) patients received RBC transfusion with a median of 2 units (25th to 75th percentile, 2 to 4 units). RBC transfusion was an independent predictor of stroke (OR 1.14, 95%CI 1.11-1.17 per unit) and stroke/TIA (OR 1.12, 95%CI 1.09-1.15 per unit). Increasing amount of transfused RBC units were associated with higher rates of stroke (no RBC transfusion: 0.5%, 1-2 RBC units: 1.0%, OR 1.42; >2 RBC units: 2.7%, OR 3.10) and stroke/TIA (no RBC transfusion: 0.8%, 1-2 RBC units: 1.8%, OR 1.49; >2 RBC units: 4.0%, OR 2.72). Multilevel propensity score analysis confirmed these findings, highlighting a very high rates of stroke (3.9%; OR, 3.85, 95%CI, 2.30-6.45) and stroke/TIA (5.9%; OR, 3.30, 95%CI, 2.17-5.02) among patients who received ≥6 units of RBC.

Conclusions. Transfusion of more than 2 units of RBC is associated with postoperative stroke and TIA in patients undergoing cardiac surgery.

C70

EURYDICE REGISTRY: EUROPEAN DIRECT AORTIC COREVALVE EXPERIENCE

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Purpose. Transcatheter aortic valve implantation (TAVI) has been designed to treat elderly patients with severe aortic stenosis at high risk for surgery. We report the results of the EURyDICE Registry: EURopean DIrect Aortic Corevalve Experience, a multi-centre experience with the self-expanding CoreValve prosthesis implanted through a direct aortic approach (DA) in patients considered high risk surgical candidates.

Methods. This multi-centre experience comprises patients treated in the 19 centres in 9 countries in Europe and in Israel, between June 2008 and October 2013. A standard dataset was circulated between center, all definitions were collected according to VARC II.

Results. A total of 478 cases have been collected, 38 implants took place in the 54 months between the first implant and the end of 2010 and 96 patients were treated in 2011. Mean age of the population was 81.3 ± 6.3 years, 48% were female, mean logistic EuroSCORE was 25.8 ± 16.1; 387 patients were in NYHA class ≥III (81%). Peripheral vasculopathy was the principal exclusion criteria from trans-femoral TAVI and was present in 293 patients (61%); 280 patients had coronary artery disease (58%) and 101 patients had undergone previous coronary artery bypass surgery. TAVI procedure was performed in 220 of cases (46%) through a right anterior mini-thoracotomy in the 2nd intercostal space or via an upper hemisternotomy in the others 258 patients. A size 29 mm CoreValve was implanted in 200 patients (42%). Procedural success was achieved in 469 patients, 98% of cases. Three patients required a 2nd valve implanted and 2 patients had >moderate para-valvular regurgitation; 30-da mortality was 9%. Seven patients experience stroke (1.4%) and 67 patients (16%) required a new permanent pacemaker (67/415 without prior pace-maker); 90% of patients had aortic regurgitation <2+/4+. Median post-operative hospitalization was 9 days.

Conclusions. Direct aortic access is a feasible approach for TAVI with the self-expanding CoreValve prosthesis. These initial results of the EURyDICE Registry are encouraging given the high risk patient cohort and evidence the fact that proximal approached should results higher valve deployment control and accurate implantation, translating into lower incidence of pace-maker implantation and para-valvular regurgitation.

C71

CORONARY ARTERY BYPASS GRAFT SURGERY IN PATIENTS WITH HIGH PRE-OPERATIVE TROPONIN I: COMPARISON BETWEEN ON-PUMP AND OFF-PUMP TECHNIQUE

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Background. Pre-operative elevated cardiac Troponin I (cTnI) is an independent predictive factor for adverse outcome following coronary artery bypass graft (CABG). No study has compared the on-pump and off-pump (OPCAB) technique in patients with elevated pre-operative myocardial injury biomarkers. We investigated in these patients the post-operative outcome after CABG with cardiopulmonary bypass or with beating-heart technique.

Methods. Patients were extracted from the Adult Cardiac Surgery Registry of Puglia Region (9760 procedures from 2011 to 2013, 3939 isolated CABG). Analyzed were 452 on-pump and 219 OPCAB procedures with preoperative cTnI above the laboratory cut-off. Patients in cardiogenic shock, emergency surgery or myocardial infarction within 24 hours prior the procedure were excluded.

Results. In comparison to on-pump patients, those operated with OPCAB technique were older (70 ± 10 vs 67 ± 10 years; p<0.001), at greater risk (EuroSCORE II 3.8 ± 3.9% vs 3.0 ± 3.7%; p=0.005), with greater values of creatinine and lower of hemoglobin, greater prevalence of extracardiac arteriopathy, chronic lung disease, urgent operation. Preoperative cTnI was not different between groups (1.9 ± 3.3 vs. 2.2 ± 5.5 ng/ml; p=0.468). Hospital mortality was similar between OPCAB and on-pump procedures (2.7% vs. 3.1%; p=0.798) as well as post-operative complications: renal worsening (dialysis 2.4% vs 2.0%; p=0.728), atrial fibrillation (26.0% vs 27.2%; p=0.745), re-intervention (0.9% vs 0.9%; p=0.971), re-intubation (2.3% vs 2.7%; p=0.774), sepsis (0.9% vs 0.9%; p=0.971), gastric (2.3% vs 0.9%; p=0.140) and neurological (ictus 0.5% vs 0.4%; p=0.979) complications. The OPCAB had significantly lower rate of blood-product transfusion (39.7% vs 51.3%; p=0.005) and a lower cTnI release in comparison to On-Pump (peak values of 6 ± 13 vs 9 ± 19 ng/ml; p<0.001). Results were confirmed in the subgroup of propensity matched patients (137 for each group selected by pre-operative characteristics).

Conclusions. In patients at high risk with elevated pre-operative cTnI, both conventional and off-pump CABG showed similar results in short-term outcome with a lower release of cTnI and a lower rate of blood transfusion after the beating-heart technique.

C72

THE IMPACT OF PREVIOUS PERCUTANEOUS REVASCULARIZATION ON SHORT-TERM RESULTS AFTER CORONARY ARTERY BYPASS SURGERY: A PROPENSITY SCORE MATCHED STUDY ON 11838 PATIENTS FROM THE EMILIA ROMAGNA CARDIAC SURGERY REGISTRY (RERIC)

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Background. In the last years an increasing number of patients is referred to coronary artery bypass graft (CABG) after previous multiple percutaneous coronary intervention (PCI). We tried to assess the impact of prior PCI on short-term results of CABG.

Methods. Perioperative data on patients submitted to CABG between January 2002 and December 2011 at 6 regional surgical centres in Emilia Romagna were reviewed from an Italian Cardiac Surgery Registry (RERIC). Patients submitted to redo surgery and to PCI and CABG during the same admission were excluded. Patients submitted to CABG after prior PCI were compared with patients submitted to primary CABG using propensity score matching techniques.

Results. Eleven thousand eight hundred thirty eight patients met the inclusion criteria: 9751 underwent primary CABG (Group A) and 2267 underwent PCI prior to CABG (Group B). Patients with prior PCI were more likely to be younger than 60 years (p<0.0001), to have unstable angina or non-ST elevation myocardial infarction (p<0.0001), previous myocardial infarction (p<0.0001), Canadian Cardiovascular Society class 3 or 4 angina (p<0.0001) and to be in cardiogenic shock (p<0.0001) but were less likely to have left main or 3 vessel disease (p<0.0001). After propensity score matching in hospital mortality was higher in Group B (2.8% vs 1.24%, p<0.05). Also 1 year all-cause and cardiac mortality were higher in Group B (5.9 vs 3.8, p=0.0006 and 2.5 vs 1.2, p=0.0015, respectively) as well as 1 year revascularization rates (3.7% vs 2.6%, p=0.0055).

Conclusions. Patients submitted to CABG after previous PCI had fewer coronary artery disease and were younger but they presented with more advanced symptoms. After propensity score matching previous PCI appeared to be a potential predictor of short-term mortality and repeat revascularization after CABG.

C73

GISSI OUTLIERS VAR STUDY: INVESTIGATION OF PATIENTS WITH BAV REQUIRING VALVE AND/OR AORTIC REPAIR. CORRELATION OF SURGICAL AND ECHO DISTINCTIVE FEATURES WITH HISTOLOGIC AND GENETIC FINDINGS IN PHENOTYPICALLY HOMOGENEOUS OUTLIER CASES

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Introduction. Bicuspid aortic valve (BAV) is the most common congenital heart disorder, affecting up to 2% of the population. Involvement of aortic root and ascending aorta (aneurysm or, eventually, dissection) is frequent in patients with pathologic or normally functioning BAV. Unfortunately there are no well known and defined correlations between valvular and vascular disease. Focusing on a patient-targeted therapy, OUTLIERS protocols are designed to deeply investigate specific phenotypes starting from the single patient, "from bedside to bench".

Methods. VAR protocol is a prospective, longitudinal, multicenter study. It observes four homogeneous small groups of BAV surgical patients (15 patients for each group): isolated aortic regurgitation, isolated ascending aortic aneurysm, aortic regurgitation associated with aortic aneurysm (<60 years), isolated aortic stenosis in older patients (>60 years). In VAR protocol, with the new outliers strategy of research, we analyse multiple aspects of BAV disease: correlation between surgical findings, 3D TE echo distinctive features, histologic features and genetic patterns. Echo analysis is extended to first-degree relatives and, in case of BAV diagnosis, even genetic test is performed. Patients and relatives are enrolled in ten cardiac surgery/cardiology centres throughout Italy (Catanzaro, Casa di Cura Villa Sant'Anna; Florence, AOU Careggi; Mestre, Ospedale dell'Angelo; Milan, Centro Cardiologico Monzino; Milan, Ospedale Niguarda; Milan, Ospedale San Raffaele; Rome, Ospedale San Camillo; San Donato Milanese, IRCCS Policlinico San Donato; Turin, Ospedale Molinette; Udine, AOU Santa Maria della Misericordia).

Results. Tissue-blood samples and echo images are analysed by corelabs (Genetics - Istituto Mario Negri Milano; Echo - Clinica Cardiologica, Padua, Ospedale Niguarda Ca' Granda - Cardiologia 4, Milan; Histology - Istituto di Anatomia Patologica University of Padua). Results from analysis are collected, then combined and compared by the coordinating centre (ANMCO Research Centre).

Conclusions. The aim of the study is to identify in selected and well defined phenotypes (OUTLIERS patients) predictors of favorable or unfavorable evolution of BAV in terms of valvular dysfunction and/or vascular degeneration. Correlations between different aspects of the disease could help in identifying fairly safe rather than clearly dangerous BAV, allowing for risk stratification and rationalization of follow-up and treatment.

C74

MITRAL VALVE REPLACEMENT WITH THE MOSAIC BIOPROSTHESIS: A 13-YEAR MULTICENTRE STUDY IN 704 PATIENTS

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Background. Long-term outcome of Mosaic porcine bioprosthesis (Medtronic Inc., Minneapolis, MN) for mitral valve replacement has been poorly addressed. The objective of this study was, therefore, to perform an independent, retrospective, multicentre study on postoperative outcome of patients submitted to mitral valve replacement with a Mosaic porcine valve.

Methods. In 10 centres, from 1992 to 2009, the Mosaic bioprosthesis was implanted for mitral valve replacement in 704 patients. There were 430 female patients (61.4%) and overall mean age of as 73.8 ± 6.6 years. Associated procedures included CABG (185 patients), aortic valve replacement (150 patients), tricuspid annuloplasty (175 patients), and other cardiac procedures (102 patients). Postoperative data were analysed by a core lab and according to the AATS/STS/EACTS guidelines.

Results. Median follow-up was 46 months (IQR range 21-69) with a cumulative duration of 2.436 patient/years. Early mortality was 3.8% (28 pts), whereas late mortality was 2.5 patient/year (92 late deaths). At 8 years, overall survival was 72.1 ± 3.7%. Actual and actuarial freedom for cardiac-related death were 89.1 ± 3.0% and 85.9 ± 2.4%, actual and actuarial freedom from valve-related death were 100% and 97.8 ± 0.5%, actual and actuarial freedom from reoperation were 80 ± 3.4%, and 76 ± 3.2%, respectively. Eight-year actual and actuarial freedom from structural valve degeneration was 90 ± 2.3% and 87 ± 2.2%, respectively. At follow-up, echocardiographic mean transvalvular gradient was 5.6 ± 2.7 mmHg (range 2.4-7.2 mmHg).

Conclusions. This independent, multicentre, retrospective study indicates that the Mosaic porcine bioprosthesis for mitral valve replacement provides satisfactory results in terms of postoperative durability and hemodynamic performance up to 13 years from implant.

Coronary 2

C75

B-TYPE NATRIURETIC PEPTIDE (BNP) PREDICT WEANING FAILURE AFTER ELECTIVE AND ON-PUMP CARDIAC SURGERY: AN OBSERVATIONAL STUDY

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Background. Natriuretic peptides (NPs), particularly B-type natriuretic peptide (BNP), are widely used markers of heart failure (HF) and myocardial infarction. BNP is a reliable marker of cardiac wall tension, volume and/or pressure overload and myocardial ischemia. This study analyzes the correlation between the perioperative levels of BNP and the weaning outcome in a specific clinical context.

Methods. Eighty consecutive patients submitted to elective and "on pump" cardiac surgery and considered ready to undergo a 1-hour weaning trial in order to evaluate the spontaneous breathing clinical tolerance were prospectively included and observed in a mixed ICU of a university hospital. Weaning was considered successful if the patient was able to sustain spontaneous breathing for more than 48h after extubation. Data were collected main pre- and intraoperative data; hemodynamic parameters at specific time points; BNP and Troponin I (TnI) plasma levels preoperatively (T0), 3 hours after the ICU admission (T1) and 30 minutes after the start of the weaning protocol (T2). Weaning and gas exchange parameters were collected 30 minutes after the start of the weaning protocol.

Results. Logistic regression analysis identified high BNP level before the trial and the product of airway pressure and breathing frequency during ventilation as independent risk factors for weaning failure. Their BNP level before weaning decreased between the two attempts (517 vs 167 pg/ml, p=0.01). In survivors, BNP level was significantly correlated to weaning duration (rho = 0.52, p<0.01).

Conclusions. Baseline plasma BNP level before the first weaning attempt is higher in patients with subsequent weaning failure and correlates with weaning duration.

C76

CLOSED CPB VS OPEN CPB IN CORONARY ARTERY BYPASS GRAFT SURGERY

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Background. The changes and improvements of extracorporeal circuits in order to increase biocompatibility, so reducing SIRS induced by CPB, are the main key points of biomedical companies. Today is also widely recognized that the increased hemocompatibility, closed circuits, miniaturized CPB and ECMO are methods suited to the needs of the patient.

Methods. The aim of this study was to compare the post-operative outcome of patients after CPB with closed circuit (no air-blood contact) rather than with standard open circuit (air-blood contact). We assessed 83 patients undergoing coronary artery surgery at the Heart Surgery Department of the "S. Orsola-Malpighi" University Hospital in Bologna. Of them, 41 patients (study group) underwent coronary artery bypass surgery using closed CPB in the period between year 2008 and the year 2012. The other 42 patients (control group) underwent the same surgical procedure with standard CPB.

Results. We identified statistically significant differences between the two groups in post-operative concentration of serum creatinine (p=0.007) and CPK-MB/total CPK (p=0.003/p=0.000).

Conclusions. In our experience we had not differences in post-operative outcome between the two groups using the two types of circuits. The closed CPB group has expressed a reduction in creatinine values and in the relationship between CPK-MB/total CPK. Closed CPB was not inferior to conventional extracorporeal circuit because it presents some advantages from the laboratory results, but the real clinical benefit and still difficult to prove, especially in homogeneous patient populations.

C77

IMPACT OF PLEURAL INTEGRITY DURING MAMMARY ARTERY HARVESTING ON SHORT-TERM OUTCOME

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Background. The aim of this retrospective study was to evaluate if the impact of pleural integrity during left internal mammary artery (LIMA) harvesting might influence short term outcome.

Methods. From May 2012 to May 2013, 136 patients undergoing isolated coronary artery bypass grafting (CABG) operation (with or without pump) were enrolled in the study. The mammary artery was always harvested in a skeletonized fashion. Patients were divided into two groups: Group A (n=96) with open pleura and Group B (n=40) with intact pleura. The two groups were comparable regarding pre- and operative data.

Results. There were no differences in mean values between Group A and Group B for: age, body mass index, ejection fraction, CPB time, cross-clamp time, number of anastomoses/patient. Group A and Group B were significantly different in terms of ventilation time (13.47 ± 18.2 vs 8.4 ± 6.3h, p<0.001), bleeding within 12h (540.31 ± 283.5 vs 392.25 ± 257.8 ml, p<0.001), blood transfusion units (1.38 ± 1.6 vs 0.6 ± 1.4, p<0.001), and length of hospital stay (14.7 ± 14.3 vs 11.2 ± 7 days, p<0.001).

Conclusions. Our data showed that preservation of pleura integrity, when possible, during LIMA harvesting has a strong impact on post-operative course. Pleural integrity can reduce postoperative bleeding with a minor need of blood transfusion. Very likely these findings along with a less time of ventilation might reduce the length of hospital stay.

C78

IMPACT OF THE SECOND INTERNAL MAMMARY ARTERY ON SHORT- AND LONG-TERM OUTCOMES IN OBESE PATIENTS: A PROPENSITY SCORE MATCHED ANALYSIS

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Background. The benefit from bilateral internal mammary artery (BIMA) grafting over single internal mammary artery (SIMA) grafting is anticipated to be enhanced in obese patients requiring coronary artery bypass grafting (CABG) as a consequence of their accelerated atherogenic graft disease. However, a very limited number of patients currently receive BIMA grafting as a consequence of lack of evidence and concerns about sternal wound complications. This study was undertaken to determine the impact of BIMA grafting on short- and long-term outcomes in obese patients.

Methods. Propensity score matched analysis for short and long term outcomes was conducted for 1654 obese (BMI ≥30 kg/m^2) patients undergoing CABG using SIMA (n=1406, 85.1%) or BIMA (n=248, 14.9%).

Results. Median BMI was 33 [interquartile range 31-35, max 50]. Operative mortality rate was 1.6% and 1.6% (p=0.9) and the incidence of deep sternal wound infection (DSWI) was 3.7% and 3.3% for patients receiving BIMA and SIMA respectively (p=1). Median follow-up was 5.3 years [interquartile range 2.1-8.2, max 12.1]. BIMA grafting was associated with an improved late survival (HR 0.46; 95%CI 0.21-1.00; p=0.04) and a reduced need for repeat revascularization (HR 0.67; 95%CI 0.38-0.99; p=0.03). The effect from BIMA grafting on long term mortality showed a trend towards a greater benefit in patients with higher BMI (p=0.059).

Conclusions. BIMA grafting can be safely offered to obese patients with significant long term advantages without substantial additional risk of operative complications including DSWI.

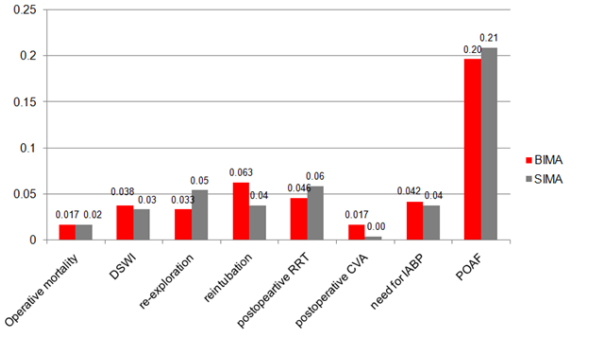

Figure 1. Incidence of postoperative complications in the treatment (BIMA) and control (SIMA) groups.
DSWI, deep sternal wound infection; RRT, renal replacement therapy; CVA, cerebro-vascular accident; IABP, intraaortic balloon pump; POAF, postoperative atrial fribrillation.

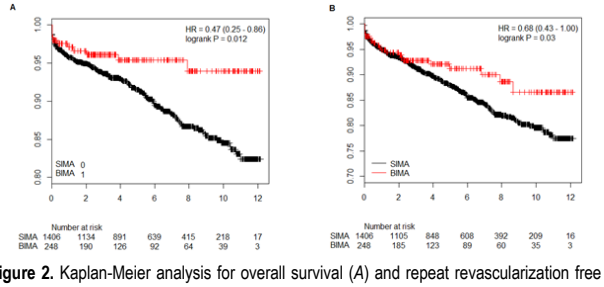

Figure 2. Kaplan-Meier analysis for overall survival (*A*) and repeat revascularization free survival (*B*) in the unmatched sample.

C79

ROUTINE BILATERAL INTERNAL THORACIC ARTERY GRAFTING IN INSULIN-DEPENDENT DIABETIC PATIENTS: EARLY AND LONG-TERM OUTCOMES

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Background. Despite encouraging late outcomes, the use of bilateral internal thoracic artery (BITA) grafts for myocardial revascularization (BITA grafting) in diabetic patients remains controversial because of an increased risk of sternal complications. In the present study, early and long-term outcomes of the routine use of left-sided BITA grafting in insulin-dependent diabetic patients were reviewed retrospectively.

Methods. Among the 2701 consecutive patients who underwent isolated BITA grafting at the authors' Institution from 1999 throughout 2012, 188 (mean age: 67.0 ± 9.0 years) were insulin-dependent diabetic patients. The mean expected operative risk, calculated according to the European System for Cardiac Operative Risk Evaluation II, was 11.0 ± 10.8%.

Results. There were six (3.2%) hospital deaths. Prolonged mechanical ventilation (17.6%), multiple transfusion (16.5%), deep sternal wound infection (DSWI, 11.7%), and acute kidney injury (10.6%) were the most frequent major postoperative complications. Predictors of DSWI were low cardiac output (p=0.015) and mediastinal re-exploration (p=0.092). The mean follow-up was 5.7 ± 3.6 years. The 10-year nonparametric estimates of overall survival, freedom from cardiac and cerebrovascular death, and major adverse cardiac and cerebrovascular events were 57.7, 83.6, and 55.4% respectively. Predictors of decreased late survival were old age (p=0.013), chronic lung disease (p=0.004), renal impairment (p=0.009), and left ventricular dysfunction (p=0.035). DSWI was a predictor of poor survival only for patients older than 70 years of age (p=0.029).

Conclusions. Left-sided BITA grafting may be performed routinely even in insulin-dependent diabetic patients. The increased rates of postoperative complications do not prevent low early mortality and good long-term outcomes. Sternal complications affect late survival in the elderly.

C80

THREE ARTERIAL GRAFTS ARE BETTER THAN TWO: A PROPENSITY SCORE MATCHING OF 1254 PATIENTS WITH MULTIPLE ARTERIAL GRAFTS

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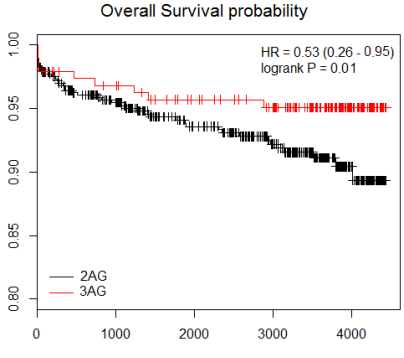
Background. The use of a second arterial conduit along with the left internal mammary artery (IMA) has been consistently associated with improved late outcomes including survival after coronary artery bypass grafting (CABG). However, whether the use of a third arterial conduit may further improve survival remains unknown. We undertook a 10 year follow-up single center propensity score matched comparison of long term outcomes in CABG patients receiving 3 versus 2 arterial grafts.

Methods. Propensity score matching was conducted among 1254 patients who required ≥3 grafts and received at least an additional arterial conduit using the right IMA and/or the radial artery along with the left IMA. We compared long term outcomes from patients who received 2 arterial conduits (2AC group=1041) versus patients who received 3 arterial conduits (3AC group=212).

Results. Operative mortality was comparable among patients receiving 3AC and 2AC (2.1% vs 1.8% respectively, p=0.4). After a mean follow-up time of 8.6 years [max 12.1], patients receiving 3 arterial conduits showed an improved overall survival (HR 0.53; 95%CI 0.26-0.95; p=0.01, Figure) and



repeat revascularization free survival (HR 0.66; 95%CI 0.28-0.99; p=0.03). The advantage for improved late survival with the use of a third arterial graft was more pronounced amongst patients less than 70 years of age (HR 0.57; p=0.01).
Conclusions. The use of a third arterial conduit in comparison to two arterial conduits only conferred a significant benefit in terms of long term survival and need for repeat revascularization.

C81

ARTERY BYPASS MINIMIZES NEUROLOGIC INJURY COMPARED TO ON-PUMP CORONARY SURGERY: A PROPENSITY SCORE MATCHED STUDY ON 286 PATIENTS

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Background. Coronary bypass surgery without cardiopulmonary bypass and aortic manipulation may reduce perioperative mortality and morbidity, especially neurologic injury related to atheroembolism from the ascending aorta and to clamping strategies. We evaluated early postoperative neurologic outcome in a matched population following clampless off-pump (CCAB: either "all-arterial" or with automatically anastomosed venous grafts) or conventional on-pump coronary artery bypass (CABG).
Methods. 366 consecutive patients were submitted to isolated coronary bypass by a single surgeon experienced in both off and on-pump procedures. In 60.9% (n=223), clampless off-pump revascularization was performed, either with the Cardica PAS-Port® automated proximal venous connector (n=110) or as a total arterial approach without proximal aortic anastomoses (n=33). After propensity score matching, 143 pairs were selected, who received either off-pump or on-pump surgery. The primary end points were operative mortality, neurologic injury, defined as non-reversible (NRNI: lethal coma or stroke) or reversible (RNI: TIA or delirium).
Results. Operative mortality was 2.4% (CCAB 1.4%; CABG 3.5%; p=0.14). The global rate of early neurologic injury was 5.6% (CCAB 2.1% vs CABG 9.1%; p=0.006). Incidence was 1.4% for NRNI (CCAB 0% vs CABG 2.8%; p=0.04) and 4.2% for RNI (CCAB 2.1% vs CABG 6.3%; p=0.06). No differences were found among other major perioperative outcomes.
Conclusions. CCAB prevents early post-operative NRNI and helps reducing the incidence of RNI, while mortality and other major complications' rate did not differ significantly between the different approaches. This result can be achieved either with a totally anaortic strategy or with the aid of a fully automated device for proximal aorto-venous anastomoses that allows minimal aortic manipulation.

C82

OFF-PUMP CORONARY ARTERY REVASCULARIZATION: IS IT WORTHWHILE?

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Background. Concerns have been raised about the real advantages of off- vs on-pump CABG. To address this issue we have reviewed our experience in a large cohort of patients at a single Institution.
Methods. 1119 consecutive patients underwent isolated CABG from 2007 to 2011 at our institution. Off-pump CABG was performed in 534 patients while 585 patients had on-pump CABG. No statistically significant differences were noted in pre-operative data except for age (p<0.005) and LVEF (p=0,049), which were lower in on-pump group. All procedures were performed by experienced surgeons. Short-term (30 days) end-points were mortality, major cardiac and neurological events and new onset of atrial fibrillation. Long-term end points were death from any cause, repeat revascularization procedures or myocardial infarction and neurological events. Median follow-up time was 3.7 years.
Results. Overall risk factors for early and late mortality at multivariate analysis were age, LVEF and presence of pre-operative renal failure. There was no significant difference between off-pump and on-pump CABG in the rate of 30 day mortality (0.94% vs 1.88%, respectively; p=0.18), major adverse cardiac events (2% vs 3%; p=0.17) and neurological events (1% for both groups) and onset of atrial fibrillation (33% vs 35%; p=0.48). Post-operative stay was lower in off-pump CABG group (p<0.05). At follow-up, there was no significant difference between both groups in any of the end-points considered, which was also confirmed when a propensity score matching was performed.
Conclusions. In our experience off-pump CABG produces similar early and late outcomes when compared to on-pump procedures, indicating that off-pump CABG represent a valid option which however should be probably reserved to selected patients.

C83

MINIMALLY INVASIVE TECHNIQUE FOR LEFT ANTERIOR DESCENDING CORONARY ARTERY BY-PASS: IS IT AN OPTIMAL CHOICE? 20 YEARS OF FOLLOW-UP IN A SINGLE CENTRE

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Background. Minimally invasive direct coronary artery bypass (MIDCAB) is safe and widely applicable with better recovery than standard coronary artery by-pass. We report the short- and long-term results in patients undergoing MIDCAB.
Methods. From 1997 to 2013 125 patients (M/F 101/24) underwent MIDCAB. Mean age was 61 ± 10 years. Isolated LAD disease was present in 85 patients (68%) and 40 (32%) had multivessel disease. The first 57 patients (46%) underwent early-postoperative angiographic reinvestigation. All patients were subsequently followed-up in our outpatient clinic. Follow-up (range 10-199 months; mean 142 months) was completed in 70% of cases.
Results. There was no in-hospital mortality, and no conversion to sternotomy. Two patients experienced a perioperative myocardial infarction and no perioperative MACCE. At early postoperative angiographic reinvestigation, the anastomotic patency rate was 54/57 (95%). Percutaneous coronary intervention of vessel other than LAD was performed in 5%. Survival was 100%, 95.8%, 84% at 1- 5 and 15 years respectively. Two patients required a cardiac intervention for mitral valve regurgitation after 7 and 10 years. One patient required a stent in LAD due to restenosis after 10 years. Cardiac event-free survival was 95.3%, 80.8%, 75.6% at 1, 5 and 10 years, respectively.
Conclusions. MIDCAB is a safe approach with good long-term results. In the presence of multivessel disease, MIDCAB may represent a viable option when complete revascularization is not feasible or a hybrid procedure is envisaged.

C84

FIVE-YEAR CLINICAL OUTCOME AND PATENCY RATE OF DEVICE-DEPENDENT VENOUS GRAFTS AFTER CLAMPLESS OPCAB WITH PAS-PORT AUTOMATED PROXIMAL ANASTOMOSIS: THE PAPA STUDY

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Background. To evaluate long-term clinical performance and angiographic patency of automated proximal venous anastomoses following clampless coronary bypass (C-CAB).
Methods. Observational study in patients submitted for isolated C-CAB and at least one proximal aorto-saphenous anastomosis performed with an automated connector (Cardica PAS-Port®) including 152 consecutive patients (165 devices and 199 device-dependent distal anastomoses), with LVEF >30% and saphenous vein diameter of 4 to 6 mm. Clinical follow-up was 96% complete (4101/4269 pt-months). Graft patency rate was assessed with 64-slice CT-scan or coronary angiography. Freedom from major adverse cardiac and cerebrovascular events (MACCE) was reported as actuarial probability with 95% CL and venous graft patency as actual rate at every year interval.
Results. Early operative mortality was 1.9%; incidence of neurologic injury was zero. Freedom from MACCE was 92.7 ± 2.1 at 1 year and 85.2 ± 4.8 at 5 years. The actual patency rate of device-dependent venous grafts was 90%, 85%, 84%, 84% and 93% for 1-, 2-, 3-, 4-, and 5-year old grafts, respectively.
Conclusions. The device is a well-performing system for proximal anastomoses. The incidence of neurologic complications seems to be reduced with this clampless approach. The high patency rate is stable over time.

C85

HYBRID CORONARY REVASCULARIZATION: INITIAL EXPERIENCE

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Background. Hybrid coronary revascularization is minimally invasive approach that combines a surgical bypass with a percutaneous technique to treat the remaining lesions. The aim of the study is to show the results of our initial experience.
Methods. Between September 2011 and March 2014, 31 patients received a complete revascularization with a hybrid approach at our Institution. Twenty nine patients were male (90.6%), mean age was 68.0 ± 10.6 years (range: 53-90 years). All patients underwent off-pump single-vessel revascularization with the left internal thoracic artery to the left anterior descending coronary artery using a left anterior small thoracotomy (LAST) as minimally invasive approach. A median of 2 vessel disease (range 1.00;3.00) has been treated using a median of 1 stent per lesion (0.0;2.00). Drug eluting stents were more frequently implanted (59.9%).
Results. All patients were discharged alive. Median ventilation time was 7.7 ± 3.6 hours and median total hospital length-of-stay was 7 (4-15) days. There were no wound complications. No conversion to full sternotomy was necessary.
Conclusions. Early experience with hybrid revascularization showed encouraging results. For sure, randomized studies with a larger patient population are necessary and a longer follow-up is essential.

C86

EFFECT OF PREOPERATIVE PHYSIOTHERAPIC TRAINING ON RESPIRATORY FUNCTION AND AUTONOMY OF WALKING IN CABG PATIENTS. A PRELIMINARY STUDY

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Background. Preoperative physiotherapic training can be very effective in postoperative recovery of patients undergoing coronary artery bypass grafting (CABG).

Methods. Thirty-five consecutively 35 patients (mean age 66 ± 8.5 years) undergone isolated CABG with the use of a single thoracic internal artery from December 2013 to February 2014, were randomized for preoperative physiotherapic training (Group Physio, n=21) or no preoperative training (Group 0, n=14). Exclusion criteria for randomization were: age >75 years and preoperative severe obstructive pulmonary disease. There were no differences between two Groups in baseline characteristics, breath rate, blood gas analysis, co-morbidity, left ventricular function, number of grafts per patient, length of postoperative stay (p=NS, for all comparisons). Primary end-point analyzed: respiratory function recovery and autonomy of walking, defined as autonomy in gait and postural changes without respiratory failure on 4th postoperative day; secondary end-point analyzed: in-hospital mortality, wound sternal healing. Data were retrospectively analyzed.
Results. Two patients in Group Physio were excluded from the results analysis because of prolonged stay in intensive care unit. Need of oxygen mask (BLB, Vmk 50%) decreased significantly from 2nd postoperative day to 4th postoperative day in Group Physio (from 81% to 37%, p<0.0001) and Group 0 (from 75% to 42%, p<0.01), but the difference was more evident in Group Physio. On 4th postoperative day, at room air partial arterial oxygen pressure was better in Group Physio than in Group 0 (92 ± 36 mmHg vs 81 ± 23 mmHg, p<0.05); autonomy of march was reached in 19 patients in Group Physio (100%) and in 12 in Group 0 (85.5%) (p<0.05). No in-hospital mortality or sternal wound complications were observed in both Groups.
Conclusions. The proposed preoperative physiotherapic training seems to confer a better primary end-point in CABG patients, improving earlier respiratory and motor function postoperatively. Following these encouraging preliminary results, the study is continuing.

C87

PREVIOUS PCI: UNDERESTIMATED ADDITIVE RISK FACTOR IN OFF-PUMP CORONARY ARTERY BYPASS GRAFTING

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Background. The number of percutaneous coronary interventions (PCI) has been increasing during the last decade and cardiac interventionalists expanded PCI to multivessel disease even in high-risk patients. Consequently, a number of patients underwent previous PCI are referred to coronary artery bypass grafting (CABG) due to symptom recurrence and restenosis. This study analyzed the influence of previous PCI on outcome of patients finally referred to CABG.
Methods. From January 2011 to January 2014, 648 consecutive off-pump CABG patients were enrolled: 502 patients do not have had previous PCI (group A) and 146 patients have had previous PCI with stenting (group B). Adverse cardiac events, need for inotropic drugs or mechanical support, intensive care (ICU) length of stay, serum creatinine levels were evaluated.
Results. The 30-day mortality was 1.6% (8/502 patients) in group A and 5.4% (8/146 patients) in group B (p=0.01). Adverse cardiac events incidence occurred in 3.7% of patients (19/502) in group A versus 11.6% (17/146) in group B (p<0.001). Need for reoperation for bleeding was slightly higher in group B (3.4% vs 0.9%, p=0.08). Number of grafts and distal anastomoses, inotropic support and supraventricular arrhythmias incidence did not differ between groups. In group A 3.5% of patients (18/502) needed mechanical support versus 10.2% (15/146) in group B (p=0.002); postoperative renal disease (serum creatinine >2 mg/dL) occurred in 1.6% of patients (8/502) in group A and in 4.7% of patients (7/146) in group B (p=0.005). ICU length of stay was significantly higher in group B (52.4 ± 8.6 vs 63.3 ± 9.8 hours, p<0.001).
Conclusions. Previous PCI was an additive risk factor in patients who underwent subsequent CABG. Our results demonstrated that PCI-group had an increased 30-day mortality and incidence of adverse cardiac events.

C88

ON- VERSUS OFF-PUMP CORONARY ARTERY SURGERY IN PATIENTS WITH LEFT MAIN DISEASE

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Objectives. Off-pump CABG (OPCABG) is an estabilished technique to treat ischemic heart disease. However the role of OPCABG in patients with left-main disease is not yet well estabilished. We report our experience comparing OPCABG vs on-pump CABG (ONCABG).
Methods. A series of 435 consecutive patients with left main disease underwent OPCABG (n=210, 48%) or ONCABG (n=225, 52%) at our Institution from 2007 to 2011. OPCABG patients were younger (p= 0.02) and had a worse NYHA class (p=0.04) compared to ONCABG. At 30 days, the following end-points were evaluated: mortality, major cardiac and neurological events and new onset of AF. Late end-points were death, repeat revascularization, myocardial infarction and neurological events. Median follow-up time was 3.61 years.
Results. Risk factors for early and late mortality at multivariate analysis were age, LVEF and pre-operative renal failure. On average 3.98 distal anastomosis were perfomed in total population (3.77 in OPCABG vs 4.18 in ONCABG, p<0.01). Less venous graft were used in OPCABG (2.6 vs 3, p<0.001). There was no significant difference between OPCABG and ONCABG in 30 day mortality (1.43 vs 1.78%, OPCABG vs ONCABG, respectively), major adverse cardiac events (1.9% vs 2.67%, p=0.8) and neurological events (1.43 vs 1.78%, p=0.67) and onset of AF (34.3 vs 38.2, p=0.49). Post-operative stay was shorter in OPCABG (7.9 and 8.6 days, p<0.01). At follow-up, there was no significant difference between both groups in any of the end-points considered.
Conclusions. In our experience OPCABG and ONCABG have shown similar early and late outcomes in patients with left main disease.

Aortic valve 2

C89

CORONARY MICROVASCULAR AND DIASTOLIC DYSFUNCTIONS AFTER AORTIC VALVE REPLACEMENT: COMPARISON BETWEEN MECHANICAL AND BIOLOGICAL PROSTHESES

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Background. Left ventricular hypertrophy (LVH) is the main compensatory mechanism to pressure overload in patients with aortic stenosis (AS). The increased left ventricular mass, related diastolic and coronary microcirculation dysfunctions (CMD) contribute to diastolic heart failure, clinical angina, arrhythmias and sudden death. Aortic valve replacement (AVR) leads to hemodynamic and metabolic improvement and to favorable changes in myocardial perfusion contributing to prolongation of survival. The aim of this study was to evaluate whether mechanical or porcine aortic prostheses differently impact diastolic dysfunction (DD) and CMD recovery after AVR for pure AS.
Methods. Fifty patients having undergone AVR for pure AS with Medtronic Mosaic Ultra (MMU) bioprosthesis 21 mm (n=25) or St. Jude Medical Regent (SJR) mechanical valve 19 mm (n=25) were evaluated preoperatively and 12 months postoperatively comparing the hemodynamic behavior and the coronary flow by echocardiography and adenosine and rest cardiac magnetic resonance-myocardial perfusion imaging (CMR-MPI).
Results. At 12 month follow-up significant differences in E/A ratio and isovolumetric relaxation time between the two groups were found. The E/A ratio decreased from 1.3 ± 0.2 to 0.8 ± 0.2 in the MMU group and from 1.1 ± 0.1 to 0.9 ± 0.1 in the SJR group (p<0.001). The isovolumetric relaxation time increased from 62 ± 5 msec to 83 ± 7 msec and from 60 ± 4 msec to 76 ± 5 msec, respectively (p=0.002). Stress-rest CMR-MPI revealed that myocardial perfusion reserve index (MPRI) increased from preoperative 1.57 ± 0.44 to 1.92 ± 0.32 (+19%) in the MMU group and from 1.58 ± 0.43 to 1.73 ± 0.26 (+9%) in the SJR group (p=0.04).
Conclusions. Improvement of MPRI and DD recovery were more evident for bioprostheses than for mechanical valves, which may have some impact on exercise capability during normal daily life. The more physiological behavior of porcine valves could indicate a reassessment of traditional indications to the valve choice for AVR regardless of patient age.

C90

CLINICAL AND ECHOCARDIOGRAPHIC RESULTS OF THE FIRST 100 CASES OF IMPLANTATION OF BIOLOGICAL AORTIC VALVE PROSTHESIS: NEW ST. JUDE TRIFECTA

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Background. Sutureless aortic valve replacement is perceived to be an effective alternative for high surgical risk patients with severe aortic stenosis due to short cross-clamp and ECC times. This study shows the results at mid-term of aortic valve replacement with the sutureless aortic bioprosthesis Perceval S of a single surgeon in a single center.
Methods. 61 patients (41 women, 20 men; mean age 78.7 ± 4.6 years, mean gradient of 52 ± 14 mmHg) underwent aortic valve implantation with the Perceval S bioprosthesis. High-thoracic epidural analgesia was used in 31 patients (50.8%). 18 patients (29.5%) had associated CABG surgery. The mean logistic EuroSCORE was 14.9 ± 9.7% (EuroSCORE II 2.3 ± 1.0, STS score 3.2 ± 1.6).
Results. The prosthesis was successfully deployed in all patients. Thirty-day mortality was 3.2% (n=2). Mean CBP and ECC times were 40.7 ± 22.6 and 27.7 ± 8.8 minutes. Perioperative echocardiography revealed significant paravalvular leakage in three patients (4.9%). Postoperative mean gradient was 13.6 ± 5.2 mmHg. Complete AV block occurred in one patient (1.6%). No post-operative strokes were observed. At a mean follow-up of 23 ± 9.7 months, no significant paravalvular leakage or valvular regurgitation was observed.
Conclusions. This study shows that sutureless implantation of the Perceval S bioprosthesis provides a simple and reproducible alternative for aortic valve replacement with substantially lower ACC and CPB times in respect of traditional prostheses. The use of this device was also associated in our patients with a very low incidence of embolic events and AVB blocks. These findings encourage the use of this valve in a broader spectrum of patients although a long-term follow-up is needed to assess valve durability.

C91

OUTCOME OF AORTIC VALVE REIMPLANTATION: SINGLE SURGEON EXPERIENCE

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Background. Aortic valve sparing procedures (VSP) are increasingly being used to treat aortic root pathologies. We examined early, mid- and long-term outcomes after VSP.

Methods. From 2002 to 2014, 57 patients underwent replacement of the ascending aorta and aortic valve reimplantation. The patients were operated by a single surgeon (LT) in two different centres (San Raffaele, Milan, and Ospedali Riuniti, Ancona). Average age was 51.5 years; 84% were male; 20% had more than moderate aortic regurgitation (AR); 27% had a bicuspid valve. Follow-up data were obtained by means of outpatient visits, including a transthoracic echocardiography examination performed at our institution or by means of telephone interview with the patients and the referring cardiologists.

Results. There were no hospital deaths. 24% underwent concomitant cusp repair (usually cusp free margin shortening) to correct prolapse. At hospital discharge, only one patient had an AR ≥2. Clinical and echocardiographic follow-up was 100% complete (median length 4.2 years, up to 12 years). There was only a cardiac related death during the follow-up. At 10 years, actuarial survival was 89 ± 7.4%. Freedom from reoperation and freedom from AR ≥3+ at 10 years were both 92.3 ± 6%. NYHA I-II was documented in all cases.

Conclusions. Current findings confirm aortic valve reimplantation technique achieves excellent clinical and surgical outcome at short and long term.

C92

SUTURELESS AORTIC VALVE REPLACEMENT IN HIGH RISK, OLDER PATIENTS: THE SORIN PERCEVAL S SOLUTION

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Background. High risk older patients needing aortic valve surgery for aortic valve stenosis may benefit from the reduction of cross clamp and ECC time. Aim of the study was to investigate the capability of the Sorin Perceval S sutureless prosthesis in achieving these goals, thus inducing a better clinical outcome.

Methods. From May 2012 to January 2014, 105 consecutive patients aged ≥75 years, underwent aortic valve replacement (AVR) +/- coronary artery bypass grafting (CABG). In 21 patients (20%, 16 females, mean age 80.6 ± 4.2 years), a Sorin Perceval S was implanted. In 4 cases CABG was necessary. The mean logistic EuroSCORE was 13.5%; 14 patients (66%) were in NYHA functional class III-IV.

Results. Despite the high ES value, the observed 30 day mortality rate was zero. The mean cross clamp and ECC times were respectively 31.3 ± 4.6 and 45.1 ± 6.5 minutes in isolated AVR and 59.5 ± 14.6 and 88.2 ± 14 minutes in AVR + CABG. The mean ICU stay was 2.1 ± 1.5 days and the postoperative hospital stay was 7.2 ± 2.4 days. The mean number of packed red blood cells units needed was 1.5 for patients. There were no instances of either paraprosthetic leak, myocardial infarction or acute kidney injury. One patient experienced a transient ischemic attack. Postoperative atrial fibrillation occurred in only 3 patients (14%), but a permanent pacemaker was necessary in 5 patients (23%).

Conclusions. In elderly patients at high risk for conventional cardiac surgery, the Sorin Perceval S seems to be an easy, fast and safe solution that guarantees good clinical outcomes in the immediate postoperative period. The need for postoperative pacemaker implantation remains the main limitation of this device.

C93

PROTESI VALVOLARE AORTICA SUTURELESS IN ACCESSO MINI-INVASIVO: 130 PAZIENTI CON 3 ANNI DI FOLLOW-UP E CONTROLLO ECO-STRESS

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Background. Non sono ancora noti i risultati a medio termine dei pazienti sottoposti a sostituzione valvolare aortica con impianto di bioprotesi sutureless e la capacità di queste protesi di risposta allo sforzo fisico.

Metodi. Dal marzo 2010 al 2014, 220 pazienti sono stati sottoposti a sostituzione valvolare aortica (SVA) con impianto di protesi sutureless tipo Perceval, di cui 130 (età media 78 ± 4.4 anni) con approccio mini-invasivo (mini-sternotomia "J"). Sono stati analizzati i dati clinici ed ecocardiografici prima dell'intervento, alla dimissione, al follow-up. Un sottogruppo di 10 pazienti con 3 anni di follow-up e idonei all'attività fisica è stato sottoposto ad eco-stress.

Risultati. Dei 130 pazienti, 116 sono stati sottoposti a SVA isolata. Sono state impiantate bioprotesi Perceval nelle differenti misure presenti: S(11), M(44), L(62), XL(13). EuroSCORE 9.9 ± 5.9%; clampaggio aortico 38 ± 12 minuti. In due casi si è resa necessaria la conversione in sternotomia mediana completa per sanguinamento. La mortalità intra-ospedaliera 2.4%, la degenza media 12.7 ± 4.7 giorni. 7 pazienti sono stati sottoposti ad impianto di pacemaker (5.6%). I decessi registrati al follow-up (22 ± 11 mesi) sono stati 4 di cui 2 per cause cardiache. I gradienti transprotesici a 6 mesi, ad 1, 2 e 3 anni sono stati rispettivamente di 13 ± 3, 11 ± 3, 10 ± 3, 11 ± 3 mmHg. Al follow-up ecocardiografico non sono stati rilevati leak paravalvolari. Nel sottogruppo di pazienti sottoposti ad eco-stress al picco dello sforzo si è osservato un incremento dei gradienti medi (11.2 mmHg >16 mmHg) e dell'effective orifice area (EOA: 1.74 cm^2 >1.98 cm^2).

Conclusioni. Le protesi sutureless mostrano soddisfacenti risultati clinici ed emodinamici. I gradienti transvalvolari medi registrati si mantengono bassi a 3 anni di follow-up in assenza di leak paravalvolari e si registra una capacità di risposta della protesi allo sforzo con aumento dell'EOA.

C94

AORTIC VALVE REPLACEMENT WITH THE SUTURELESS BIOPROSTHESIS PERCEVAL S: OUR EXPERIENCE

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Background. Our study aims to evaluate the clinical and echocardiographic results of the new bioprosthesis: Trifecta (St. Jude Medical). This prosthesis was introduced into clinical practice as a tri-leaflet stented pericardial valve designed for supra-annular placement in the aortic position.

Methods. 100 patients underwent aortic valve replacement (AVR) with the Trifecta valve between April 2013 and March 2014. 66 patients were male and 34 were female. Mean age was 75 ± 7.9 (range 43-88 years). Prevalent cause of AVR was aortic stenosis in 81 patients. The mean preoperative pressure gradient was 47.81 ± 11.87 (range 21-69 mmHg). All patients were in New York Heart Association class III or IV. 52 patients underwent concomitant procedures: 42 CABG, 5 mitral valve replacement, 5 ascending aorta replacement.

Results. There were no intraoperative deaths. The 30-day in-hospital mortality was 3% (3 patients). 3 patients underwent PM implantation to complete atrio-ventricular block. The main gradients were 19, 14, 11, 11, 9 mmHg for the 19, 21, 23, 25, 27 mm valve size respectively. No prosthesis dislocation, endocarditis or relevant aortic regurgitation was observed at discharge.

Conclusions. The initial experience with the Trifecta valve bioprosthesis shows excellent outcomes with favourable early haemodynamics. Further studies with longer follow-up are needed to confirm these preliminary results.

C95

PROTESI VALVOLARI AORTICHE SUTURELESS E MULTIPLE POSSIBILITÀ D'IMPIEGO: RISULTATI CLINICI A 4 ANNI DAL PRIMO IMPIANTO

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Background. L'impiego delle bioprotesi sutureless nella sostituzione valvolare aortica riduce il tempo di ischemia cardiaca grazie alla rapidità della tecnica d'impianto. L'obiettivo del nostro studio è stato l'analisi dell'outcome clinico di pazienti sottoposti a sostituzione valvolare aortica con impianto di protesi Perceval in 4 anni di esperienza e particolare attenzione agli interventi combinati e recidivi.

Metodi. Tra marzo 2010 e 2014 sono stati sottoposti a sostituzione valvolare aortica con impianto di Perceval 220 pazienti di cui 116 con approccio mini-invasivo e procedura isolata, 23 re-interventi (di cui 8 per degenerazione di bioprotesi aortica, 15 già sottoposti a CABG), 81 sottoposti a procedure combinate (51 CABG, 2 sostituzione valvolare mitralica, 3 CABG e concomitante chiusura di auricola sinistra, 1 plastica di radice aortica, 1 endoarterectomia carotidea, 3 plastiche di valvola tricuspide, 2 miectomia con CABG, 1 sostituzione dell'aorta ascendente con CABG, 1 chiusura di difetto interventricolare, 10 chiusura di auricola sinistra, 5 ablazione di fibrillazione atriale, 1 miectomia).

Risultati. Sono state impiantate 15 protesi di misura S; 83-M; 104-L; 18-XL. Nel gruppo di pazienti trattati con approccio mini-invasivo, 130 sono stati sottoposti a mini-sternotomia a J e 8 a mini-toracotomia destra. EuroSCORE 11.3 ± 7.9%. Il clampaggio aortico registrato è stato di 44 ± 17.5 minuti (38 ± 12.7 in caso approccio mini-invasivo). La mortalità intra-ospedaliera osservata è stata del 3.7% e al follow-up (20 ± 11 mesi) di 2.3% (5 pazienti di cui 2 per cause non cardiache). I gradienti trans-protesici medi registrati a 6 mesi, ad 1, a 2 ed a 3 anni sono stati rispettivamente di: 13.3 ± 5 mmHg, 13.1 ± 4.6 mmHg, 13.6 ± 5 mmHg, 13.2 ± 3.8 mmHg.

Conclusioni. L'impianto di valvole sutureless Perceval è associato a ridotti tempi di clampaggio aortico, e di conseguenza ad un buon outcome clinico. Il peculiare sistema di "auto-ancoraggio" di queste bioprotesi le rende una valida opzione in differenti indicazioni soprattutto in caso di pazienti anziani ad alto rischio chirurgico ed in caso di procedure complesse per ridurre il tempo ischemico.

C96

FEASIBILITY OF AORTIC VALVE REPLACEMENT VIA RIGHT MINI-THORACOTOMY WITH TOTAL CENTRAL CANNULATION

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Background. Minimally invasive aortic valve replacement (MIAVR) through a right mini-thoracotomy is a procedure developed during the last years; its use is not widespread because the surgical approach limits the surgeon's view to

a very tiny operating field, resulting in a more challenging procedure. Nowadays the limits of this technique, as described in the literature, are the longer cardiopulmonary bypass time compared to the standard approach and the need of peripheral cannulation.
Methods. We retrospectively reviewed 156 patients who received an aortic valve replacement between January 2010 and January 2014 using a minimally invasive technique through a right mini-thoracotomy. Ninety nine patients were male (60.3%), mean age was 72.3 ± 11.3 years. A total central arterial and venous cannulation was adopted in all patients. All patients received an aortic valve replacement with a pericardial bioprothesis sutured using three 2-0 prolene running sutures. Median prosthesis size was 25 mm (21-27).
Results. MIAVR was successfully performed through a 4 to 6 cm skin incision at the third intercostal space. Overall cardiopulmonary bypass was 62.5 ± 16.1 minutes and aortic cross clamping was 49.3 ± 13.1 minutes. Median intensive care and hospital stay were 40.5 (13.3-1258.2) hours and 10 (5-127) days respectively. In-hospital mortality was 1.9% (3/156). No conversion to full sternotomy was necessary.
Conclusions. Our initial series confirms that MIAVR achieved through a right mini-thoracotomy is a safe procedure with excellent results. Using running sutures, cardiopulmonary bypass and cross-clamping times comparable with the standard full sternotomy can be obtained. The central cannulation can be easily performed without increasing the surgical time and avoiding groin incisions. Advantages of this technique include early mobilization and rehabilitation, excellent cosmetic result and lower risk of wound complications.

C97

MINIMALLY INVASIVE AORTIC VALVE REPLACEMENT WITH EDWARDS INTUITY BIOPROSTHESIS IN AN EXTREME OBESE PATIENT

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Background. In obese patients undergoing cardiac surgery a minimally invasive approach (MIA) represents a viable solution to improve postoperative outcomes. A fast-deployment bioprosthesis can simplify minimally invasive procedures for aortic valve replacement (AVR). We describe an Edwards INTUITY bioprosthesis implanted through MIA in an extreme obese patient.
Methods. A 66-year-old man with hypertension, severe COPD and diabetes mellitus was admitted for symptomatic severe aortic stenosis (AS) (NYHA class III). Logistic EuroSCORE I was 6.58%. Body mass index (BMI) was 47.32 and, based on National Health and Nutrition Examination Survey (NHANES) criteria, this patient was considered extreme obese. We decide to implant an Edwards INTUITY bioprosthesis in MIA in order to reduce operative times and risk of infection resulting from obesity and diabetes mellitus. Un upper J-type ministernotomy in the third intercostal space was performed. A 27 mm diameter Edwards INTUITY valve was implanted.
Results. Deployment time was 13 minutes. Cardiopulmonary bypass time, aortic cross-clamp time and operative time were 90, 51 and 230 minutes respectively. The patient was extubated 5 hours postoperatively. Postoperative course was characterized by paroxysmal atrial fibrillation that resolved pharmacologically. Blood transfusions were not necessary and no sternal wound complications developed. The patient was discharged on day 6. At discharge the echocardiogram showed a mean transvalvular gradient of 10 mmHg. At 3 month follow-up the patient was alive and showed a clinical status improvement (NYHA-class I).
Conclusions. Extreme obesity represents an independent risk factor for intraoperative and postoperative complications in cardiac surgery. In our early experience the Edwards INTUITY bioprosthesis shows a good hemodynamic performance and it is especially suitable for patients with higher BMI and BSA. The simplicity and quickness of implantation of this bioprosthesis make it useful for MIA. The described procedure enlarges the therapeutical options for extremely obese patients needing AVR.

C98

BETTER RESULTS WITH FULL STERNOTOMY, HIGH THORACIC EPIDURAL ANALGESIA (HTEA) AND SUTURELESS AORTIC VALVE PROSTHESES FOR AORTIC VALVE REPLACEMENT IN HIGH-RISK PATIENTS

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Background. The sutureless aortic bioprosthesis Sorin Perceval S can be implanted with short cross-clamp and CPB times. High thoracic epidural analgesia (HTEA) allows optimal control of peri-operative pain leading to early mobilization and functional recovery after cardiac surgery. The aim of our study was to compare the outcome after aortic valve replacement with the Perceval S via full sternotomy using two different anesthesiological approaches: blended epidural vs. general anesthesia.
Methods. 61 patients (41 women, 20 men; mean age 78.7±4.6 years, mean gradient of 52±14 mmHg) underwent aortic valve replacement with the sutureless Perceval S bioprosthesis: 31 pts received HTEA along with early extubation (G1) and 30 patients had traditional anesthesiological management (G2). Mean age was 78±4.8 years (G1) vs 79.4±4.3 (G2). Logistic EuroSCORE was 15.5±9.8 (G1) vs 12.0±9.4 (G2). Associated CABG surgery was needed in 5 patients in G1 (16.1%) and 13 (43.3%) in G2.
Results. Thirty-day mortality was 3.2% (n=2, both in G1). Three significant paravalvular leakage were observed (4.9%). AV block requiring PM implantation occurred in one patient (1.6%, G1). No post-operative strokes were observed. Mean ICU stay was 22.8±14.1 hours (G1) vs 29.4±14.3 (G2) (p=0.08), mean post-operative hospital stay was 6.6±2.0 days (G1) vs 8.6±5.4 days (G2) (p=0.06).
Conclusions. This study shows that aortic valve replacement with the sutureless Perceval S bioprosthesis is feasible and safe with excellent haemodynamic performances and low incidence of embolic events and AV blocks. The use of high thoracic epidural analgesia with prompt post-operative extubation and mobilization seems to favourably impact on ICU stay and overall hospital stay also considering that the patients in the epidural group were at higher risk. Further investigation and follow-up are needed to confirm our findings.

C99

EDWARDS INTUITY VALVE SYSTEM: A GOOD OPTION FOR MINIMALLY INVASIVE AORTIC VALVE REPLACEMENT

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Background. The sutureless bioprosthesis represents an innovative solution for aortic valve replacement (AVR) reducing cardiopulmonary bypass (CPB) and aortic cross-clamp (ACC) times. These characteristics make it especially suitable for minimally invasive approaches (MIA). We present our initial experience with a new class of rapid-deployment aortic valves, the EDWARDS INTUITY Valve System implanted in MIA.
Methods. Between June 2012 and April 2014, 59 patients with symptomatic aortic stenosis underwent AVR with EDWARDS INTUITY Valve. Of these 43 patients underwent isolated AVR. In 38 patients (64% of all patients and 88% of isolated aortic valve disease patients), AVR in MIA was performed: 28 (74%) patients received an upper J-type minsternotomy and 10 (26%) patients received a right anterior minithoracotomy. Three month and one year follow-up were completed.
Results. Implantation success was 97% (36/37). Deployment time was 15.3 ± 4.1 minutes. CPB and ACC time were respectively 90.13 ± 21.75 and 58.78 ± 15.8 minutes. Mechanical ventilation time was 6.01 ± 2.84 hours, ICU stay was 1.19 ± 0.51 days and ward stay was 5.7 ± 1.3 days. The transvalvular gradient at discharge was 10.2 ± 2.9 mmHg (mean) and 17.3 ± 6.3 mmHg (peak). At three month follow-up mean transvalvular gradient and peak transvalvular gradient were 8.3 ± 4.6 and 13.7 ± 7.2 mmHg, respectively. Three month survival was 100%. At one year follow-up two patients died for non cardiac causes and the mean transvalvular gradient and the peak transvalvular gradient were 7.4 ± 3.6 and 12.5 ± 4.3 mmHg, respectively.
Conclusions. Minimally invasive AVR using an EDWARDS INTUITY Valve is a feasible and reproducible procedure with excellent results in terms of survival and hemodynamic performance. This bioprosthesis represents a useful tool that promise to reduce technical difficulties and operative times during AVR in MIA. However, experience with a larger series of patients and a longer follow-up is necessary to validate these preliminary data.

C100

THE USE OF THE SUTURELESS AORTIC BIOPROSTHESIS SORIN PERCEVAL S HALVES THE AORTIC CROSS-CLAMP AND CARDIOPULMONARY BYPASS TIME: A SINGLE SURGEON EXPERIENCE

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Background. Since the introduction of the new sutureless aortic bioprostheses, the attention has been also focused on the potential benefits deriving from the reduction of cross-clamp and CPB times. The purpose of this study is to establish if the Perceval S can be effectively implanted in shorter times and with better peri-operative results in comparison with a traditional stented valve.
Methods. We retrospectively analyzed intra and post-operative data of 40 consecutive patients receiving Perceval S sutureless aortic valve (group P) and 40 consecutive patients receiving Mitroflow prosthesis (group M) for isolated valve replacement via full sternotomy.
Results. Group P patients were older (79.0 ± 4.2 vs 76.9 ± 6.4 years) and at higher risk (EuroSCORE 15.9 ± 10.0 vs 10.3 ± 6.8) than group M patients. Aortic cross-clamp and cardiopulmonary bypass times were 26.4 ± 7.6/38.5 ± 23.3 in group P and 51.6 ± 8.4/59.8 ± 10.9 in group M. Within 30 days 3 patients died (2 in group P and 1 in group M). Group M patients had a mean prosthesis size significantly smaller than for group P (22.4 ± 1.5 vs 23.3 ± 1.4 mm). Despite the higher surgical risk, group P patients had a shorter intensive care unit stay (26.5 ± 21.4 vs 40.3 ± 39.3 hours) and a shorter post-operative hospital stay (6.8 ± 2.0 vs 7.8 ± 2.3 days). PM implantation for complete AV block was needed in one patient in both groups. Two strokes (5%) occurred in group M, none in group P. One endocarditis, one respiratory insufficiency and one renal insufficiency occurred in group M while none were observed in group P.

Conclusions. Our data confirm the advantages of the Perceval S self-anchoring valve in terms of reduced cross clamp and ECC times along with the consequent reduction of surgical trauma resulting in improved clinical outcome. These issues encourage a broader application of this prosthesis.

C101

TAVI VS SURGERY IN PATIENTS WITH AORTIC VALVE STENOSIS AND SMALL ANNULUS

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Background. Patient-prosthesis mismatch (PPM) after aortic valve replacement (AVR) is more frequent in patient with aortic small annulus and is associated with poor functional improvement and increased short and long term mortality and morbidity. Few studies evaluated the performance of percutaneous aortic valves in this particular anatomic situation. The aim of this study was to evaluate the occurrence of PPM and the hemodynamic performance of percutaneous small aortic valve prostheses compared to surgical implants in patients with small aortic annulus (average diameter ≤20 mm).

Methods. Retrospective analysis comparing patients undergoing percutaneous aortic valve replacement (TAVI) with CoreValve 26 and Edwards Sapien XT 23 at our Center and patients operated on AVR matched to the size of the aortic annulus (≤20 mm), by sex, age, BSA, BMI. Clinical and echocardiographic data were collected pre-procedure, at 6 and 12 months in TAVI patients; in surgical group the same data were evaluated pre-operatively, at 12 and 36 months after surgery.

Results. 26 TAVI patients [11 CoreValve 26 (42%) and 15 Edwards Sapien XT 23, (58%)] vs 26 AVR patients [7 Sorin Mitroflow 19 (27%), 1 Carpentier Edwards 19 (4%), 13 Sorin Mitroflow 21 (50%), 5 Carpentier Edwards 21 (19%)]. There was no statistically significant difference between the pre-procedure echocardiographic parameters. In TAVI group, the absolute and indexed effective valve area post-procedure resulted significantly greater ($p<0.01$) and the transvalvular gradients significantly lower ($p<0.01$) compared to the AVR group. Aortic regurgitation was significantly greater in TAVI group ($p<0.01$).

Conclusions. Moderate PPM is present in 5 TAVI patients (19%) and in 23 AVR patients (88%) ($p<0.01$). No case of PPM in severe TAVI group (0%), severe PPM in 4 patients AVR (15%) ($p=0.11$). We observed also a greater hypertrophic ventricular reduction after surgery with respect to TAVI.

C102

PATIENT-PROSTHESIS MISMATCH POST-IMPIANTO DI TAVI VALVE-IN-VALVE: RISULTATI CLINICI ED EMODINAMICI IN CONFRONTO CON PROTESI SUTURELESS

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Background. La scelta dell'approccio, chirurgico o transcatetere, in caso di protesi biologiche valvolari aortiche degenerate è un tema aperto visto il rischio elevato di questi pazienti, i nuovi device e le possibili conseguenze legate al patient-prosthesis mismatch (PPM).

Metodi. Dal 2010 sono state impiantate 343 protesi transcatetere (TAVI) e 220 sutureless. Di questi, 6 TAVI e 8 sutureless erano già stati sottoposti a sostituzione valvolare aortica (SVA) con protesi biologica ed indicazione alla sostituzione per degenerazione protesica. I pazienti TAVI hanno ricevuto una procedura valve-in-valve (VinV) mentre ai pazienti sutureless è stata rimossa l'intera protesi in caso di modelli stented o solo i lembi degenerati in caso di protesi stentless/homografts.

Risultati. L'età media era 78.7 ± 3 anni in sutureless e 80.2 ± 2.3 in TAVI ($p=0.35$). Log-EuroSCORE 36.4 ± 24.1 e 33.8 ± 13.8, rispettivamente ($p=0.81$). Non sono stati registrati decessi ospedalieri. Degenza in terapia intensiva ed ospedaliera 5.6 ± 5 vs 2.3 ± 2 giorni ($p=0.,16$) e di 15 ± 8 vs 10.8 ± 2.9 giorni ($p=0.25$), rispettivamente per sutureless e TAVI. Al follow-up (21 ± 13 mesi) nessun paziente è stato perso né sono stati registrati decessi. La qualità della vita (questionario EQ-5d) ha registrato un miglioramento del 65% in sutureless e del 67% in TAVI ($p=0.82$). Al controllo ecocardiografico al follow-up non sono stati registrati casi d´insufficienza intra-protesica né paravalvolare. Nel gruppo sutureless, 1 paziente aveva PPM moderato (EOAi 0.82 cm^2/m^2) e 7 assenza di PPM. Nel gruppo TAVI sono stati registrati 2 PPM severo (EOAi 0.59 e 0.61 cm^2/m^2) e 3 PPM moderato (EOAi 0.67; 0.7; 0.7 cm^2/m^2). In media 0.96 ± 0.08 cm^2/m^2 in sutureless vs 0.71 ± 0.15 cm^2/m^2 in TAVI ($p=0.001$).

Conclusioni. La SVA con sutureless e l'impianto TAVI VinV sono entrambe strategie efficaci in caso di reintervento per una protesi aortica biologica degenerata. La significativa differenza in termini di fenomeno PPM, mai presente in caso di protesi sutureless, potrebbe favorire la scelta chirurgica in pazienti con protesi di diametro piccolo al primo intervento.

Mitral valve 2

C103

LONG-TERM RESULTS OF ON-X MITRAL PROSTHESIS: A SINGLE-CENTER EXPERIENCE

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Objective. The aim of this retrospective study was to evaluate the results of On-X mitral prosthesis at mid-term follow-up.

Methods. From April 2002 to April 2014, 123 On-X prostheses were implanted in mitral site for both functional and organic mitral valve disease. Mean age was 63±9 years. 76 out of patients were female. Mitral valve stenosis was present in 83 cases (mild 13; moderate 25; severe 45). Mitral valve was regurgitant in 112 patients (mild 23; moderate 23; severe 66). Tricuspid regurgitation was also present in 107 cases (mild 52; moderate 33; severe 22). Average ejection fraction (EF) and pulmonary artery pressure (PAPs) were 55 ± 9% and 48 ± 16 mmHg, respectively. In 3 cases, EF was <35%. Pulmonary hypertension (PH) was moderate in 78 (62%) and severe in 35 (28%). Other surgical procedures were added in 92 cases.

Results. Early mortality was 7.9% (10 cases). Median follow up was 61 (32-92). Long-term survival was 86±3. One case underwent heart transplantation after 41 months; one case underwent reoperation due to mitral prosthesis severe leakage after 86 months; 7 patients complained heart failure symptoms and just 1 case experienced a stroke episode. Long-term event free survival was 73 ± 4. At late echocardiographic control, 2 cases showed mild leakage without hemolysis and other symptoms. Mean gradient over On-X prosthesis was 5 ± 2 mmHg, peak gradient was 12 ± 5 mmHg. EF was 60 ± 8% and PAPs was 35 ± 10 mmHg.

Conclusions. Mitral On-X prosthesis provided good long-term clinical and echocardiographic results, showing a very low rate of hemorrhagic/thromboembolic events.

C104

MITRAL VALVE REPAIR VERSUS REPLACEMENT IN THE ELDERLY AND FRAIL PATIENTS AGED 75 YEARS OR OLDER: STILL AN UNSOLVED DILEMMA

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Background. Mitral valve repair (MVRe) has overall demonstrated advantages over replacement (MVR). Complex MVRe however might impair myocardial protection and enhance the drawbacks of a long cardiopulmonary bypass time, thus affecting the outcomes in elderly frail patients. We compare MVRe to MVR in patients older than 75 years evaluating survival, functional health and self-perception of well-being.

Methods. Between January 2000 and December 2010, 113 consecutive patients aged ≥75 years (median 78, range 75-87 years) underwent MVRe (40 patients, 35%) or MVR. The 5-item Cardiovascular Health Study frailty scale was comparable between the two groups (MVRe 1.3 ± 2.1, MVR 1.4 ± 1.1, p=NS). Mean 100% complete follow-up was 53.7 months. Quality of life was assessed by SF-12 test.

Results. In-hospital mortality was 0% in MVRe vs 8.2% in MVR group (p=NS). Propensity score was used to adjust for observed confounders. At logistic regression analysis age ($p=0.0493$), EF <40% ($p=0.0259$) and cross-clamp time ($p=0.0166$) increased the risk for in-hospital mortality whereas type of procedure did not (p=NS). Survival at 5 and 10 years was 80.7 ± 6.7% and 50.5 ± 11.6% for MVRe and 66.6 ± 6.5% and 38.6 ± 10.4% for MVR, respectively ($p=0.4064$, and $p=0.3510$). No differences were observed for Physical (40.4 ± 5.7 vs 38.6 ± 7.8, $p=0.3067$) and Mental Health Composite Scores (48.3 ± 12.1 vs 49.2 ± 10, $p=0.7531$) between MVRe and MVR groups, respectively.

Conclusions. In patients over 75 years of age MVRe and MVR achieve similar early results. Likewise, no significant differences in terms of survival and quality of life can be observed between the two procedures at mid-term follow-up.

C105

LA CHIRURGIA RIPARATIVA DELL'INSUFFICIENZA MITRALICA DEGENERATIVA: 14 ANNI DI ESPERIENZA CON L'EDGE-TO-EDGE

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Background. Tra le numerose tecniche riparative della valvola mitrale, quella dell'egde-to-edge (E2E) è semplice, riproducibile ed efficace. Riportiamo la nostra esperienza clinica con questa tecnica nella chirurgia riparativa dell'insufficienza mitralica (IM) degenerativa.

Metodi. Dal maggio 1999 al luglio 2013, 137 pazienti con una IM degenerativa sono stati sottoposti a riparazione valvolare mediante E2E, in sternotomia o minitoracotomia destra (13.1%). L'età media era 57.7 ± 14.1 anni e il 62.7% erano maschi. L'EuroSCORE logistico medio era 8.9 ± 8.8 ed il 24% erano in FA. Intraoperatoriamente, l'IM era data da una disfunzione del lembo anteriore, posteriore o di entrambi, in 34 (24.8%), 20 (14.6%) e 80 (58.4%) pazienti rispettivamente. In 3 pazienti l'IM era secondaria ad una

dilatazione dell'anulus mitralico. L'E2E era paracommissurale in 15 pazienti (10.9%), "rescue" di un'altra tecnica riparativa in 12 (8.8%). Una anuloplastica con anello è stata aggiunta in 133 pazienti (97%). In 18 pazienti (13.1%) è stata effettuata una maze concomitante.

Risultati. La mortalità operatoria è stata di 7 pazienti (5.1%) e per cause non legate alla tecnica. Nell'immediato postoperatorio 2 pazienti sono stati rioperati per un SAM. Il follow-up medio (96.8% dei pazienti) è stato di 6.4 ± 4.2 anni (range: 6 mesi-14.6 anni). Dei 4 pazienti (3.1%) deceduti a distanza nessuno era stato sottoposto a un E2E "rescue". 3 pazienti (2.3%) sono stati rioperati per una IM severa. A 14 anni, la libertà attuariale da decesso o reintervento era 94.8 ± 2.7% e 92.7 ± 4.2% rispettivamente. Tra i pazienti sopravvissuti, 114 (97.4%) erano in I-II CF NYHA, 110 (94%) avevano una IM residua assente o lieve e 7 (6%) moderata.

Conclusioni. L'E2E, nella nostra esperienza, è indicata nei casi in cui una tecnica riparativa convenzionale sia di difficile esecuzione o sia fallita. A lungo termine, oltre agli ottimi risultati sulla sintomatologia clinica e sul grado di insufficienza, abbiamo ottenuto una mortalità ed un tasso di reintervento accettabili.

C106

RECURRENT MITRAL VALVE REGURGITATION AFTER REPAIR IN NON-ISCHEMIC MITRAL VALVE DISEASE: A SINGLE-CENTRE EXPERIENCE

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Background. Mitral valve repair (MVRep) is the standard-of-care in correction of mitral regurgitation (MR). Little is known regarding the outcome for failed MVRep. We report our 9-year experience in MVRep reoperation.

Methods. Between October 2004 and July 2013, 45 patients (M/F 24/21) underwent reoperation for recurrent MR. Mean age at first and second intervention was 56 ± 13 and 66 ± 12 years with a median freedom from reoperation of 4 years. Mean pre-operative LVEF at first and second operation were 63 ± 8% and 58 ± 9%. The leading cause was valve-related in 20 patients and procedure-related in 25. The indication for the second intervention is shown in Table 1.

Results. At reoperation, 26 (58%) patients underwent re-repair and 19 patients (42%) mitral valve replacement (MVR), biological/mechanical 10/9. During re-repair, a modification of the annuloplasty was performed in 18 (69%) patients, for a total of 13 anterior and 5 posterior leaflet procedures. Concomitant procedures included 6 CABG, 4 AVR and 10 TVRep. Mean cross-clamp time was 105 ± 45 min. There was no operative mortality, in-hospital-mortality was 2% after MVR. At follow-up, there were two deaths after MVR due to heart failure. Three patients underwent a third surgery for failure of the re-repair. At the latest follow-up 40 patients (89%) presented mild-MR and NYHA less than II. At echocardiography, LVEF and LVDVi were 56 ± 10% and 66 ± 23 ml in re-MVRep, 52 ± 13% and 62 ± 26 ml in MVR group. The 1- and 5-year freedom from reoperation rates were 90% and 74% in MVRep and 100% in MVR group.

Conclusions. In case of failure of MVRep, re-repair is feasible with good early and mid-term results.

Table 1. Indications for reoperation.

	Overall (n=45)	Re-repair (n=26)	Replacement (n=19)
Regurgitation ≥3+	38 (84%)	22 (84%)	16 (84%)
Hemolysis	1 (2%)	0	1 (5%)
SAM	1 (2%)	1 (4%)	0
Endocarditis	6 (13%)	4 (15%)	2 (10%)
Stenosis ≥ 2+	7 (15%)	1 (4%)	6 (32%)

C107

FIVE-YEAR CLINICAL AND ECHOCARDIOGRAPHIC FOLLOW-UP OF A SEMIRIGID ANNULOPLASTY BAND: SORIN MEMO 3D

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Background. Annuloplasty with rings or bands is a key principle of mitral valve repair. Semirigid devices aim to preserve a more physiological annular motion in order to improve hemodynamics and ventricular remodeling. We assessed clinical and echocardiographic outcomes following mitral repairs completed with the implantation of a semirigid annuloplasty band (Sorin Memo 3D, Sorin Biomedica, Saluggia, Italy).

Methods. Between January 2007 and June 2008, 63 mitral repairs at one single institution (Ospedale Civile, Legnano, Milan) were completed with the implantation of a semirigid annuloplasty band (Sorin Memo 3D, Sorin Biomedica, Saluggia, Italy). Etiology of regurgitation was both degenerative (43 patients, 68.3%) and functional (20 patients, 31.7%). The most common alterations were a posterior leaflet prolapse or a restricted systolic motion of the P3 scallop. Combined procedures were not an exclusion criterion. In September 2013, surviving patients underwent clinical and echocardiographic follow-up.

Results. Two patients did not survive hospitalization (death not device-related). At a mean follow-up of 68.5±4.7 months, three patients had died (two for malignancy and one for cardiac death, not device-related) and two were lost. Freedom from reoperation was 98% (one replacement for endocarditis). Four strokes were reported (7%). At echocardiographic examination, no grade III or higher regurgitation was registered, while 37 patients (67.3%) had no regurgitation. Mean left ventricle end-systolic diameter had decreased from 39.7 ± 6 mm to 30.5 ± 6.2 mm. Mean left ventricle end-diastolic diameter had decreased from 59.3 ± 6.9 mm to 48.2 ± 7.1 mm. Mean left atrium diameter had decreased from 53.5 ± 5.5 mm to 46 ± 9.2 mm. Mean pulmonary artery systolic pressure had decreased from 44.8 ± 7.1 mmHg to 32.5 ± 6.2 mmHg. Mean ejection fraction had increased from 46.9 ± 12.9% to 58.6 ± 8.3%.

Conclusions. At mid-term follow-up, Sorin Memo 3D semirigid band appears a safe and effective device for mitral valve repair. The repairs appear stable over time and echocardiographic measurements confirm the positive left heart remodeling with improvement of cardiac function.

C108

PROLASSO MITRALICO BILEMBO DA MALATTIA DEGENERATIVA. L'INFLUENZA DELLE TECNICHE CHIRURGICHE SUI RISULTATI A LUNGO TERMINE

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Background. Scopo dello studio è stato quello di valutare l'influenza della tecnica chirurgica utilizzata (riparativa vs sostitutiva) sui risultati a lungo termine nei pazienti con prolasso mitralico bilembo da malattia degenerativa.

Metodi. Dal 2001 al 2012, 421 pazienti sono stati sottoposti ad intervento per prolasso mitralico bilembo da malattia degenerativa. La terapia conservativa è stata impiegata in 146 pazienti (34.7%) (gruppo VMR), e quella sostitutiva in 275 (65.3%) (gruppo VMS). Questi ultimi sono stati divisi in 2 sottogruppi: VMS sottogruppo A operati conservando routinariamente l'apparato sottovalvolare posteriore e in casi selezionati l'anteriore o entrambi (119 pazienti, 43.3%), e VMS sottogruppo B senza conservazione dell'apparato sottovalvolare (156 pazienti, 56.7%). I pazienti del gruppo MVS erano più anziani (70 ± 12 vs 56.4 ± 14.5 anni) rispetto a quelli del gruppo VMR.

Risultati. Nel gruppo VMR, 5 pazienti sono deceduti (3.4%) e 6 pazienti (4.1%) sono stati sottoposti a VMS per insufficienza mitralica recidiva; 11 pazienti del gruppo SVM sono stati rioperati (4%). Sono deceduti 11 pazienti SVM sottogruppo A (9.2%) e 29 pazienti SVM sottogruppo B (18.6%). I pazienti del gruppo MVR hanno dimostrato nel periodo post-operatorio una significativa riduzione dei diametri tele-diastolici (DTD) e tele-sistolici (DTS) del ventricolo sinistro. Anche la massa ventricolare sinistra ha dimostrato una significativa regressione durante i primi 4 anni conservata nel corso del follow-up; la frazione d'eiezione (FE) del ventricolo sinistro ha mostrato nel contempo un significativo miglioramento. Nel gruppo SVM sottogruppo A i DTD si sono inizialmente ridotti mentre nel gruppo SVM sottogruppo B i DTD e i DTS sono invece costantemente aumentati con un netto peggioramento della FE. Tali dati si sono dimostrati statisticamente significativi.

Conclusioni. Nei pazienti affetti da prolasso mitralico bilembo da malattia degenerativa quelli trattati con tecnica VMR conseguono una migliore performance degli indici della contrattilità ventricolare sinistra rispetto a quelli trattati con tecnica VMS associata ad una migliore sopravvivenza a breve e lungo termine. Ogniqualvolta VMR è irrealizzabile, si raccomanda la conservazione dell'apparato sottovalvolare nei pazienti sottoposti a VMS per ridurre il rischio di mortalità precoce e tardiva e migliorare la FE.

C109

MITRAL VALVE REPAIR FOR DEGENERATIVE MITRAL VALVE REGURGITATION: IS THE SUTURE TECHNIQUE STILL ADEQUATE IN THE RING ERA? A SIX-YEAR EXPERIENCE

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Background. Mitral suture annuloplasty was introduced in the fifties, but in the last thirty years the ring annuloplasty, because of its relative ease of execution, high reproducibility and excellent results, is fully accepted as gold standard surgical treatment for degenerative and functional mitral valve disease. This study aims to evaluate if mitral circumferential annuloplasty by suture is still a valid alternative to ring annuloplasty.

Methods. Between June 2002 and May 2008, 91 patients with isolated severe mitral valve regurgitation due to degenerative mitral valve disease underwent mitral valve repair. Valve anatomy, annulus size and cardiac function were carefully assessed by pre-operative echocardiography. Through median sternotomy, 46 patients underwent mitral annuloplasty by prosthetic ring (group I) and 45 patients (group II) underwent mitral suture annuloplasty. No differences existed between the groups in terms of pre-operative patient profile. We compared the mid-term echocardiographic and clinical outcomes.

Results. The mean age was 60 ± 13 years in Group I, 64 ± 10 years in Group II and logistic EuroSCORE was 3 ± 2.1 and 2.4 ± 1.5, respectively. In group I 72% (33) of patients underwent single mitral ring annuloplasty and 28% (13) of patients underwent mitral ring annuloplasty with P2 quadrangular resection, we used MRS mitral ring and Physio mitral ring in 95.7% (44) and

4.3% (2) of the first group patients, respectively. The mean follow-up was 30 ± 14 months in group I and 31 ± 12 months in group. Follow-up echocardiographic assessment showed 17.8% (8) of patients in group II a recurrence of a moderate-severe mitral regurgitation (≥2/4), instead in group I 4.4% (2) of patients showed a residual moderate mitral regurgitation (=2/4) but no recurrences of severe mitral insufficiency was observed. At the follow-up clinical assessment was observed NYHA III/IV status in 11% (5) and 2.2% (1) of patients of group II and group I, respectively.
Conclusions. Mitral annuloplasty by prosthetic ring is superior to suture mitral annuloplasty for the surgical treatment of mitral valve degenerative regurgitation in the mid-term echocardiographic and clinical outcomes.

C110

LONG-TERM FOLLOW-UP OF MITRAL VALVE SURGERY IN PATIENTS WITH SEVERE LEFT VENTRICULAR DYSFUNCTION IN ISCHEMIC AND DILATED CARDIOMYOPATHY

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Background. In this study we retrospectively compare the results of MV surgery for the treatment of functional mitral regurgitation (MR) in advanced dilated (DCM) and ischemic cardiomyopathy (ICM).
Methods. Between 2000 and 2013, 102 patients with severe functional MR and LVEF <30% underwent mitral surgery. In ICM group more patients with diabetes (43 vs 12%, p=0.01), peripheral vascular disease (31 vs 12%, p=0.03) and IABP pre-op (32 vs 9%,p=0.009). LV dimensions were different: indexed LV end-diastolic volume (iLVEDV) and indexed LV end-systolic volume (iLVESV) were smaller in ICM patients (80 ± 19 vs 99 ± 25 ml/m², p<0.001 and 57 ± 15 vs 73 ± 26 ml/m², respectively, p<0.001). EuroSCORE was not different (29 ± 16 vs 24 ± 14, p=0.07). MV repair rate was similar in both group (72% vs 73%, p=0.8). CABG was performed in all ICM patients (mean 2.1 ± 1.3).
Results. Actuarial survival at 1 month, 2, 5 and 8 years was (%) 93 ± 3 vs 97 ± 3 (p=0.02), 82 ± 5 vs 93 ± 5 (p<0.02), 72 ± 6 vs 75 ± 8 (p=0.14) and 67 ± 7 vs 61 ± 10 (p=0.05) in ICM group and in DCM group, respectively. At echo follow-up (mean 5.0 ± 3.7 years) there was a significant similar increase in LVEF (ICM, from 27 to 40%, p<0.01; DCM from 28 to 39%, p<0.01) and significant reduction in LV dimension (p<0.05) in both groups. At multivariate analysis, pre-operative iLVEDV >85 ml/m² (HR 2.1, CI 1.2-6.7, p=0.033) and iLVESV>68 ml/m² (HR 3.8, CI 1.5-6.9, p=0.009) were strong predictors of mortality. Freedom from moderate MR was correlated with outcome: survival with no MR was 85 ± 5% and 69 ± 13% for moderate MR patients (p=0.04).
Conclusions. Mitral valve surgery can be performed with acceptable outcomes in patients with end-stage cardiomyopathy. DCM patients have better in-hospital but worse long-term survival. Residual valve regurgitation more frequent in DCM group could explain the trend to worse outcome at follow-up.

C111

MITRAL VALVE REPAIR FOR FUNCTIONAL MITRAL REGURGITATION: IS THERE ANY PLACE FOR NON-CONVENTIONAL ANNULOPLASTY?

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Objective. Mitral annuloplasty (MA) with a ring or a band is the golden standard for the treatment of functional mitral regurgitation (FMR). In this retrospective study we investigate the long term results of MA where non conventional strategies (autologous pericardium or suture annuloplasty) were used.
Methods. From June 1993 to June 2004, 182 patients underwent MA for FMR (ischemic 65%; non-ischemic 35%); in 132 cases a strip of autologous pericardium was used whereas in 50 cases a suture annuloplasty was performed. End-diastolic volume (EDV) and end-diastolic volume were118 ± 38 ml/m² and 76 ± 32 ml/m²; EF was 34 ± 11%. FMR was 2+ in 28%, 3+ in 39% and 4+ in 33% of cases.
Results. Thirty-day mortality was 6.0%. Median follow-up time was 120 (IQR 37-148). Overall survival was 68%, 59% and 47% at 5, 10 and 15 years. Freedom from cardiac deaths was 73%, 64% and 55%; freedom from cardiac events was 62%, 52% and 40%. At follow-up NYHA class improved in 67%, remained unchanged in 25% and worsened in 8% of cases, being 80% of survivors in NYHA class I-II. One hundred thirty-three patients had an echocardiographic evaluation, which showed lower EDV (from 121 ± 34 to 108 ± 40, p=0.005) and ESV (from 75 ± 30 to 68 ± 32, p=0.007), higher EF (from 35 ± 11 to 40 ± 13, p=0.001). FMR reduced from 3.1 ± 0.8 to 1.2 ± 0.9 (p=0.001).
Conclusions. Non conventional strategies for MA provides good long-term clinical and echocardiographic results.

C112

A NEW TECHNIQUE TO CORRECT POSTERIOR LEAFLET PROLAPSE, THE U TECHNIQUE. EARLY RESULTS FROM A MULTI-INSTITUTIONAL STUDY

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Background. A new technique for correction of posterior leaflet (PL) prolapse without resection or use of artificial chordae (U technique, U: uniscallop) was applied in many Institutions. The early results are herein reported.
Methods. From November 2013 to February 2014, 43 patients with either isolated PL prolapse (n=33) or bileaflet prolapse (n=10) with (n=13) or without (n=30) rupture underwent repair, using the U technique, based only on scallop suture without resection or artificial chordae application. The annulus was always reshaped using different rings or bands, with the aim to over-reduce it. Median sternotomy was used in 32 cases, a small right thoracotomy in 10 and a robotic approach in 1. Postoperative echocardiography was performed in all patients at discharge.
Results. Mean age was 53 ± 9 years and EF was 56 ± 7%. Mean MR grade (1 to 4) was 3.8 ± 0.5. There was one in-hospital death due to pneumonia (2.3%). No patient showed systolic anterior motion. At discharge, mean EF was 55 ± 8%. Mean EF was 0.1 ± 0.3, with 4 patients showing MR grade 1. All patients who underwent non-sternotomy approaches had no residual MR.
Conclusions. Although the rationale for the use of the U technique is different from what is generally accepted, early results of the U approach are excellent and comparable with those ones from conventional techniques. Its simplicity can increase the rate of repair of PL prolapse especially in minimally invasive approaches.

C113

EARLY AND LONG-TERM OUTCOMES OF MINIMALLY INVASIVE MITRAL VALVE SURGERY THROUGH RIGHT MINITHORACOTOMY: A TEN-YEAR EXPERIENCE

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Background. To describe the early and long-term outcomes of patients undergoing minimally invasive mitral valve surgery (MIMVS) through right minithoracotomy (RT) over a 10-year period.
Methods. From September 2003 to December 2013, a total of 1604 consecutive patients underwent MIMVS through RT.
Results. The mean age was 63 ± 13 years, 770 (48%) patients were female and 218 (13.6%) had previous cardiac operations. The most predominant pathology was the degenerative disease (n=1114, 70%), followed by functional mitral valve regurgitation (n=191, 12%), rheumatic disease (n=151, 9.4%), endocarditis (n=80, 5%) and prosthetic dysfunction (3.2%). Mitral valve repair was performed in 1137 (71%) patients and 476 (29%) had mitral valve replacement. Direct aortic cannulation was achieved in 1325 (83%) patients. Among the degenerative disease, rate of mitral valve repair was (82%, n=932). Repair techniques included annuloplasty (95%), leaflet resection (63%), neochordae implantation (16%) and sliding plasty (11%). Concomitant procedures included tricuspid valve repair (n=234, 14.6%), atrial fibrillation ablation (n=152, 9.5%) and atrial septal defect closure (n=51, 3.2%). Overall in-hospital mortality was 1.1% (n=19, predicted median EuroSCORE 6%, range interquartile 3-14%). Thirty-four patients (2.1%) had conversion to sternotomy. Incidence of stroke was 2% (n=32). Overall survival at 10 years was 88 ± 2%. Freedom from reoperation at 10 years was 94 ± 2% for repair and 80 ± 6% for replacement. Freedom from recurrent mitral regurgitation ≥3+ at 10 years was 90 ± 3%.
Conclusions. Minimally invasive mitral valve surgery is a safe and reproducible approach associated with low mortality and morbidity, high rate of mitral valve repair and excellent late results.

C114

MINIMALLY INVASIVE VIDEO-ASSISTED MITRAL VALVE SURGERY: RESULTS OF A TAILORED APPROACH IN 624 CONSECUTIVE PATIENTS

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Background. Endodirect aortic cannulation technique allows both antegrade arterial perfusion and insertion of an EndoClamp aortic catheter into the ascending aorta. This approach may eliminate complications associated with the standard femoral artery cannulation.
Methods. From November 2005 to March 2014, 627 consecutive minimally invasive mitral valve procedures were performed at our Institution. In 65 patients (10.4%) aortic cannulation and clamping were achieved through the Endodirect kit. Relative indications for direct aortic cannulation included:

aortic and peripheral arterial disease. Relative contraindications included: significant dilation of ascending aorta (>45 mm), porcelain aorta, severe chest deformity, inability to obtain or maintain one lung ventilation and severe adhesion in redo surgery.

Results. The mean age was 69.1 ± 9.5 and 24.6% (16/65) of the patients were female. Mean logistic EuroSCORE was 9.8 ± 13.2 and 26.1% (17/65) of the patients had undergone previous cardiac surgery. Mitral valve repair was performed in 48 patients (73.8%). Seventeen patients (26.2%) underwent MV replacement. Concomitant procedures included: 2 tricuspid valve annuloplasty (3.1%) and 4 atrial septal defect closure (6.1%). Mean duration of cardiopulmonary bypass was 113.1 ± 26.0 minutes. The mean cross-clamp time was 83.6 ± 20.8 minutes. Conversion to sternotomy occurred, because of aortic tearing, only in 1 patient (1.5%). No cases of endoClamp migration occurred during surgery.

Conclusions. Direct aortic cannulation should expand the pool of patients eligible for port-access operations also in case of absolute contraindications to peripheral artery access such as severe peripheral vascular disease. Moreover, it allows the avoidance of complications associated with retrograde perfusion and femoral artery cannulation.

C115

MINIMALLY INVASIVE SIMPLE VERSUS COMPLEX MITRAL VALVE REPAIR

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Background. Complex mitral valve repair is technically challenging, especially in case of port access approach. In this study we compare outcomes of patients undergoing simple versus complex repair in degenerative mitral valve disease through a minimally invasive video-assisted access.

Methods. Between January 2006 and March 2013, 329 patients with degenerative mitral valve disease underwent port access mitral valve surgery. 42 patients underwent mitral valve replacement, while 284 underwent mitral valve repair. Taking into account that 13 patients had undergone previous mitral valve repair, thus not eligible for re-repair the repair rate is 89.9%. Simple MV repair (SMR), defined as ring annuloplasty with or without quadrangular posterior mitral leaflet (PML) resection and with or without sliding or folding, was performed in 184 cases (64.8%). The remaining 100 patients (35.2%) underwent complex MV repair (CMR) by means of either anterior mitral leaflet (AML) or PML chordal transposition or neochordal positioning, AML patch positioning and papillary muscles shortening with or without additional procedures as described for the SMR.

Results. Operative bypass and clamp times were significantly longer in the complex versus simple MV repair group. Early and 5-year post-operative echocardiographic analysis showed 8 patients in the simplex MV repair group and 3 patients in the complex MV repair group with greater than grade 2 MV regurgitation. No statistical differences were observed in terms of survival and freedom from re-operation at 5 years.

Conclusions. Minimally invasive approach does not limit the possibility of a good and appropriate mitral valve repair. It ensures a better vision of the mitral valve allowing more complicated valve repair. Complex MV repair is safe, feasible and reproducible with port access approach with excellent early and long-term outcomes.

C116

EARLY OUTCOMES IN MINIMALLY INVASIVE MITRAL VALVE SURGERY AND DEPRESSED EJECTION FRACTION: AN 8-YEAR EXPERIENCE

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Background. The beneficial effect of minimally invasive mitral valve surgery (MIMVS) has been well documented in patients with normal left ventricular ejection fraction (LVEF). However, few studies have examined outcomes of MIMVS in patients with depressed LVEF. The aim of our study was to evaluate our experience with MIMVS in patients with LVEF <35%.

Methods. From June 2004 to December 2012, 1240 patients underwent MIMVS. Of these, 63 patients had a LVEF <35%.

Results. Thirty-day mortality was 1.6% with a median predicted EuroSCORE of 14 (interquartile range [IQ] 8-18). Mean age was 69 ± 10 years and mean LVEF was 32 ± 3%. Seven patients (11%) had redo surgery. Functional mitral regurgitation (MR) was present in 30 patients (47%) and degenerative MR in 24 patients (38%). Two patients required surgery for active endocarditis and 3 patients had prostheses mitral valve dysfunction. Thirty-five patients (53%) underwent mitral valve replacement and 28 (44%) patients underwent mitral valve repair. Combined procedures were: tricuspid repair (n=6, 10%) and atrial fibrillation surgery (n=4, 6%). The median ventilation time was 10 hours (IQ range 6-20), as well as the median for intensive care unit and hospital stay was 2 day (IQ range 1-3) and 7 (IQ range 6-9). Two patients had a postoperative stroke, incidence of postoperative atrial fibrillation and blood transfusion was 30% (n=19) and 16% (n=10).

Conclusions. Minimally invasive mitral valve surgery in patients with depressed LVEF is a safe approach and can be achieved with low operative mortality and morbidity.

Endocarditis and infections

C117

NEGATIVE PRESSURE IN THE TREATMENT OF DEEP STERNAL WOUND INFECTION: FROM INFANCY TO OLD AGE. A SINGLE CENTER EXPERIENCE

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Background. To review our experience in the treatment of deep sternal wound infections (DSWI) with topical negative pressure.

Methods. Between October 2004 and February 2014, 11240 patients underwent cardiac surgery through a full median sternotomy at our institution (8488 cases in the adults, 2752 cases in pediatric or neonatal age). Deep sternal wound infection occurred in 101 patients (0.89%; 71 adults, 63 male, 38 female). Mean age was 63 ± 25 years (range 6 days-79 years). In adults, cardiac diseases leading to operation included: 48 coronary artery disease, 10 aortic valve disease, 6 mitral valve disease, 7 cardiomyopathies; in newborn/children: 12 transposition of the great arteries, 1 hypoplastic/single ventricle, 6 tetralogy of Fallot, 6 interventricular septum defect, 5 aortic coarctation. Diabetes and obesity coexisted in 41 adults, the internal mammary artery had been harvested in 48. The mean interval between operation and infection was 27 ± 14 days. Most frequent pathogens were: Staphylococci aurei in 33%, epidermidis 26%.

Results. One adult patient and one pediatric patient died during DSWI treatment (1.98% mortality). Causes of death were multi-organ failure and low output syndrome respectively. The median healing time was 14 ± 5.5 days in adults (range 7-30 days), 14± 2.3 in pediatric patients (range 11-18 days). DSWI did not recur following VAC treatment in any case. Mean hospital stay was 29 ± 12 days in the adult, 29 ± 11 in the pediatric age.

Conclusions. Negative pressure wound therapy improves the prognosis of post-sternotomy DSWI, reduces the risk of reinfection and the time needed for wound healing. It can be considered the first choiche approach for post-sternotomy DSWI.

C118

TRATTAMENTO DELLA MEDIASTINITE MEDIANTE PLACCHE ESTERNE DI VENTROFIL

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Background. La mediastinite è una temuta complicanza degli interventi cardiochirurgici con un'incidenza dell'1-2%, una mortalità del 10%-30% indipendentemente dalla tecnica utilizzata per la resintesi. Convinti che l'assenza di materiale estraneo alla ferita sia un presupposto per favorire l'eradicazione dell'infezione, abbiamo introdotto una tecnica originale che prevede la rimozione di tutti i fili di acciaio e l'accostamento dello sterno e dei tessuti sottocutanei tramite l'applicazione di placche esterne (Ventrofil® suture set; Aesculap Braun), senza riposizionare i fili sternali.

Metodi. La tecnica consiste nella rimozione dei fili sternali e di tutte le suture soprasternali precedenti, curettage, resintesi della ferita mediante 4 placche esterne posizionate lateralmente ai margini della ferita (2 per lato), unite da un filo di acciaio, passato nel sottocute sopra il piano sternale. Dopo un periodo minimo di 2 settimane di antibiotico terapia mirata placche e fili vengono integralmente rimossi. Da Gennaio 2010 a Febbraio 2014, sono stati così trattati tutti i pazienti cardiochirurgici in cui si è sviluppata una infezione sternale profonda (15/1830, 0.8%, età media 72 anni, range 52-88).

Risultati. In nessun paziente è stato necessario il ricovero in terapia intensiva dopo la procedura. La guarigione completa, intesa come integrità cutanea e assenza di instabilità sternale, si è verificata in tutti i pazienti tranne uno, che ha sviluppato una deiscenza superficiale della ferita, estesa per circa 4 cm (guarito in 30 giorni con l'ausilio della "vacuum therapy" domiciliare). Le placche sono state rimosse in media dopo 18 giorni (range 14-21), la degenza media ospedaliera è stata di 24 giorni (range 15-34).

Conclusioni. I risultati di questa esperienza sembrano incoraggianti, crediamo che questa nuova tecnica chirurgica, che si è rivelata sicura, veloce e ripetibile, possa essere considerata una ragionevole alternativa ai tradizionali trattamenti delle mediastiniti.

C119

STERNAL PLATING IN COMPLICATED STERNAL DEHISCENCE

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Background. Sternal dehiscence is a serious complication after cardiac surgery: it can cause chest pain, respiratory failure and can initiate an infectious process. Sternal re-fixation is often performed by simple rewiring or applying the Robicsek's technique. However, these systems can be ineffective due to the poor bone quality or in presence of extensive sternal fractures. Furthermore, the Robicsek's technique requires an extensive dissection of

the lower face of the sternum that may be dangerous in the presence of grafts running below the bone, especially after many months from the first operation. The sternal closure systems with titanium plates have been proposed to treat the complicated sternal dehiscence. We describe our experience in sternal plating in complex cases in which the usual techniques have failed or in the presence of grafts adherent to the lower surface of the sternum.

Methods. We applied the titanium sternal plating (RPS, Tuttlingen, Germany) in nine patients (69 ± 9 years old, 67% male). Two patients had a severe chronic obstructive pulmonary disease, and five had diabetes. The mean BMI was 29 ± 3. Seven patients had undergone CABG (in all cases the left mammary artery was used, and one patient had the two mammary arteries harvested) and two AVR. Four patients already underwent an ineffective Robicsek's reconstruction. A 72-year-old woman with an initial post-CABG good sternal healing developed a bone instability following a chest trauma. The interval between the cardiac procedures and the sternal plating was 13 ± 10 months.

Results. The postoperative early and late course was uneventful in seven patients. One patient experienced an initial superficial wound dehiscence, which resolved with dressings. The post-trauma patient has a partial detachment of plaques with residual pain and motility and is awaiting a new surgical procedure. There were no instances of mediastinitis.

Conclusions. Sternal plating is effective in the stabilization of the chest wall in complex cases, avoiding the need for extensive dissection.

C120

THE "U JAILED" STICH, A NOVEL TECHNIQUE FOR STERNAL CLOSURE

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Background. Sternal dehiscence adds to major morbidity and mortality after sternotomy. Sternal dehiscence invariably leads to additional surgical procedures and may be life-threatening when associated with mediastinitis and sepsis. The technique of sternal closure is important and yet has not changed significantly over time. We describe a simple technique for sternal closure that does not require special equipment, is cost effective and provides secure closure.

Methods. This technique provides of a "U" stich placed in parasternal fashion. Needle is then crossed under the loop to jail and fix the wire under tension, and twisted together in the middle of the sternum to form the final cabled knot. In this way sternal edges are approximated avoiding tension on every single wire. The "U jailed" technique was used in 95 patients underwent full midsternotomy.

Results. One patient experienced a sternal click with cough 2 months postoperatively. No incidence of sternal dehiscence has occurred in any patient.

Conclusions. The "U jailed" sternal closure creates a secure closure with a broader point of fixation than simple wire closure. Postoperatively, the sudden increases in intrathoracic pressure that occur with cough or straining are dissipated across a broader area, enhancing stability.

C121

POLYURETHANE FOR A DIFFERENT STRATEGY TO PREVENT STERNAL WOUND INFECTION, A PROSPECTIVE STUDY

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Background. Sternal wound infection is a rare but dangerous complication, several devices are available to treat it but its prevention is still on a behavioural basis. We used to cover the wound with sterile gauge and change it every other day. Aim of this prospective, non randomized, observational study is to test the safety of a different strategy based on a polyurethane medication removed in fifth postoperative day to isolate the wound from ICU environment and to reduce its manipulation.

Methods. Risk factors, surgical aspects and postoperative course were recorded with regard mainly to wound aspects.

Results. 153 consecutive patients from November 2013 to April 2014 underwent a cardiac operation in our institution: 35% pure CABG, 19% mitral, 33% aortic and 13% other as primary procedure. 23 ministernotomies were performed mainly in aortic patients. Polyurethane medication was removed in day 5 (± 1). All wounds were fine at first inspection, we report erythema in two patients, no dehiscence or secretions were noted. 3 patients (1.96%) subsequently developed dehiscence, all recovered. The sternal bone was involved just in one. No mediastinitis occurred.

Conclusions. Polyurethane medication can be safely used for primary prevention of sternal wound complications and can be removed in 5th postoperative day. Its nature can manage eventual mild secretions and removal in 5th day reduces the chances of contamination from environment or department staff. Limits of this study are: no control group, limited amount of patients. A further period is in program.

C122

STUDIO OSSERVAZIONALE DI CONFRONTO TRA L'USO DI UNA MEDICAZIONE AVANZATA RISPETTO AD UNA TRADIZIONALE SULLA FERITA CARDIOCHIRURGICA

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Background. Con questo studio osservazionale ci si è proposti di valutare se l'utilizzo routinario di una medicazione avanzata al posto di una tradizionale, a fronte di un costo maggiore, del materiale, può portare dei benefici sia dal punto di vista gestionale che clinico.

Metodi. Negli ultimi dieci mesi del 2013 la popolazione chirurgica è stata divisa casualmente in due gruppi (risultati omogenei dal punto di vista del rischio preoperatorio). I pazienti del gruppo trattato con medicazione avanzata sono stati sottoposti ad un numero significativamente maggiore di bypass. La monitorizzazione dell'andamento delle ferite è stata eseguita da tutti gli infermieri che hanno seguito i malati e le osservazioni relative sono state raccolte su apposita flowchart.

Risultati. La valutazione assistenziale è stata senz'altro positiva: la medicazione avanzata cambiata ogni 4 gironi ha ridotto il carico di lavoro del personale ed il disagio dei pazienti. Le ferite hanno avuto un andamento significativamente migliore essendosi ridotti tutti quei fenomeni di sierosità, arrossamento e presenza di ematomi che possono contribuire alla comparsa di deiscenze ed infezioni. Pur con numeri molto piccoli nel gruppo di pazienti con medicazione avanzata il verificarsi di problemi maggiori di ferita è stato percentualmente significativamente inferiore.

Conclusioni. La superiorità della medicazione avanzata sembra essere evidente da qualunque punto di vista; se dovesse essere dimostrato anche un effetto protettivo anche nei riguardi delle deiscenze maggiori (con i relativi elevati costi di cura) dovrebbe essere preso in considerazione il suo utilizzo routinario.

C123

TRATTAMENTO DELLE DEISCENZE DI FERITA STERNALE MEDIANTE L'USO DI PRESSIONE TOPICA NEGATIVA

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Background. L'utilizzo della pressione negativa ha avuto ampia diffusione in cardiochirurgia nel trattamento delle deiscenze della ferita chirurgica.

Metodi. Nella nostra Struttura nel periodo gennaio 2010-dicembre 2013 sono stati eseguiti 2231 interventi maggiori e si sono avute 101 deiscenze di ferita sternotomica che hanno richiesto una revisione chirurgica.

Risultati. L'utilizzo della pressione negativa nel loro trattamento è cresciuto da meno del 57% dei casi a più del 73% ed è stato riservato prevalentemente ai casi di deiscenza profonda/mediastinite consentendo di attendere la sterilizzazione della ferita garantendo al paziente una buona qualità di vita e riducendo notevolmente il carico assistenziale.

Conclusioni. L'utilizzo della pressione negativa si è rivelato di facile apprendimento e non ci sono stati eventi avversi di rilievo legati alla procedura L'utilizzo della terapia a pressione negativa ha ridotto la necessità di ricorrere ad interventi di chirurgia plastica maggiore per la ricostruzione della parete toracica anteriore. Il suo utilizzo precoce anche nelle deiscenze più superficiali ha inoltre evitato la recidiva consentendo un notevole risparmio economico in quanto quasi costantemente il ripresentarsi di un problema di ferita è stato accompagnato da una infezione che ha richiesto ricovero e la somministrazione di terapia antibiotica endovena. La mediastinite rimane comunque una patologia gravata da una mortalità significativa di poco inferiore all'8%.

C124

SIMULTANEOUS VALVULAR SURGERY AND SPLENECTOMY IN PATIENTS WITH INFECTIVE ENDOCARDITIS: DIAGNOSTIC AND THERAPEUTIC WORK-UP

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Background. Incidence of embolic complications in infectious endocarditis (IE) is estimated to 3-5%. Splenectomy is recommended in patients with splenic abscess, but differentiation between splenic infarction (SI) and splenic abscess (SA) remains difficult. Current guidelines do not provide a recommendation for a systematic screening of septic embolism. The purpose of this study is to identify the incidence of complications of splenic embolization in patients with IE; to differentiate SI and SA with preoperative imaging and identify the best timing of splenectomy.

Methods. We analyzed 41 consecutive patients who underwent valve surgery for IE at the Department of Cardiac Surgery of "Policlinico" of Bari from January 2011 to January 2014. All patients underwent total-body CT scan. 14 patients with splenic embolization (SE) underwent contrast-enhanced-ultrasonography (CEUS-SonoVue ®) for the morphology evaluation of the ischemic area. Splenectomy was performed in 11 patients while in 3 patients it was not accomplished because preoperative imaging was not suggestive for SA. Splenectomy was always performed in the same operative session, after cardiac surgery. Two groups were considered: patients undergoing isolated cardiac surgery (CCH, n=30), and patients undergoing combined cardiac and splenectomy (CCH + SP, n=11). A telephone follow-up was performed.

Results. Systematic execution of total body CT-scan documented a significantly higher incidence of SE (34.1%) compared with literature (3-5%). Pre-operative, peri-operative and post-operative characteristics were homogeneous. Intra-operative and hospital mortality, the ICU stay and total hospital stay did not different between two groups (mortality 20% vs 9.1%, p=0.6, no patient had a hospital stay >30 days). Telephone follow-up documented the death of three patients.
Conclusions. High incidence of arterial embolization in IE makes it mandatory a systematic search of its occurrence by the execution of diagnostic procedures. Morbidity was similar in the two groups.

C125

SURGICAL TREATMENT OF ACUTE INFECTIVE ENDOCARDITIS

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Background. Surgery for infective endocarditis (IE) is associated with high postoperative mortality and morbidity. Conflicting data are available on late results. We reviewed patients treated surgically for IE at our institution to examine their profile and outcomes.
Methods. We conducted a retrospective review of consecutive patients who underwent surgery for native and prosthetic valve endocarditis (PVE) between January 1, 2006, and March 31, 2014. Survival and complications were evaluated at the end of hospital stay and at last follow-up. The mean follow-up was 36 months and was 95% complete.
Results. 112 patients underwent surgery for IE during the study period (60 ± 16 years, 72% men): 77 (69%) had native valve endocarditis and 35 (31%) had PVE. Many patients were referred to our institution with advanced endocarditis and in poor clinical state: 79 were in NYHA class III-IV and 13 required preoperative OTI. Blood cultures were positive in 62 patients: 2 gram-, 2 fungi, 58 gram+ (29 Staphylococcus species, 11 of them S. aureus). 15 patients had pseudoaneurysm of mitro-aortic intervalvular fibrosa (MAIVFp). Surgical strategy consisted in debridment of all infected tissues, patch reconstruction when needed and valve replacement or repair and regarded 52 aortic valves, 29 mitral valves, 6 tricuspid valves, 14 double valves 11 and aortic roots. There were 16 (14%) 30-day deaths and 6 (5%) late deaths. Age, PVE, emergent surgery, NYHA III-IV, MAIVF had significantly higher 30-day mortality. Five-year cumulative survival was 83 ± 4% and was higher in NV then in PVE (83% vs 52%, p=0.001). Freedom from recurrent endocarditis at 5 years was 92 ± 4%. Staphylococcal endocarditis was not associated with worse outcomes compared with other germ's infections.
Conclusions. Surgical treatment of infective endocarditis is still associated with high early and late mortality and mortality. Age, emergent surgery, heart failure, MAIVFp and PVE are associated with worst outcome. Surgical results are independent of the causative agent.

C126

TRICUSPID REPAIR FOR INFECTIVE ENDOCARDITIS: A SELECTIVE APPROACH

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Background. Surgical treatment of infective tricuspid endocarditis can be performed by valve repair or replacement surgery. We report our retrospective experience in the treatment of infective tricuspid endocarditis with valve repair.
Methods. From January 1981 through February 2014, 702 patients were operated in our institution for infective valve endocarditis, with tricuspid involvement in 74 cases. Tricuspid valve repair was performed in 27 patients whose valves had infective lesions involving a single leaflet. One goal of the repair was to avoid implanting any prosthetic material. In 15 patients a wide quadrangular resection of the anterior leaflet and De Vega annuloplasty was performed. In 12 cases the vegetations involved the posterior leaflet of the tricuspid valve and a complete leaflet excision associated with annuloplasty was performed.
Results. There was no difference among groups in terms of operative characteristics (mean number of grafts: 2.4 ± 7 in group A, 2.2 ± 7 in group B, 2.2 ± 8 in group C; p=0.55). There was no significant difference in terms of bleeding between aspirin-responsive and aspirin-resistant group A patients. This difference was significant only at 6 hours in group B patients (280 ± 137 vs 441 ± 291 mL; p=0.03), with no difference at 12 and 24 hours. Group C patients showed significant differences in blood loss amounts at all three time-points according to aspirin test responsiveness (at 6 hours: 210 ± 121 vs 397 ± 186 mL, p=0.025; at 12 hours: 296 ± 139 vs 571 ± 215 mL, p=0.017; at 24 hours: 441 ± 180 vs 915 ± 388 mL, p=0.015). There was no significant difference in total bleeding between ADP test responders and non-responders within both group B and group C. The percentage of ADP test responders did not differ between group B and C.
Conclusions. Patients with vegetations and other signs of infection localized on a single tricuspid leaflet can be considered good candidates for valve repair.

C127

15-YEAR SINGLE-CENTER EXPERIENCE FOR SURGICAL TREATMENT OF INFECTIVE ENDOCARDITIS

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Objective. Surgery for infective endocarditis (IE) is potentially a life- saving procedure with high surgical mortality and morbidity. The aim of this study is to assess our 15-year experience for infective endocarditis (IE), analyzing incidence of IE-recurrence, mortality, morbidity and procedural costs.
Methods. 248 consecutive patients, who fulfilled criteria for IE, were admitted in our hospital. About 30% of cases were late referred (after 21 days from the onset of the symptoms). The mean age at presentation was 56+18 years. Right side IE was present on 29 cases (12%). The HIV state was present in 22 cases (10%). PCR, Creatinine level and LDH were significant higher in redo patients than native IE. Isolated aortic valve IE was 35%, associated with mitral 15% and tricuspid 1%. Mitral valve repair or replacement represented 50%, isolated or with associated procedures.
Results. Surgery was elective in 84% of cases. The overall in-hospital mortality was 14.9% (37 patients), 7.3% had an aortic valve replacement, 5.6% had a mitral replacement and 2% mitral repair. Predictors of early mortality were redo surgery, multiple valve surgery, preoperative NYHA class IV. In the 39 patients submitted to the aortic redo valve surgery, 11 cases were for dehiscence or paravalvular leakage. Between the native aortic valve IE, 10 patients died undergoing associated mitral, tricuspid or coronary artery bypass graft. Staphylococcus aureus represented the major pathogen microorganism but 20% had negative blood cultures. The ICU-stay was meanly 7.5 ± 16.2 days, Severe late complications occurred in 12% patients and six patients had early recurrence of IE requiring valve surgery during hospitalization.
Conclusions. Preoperative conditions of patients strongly predict early and late outcome. Main factors associated with hospital mortality were redo surgery, NYHA class IV, preoperative neurologic complication. In the third millennium IE continues to be surgically challenging and it represents a high social cost.

C128

LONG-TERM OUTCOME OF PATIENTS UNDERGOING REINTERVENTION FOR INFECTIVE ENDOCARDITIS

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Background. Infective endocarditis (IE) is still a complication that affects the outcome of patients who undergo cardiac surgery. When IE occurs, reintervention is often required. This study aimed to examine the outcome of patients undergoing reoperation for IE.
Methods. From November 2001 to February 2013, 86 patients underwent reintervention for IE in our center. The first operation was an isolated mitral procedure (repair/replacement) in 13 patients, an isolated aortic procedure in 20 patients, an aortic replacement combined with a mitral procedure in 17 patients, a CABG combined with a valvular procedure in 16 patients and a complex operations in 20 patients. Thirty-two (37%) patients were female. Mean age was 67.64 ± 12.85 years and mean Logistic EuroSCORE was 34.88 ± 22.25. The time between the first and second intervention was 149.95 ± 65.33 months.
Results. Overall in-hospital mortality was 19% (16). In two patients (2%) death was intraoperative. In 13 (81%) cases death was due to low cardiac output related to sepsis; two (13%) patients had a stroke, and one (6%) patient had an abdominal hemorrhage. The mitral valve was involved to IE in 7 (44%) patients who died in perioperative period. Mean CPB time and ACC times were 205.92 ± 86.17 and 136.06 ± 71.83 minutes respectively. Mean ICU stay was 4.27 ± 5.64 days. Survival at 1, 5 and 10 years was 63%, 55% and 48%, respectively. Reoperation-free survival was 99%; in one patient, 10 years after first operation, was performed a valve-in-valve procedure due to bioprosthesis degeneration. Follow-up was completed of 85%; median follow-up time was 22 months (range 0-139 months).
Conclusions. In our experience, redo surgery for IE is more frequently in patients who previously had a combined procedure. Reoperations for IE are challenging for the surgeon and the in-hospital mortality rate is very high. In survivors, freedom from IE recurrence is excellent.

C129

MITRAL AND TRICUSPID ENDOCARDITIS: IS MINIMALLY INVASIVE SURGERY A GOOD CHOICE?

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Background. Video-assisted Port Access minimally invasive valve surgery (MIVS) has already demonstrated its feasibility and long-term durability. However, experience in more complex valve disease such as infective endocarditis (IE) still remains limited. We sought to retrospectively evaluate

immediate and late results of MIVS in a cohort of patients with diagnosis of acute and healed IE.

Methods. From November 2006 to December 2013, 33 MIVS procedures were performed in patients with mitral valve (MV) and/or tricuspid valve (TV) infective endocarditis. Twenty-eight were acute endocarditis (84.8%) and 5 were healed endocarditis (15.2%).

Results. MV procedures were performed in 30 patients (90.9%): of these replacements were 24 (80%) and repairs 6 (20%). MV repairs involved valve resection in 5 patients (83.3%), transposition of chordae in 1 patient (16.7%), pericardial patch in 1 patient (16.7%) and annuloplasty in 5 patients (83.3%). Associated procedures (2/30, 6.7%) were: TV repair in 1 case and TV replacement in 1. TV lone procedures were performed in 3 patients (all replacements). Thirty-day mortality was 6.1% (1 fungal septicemia, 1 stroke). No other CVA was recorded. After a mean follow-up of 2 years 27/31 (87.1%) patients are alive. The 7-year cumulative survival rate was 75.6% in the global series (80.0% for healed endocarditis and 75.0% for acute endocarditis). Freedom from reoperation at 7 years was 86.5% in the global series.

Conclusions. Minimally invasive mitral valve surgery for IE is associated with good early and long-term results. Preoperative accurate TE evaluation is mandatory for surgical planning and to exclude involvement of the aortic valve.

C130

OUTBREAK OF MULTIDRUG-RESISTANT ACINETOBACTER BAUMANNII IN CARDIAC SURGERY

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Background. Acinetobacter baumannii (AB) is an important nosocomial pathogen, most often affecting critically ill patients. It can survive for long periods on dry surfaces and develop multi-drug resistance (MDR).

Methods. In 12 months, 14 cardiac surgery patients were infected by MDR-AB. We describe the outbreak investigation, patients' clinical characteristics and control measures.

Results. The index-source patient was a 75 years old man transferred from another hospital with cardiogenic shock and severe aortic valve stenosis operated in September 2009. The patient had a positive MDR-AB bronchial culture since the first postoperative day. 13 patients developed pulmonary MDR-AB infections in the subsequent 12 months. Strains had the same antibiotic susceptibility pattern, and molecular genotypization (PFGE) showed a genetic relationship. Compared with patients operated in the same interval, MDR-AB positive patients were more likely to have previous hospitalization (78.6% vs 41.5%, p=0.04); chronic renal failure (35.7% vs 8.3%, p=0.01); inotropes use (28.6% vs 0.8%, p=0.0001); antibiotics use (21.4% vs 0.8%, p=0.0001); ejection fraction ≤35% (42.9% vs 5.7%, p=0.0001); NYHA class III-IV (64.3% vs 32,3%, p=0.047); reoperation (31.4% vs 3.3%, p=0.022); IABP (14.3% vs 1.3%, p=0.022); higher logistic EuroSCORE (19.8±14.9 vs 5.6±6.1, p=0.0001). Their 30-day mortality was 57%. In April 2010, a new protocol for patients infected/colonized by MDR organisms was issued from the Hospital Infection Control Committee containing several measures to limit the outbreak (education, cleaning issues, hand-hygiene, isolation procedures). The comparison between pre- and post-protocol Incidence Density Rate revealed a significant decrease (0.3 per 1000 days of stay compared with 0.03 per 1000 days of stay, p=0.0001).

Conclusions. Outbreaks of MDR-AB strains are an emerging problem in hospitals. Multidisciplinary approach, constant surveillance, compliance with infection-control protocols overseen via site visits at healthcare facilities and appropriate antibiotic use are efficient measures to control the spread of such organisms.

Congenital 2

C131

USE OF HEMOSTATIC AGENTS IN CONGENITAL HEART DISEASE SURGERY

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Background. The use of hemostatic agents in pediatric cardiothoracic surgery is limited at the moment due to the high cost of these devices. However, we maintain that not using them leads to much higher costs and risks. Therefore the objective is to evaluate whether the use of hemostatic agents during cardiothoracic operation is able to influence the duration of operation, the use of hemoderivatives, the complications during and after operation, and the development of adherences and infections.

Methods. From March 2012 until April 2013 a prospective study was carried out on 70 patients aged 0 to 12 years who had to undergo surgery for congenital heart defects repair. Patients were randomized in 2 groups (39 vs 31). For the first group hemostatic agents with anti-adhering properties (Tachosil®) were used during surgery whilst for the second group they were not. For each patient duration of surgery, quantity of hemoderivative used, intra and post-operative complications (1=presence of complication), development of adherences (1= presence of adherence) and of infections were registered.

Results. The study showed that for patients treated with hemostatic agents during operation, surgery time was shorter (20.3 ± 2.4 vs 38 ± 3.1 min), less hemoderivatives were necessary and fewer complications (p<0.002), adherences and infections (p<0.001) were encountered compared with the untreated group.

Conclusions. This study showed that the use of hemostatic agents not only facilitates the various surgical stages but also demonstrated how their use can lower considerably the risks and costs involved in the procedure and in the management of intra and post-operative complications and infections.
Furthermore, Tachosil proved to have not only high antibacterial but also anti-adhesive properties, thus allowing a reduction of the adherence strength in re-operations.

C132

HISTIDINE-TRYPTOPHAN-KETOGLUTARATE (CUSTODIOL) SOLUTION AS MYOCARDIAL PROTECTION IN SWITCH OPERATION: AN OBSERVATIONAL SINGLE CENTER STUDY

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Background. Although normothermia and warm blood cardioplegia are widely used in adults, cold crystalloids and hypothermia remain routinely used in pediatric cardiac surgery, especially for neonates. Histidine-tryptophan-ketoglutarate (Custodiol) cardioplegic solution is administered as one single dose for more than 2 hours of ischemia. The aim of this retrospective study was to compare Custodiol and repetitive anterograde cold blood cardioplegia in arterial switch operation.

Methods. From January 2000 to March 2014 we enrolled 151 consecutive patients undergoing switch operation for transposition of great artery (45 with interventricular septal defect) who have received cold blood cardioplegia (n=107) or Custodiol (n=44), which has become the gold standard in our center from February 2010. We analyzed the recorded data of principal outcomes.

Results. No significant difference in mortality at 30 days was found between blood and Custodiol groups (7 patients vs 1, p=0.26). There was no statistical difference about peak of creatinine kinase MB and troponin I, but the tendency of CK-MB was higher in blood group (p=0.07). Also intubation time, ICU stay, lactate levels and number of patients with low cardiac output syndrome were similar. Instead, extracorporeal circulation and aortic cross-clamping times were lower in the Custodiol group (219.1 ± 58.8 vs 165.3 ± 48.9 minutes, p=0.00001 and 134.3 ± 37.1 vs 97.2 ± 21.2 minutes, p=0.00001, respectively) with lower temperature in blood group (18.9 ± 2.3 vs 24.5 ± 3.8°C, p=0.00001). For inotropic time, the use of adrenaline was the same (4.8 ± 3.3 vs 4.2 ± 3.2 days, p=0.30) but milrinone was used more in the Custodiol group (1.9 ± 2.5 vs 5.1 ± 3.2, p=0.00001). The open sternum in ICU were less in Custodiol group (90 vs 26, p=0.0019), but without difference in the use of ECMO (7 vs 1, p=0.13).

Conclusions. One single dose of Custodiol cardioplegic solution in switch operation is safe and protects the myocardium equally well as repetitive anterograde cold blood cardioplegia, also reduces surgical time and makes easier the surgical technique.

C133

TOTAL ANOMALOUS VENOUS DRAINAGE: WHAT'S THE BETTER STRATEGY?

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Total anomalous systemic venous drainage is an exceptional form of congenital heart disease. Various types of total anomalous systemic venous drainage exist and classification is made according the different techniques of cardiopulmonary bypass to be performed. This disorder is usually associated with other intracardiac defects and heterotaxia. Surgical correction is often difficult and complicated. We present an unusual case of total anomalous systemic venous drainage in which the right superior vena cava, persistent left superior vena cava and inferior vena cava were present and unusually connected to the left atrium. The coronary sinus was unroofed and left isomerism was present. A left-to-right shunt to allow the systemic venous return to reach the pulmonary circulation was present for a restrictive atrial septal defect and a small patent ductus arteriosus. A 4-day-old girl was admitted to our hospital for cyanosis (saturation 70%) dyspnea and heart failure. Her weight was 2.6 kg. Cardiac catheterization was performed and urgent septectomia in hypothermia and circulatory arrest was accomplished. 10 months later an atrial buffle was implanted using bovine pericardium, such that all pulmonary veins drained through the mitral valves to the left ventricle and all systemic veins drained through the tricuspid valves to the right ventricle. The patient had an uneventful recovery. At 8 month follow-up, she was healthy on physical examination, and a non restricted flow to both right and left ventricle was seen by the echocardiographic assessment. The patient presented a junctional rhythm, we do not think should be treated by a pacemaker implantation.

C134

ALCAPA AND MASSIVE PULMONARY ATELECTASIS: HOW A STENT IN THE AIRWAY CAN BE LIFE-SAVING

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The anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) is a rare congenital anomaly. Without correct diagnosis and surgical repair, death ensues in up to 90% of patients during infancy.

Case report. A 10-month-old girl was admitted to the emergency department of our hospital because of persistent fever and progressive dyspnea. Chest X-ray showed *mediastinal enlargement and* complete opacification of left hemithorax. A chest CT scan unveiled a huge cardiomegaly with the left atrium compressing the left main bronchus. After radiological examination her clinical condition quickly worsened with cardiogenic shock and repeated cardiac arrest. On echocardiogram, ALCAPA was demonstrated, with dilation and severe dysfunction of the left ventricle (LV). Because of pulmonary pressure above systemic, due to pulmonary atelectasis, the LCA appeared to be perfused from the lumen of the pulmonary artery, in retrograde fashion. In the attempt of re-expanding the atelectatic lung, an emergency bronchoscopy was performed and stent was positioned in the left bronchus with lung re-expansion. On echocardiogram, anterograde flow from the LCA toward the lumen of pulmonary artery was then observed, with mild improvement of hemodynamic conditions and myocardial contractility. Corrective surgery was successfully performed and a LV assistance device was placed for 5 days. The girl was progressively weaned off from inotropic support and ventilation. Bronchial endoscopy at 2 years confirmed excellent stent stabilization and ri-epithelization. On echocardiogram, LV function is nearly normal.

Conclusions. In ALCAPA, left pulmonary atelectasis, due to massive cardiomegaly and bronchial compression, can be observed. Because of severe pulmonary hypertension in this setting, the anterograde perfusion in ALCAPA may be acutely compromised. Emergency bronchial stenting should be considered to allow lung re-expansion, decrease pulmonary resistance and restore the anterograde blood flow in the anomalous coronary artery. This procedure may allow patient stabilization and successful surgical repair.

C135

AORTO-LEFT VENTRICLE TUNNEL: A CASE REPORT

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Aorto-ventricular tunnel is a congenital, extracardiac channel which connects the ascending aorta above the sino-tubular junction to the cavity of the left (90%), or (less commonly) right ventricle. The exact incidence is unknown, etiology is uncertain and it should be distinguished from other lesions which cause rapid run-off of blood from the aorta and produce cardiac failure. Associated defects are frequent and the aortic valve is abnormal in about 20% of patients, ranging from two-leaflet valves without obstruction to severe dysplasia or atresia. Most patients suffer heart failure in the first year of life. Cardiac catheterization is needed to elucidate coronary arterial origins or associated defects. Optimal management consists of prompt surgical repair with very low operative mortality, but all patients require life-long follow-up for recurrence, aortic valve incompetence, left ventricular dysfunction, and aneurysmal enlargement of the ascending aorta. A 10-day-old boy was referred for cardiac surgery. Surgery was performed immediately. The orifice of the tunnel was 5 mm in diameter at the aortic end, approximately 5 mm away from the orifice of the right coronary artery. An extracardiac aneurysm of approximately 15 mm in diameter was present. There were no abnormalities of the coronary orifices, but severe AV leaflets uncoaptation with dysplasia. The ascending aorta and the right aortic sinus were dilated, and there was marked dilatation of the left ventricle. The tunnel was closed with a pericardial patch at the aortic orifice and the aneurysm was transficted with prolene suture to completely obliterate the tunnel. Postoperative echocardiography showed no residual Ao-LV reflux, but revealed mild AI.

C136

NEONATAL AORTIC COARTATION WITH PERSISTENT FIFTH AORTIC ARCH: A NOVEL SURGICAL APPROACH

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Persistent left fifth aortic arch is a rare anomaly often associated with aortic coarctation, whose treatment using a novel surgical approach is herein reported. A 5-day-old newborn with clinical signs of duct- dependent aortic coarctation was transferred to our Unit. Echocardiography showed an interrupted fourth aortic arch, persistent left fifth aortic arch associated with coarctation of the aorta, restrictive PDA and muscular VSD, and severely compromised left ventricular function. After pharmacologic stabilization under PGE_1 and dopamine, the patient was listed for arch repair. This was accomplished through left postero-lateral thoracotomy by using the fifth aortic arch as an in situ flap to enlarge the forth aortic arch and by associating an extended end-to-end anastomosis. Both intra- and post-operative course was uneventful. The patient was extubated on post-operative day 1 and discharged home on post-operative day 8. To date, the infant has been followed for a total of 30 days since surgery was performed. He is in good clinical conditions, thriving well. Serial echocardiographic assessments show optimal surgical results. We believe that the newly reported surgical approach is effective and safe and allows an adequate and autologous enlargement of the entire fourth aortic arch.

C137

FEASIBILITY AND SAFETY OF BIVENTRICULAR REPAIR IN NEONATES WITH HYPOPLASTIC LEFT HEART COMPLEX

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Background. Hypoplastic left heart syndrome (HLHS) is a spectrum of structural cardiac malformations characterized by variable underdevelopment of the left heart-aorta complex. A minority of patients having a milder degree of left ventricular hypoplasia, described as hypoplastic left heart complex (HLHC), may be selected for biventricular repair. The objective of this study was to assess the outcome of the biventricular approach in HLHC.

Methods. We evaluated 30 neonates diagnosed with HLHC retrospectively, following established criteria. We analyzed the echocardiographic data recorded just after birth and at last follow-up after surgery. All patients were operated on in the neonatal period using various surgical techniques.

Results. There were no early deaths and only 1 late death after a mean follow-up of 62.9 ± 43.8 months. All patients presented a significant growth of the left ventricular structures, with a Z-score increase of 1.17 ± 1.05 for mitral annulus, 1.72 ± 1.23 for aortic annulus and 1.33 ± 1.46 for left ventricular end-diastolic diameter. Postoperatively, 18 patients showed a left valvular stenosis and 17 patients underwent a reoperation and/or an interventional procedure. Freedom from surgery or interventional catheterizations at 1, 3 and 5 years was 53%, 49% and 43% respectively. The 29 current survivors are all in a good functional status.

Conclusions. In our experience we achieved good results from biventricular repair in patients with HLHC, with a significant growth of left heart structures and an excellent clinical status at a medium term follow-up. Nevertheless there was a high rate of reoperations and/or interventional catheterizations.

C138

HYPOPLASTIC LEFT HEART SYNDROME: TEN-YEAR EXPERIENCE OF A SINGLE CENTER WITH NORWOOD PROCEDURE

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Background. The care of children with hypoplastic left heart syndrome (HLHS) have dramatically changed over the last year, and actually HLHS represents an increasing population.

Methods. From 2004 to 2014, 27 neonates (13 male) with HLHS were admitted to our hospital. Mean age and weight at first stage palliation (FSP) were 7.8 days and 2.1 kg. There were 13 (48%) mitral atresia and 4 (14%) aortic atresia. Ascending aorta diameter was 2.9 mm (min 2, max 6). Norwood-Sano (NS) was performed in 17 neonates and classic Norwood (CN) in 10. A 3.5 mm shunt was used in CN and a 5 mm right ventricle to pulmonary artery conduit was used in NS.

Results. Hypothermic circulatory arrest was used in 10 neonates and selective cerebral perfusion in 17. Hospital mortality was 25.9%. Two children (7%) died late for non cardiac causes. Mean time between FSP and BDG was 7.48 months. BDG was accomplished without mortality in 14 (51.8%) children at a mean age of 7.48 months. No mortality was observed after BDG. On follow-up one child was lost after BDG. Mean time between BDG and Fontan (TCPC) was 4.1 years. TCPC was completed, without mortality, in 6 (22.2%) children at a mean age of 4.7 years. Seven children (25.5%) are waiting TCPC and 4 BDG. Reoperation for systemic outflow obstruction was necessary in 1 (3.7%). At last follow-up (mean 4.5 years) 17 children were alive. At echocardiographic evaluation systemic ventricle function was good in all. Despite right ventricle aneurysm at the conduit anastomosis site in the NS, no differences were observed in myocardial function between NC and NS. No significant systemic atrioventricular and neoaortic valve insufficiency was observed.

Conclusions. HLHS remains a complex congenital heart disease with high mortality at FSP. The results after BDG and TCPC are satisfying.

C139

USE OF FRESH AORTIC HOMOGRAFTS FOR THE RECONSTRUCTION OF RVOT

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Background. The choice of the ideal prosthesis for the reconstruction of the right ventricular outflow tract is still a challenge for the pediatric cardiac surgeon. In our long experience we used different types of prosthesis, and each of them has shown specific issues (stenosis, valvular incompetence, conduit aneurysm, calcification, endocarditis). In particular, during the last ten years, we mostly used Contegra® conduit. However, even if it showed a high incidence of supravalvular stenosis in patients with hypoplastic pulmonary branches at medium-term follow-up, we preferred it to other conduits for its easy surgical implantation, low incidence of intraoperative bleeding and easy availability in different size.

Methods. From January 2013 we started a protocol for cadaveric ascending aorta explant. In the last 12 months we implanted 9 fresh aortic homografts (mean size 19-21 mm), sterilized at low antibiotics concentration and then cryopreserved at 4°C, for the following CHD: 3 ToF, 2 PA+VSD, 1 Truncus type A and 3 RVOT obstructions in patients with a ToF radically corrected with Contegra® conduit (respectively 21, 39 and 60 months before).

Results. There was 1 ECMO implantation in a patient with PA+VSD, but it was not related to the prosthesis (postoperative low output syndrome). No complications occurred in the other patients. Follow up (max 12 months) showed a maximum transprosthetic gradient of 22 mmHg and a medium of 12 mmHg, a trivial incompetence of the prosthetic valve in 2 patients and a mild in one patient (mismatch prosthesis/patient).

Conclusions. Despite the difficulty in retrieval and lack of available measures, our current trend in the choice of the ideal prosthesis is represented by fresh aortic homografts, because of their long term durability also in patients with hypoplastic pulmonary branches or high pulmonary pressures.

C140

OUTCOME AFTER ADULT HEART TRANSPLANTATION FOLLOWING FAILURE OF ATRIAL SWITCH PROCEDURE

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Background. To report the outcome of orthotopic heart transplant (OHTx) in adults with a failing systemic right ventricle following atrial switch procedure in infancy.

Methods. Patients undergoing OHTx, preceded by an atrial switch operation, between 2001 and March 2014 were identified from the departmental data base. A retrospective case note analysis of these patients was undertaken.

Results. During the study period, 230 OHTx were performed at our institution. Of these 18 patients (7.8%) had undergone previous atrial switch (6 Senning, 12 Mustard) for transposition of the great arteries (TGA) or TGA with VSD (n=2). Mean age at atrial switch procedure was 17.3 ± 15.2 months. Two patients were mechanically supported prior to OHTx with Heartware HVAD for 10 and 22 months respectively. Mean age at OHTx was 27.9 ± 8.9 years. Post-transplant ITU stay was 6.5 days (1-25 days). Four patients required renal replacement therapy and one needed tracheostomy. Median follow-up is 5.31 years. Early in our experience there were 4 deaths. One from cerebral-vascular accident 8 days from transplant, 2 from rejection at 9.6 years and 9 days from transplant and one from EBV related lympho-proliferative disorder 9.9 years from transplant. There have been no deaths since 2010.

Conclusions. Outcome of heart transplantation following atrial switch procedure has a good medium term outcome. Mortality is not related to technical aspects of transplant surgery. Development of mechanical cardiac support has enabled us to bridge these patients to OHTx allowing better donor selection and prevention death on the waiting list.

C141

ROLE OF BRONCHOSCOPY IN DIAGNOSIS, TREATMENT AND FOLLOW-UP OF TRACHEOBRONCHIAL VASCULAR COMPRESSION: THE MANAGEMENT AT MEYER CHILDREN'S HOSPITAL

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Background. Anomalies of the aortic arch (AAA) can cause airway obstruction. While increasing evidence suggests the value of bronchoscopy in diagnosis and during surgery, the role of endoscopy in managing residual symptoms after surgical correction is not well defined. This study was designed to review our institutional experience with vascular anomalies focusing on the role of airway stents in the treatment of post-surgical sequelae.

Methods. Tracheobronchial vascular compression was diagnosed by bronchoscopy and confirmed by thorax computed tomography angiography (CTA). All patients with a reduction of the tracheal lumen exceeding 70% or <70% and life-threatening respiratory symptoms were scheduled for surgery. Intraoperative bronchoscopy was always performed during the surgical manoeuvre and immediately after chest closure to confirm the effective airway patency or the persistence of a significant malacia with need of stent insertion.

Results. An endoscopic and radiological diagnosis of AAA obstructing airway lumen was made in 62 patients. Airway compression was due to: left bronchial compression by left pulmonary artery and descending aorta (15), innominate artery compression (16) anomalies of right aortic arch (13), double aortic arch (8), bicarotid trunk (6), aberrant right subclavian artery (3) and pulmonary artery sling (1). Patients underwent surgical correction at a median age of 8.7 months (0.2-184.7). To treat persistent and significant tracheo or bronchomalacia or residual symptoms, 21 patients respectively required silicone or metallic stent. At last endoscopic examination (median follow-up 1.6 years, range 0.1-8.1) adequate airway patency was described in 92% of patients (n=57) without residual symptoms. All silicone stents but 1 were successfully removed. Metallic uncovered stents, considered permanent, are still in place and completely re-epitheliazed.

Conclusions. Bronchoscopy can be very helpful for diagnosis and during surgical correction of AAA; it also provides accurate follow-up in patients with persistent symptoms or tracheobronchial malacia.

Aorta and arch 2

C142

POLYMORPHISMS OF ENDOTHELIAL NITRIC OXIDE GENE AS STRONG RISK FACTORS OF SPORADIC ASCENDING AORTA ANEURYSM

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Background. Endothelium-derived nitric oxide (NO) is produced by an oxidative reaction catalyzed by endothelial NO synthase (eNOS). A lot of study shows reduced levels of NO in patients with aneurysm and bicuspid aortic valve (BAV). We want to analyse the role of the influence of polymorphisms of eNOS in patients with sporadic thoracic ascending aneurysm no BAV related (S-TAA).

Methods. Aortic specimens were obtained from 64 patients (44 men and 20 women, age 63 ± 9.5 years) undergoing surgical repair of S-TAA. A control group of 68 subjects (34 men and 34 woman, age: 61.1 ± 5.8 years) was also enrolled. Histopathological and immunohistochemical analyses were performed. Furthermore, genotyping of two common and functional single nucleotide genetic polymorphisms (SNPs) of eNOS gene was executed.

Results. We identified three different phenotypes of S-TAA according to the severity of medial degeneration: low, moderate and elevated. No significant differences were detected in terms of clinical features. In contrast, significant differences were observed in term of apoptosis of smooth muscle cells and metalloproteinase concentrations. Genotyping analysis revealed a significant association between the -786T/C eNOs SNP and the risk of S-TAA (OR=4.7(1.92-16.32), p=0.0002 by Fisher test). In addition, a significant association was detected between this SNP and elevated medial degeneration. The biological effect of this SNP is in determining low levels of eNOs and consequently a reduced NO amount that contributes to elevated medial degeneration, plurifocal apoptosis and severe concentration of metalloproteinases.

Conclusions. Thus, polymorphisms of eNOs gene seem to have a key role in the pathophysiology of S-TAA.

C143

ROLE OF HISTOLOGY IN EVALUATING THE AORTIC TISSUE OBTAINED AT THE TIME OF ASCENDING AORTA REPLACEMENT. A MORPHOLOGIC STUDY FROM A SINGLE CENTRE

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Background. To report the results of a morphologic study performed on aortic wall samples obtained at surgery for ascending aorta aneurysms (AAA) and to evaluate potential risk factors for aortic dilatation.

Methods. Between September 2009 and December 2013, 154 patients (49 female, 32%; mean age 66 ± 11 years, range 31-88 years) underwent elective surgery for AAA; 132 patients (86%) had isolated AAA and 22 (14%R) AAA and aortic root ectasia. At 2D echo mean aortic diameters were 41 ± 7 mm at the aortic root, 52 ± 8 mm at AA and 31 ± 4 mm at the arch. A bicuspid aortic valve (BAV) was found in 25% of patients. Replacement of the AA was performed in 93 patients (60%) whereas 41 (27%) underwent a valve sparing procedure and 20 (13%) a Bentall procedure.

Results. A histological diagnosis was obtained in 105 out of 154 patients (68%) who were divided according to histological features into 4 groups: Group A (42 patients, 40%) with cystic medial necrosis; Group B (36 patients, 34%) with non-specific lesions (mainly characterized by thinning of aortic wall, mild to moderate elastic fibers decrease and by non significant deposits of alcianophile amorphous substance); Group C (21 patients, 20%) with atherosclerosis; Group D (6 patients, 6%) with necrotizing aortitis. BAV was

found to be statistically related to Group B patients. Mean diameters for aortic root, AA and arch were 42 ± 6, 51 ± 6, 31 ± 4 mm for Group A, 40 ± 9, 49 ± 4, 32 ± 4 mm for Group B, 44 ± 6, 55 ± 10, 32 ± 4 mm for Group C and 40 ± 7, 55 ± 2, 34 ± 4 mm for Group D.
Conclusions. Cystic medial necrosis remains the most frequent lesion in AAA, the highest degrees of aortic dilatation were associated to atherosclerosis. Other studies are required for a better definition of the aspecific lesions and their relationship with BAV. Furthermore, aortits should not be underestimated, being a very aggressive condition.

C144

SURGICAL ORIENTED APPROACH TO THE AORTIC ROOT GEOMETRICAL RELATIONSHIPS

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Objective. The widespread of aortic valve repair procedures and sparing techniques led surgeons to the need of integrating in their cultural burden the aortic valve features described by the anatomists. We analysed the relationships between different elements of the aortic root functional unit to provide surgeons some useful information to standardize the conservative aortic valve surgery approach.
Methods. We prepared 16 formol-fixed normal human aortic roots and photographed them. Using a computer aided design software we measured the commissural distances (CD) and added them to approximate the sinotubular junction (STJ). We called this value linear STJ (lSTJ). We did the same with the nadir distances (ND) to approximate the virtual basal ring (VBR) and we called this value linear VBR (lVBR). Conscious of the underestimation of these values, we also considered what we named circular STJ (cSTJ) and circular VBR (cVBR). Assuming that the STJ and the VBR are the circumferences passing, respectively, through the three commissures and the three nadir, we were able to calculate the cSTJ and the cVBR using the Erone's formula that allows to get the circumcircle of a triangle with known sides (the three CD for the cSTJ and the three ND for the cVBR). Since these values are probably overestimated, to reduce the measurement error we averaged the linear and the circular data thus obtaining the so called estimated STJ and VBR (eSTJ and eVBR).
Results. lVBR was 60.06 ± 6.82 mm and cVBR 86.30 ± 8.46 mm so that eVBR was 77.68 ± 7.40 mm while lSTJ was 76.67 ± 7.69 mm and cSTJ 94.10 ± 9.54 mm so eSTJ resulted 85.38 ± 8.60 mm. We also highlighted that the ratio between eVBR and eSTJ was 1.11 ± 0.17.
Conclusions. We propose a simple method to estimate, from CD and ND lengths, the STJ and VBR measures.

C145

IMPACT OF CUSP REPAIR ON REOPERATION RISK FOLLOWING THE DAVID PROCEDURE: A 12-YEAR SINGLE CENTER EXPERIENCE

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Background. Valve-sparing aortic root replacement has been progressively widely performed for the treatment of aortic root aneurysm, however, evidences of durability following adjunctive cusp repair are limited in literature.
Methods. Between June 2002 and January 2014, 150 consecutive patients underwent valve-sparing aortic root replacement. The mean age was 61 ± 12 years. Twenty-nine patients (19%) had bicuspid aortic valve (BAV). In 18 cases (12%) cusp motion or anatomical abnormalities concurred in determining aortic regurgitation requiring an adjunctive cusp repair. The Valsalva graft was invariably used. Mean CPB time was 137 ± 32 minutes and the mean duration of aortic cross-clamping time was 117 ± 26 minutes. Follow-up ranged from 1 to 136 months (mean 79 ± 36 months) and was 99% complete.
Results. There were no intra-operative deaths. The mortality pre-discharge was 0.7% (1 patient). There were eight late deaths during follow-up. The cumulative 1-, 5- and 10-year survival rates were 99%, 94% and 93%, respectively. Overall freedom from reoperation due to aortic valve regurgitation was 96% at 1 year, 92% at 5 years and 90% at 10 years, without significant difference between patients with tricuspid and bicuspid aortic valve. The rate of aortic valve reoperation was significantly higher (p=0.012) in patients who received leaflets' repair, when compared with patients who did not, with a freedom from reoperation at 5 years of 78% vs 94%. Interestingly, among patients with BAV, those who did not require cusp repair had a freedom from reoperation at 5 years of 100%, with a significant difference when compared with patients who received cusp repair (p=0.03). Conversely, cusp repair did not affect reoperation risk in patients with TAV.
Conclusions. Our long-term data provided satisfactory results. A careful evaluation of the valve in the setting of BAV is mandatory and we recommend caution in using this technique in case of asymmetric BAV requiring cusp repair.

C146

ENDOVASCULAR TREATMENT OF AORTIC DISSECTION. A SINGLE CENTRE EXPERIENCE

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Background. Aortic dissection is one of the most cardiovascular diseases associated with a high mortality rate. In complicated type b dissections with favourable anatomy, thoracic endovascular aortic repair (TEVAR) has become the gold standard treatment. This retrospective study aims to describe our experience in the endovascular treatment of aortic dissection.
Methods. From March 1999 to November 2013, 189 patients with complicated type b aortic dissection were treated with TEVAR. The average age of the patients was 59.1 ± 12.1 years. Among these patients, 36 were affected by acute dissection and 153 by chronic dissection.
Results. The in-hospital mortality was 2.1% (4 patients). Two patients died because of intestinal ischemia, 1 from aortic rupture after implantation and 1 from sepsis. The hospital stay was 8.4 ± 6.8 days. Twelve patients had postoperative complications: 3 retrograde aortic dissections by endoleak type 1a, 4 and 2 major and minor neurological complications respectively, 2 cases of intestinal ischemia, 2 cases of lower limb ischemia, 5 cases of acute renal failure which temporarily required dialysis. Forty-six patients developed stent graft-induced new entry (SINE) at follow-up imaging, 18 of these were treated with a second TEVAR. Eleven patients underwent surgery for post-implantation complication of which 7 for retrograde dissection, 3 for distal SINE and 1 for lower limb ischemia. Of these, two patients died during the postoperative period.
Conclusions. Complicated type b dissections are effectively treated with TEVAR. A close follow-up imaging is necessary to detect potential TEVAR complications which may require endovascular or open surgical repair.

C147

EXTENDING THE SUITABILITY OF ENDOVASCULAR THERAPIES IN MULTISEGMENTAL THORACIC AORTA PATHOLOGY: AORTIC ARCH REPLACEMENT WITH PROPHYLACTIC SUPRA-AORTIC VESSELS DEBRANCHING

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Background. The aim of this study is to report our experience with aortic arch replacement combined with supra-aortic vessels debranching to create an optimal landing zone for possible subsequent endovascular stent-grafting of the distal thoracic aorta.
Methods. From 2007 to 2014, 90 patients (mean age 68 ± 17 years; 22 female) underwent aortic arch replacement concomitant with prophylactic debranching of the supra-aortic vessels. Fifty-one patients had chronic aneurysms and thirty-nine had type A acute aortic dissection. Twelve (13.3%) patients had a previous cardiothoracic surgery or endovascular repair. The technique consists of replacing the ascending aorta and the aortic arch, and at the same time, relocating the origin of the supra-aortic vessels just above the sinotubular junction creating a long and safe proximal landing zone for subsequent stent-graft deployment.
Results. The procedure was performed under moderate hypothermic circulatory arrest (27± 2°C) for 29 ± 9 min. and antegrade cerebral perfusion (49 ± 14 min). Cardiopulmonary bypass and aortic cross-clamp time were 134 ± 42 and 67 ± 28 min. Hospital mortality was 3.3%. Stroke was observed in 4 patients (4.4%). At follow-up (39 ± 11 months), survival was 88% ± 3%. Thirteen patients required a second endovascular procedure on the descending aorta. In all cases, the stent-grafts were successfully released in the landing zone created at the time of primary repair. No type I A endoleak was observed. There was neither death nor neurologic complications after the endovascular stage.
Conclusions. Our technique extends the suitability of endovascular therapies during aortic arch replacement, creating a long and stable landing zone that allows safe performance of a second endovascular step if needed.

C148

COMPLEX THORACIC AORTIC SURGERY: ONE STAGE APPROACH

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Background. Extensive thoracic aortic aneurysms still represent a challenge in cardiac surgery. The frozen elephant trunk procedure, combining conventional surgery with endovascular techniques, allows single-stage treatment for such pathology. Here we present our 7-year experience and results with the single-stage frozen elephant trunk procedure.
Methods. Between January 2007 and January 2014, 146 patients were treated with the frozen elephant trunk procedure in our institution. Mean age was 61 ± 10 years. Indications for surgery included: chronic type A dissection (n=71, 48.6%), chronic degenerative aneurysm (n = 45, 30.8%), chronic type B dissection (n=17, 11.6%), acute type A dissection (n=11, 7.5%) and acute type B dissection (n=2, 1.4%). Eighty (55%) were reoperations. As main associated aortic and cardiac procedure, ascending aorta replacements were performed in 61 patients, Bentall operation in 22. Brain protection was achieved by means of antegrade selective cerebral perfusion and moderate hypothermia (26°C) in all cases.

Results. In-hospital mortality was 15.8%. Postoperatively, spinal cord injury occurred in 14 patients (9.6%): paraplegia in 10 (6.9%), and paraparesis in 4 (2.7%). Follow-up was 100% complete. Seventy-one percent of the patients with chronic aortic dissection had complete thrombosis of the peri-stent false lumen. Thirty-two patients (22%) required endovascular completion 31 ± 34 months after the first procedure, with 100% technical and procedural success.
Conclusions. The frozen elephant trunk technique offers a potentially curative single-stage procedure for patients with extensive thoracic aortic disease, with encouraging short-term and midterm results. Longer-term follow-up is warranted.

C149

AXILLARY ARTERY VERSUS FEMORAL ARTERY FOR ARTERIAL CANNULATION IN TYPE A ACUTE AORTIC DISSECTION. EVIDENCE FROM A META-ANALYSIS OF COMPARATIVE STUDIES AND ADJUSTED RISK ESTIMATES

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Background. There is a growing perception that femoral arterial cannulation (FAC), by reversing the flow in the thoracoabdominal aorta, may increase the risk of retrograde brain embolization, dissection and organ malperfusion in type A aortic dissection. Axillary artery cannulation (AXC) has been reported to improve operative outcomes by allowing antegrade blood flow. However, FAC still remains largely utilized as a consensus for the routine use of AXC has not yet been reached.
Methods. A meta-analysis on comparative studies reporting operative outcomes using AXC versus FAC was performed. Pooled weighted incidence rates for endpoints of interest have been obtained using inverse variance model.
Results. Overall, a total of 8 studies including 793 patients were analysed (AXC=396, FAC=397). AXC was associated with reduced risk for in-hospital mortality (RR 0.41; 95%CI.29-0.58; p<0.001) and peripheral neurological deficit (RR 0.59; 95%CI 37.0-0.93; p=0.02) when compared to FAC. Pooled risk adjusted estimates confirmed AXC associated with a significant trend towards reduced in-hospital mortality (adjusted OR.63; 95%CI 0.43-0.92; p=0.02) and reduced incidence of (adjusted OR.59; 95%CI 37.0-0.93; p=0.02).
Conclusions. The present meta-analysis confirmed that AXC was superior to FAC in reducing in-hospital mortality and the incidence of permanent neurologic deficit in patients operated on for type A acute aortic dissection.

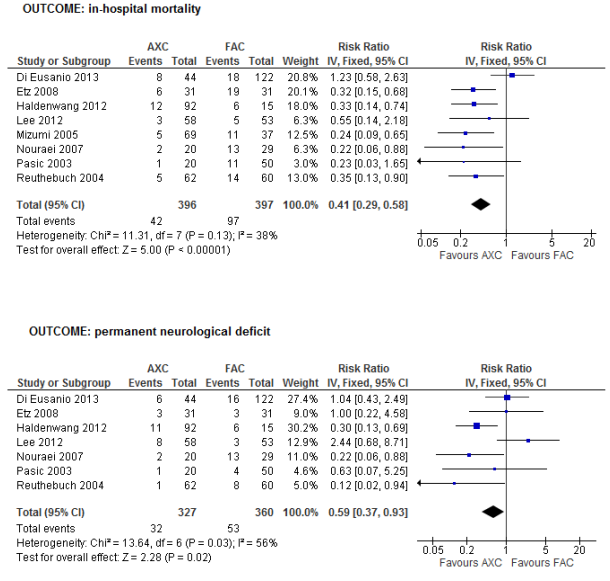

Figure. Forest plot for in-hospital mortality (top) and permanent neurological deficit (bottom). AXC, axillary cannulation; FAC, femoral cannulation.

C150

CAREFUL PREOPERATIVE PLANNING AND STRICT PERIOPERATIVE MONITORING AND BLOOD PRESSURE MANIPULATION REDUCE THE RISK OF SPINAL CORD INJURY AFTER HYBRID AORTIC ARCH AND DESCENDING AORTA REPAIR

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Background. Single-stage repair of concomitant aortic arch (AR) and descending thoracic aorta (DTA) lesions have become popular in recent years but these procedure may be complicated by a significant risk of spinal cord injury (SCI), as high as 20%. We applied our protocol of perioperative monitoring and blood pressure manipulation developed for surgery of the DTA to hybrid procedures on AR/DTA. We reviewed the clinical outcomes in these patients, in particular regarding the incidence of SCI.
Methods. We interrogated our prospectively maintained database and identified 43 hybrid procedures on AR and DTA between 2002-2013.
Results. Mean age was 64 years (46.8% male). Mean logistic EuroSCORE was 29 (range 4.67-67.9). Forty-five patients were operated with a commercially available device whilst in two cases a thoracic endograft was deployed antegrade after open arch repair. Four patients (9.3%) had a CSF drain inserted. Concomitant procedures included ascending aorta replacement (47; 100%), root replacement (13; 30.2%), MVR/TVR (1; 2.3%) and CABG (5; 11.6%). Landing zone was above T10 in all patients and above T8 in the majority of them. Goal-directed therapy with a mean BP 85-105 mmHg, CI >2.4 l/min/m², a UOP >1 ml/kg/h and base excess of 0 ± 5 with a pH >7.3 were targeted. Operative mortality and stroke rate were 16.3% and 4.6% with one only case of paraplegia (2.1%).
Conclusions. Although such procedures are associated with high mortality and moderate stroke risk, strict perioperative/postoperative monitoring of all haemodynamic and metabolic parameters with CSF drainage allow for protection of the spinal cord following hybrid AR and DTA repair.

C151

INCIDENCE AND CHARACTERIZATION OF NEUROLOGIC INJURY AFTER SURGERY FOR TYPE A ACUTE AORTIC DISSECTION

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Background. Despite improvements in surgical techniques, cerebral protection strategies and post-operative care, neurologic injury still plays a major role after surgery for type A acute aortic dissection. We attempted to standardize neurologic assessment according to Bamford Classification and to identify preoperative and surgical predictors of different neurologic outcomes.
Methods. A monocentric experience on 140 consecutive patients with type A aortic dissection treated with open surgery between January 2007 and July 2012 was reviewed. All patients were categorized according to Penn classification to standardize clinical presentation. Clinical status and intra-operative features were evaluated in relation to mortality and neurological outcome.
Results. Operative mortality was 18.8% and overall in-hospital mortality was 35.1%; both were significantly increased by preoperative complications and Penn class C. Temporary (TND) and permanent neurologic damage (PND) were 7.9% and 13.6%, respectively. We observed four different patterns of neurological sequelae, sometimes coexistent: anoxic encephalopathy (17.1%), stroke (13.6%), watershed stroke (2.1%) and myelopathy (2.1%). Strokes were classified in total anterior circulation infarct (TACI, 21%), partial anterior circulation infarct (PACI, 10.5%), lacunar infarct (LACI, 52.6%) and posterior circulation infarct (POCI, 5%). Neurological outcome was not related to preoperative features but to surgical management: axillary artery cannulation (AAC) alone was associated with a higher incidence of LACI when compared to femoral artery cannulation (FAC), mostly involving the left emisphere (14.5% vs 3.1%, p=0.02). Such difference is also evident when considering the technique of antegrade cerebral perfusion (left LACI 15.8% with axillary perfusion alone vs 2.9% with Kazui, p=0.04). TND was more frequent with AAC when compared to FAC (54.4% vs 27.3%, p=0.03).
Conclusions. Penn classification is capable to predict patients with increased surgical risk but it does not affect neurological outcome. Neurological outcome after aortic surgery in type A dissection is strongly dependent by different surgical management. Diffuse anoxic injury and lacunar infarct are the most frequent clinical syndromes.

Multiecenter trials 3

C152

DO BIOLOGICAL VALVES CONFER ANY EARLY OR LONG-TERM SURVIVAL ADVANTAGE FOR PROSTHETIC AORTIC VALVE ENDOCARDITIS? A MULTICENTER EUROPEAN STUDY

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Background. Surgical treatment of prosthetic endocarditis (PVE) remains challenging. Individual institutional policies often dictate the use of biological or mechanical valves for redo-AVR (RAVR). However, the impact of valve substitute is still poorly addressed.

Methods. One hundred fifty-nine PVE undergoing RVAR during the last 12 years at 7 European Institutions were analyzed according to the type of valve substitute (67 mechanical, 42.1% - Group M vs 92 biological, 57.9% - Group B). Early-to-long term outcome were compared in the population and in a non-parsimonious propensity-matched subgroup (62 patients).
Results. The 2 groups differed in terms of several baseline characteristics (age, time to surgery, comorbidities, previous surgery, etc.; p≤0.38). Hospital mortality and most of the major hospital morbidities were similar (p=NS), except for a higher incidence of acute myocardial infarction (p=0.029) and higher transfusions (p=0.011) in Group M, and a higher acute renal insufficiency (p=0.042), revision for bleeding (p=0.023), and need for permanent pacemaker (p=0.030) in Group B. Twelve-year actuarial survival, freedom from stroke, thrombo-embolisms and re-intervention proved comparable (p=NS); Group B had slightly lower 12-year freedom from acute heart failure (AHF, p=0.065). However, Cox proportional hazard models adjusted for covariates did not demonstrate differences between the 2 groups in terms of twelve-year survival and freedom from AHF. Propensity-matched patients showed similar hospital mortality and morbidity, 12-year actuarial survival, freedom from AHF, stroke, thrombo-embolism, and re-intervention (p=NS).
Conclusions. Differences in early and long-term outcome after mechanical or biological RAVR for PVE are biased by differences in baselines characteristics. Risk-adjusted hazard models and propensity-score matching demonstrated similar early-to-long term results with both types of prostheses.

C153

CONCOMITANT MITRAL AND AORTIC VALVE SURGERY. LONG-TERM RESULTS FROM AN ITALIAN REGIONAL CARDIAC SURGERY REGISTRY

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Background. Reliable data on the long term survival of patients operated with double valve surgery (DVS) are limited in the literature. In this study, in-hospital mortality and 5-year survival were determined and the potential risk factors for increased mortality were identified and discussed.
Methods. This is a report of a prospective study of 1167 patients undergoing concomitant aortic and mitral valve surgery from 2002 to 2011. Data were prospectively collected in a regional database from Emilia-Romagna (Italy).
Results. Overall in-hospital mortality for DVS was 6.9%. Both in-hospital and 1-year mortality were statistically significant between age groups, particularly in patients aged ≥ 80 years. In-hospital mortality was significantly higher for patients with a smaller BMI, for those who had concomitant CABG, and those who received mitral valve replacement (MVR) instead of plasty (MVP). In-hospital and 1-year mortality were highest in patients <70 years who received both tissue valves, and in patients ≥70 who had both mechanical valves implantation. There were significant differences in 5-year follow-up survival according to age, BMI, and concomitant CABG. Choice between MVR vs MVP did not affect 5-year survival. Multivariable analysis showed that patient-related factors appear to be the major determinant of late survival, irrespective of the type of operation or other intraoperative variables.
Conclusions. Advanced age, smaller BMI, and concomitant CABG are significant risk factors for mortality in DVS. MVP provided comparable 5-year outcomes with MVR. Multivariable analysis demonstrates that comorbidities are the real burden in the successful treatment of patients undergoing double valve procedures.

C154

EFFECTS OF OFF-PUMP CORONARY ARTERY BYPASS SURGERY ON HOSPITAL AND MID-TERM MORTALITY IN PATIENTS WITH PREOPERATIVE ANEMIA: RESULTS FROM A PROSPECTIVE MULTICENTER REGISTRY

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Background. Preoperative anemia is an important risk factor for morbidity and mortality after cardiac operations. Cardiopulmonary bypass (CPB)-induced hemodilution, also related to several complications, is more pronounced in anemic patients. Aim of the study is to evaluate if performing CABG with (CPB-CABG) or without (OPCAB) CPB produces different clinical results in anemic patients.
Methods. Consecutive adult patients undergoing OPCAB or CPB-CABG from January 2011 to June 2013 were extracted from a Regional Cardiac Surgery Registry. The last preoperative hemoglobin value was used, according to World Health Organization criteria, to select anemic patients (hemoglobin <13.0 g/dL in males and <12.0 g/dL in females). Propensity-score methods were used to control confounding factors. Mid-term survival was evaluated and it was 80% complete.
Results. Out of 871 CABG procedures performed in anemic patients, 321 patients undergone OPCAB and 550 patients undergone CPB-CABG. Mean preoperative hemoglobin values were significantly lower in OPCAB patients (11.2 ± 1.2 vs 11.4 ± 1.1 g/dL; p=0.008). Forty-two patients died during hospitalization and 44 patients died after discharge. In the entire population and in propensity-matched group (422 patients), off-pump surgery had a lower rate of hospital mortality [7 (2.2%) vs 35 (6.4%); p=0.005]. OPCAB technique was associated to lower hospital mortality with adjusted odds ratio ranging from 0.24 (p=0.002) to 0.27 (p=0.002) in the entire sample and from 0.15 (p=0.003) to 0.16 (p=0.004) in propensity-matched group correcting for predictors of hospital mortality, for propensity score and for EuroSCORE II. OPCAB patients had lower incidence of Intensive Care Unit length of stay >72 hours, Red blood cells (RBC) transfusions and respiratory failure. No significant difference in mid-term survival was observed.
Conclusions. In anemic patients OPCAB significantly reduced hospital mortality and morbidity but had no effect on mid-term mortality. CPB-related hemodilution, further post-operative hemoglobin drop and RBC transfusions could affect immediate outcomes.

C155

IMPACT OF SEVERE LEFT VENTRICULAR SYSTOLIC DYSFUNCTION ON 6-MONTH OUTCOME AFTER TAVI OR SURGICAL AORTIC VALVE REPLACEMENT: RESULTS FROM A PROPENSITY-MATCHED POPULATION OF A NATIONAL MULTICENTER STUDY

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Background. Six-month follow-up studies comparing AVR vs TAVI in a similar base-line risk-profile population of patients with severe preoperative left ventricular systolic dysfunction (SPLVSD) are currently lacking.
Methods. Three hundred forty-nine SPLVSD enrolled in a single-nation multicenter registry were propensity-matched for age, sex, systemic and cardiac comorbidities, priority, frailty score, NYHA class, EuroSCORE. Thirty-day and 6-month outcome of 162 propensity-matched patients were analyzed at the National Institute of Health by linking with regional Social-Security Death & Events Masterfiles.
Results. Thirty-day mortality, major hospital morbidity (AMI, stroke, low cardiac-output syndrome, renal dysfunction) and hospitalization-length were comparable (p=NS). AVR reported lower pacemaker implantation (p=0.01), but higher transfusion-rates (p<0.01). Six-month survival proved comparable (log-rank p=0.11), as well as the risk of 6-month death (HR=0.61, CI 0.29-1.23; p=0.19). Six-month overall postoperative freedom from MACCE approximated statistical significance in favor of TAVI (log-rank p=0.05), with a higher risk of 6-month MACCE after AVR (HR=0.48 TAVI vs AVR, CI 0.23-0.98; p=0.04). However, freedom from MACCE after hospital discharge was comparable (HR=0.7, CI 0.27-1.84; p=0.47), being the better 6-month overall freedom from MACCE after TAVI related to a lower, though not-significant, incidence of 30-day mortality, stroke and low cardiac-output syndrome. Fifty re-hospitalizations were registered after discharge in TAVI-cohort, 34 in AVR-cohort, being the proportion of patients requiring at least one re-hospitalization higher after TAVI (37% vs 28.4%, p=0.16).
Conclusions. Similar hospital to 6-month outcome was reported after TAVI and AVR in SPLVSD. Despite a higher re-hospitalization rate after TAVI during the first 6 months, MACCE were lower, due to a higher incidence of hospital complications after AVR.

C156

DIFFERENZE NELLA RISPOSTA INFIAMMATORIA SISTEMICA E POLMONARE NEL CONFRONTO CEC VS MINI-CEC

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Una ridotta risposta infiammatoria negli interventi condotti mediante mini-circolazione extracorporea (MECC) è stata descritta. Studi precedenti hanno confrontato però gruppi trattati con differenti sistemi di perfusione:

circolazione extracorporea tradizionale (CECC) con pompa roller versus pazienti trattati con MECC con pompa centrifuga. Scopo di questo studio è valutare la risposta infiammatoria sistemica e polmonare comparando MECC e CECC dotate di medesima pompa centrifuga.

Metodi. Dal 2009 sono stati arruolati 20 pazienti sottoposti a rivascolarizzazione chirurgica del miocardio mediante CECC e 20 mediante MECC. In entrambi i gruppi sono stati usati una pompa centrifuga. Campioni di sangue sono stati prelevati durante l'intervento dalla circolazione sistemica e dal vent ventricolare, così come campioni di sangue sistemico a 24, 72 e 120 ore dalla fine della circolazione extracorporea. Le citochine proinfiammatorie IL-1b e IL-6 sono state dosate mediante tecnica ELISA.

Risultati. L'età media era di 66.1 ± 5 anni nel gruppo MECC, e di 69.1 ± 8 nel gruppo CECC. Il numero di graft eseguiti (MECC 2.3; CECC 2.5); il tempo di circolazione extracorporea (MECC 77.2; CECC 83.6 min) ed il tempo di clampaggio aortico (MECC 56.5; CECC 58.6 min) erano simili fra i due gruppi. La concentrazione sistemica di IL-1b a 24, 72 e 120 ore dalla fine della circolazione extracorporea era inferiore nei pazienti trattati con MECC: tuttavia solo a 72 ore mostrava una significatività statistica (p=0.02). Le concentrazioni sistemiche di IL-6 a 24, 72, e 120 ore erano inferiori nel gruppo MECC, ma senza una significatività statistica (p>0.05). I valori di IL-1b e IL-6 erano più alti nei campioni prelevati dal vent ventricolare rispetto a quelli sistemici, in entrambi i gruppi, in maniera significativa (p=0.05).

Conclusioni. A livello di risposta infiammatoria, non è evidente un effetto benefico della MECC rispetto alla CECC utilizzando lo stesso sistema di propulsione. L'analisi dei marker infiammatori ha permesso di evidenziare un significativo e precoce coinvolgimento del distretto polmonare.

C157

VENO-ARTERIAL ECMO FOR FULMINANT MYOCARDITIS IN ADULT PATIENTS: A MULTI-INSTITUTIONAL EXPERIENCE

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Background. Fulminant myocarditis (FM) represents a life-threatening event, usually characterized by a rapid course, often leading to refractory cardiogenic shock and cardiac arrest. It has been shown that veno-arterial extracorporeal membrane oxygenation (VA-ECMO) provides effective cardiocirculatory support in these circumstances. This study reports the data from an international multicentre study group which analysed subjects affected by FM and treated with VA-ECMO in a 5 year period.

Methods. From hospital databases, 51 patients with diagnosis of FM submitted to VA-ECMO in the last 5 years were found and analysed. Median age was 37.8 years (range 18-64 years), and 33 were female. VA-ECMO support was instituted for frank cardiogenic shock in 31 patients, for cardiac arrest and CPR in 14, and for severe hemodynamic instability in 6, respectively. Forty-three patients received peripheral (femoro-femoral) approach, while 8 patients had a central implantation. Concomitant IABP was applied in 39 patients, and left ventricular venting was used in 6 patients.

Results. Hospital mortality was 29% (15 patients) whereas 2 patients died after hospital discharge (1 after heart transplant and 1 for sudden death). Mean VA-ECMO support was 9.1 days (range 1-24 days). Two patients received subsequently another type of mechanical support during hospitalization, and 8 patients were were finally transplanted. Pathogens were found in only 4 patients. Major complications were recorded in 29 patients (2 cases of ECMO system failure). Cardiac recovery was observed in 28 patients. Postoperatively, recurrent myocarditis was observed in 2 cases only (at 6 and 12 months from the first FM event, respectively), and 8 patients experienced cardiac-related complications.

Conclusions. Fulminant myocarditis represents a rare, but lethal disease. VA-ECMO provides an invaluable mechanical support for the majority of the patients, although major complications frequently occur. Long-term outcome appears favourable with rare episodes of recurrent myocarditis or cardiac-related events.

C158

IN-HOSPITAL NEUROLOGIC COMPLICATIONS IN ADULT PATIENTS UNDERGOING VENO-ARTERIAL EXTRACORPOREAL MEMBRANE OXYGENATION: RESULTS FROM THE EXTRACORPOREAL LIFE SUPPORT ORGANIZATION (ELSO) REGISTRY

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Background. Neurologic complications in adult patients undergoing veno-arterial extracorporeal membrane oxygenation (VA-ECMO) have been poorly investigated. The aim of this study was to elucidate epidemiology, complication profiles, hospital outcome, and potential predisposing factors of such events through the analysis of the Extracorporeal Life Support Organization (ELSO) Registry.

Methods. We retrospectively examined 4.522 adult patients submitted to VA-ECMO and included in the ELSO Registry from 1992 to June 2013. Extracorporeal life support was applied for cardiac dysfunction in 3.005 patients, for cardiopulmonary resuscitation in 877, and for respiratory failure in 640, respectively. Cohort patients were divided into 2 groups according to the in-hospital occurrence or absence of neurologic complications as defined in the Registry form, and their hospital course evaluated. Multivariable logistic regression was performed to identify independent predictors.

Results. Neurologic events occurred in 682 patients (15.1%), including brain death in 358 (7.9%), cerebral infarction in 161 (3.6%), seizures in 83 (1.8%), and cerebral hemorrhages in 80 (1.8%), respectively. Multiple neurologic events in the same patient occurred in 70 cases. Hospital mortality in patients with neurologic injury was 89% in patients with single event, 95% with two events, and 100% with 3 or more events, as compared to 57% in patients without cerebral involvement (p<0.001). Multivariate analysis showed that younger age, cardiac arrest or ECPR prior to VA-ECMO, use of inotropes on ECMO, hemolysis, and severe hypoglycemia, were independent predictors of in-hospital neurologic compromise.

Conclusions. Neurologic complications in adult patients submitted to VA-ECMO are common and characterized by a dismal hospital outcome. Further research should focus about better understanding of brain/ECMO interaction and management to avoid or limit such catastrophic adverse events.

C159

PREDICTORS OF FUTILE REDO AORTIC VALVE SURGERY REGARDLESS OF RISK-SCORES: AN ANALYSIS FROM THE MULTICENTER RECORD INITIATIVE

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Background. Redo aortic valve replacement (RAVR) carries higher perioperative risk of mortality and morbidity. We aim to identify factors determining early (within 6 months) mortality after RAVR from a large multicenter European database, thus defining "futile" surgery, and potentially indicating nowadays less-invasive trans-catheter procedures.

Methods. Death within 6 months from surgery defines a "futile" RAVR. Seven-hundreds-fourteen patients out of 763 (93.6%) enrolled in RECORD registry have a minimum 6-month follow-up or died within 6 postoperative months. Predictors of "futility" were identified at multivariate analysis. Classification tree analysis with Chi-squared automatic interaction detection (CHAID) method was used to identify those categories of patients at "highest-risk" to undergo a futile surgery. Receiver operating characteristics (ROC) curve analysis assessed the ability of risk scoring methods in predicting "futility".

Results. Six-month mortality was 9.9%. Logistic regression analysis identified left ventricular ejection fraction (LVEF) <30% (p<0.0001, OR 5.85), active endocarditis (p<0.0001, OR 3.58) and aortic cross clamping time (XCT) >150' (p=0.006, OR 2.47) as predictors of "futile surgery" (Hosmer-Lemeshow's p=0.892; AUC: 0.71).Independent predictors of XCT >150' were "urgent/emergent" procedures (OR 2.50) and procedures "other than RAVR ± CABG" (OR 6.36). CHAID analysis showed active endocarditis as the most relevant risk factor, followed by LVEF <30% and XCT >150' (AUC: 0.71, 95%CI

0.64-0.78). Endocarditis + LVEF <30% configured the highest risk category (56.2%6-month mortality), followed by endocarditis + LVEF >30% + XCT >150' (36.4% 6-month mortality). Patients without endocarditis but with LVEF <30% had 24.0% 6-month mortality, followed by non-endocarditic patients with LVEF >30% + XCT >150' (11.3% mortality).
Conclusions. Severe left ventricular dysfunction, foreseen complex surgical procedures and urgent/emergent indications to RAVR have unacceptable 6-month mortality rate after surgery, which might be better served by trans-catheter approaches. The poor outcome reported after RAVR for active endocarditis mandates urgent implementation of current treatment strategies.

C160

A CHALLENGE FOR PERCEVAL: AORTIC VALVE REPLACEMENT WITH SMALL SUTURELESS VALVES. A EUROPEAN MULTICENTER STUDY

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Background. Controversies exist about performance of small aortic prostheses (size <21): they are credited having a role in determining increased morbidity/mortality after aortic valve replacement (AVR). In certain settings, e.g. elderly patients and/or calcified roots, only small stented valves are implantable, tolerating a risk of high postoperative gradients and compromised outcome. Sutureless technology is now available, but performance of the smallest size of these prostheses is unknown.
Methods. Prospective registries of four European centers including 276 consecutive patients (mean age 79.7 ± 5.2 years, 69.9% females) were analyzed in order to compare data of the smallest model of Sorin-Perceval sutureless prosthesis with those from larger sizes of the same valve. In 47 patients, the smaller valve, "S" size, was inserted (S-group) and 229 had a larger one, labeled "M" and "L" by the manufacturer (L-group in the study). Except for body-surface-area (S-group 1.60 ± 0.16 vs L-group 1.78 ± 0.19 m^2, p<0.001), no other relevant difference was noted between groups (EuroSCORE log: 11.4 ± 6.1 vs 12.6 ± 9.6; p=0.28). Mean follow-up was 1.5 ± 1.3 years.
Results. AVR was obtained via median sternotomy in the majority of cases (S: 87.2% vs L: 79.5%, p=0.31). Associated procedures were performed equally in both group (12.8% vs 35.4%, p=0.87). In case of isolated AVR, cardiopulmonary bypass and cross-clamp times of S-group were 49.1 ± 16.0 and 30.7 ± 9.2 min vs 52.6 ± 23.1 and 32.3 ± 13.6 min in L-group (p=0.33 and 0.45). Hospital mortality was 0% in S-group vs 2.6% in L-group (p=0.62). At discharge, peak pressure gradient was 22.7 ± 7.9 and 20.9 ± 8.4 mmHg (p=0.24) while iEOA was 0.84 ± 0.16 and 0.86 ± 0.25 for S- and L-group, respectively (p=0.76). At follow-up, echo data were similar and survival did not differ (p=0.17).
Conclusions. This multicenter study confirms safety, efficacy and fast positioning of Perceval in elderly patients and risky scenarios. Performance of the smaller valve is satisfying and patient outcome is not affected by prosthesis size.

C161

EARLY CLINICAL AND HEMODYNAMIC RESULTS OF THE ST. JUDE MEDICAL TRIFECTA AORTIC VALVE: RESULTS FROM A REGIONAL ITALIAN PROSPECTIVE MULTICENTER REGISTRY

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Background. The Trifecta aortic bioprosthesis (St. Jude Medical, Inc., St. Paul, MN, USA) is a novel stented pericardial heart valve with excellent preliminary results. Aim of the study was to evaluate its early clinical and hemodynamic performances in a multicenter regional registry.
Methods. Between January 2011 and June 2012, 178 consecutive patients undergoing aortic valve (AV) replacement with the Trifecta bioprosthesis were prospectively enrolled at 9 Italian centers. The average age was 75.4 ± 7.7 years (range, 44 to 86), 95 (53%) were men, and mean logistic EuroSCORE was 7.7 ± 6.7 (range 1 to 41). Indication for AV replacement included stenosis in 123 patients, (69%), mixed lesions in 25 (14%), and predominant regurgitation in 30 (17%). Ninety-three (52%) patients were in New York Heart Association (NYHA) functional class III or IV. Concomitant procedures were performed in 97 patients (55%). Echocardiographic data were obtained at discharge, and 6-month and 1-year postoperatively.
Results. Hospital mortality accounted for 5 patients (2.8%), and no valve-related perioperative complications were registered. In a median follow-up of 20.5 months (range, 6 to 34), there was one early (≤6 months) thromboembolic event, one major bleeding, and 3 endocarditis (2 explants). Two late (>6 months) thromboembolic events and two endocarditis (1 explant) occurred. No valve thrombosis or structural deterioration was recorded after discharge. At 30 months, freedom from all-cause mortality was 87%, freedom valve-related mortality 99.4%, freedom from endocarditis 97.5%, and freedom from valve explants 98%, respectively. At 1 year, averaged mean gradients ranged from 16 to 8 mmHg, and effective orifice area index from 1.0 to 1.2 cm^2/m^2 for valve sizes 19 to 27 mm, respectively. Nineteen (11%) patients had mild to moderate patient-prosthesis mismatch.
Conclusions. Trifecta bioprosthesis provided favourable clinical and hemodynamic results. However, a longer follow-up is needed to confirm these encouraging preliminary data and durability.

Aortic valve 3

C162

COMPUTATIONAL STUDY OF THE WALL STRESS IN THE AORTIC ROOT IN THE PRESENCE OF A STENTLESS AORTIC VALVE

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Background. The presence of a stent in an aortic bioprosthesis has been shown to increase stress on the valve leaflets and to reduce dynamic root motion during the cardiac cycle. A computational fluid dynamics simulation study was conducted to compare the forces developed in the aortic root after aortic valve replacement with stented or stentless bioprosthesis.
Methods. We considered two patients with a stentless valve implanted (Sorin Freedom SOLO). For each patient a contrast enhanced ECG gated CT scan was acquired. Then, the volumes of the two ascending aortas were reconstructed by means of the code VMTK, and the computational meshes were generated. Finite Element simulations were then performed, by solving the fluid-structure interaction problem with the code LIFEV. We virtually designed a stented configuration in the same patients by changing the elasticity properties in the root.
Results. The displacements in the stentless model are more physiological then in stented model (Fig. 1). Specifically, the presence of the rigid frame and of the base ring in the stented valve may represent an obstacle to the systolic dilation of the aortic root. On the contrary, the stentless valve seems to preserve the aortic root dynamics and guarantee the same deformations as in the healthy aorta. The pattern of the velocity flow field in the stentless model (Fig. 2) is asymmetrical, not uniform and with a central jet characterized by a peak velocity of about 2.00 m/s, a typical value achieved in the normal ascending aorta.
Conclusions. Computational methodologies represent a useful tool to investigate the aortic valve behaviour in physiologic and pathologic conditions and to reproduce virtual postoperative scenarios. Our preliminary results highlighted that stentless valves preserve the normal function and geometry of the aortic root.

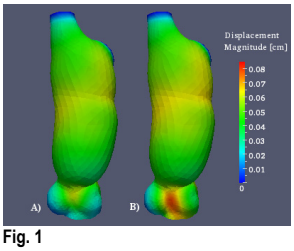

Fig. 1

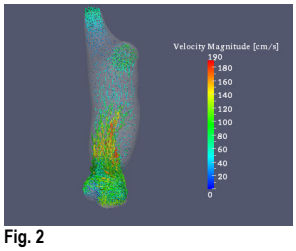

Fig. 2

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INITIAL EXPERIENCE AND EARLY HEMODYNAMIC PERFORMANCE OF THE ST. JUDE TRIFECTA PERICARDIAL VALVE

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Background. The study objective was to determine whether the new-generation Trifecta (St. Jude Medical Inc, St. Paul, Minn) pericardial bioprosthesis aortic valve, which is designed for supra-annular positioning, produces early postoperative performance and hemodynamic results.
Methods. Between June 2011 and December 2013, we retrospectively reviewed 70 consecutive patients (mean age 76.5 ± 6.7 years) who underwent aortic valve replacement with the Trifecta bioprosthesis in our institution. Early postoperative hemodynamic performance with Doppler echocardiography at discharge and 6 months after surgery were evaluated. At

follow-up (mean 6 months) clinical outcomes, freedom from complications and prosthesis performance were also investigated.
Results. Surgical indications were mostly represented by aortic valve stenosis in 54 patients (77.4%), followed by mixed lesions in 12 patients (17.1%) and aortic insufficiency in 4 patients (5.7%), respectively. Mean additive EuroSCORE was 6.92. Associate procedures were performed in 27 patients (38.6%). Preoperative LVEF was 61.4%, with maximum and mean transvalvular gradient of 75.2 mmHg and 42.7 mmHg, respectively. The highest number of subjects received a 21 mm prosthesis (27 patients) and a 23 mm prosthesis (27 patients). In-hospital mortality was 2.8% (2 patients).At discharge LVEF was 62.4% and the mean transvalvular gradient 9.1 ± 2.4 mmHg. Two months after surgery, 1 patient required reintervention because of severe regurgitation due to structural prosthesis deterioration. At 6 month follow-up, mortality was 4.4% (3 patients, not cardiac related); one case of moderate intra-prosthesis regurgitation was observed. Valve area and indexed effective orifice area were 1.74 ± 0.4 cm^2 and 0.73 ± 0.12 cm^2/m^2, respectively. Mean transvalvular gradient was 9.94 ± 3.5 mmHg. Similar statistical significance was found when data were stratified by valve size. Severe prosthesis-patient mismatch was not detected.
Conclusions. Early hemodynamic performance and clinical outcomes of the Trifecta bioprosthesis appear favorable. Additional and longer follow-up is required to have a more complete profile of this prosthesis and to confirm this encouraging clinical outcome.

C164

LONG-TERM FOLLOW-UP OF THE SORIN FREEDOM SOLO STENTLESS VALVE: CLINICAL AND HEMODYNAMIC FINDINGS

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Background. The Freedom Solo is a pericardial stentless valve implanted in supra-annular position with an easy running suture showing early optimal performance. The study aim was to evaluate the long term results of this bioprosthesis.
Methods. Between December 2004 and November 2009, 108 patients (31 males; mean age 78 ± 6 years) underwent AVR with the Freedom SOLO. Mean NYHA class was 2.5 ± 0.7 and the mean logistic EuroSCORE was 10 ± 7.
Results. The mean prosthesis size was 22.7 ± 1.9 mm, concomitant procedures were performed in 65 patients (60%). Two patients (2%) died at 30 days because of intestinal infarction and respiratory failure respectively. Mean follow-up was 69 ± 17 months and was completed in 100% of patients. One, 5 and 8 year actuarial survival was 89%, 73% and 58%, actuarial freedom from structural valve deterioration was 98%, 92%, 68%, actuarial freedom from reoperation 99%, 98% and 95%, actuarial freedom from thromboembolic events was 99%, 98%, 96%, respectively. During echocardiographic follow-up (mean 62 ± 28 months) data worsened mildly but progressively: discharge, 1-, 3- and 5-year mean gradients were (7.9 ± 3.6, 8.9 ± 3.6, 10.3 ± 4.5, 13.3 ± 11.5 mmHg, p<0.01), indexed effective orifice areas were (1.1 ± 0.4, 1.0 ± 0.2, 0.9 ± 0.2, 0.9 ± 0.2 cm^2/m^2, p<0.01), left ventricular masses were (202 ± 72, 174 ± 48, 189 ± 62, 190 ± 68 g, p=0.72). Transprosthetic regurgitation was trivial/mild in 13 (12%) and moderate in 3 (3%). Nine patients developed paravalvular leak (8.3%); in all but 2 was trivial or mild. Structural valve deterioration was detected in 15 patients due to leaflet fibrosis combined with gross calcification in 14 (13%) and to leaflet retraction with severe aortic regurgitation 1 (1%).
Conclusions. At 9-year follow-up, Freedom SOLO stentless valve seems to show satisfactory results being an attractive option mainly in cases of small annulus; however the initial unexpected worsening of prosthesis performance needs further evaluation at longer follow-up.

C165

TOTALLY BIOLOGICAL PERICARDIAL VALVED CONDUIT FOR AORTIC SURGERY: OUR EXPERIENCE

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Background. The biological pericardial conduit is a conduit characterized by a single sheet of bovine pericardium with a biological porcine valve. It is treated with a specific treatment that makes it more resistant to calcification and infective processes. We reported our experience with this conduit in aortic surgery.
Methods. From May 2013 to March 2014 in 10 patients, submitted to aortic surgery for different disease we implanted a total biological pericardial conduit. The median age was 68.5 (25th-75th percentile: 64-71), three were female (30%), median logistic EuroSCORE was 5.77% (25th-75th percentile: 4.65-8.63), two patients (20%) had undergone precious cardiac operation and median preoperative ejection fraction was 60% (25th-75th percentile: 57-64.25). Six patients (60%) had annuloaortic ectasia, 1(10%) chronic aortic dissection, 1 (10%) acute aortic dissection and 2 (20%) aortic pseudo-aneurysm. Concomitant coronary disease was present in 4 patients (40%) and in 1 patient there was a descending aorta thoracic blister.
Results. Elective surgery was performed in 6 (60%) patients, urgent in 2 (20%) and emergent in another 2 (20%) patients. In 8 (80%) patients we performed a modified Bentall operation, in 1 ascending aorta and aortic valve replacement and in another one aortic root remodeling with ascending and hemiarch replacement. CPB median time was 207 minutes (25th-75th percentile: 144-242), cross clamp median time was 148 minutes (25th-75th percentile: 140-183). In 7 (70%) patients we performed the operation in deep hypodermic circulatory arrest. There were two (20%) in-hospital deaths not prosthesis related: one for MOF and one for massive pulmonary embolism. The median ICU length of stay was 42.5 hours (25th-75th percentile: 27-65.5), median intubation time was 26.5 hours (25th-75th percentile: 18.25-59). There were not pericardial revision for bleeding and the median postoperative bleeding was 680 ml (25th-75th percentile: 650-887.5). At follow-up (median 117 days, 25th-75th percentile: 93-224) all patients out of in-hospital mortality are asymptomatic and returned to their normal life activity.
Conclusions. In our experience the use of a totally biological conduit for surgery of the aorta and aortic root is safe and flexible with low postoperative bleeding. At short-term follow-up the patients showed a good quality of life without symptoms. Further studies and longer follow-up are needed to confirm the good short-term outcome observed in our series.

C166

MINIMALLY INVASIVE AORTIC VALVE REOPERATION

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Background. Aortic valve surgery after previous cardiac surgery is usually associated with an increased risk profile. The goal of this study was to show that minimally invasive surgery can be adopted also in case of redo operation.
Methods. We retrospectively reviewed 44 patients who underwent reoperative aortic valve replacement at our Institution between October 2007 and January 2014. There were 24 male (54.5%) and the mean age was 70.4 ± 13.1 years (range: 30-84 years). Twenty-five patients had patent bypass grafts and 19 previously had heart valve replacement or repair. Six patients had endocarditis as aetiology. Out of 44 patients operated, 43 had minimally invasive upper "J" ministernotomy and only one a minithoracotomy approach.
Results. All patients received an aortic valve replacement. Mean cardiopulmonary bypass time and mean cross-clamp time were respectively 76.4 ± 26.7 min and 59.8 ± 23.9 min. Median postoperative ventilation time was of 6 hours (3-408). Postoperative outcomes, in terms of intensive care unit stay, blood loss, transfusions and sternal complications have been analyzed. One patient affected by endocarditis died during the hospital stay (mortality 2.3%).
Conclusions. Minimally invasive aortic valve surgery reoperation through an upper "J" sternotomy or through a right minithoracotomy proved to be as safe as reproducible procedure with competitive results in terms of hospital morbidity and mortality rates.

C167

PERCEVAL S SUTURELESS IMPLANTATION IN PATIENTS UNDERGOING MULTIPLE VALVE SURGERY

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Background. Perceval S Sutureless valve has shown excellent outcomes after isolated aortic valve replacement (AVR). However, no experience is reported on Perceval S in multiple valve surgery. The aim of our study is to report our single center experience in high-risk patients undergoing AVR combined with mitral and/or tricuspid valve surgery.
Methods. A retrospective, observational study of prospectively collected data on 35 consecutive high-risk patients undergoing AVR with Perceval S valve and other valve procedures were collected. Of these, 8 had previous cardiac surgery.
Results. Twenty-seven patients underwent AVR+ mitral valve surgery (15 replacements and12 repairs), of which 2 had also tricuspid valve repair. Of the 8 redo patients, 5 had AVR after previous mitral valve surgery (3 replacement and 2 repairs) and 3 had AVR re-replacement associated with tricuspid surgery (1 replacement and 2 repairs). The mean cross clamp and cardiopulmonary bypass times were 93 ± 32 min and 140 ± 45 min, respectively. In hospital mortality was 2.8% (1/35) with an expected median logistic EuroSCORE I of 16% (range 4-74%). Postoperative stroke and need of pacemaker implantation occurred in 2 patients, respectively. At a median follow-up of 6 months, survival was 83%, freedom from reoperation was 100%. No paravalvular leakage occurred and the mean gradient at follow-up was 11 ± 4 mmHg.
Conclusions. Aortic valve replacement with Perceval S sutureless valve in combined multiple valve surgery is a feasible and safe procedure associated with good early and 6-month outcomes.

C168

PERMANENT PACEMAKER IMPLANTATION AFTER SUTURELESS PERCEVAL BIOPROSTHESIS: INSIGHTS FROM A SINGLE-CENTER EXPERIENCE

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Background. Conventional aortic valve replacement (AVR) carries a risk of permanent pacemaker implantation (PPI) around 1%. In transcatheter aortic valve implantation (TAVI) it is up to 40% especially in case of self-expanding

valves. Sutureless prosthesis is a recent viable option for AVR but, sharing nitinol technology with certain TAVI valves, concerns exist regarding the risk of pacemaker. This study investigated potential predictors of PPI with sutureless Perceval prosthesis.
Methods. From our Institutional prospective database all consecutive patients who received a Sorin-Perceval valve, since the beginning of our experience to March 2014, were identified. Patients who had indwelling pacemaker at admission (n=11) were excluded, leaving 105 for a retrospective analysis. After 6.3 ± 4.0 days from surgery, 7 patients (6.7%) necessitated PPI during hospitalization. Parameters of these patients were compared to those of others 98 without PPI.
Results. Patients who required PPI had higher body-mass-index (31.5 ± 3.9 vs 27.6 ± 5.5; p=0.04) and lower left-ventricle end-diastolic-volume (61.5 ± 7.1 vs 81.8 ± 38.1 ml, p<0.001). No other baseline or operative characteristics differed significantly (age, sex, creatinine, COPD, peripheral vascular disease, hypertension, diabetes, CAD, EuroSCORE, anemia, degree of valve stenosis, redo status, betablockers, antiarrhythmics, statins, ministernotomy, operative times). Studying ECG, no difference was found regarding pre-operative heart rate, PR interval, QRS duration and QTc, left-bundle-branch block, whereas right-bundle-branch block (RBBB) was significantly prevalent in PPI group (42.9% vs. 6.7%; p=0.03). Early mortality was not affected by PPI (0 vs. 3.1%; p=0.81) neither hospital stay (9.9 ± 3.1 vs. 7.4 ± 3.6 days; p=0.08).
Conclusions. AVR with Perceval is a safe procedure, although incidence of PPI is not negligible. Attention should be paid in case of obese patients, small ventricles and baseline RBBB. This conduction disturbance was reported as risk factor for PPI also in TAVI and it is probably an element of vulnerability during prosthesis expansion. Complete calcium ablation and no supplemental ballooning could be investigated to reduce PPI.

C169

MINIMALLY INVASIVE VERSUS FULL STERNOTOMY AORTIC VALVE REPLACEMENT: SHORT AND LONG-TERM PROPENSITY SCORE BASED COMPARISON

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Background. Minimally invasive aortic valve replacement (MiniAVR) through J shaped limited upper sternotomy or anterior right thoracotomy have emerged as attractive alternatives to full sternotomy AVR (FS-AVR) in order to reduce operative morbidity. However, the benefit of MiniAVR on operative outcomes still remains controversial and whether MiniAVR can affect late results is unknown.
Methods. Prospectively collected data from institutional database were reviewed. Among 913 undergoing isolated AVR, a total of 168 received MiniAVR and 745 had FS-AVR according to the surgeon's preference. Inverse propensity score (PS) weighting was used to estimate treatment effects on short and long-term outcomes.
Results. MiniAVR was associated with a reduced risk for reintubation (OR 0.86; 95%CI 0.73-0.99; p=0.04) and sternal wound infection (MiniAVR (OR 0.96; 95%CI 0.92-1.000; p=0.05). On the other hand MiniAVR (p=0.15) did not increase the risk for re-exploration for bleeding (p=0.15) or pericardial collection (p=0.67). A trend towards a reduced operative mortality (0.5% vs 2.1%; p=0.07) and a shorter length of hospital stay (-2.5 ± 2.4 min; p=0.09) was observed for MiniAVR. After a mean follow-up time of 1391 days [range 1-3828], MiniAVR did not affect late mortality (HR 0.74; 95%CI 0.81-2.22) and need for redo AVR (HR 1.2; 95%CI 0.81-0.1.53; p=0.4).
Conclusions. MiniAVR was associated with a trend towards better operative outcomes and provided excellent late results comparable to conventional full sternotomy AVR. This strategy should be considered as a valuable alternative to full sternotomy, especially in high risk AVR setting.

C170

MINIMALLY INVASIVE VALVE SURGERY HAS LOWER MORBIDITY IN VERY OBESE PATIENTS COMPARED TO MEDIAN STERNOTOMY APPROACH

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Objective. To assess the potential of the minimally invasive approach to minimize the rate of in-hospital surgical complications in a population of morbid obese (BMI >35 kg/m^2) patients undergoing single or multiple valve surgery.
Methods. From January 2003 to February 2013, 73 consecutive patients (24 males, 33%) with BMI ≥35 kg/m^2 (38.7 ± 4.4 kg/m^2) underwent isolated mitral and (or) aortic valve surgery ± tricuspid valve repair by the means of median sternotomy (MS) or minimally invasive valve surgery (MIVS) approach. Both groups had no differences in preoperative variables.
Results. Thirty-nine patients underwent MIVS approach and 34 had valve surgery through MS. The mean age was 66.5 ± 10 years (67 ± 9 vs 65.8 ± 11.8 years, p=0.81, MIVS vs MS). Total cardiopulmonary bypass (CPB) time and cross-clamp (X-clamp) time were comparable (127 ± 40 vs 132 ± 60 min, p=0.83; and 87.6 ± 33.5 vs 95 ± 47 min, p=0.77, MIVS vs MS). Mechanical ventilation time and post-operative use of blood products did not differ in the two groups. Median Intensive Care Unit (ICU) stay was 1 day for both groups (p=0.17). Composite complication rate was lower in the MIVS compared to MS group (10% vs 38%, p<0.01) and was mainly driven by higher in-hospital surgical wound complication (3% vs 18%, p=0.029; MIVS vs MS) and occurrence of major post-operative arrhythmias (0% vs 18%, p<0.01; MIVS vs MS). At multivariable analysis, the only risk factor for post-operative composite complications was the MS approach. Patients exhibited the same median hospital stay (7 days, p=0.88) and there was only one in-hospital death in the MS group (0% vs 3%, p=0.2). We found a higher discharge-at-home rate in the MIVS group (44%) versus MS group (24%).
Conclusions. In morbid obese patients the minimally invasive approach is not only safe and feasible, but also associated with fewer composite complications, mainly due to lower incidence of surgical site dehiscence and post-operative major arrhythmias. Furthermore, a higher proportion of MIVS patients were discharged at home compared to MS group.

C171

MINIMALLY INVASIVE AVR WITH THE EDWARDS INTUITY BIOPROSTHESIS: EARLY RESULTS IN HIGH-RISK PATIENTS

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Background. Due the availability of transcatheter aortic valve implantation (TAVI), an increasing number of high risk patients are being referred to surgeons. On the other hand, this disruptive technology still carries a certain amount of unpredictability of result especially if we look at paravalvular leaks (PVL) incidence. The introduction of an easy deployment prosthesis makes it possible to treat also high risk patients with a procedure that resembles the excellent results of conventional aortic valve replacement even with a minimally invasive approach (MIAVR).
Methods. 59 consecutive patients received an Edwards Intuity bioproshesis. We analysed a subgroup of 22 patients with logistic EuroSCORE higher than 15. Mean age was 81.6 ± 1.7; mean logistic EuroSCORE 27.3 ± 10; NYHA III/IV 68.2%; LVEF 51 ± 18.3; PAPs 40 ± 9.6. Ultrasound data were collected at discharge and at 6 month follow-up. Follow-up was 100% complete.
Results. All patients received an Edwards Intuity valve via an upper mini-sternotomy. 63% of the patients with a small annulus have a 19-21 valve. Mean aortic cross-clamp and ECC times were respectively 50 ± 15 and 84 ± 27minutes. 42% of the patients were transfused. Two patients had a permanent pacemaker. We observed no in-hospital and 1 late mortality not valve and cardiac related. Echocardiographic data at discharge and at 6 months were respectively: mean gradient 9.83 ± 3.76 and 7.29 ± 3.2; LVEF 48.6 ± 11 and 53.7 ± 7.9; severe pulmonary hypertension was present in 11% of patients. Paravalvular leak (PVL) none in 95.5% and trivial in 1 patient (4.5%). Only 1 patient had a moderate prosthesis-patient-mismatch (PPM). Conclusions: Minimally invasive aortic valve replacement with Edwards Intuity valve has excellent early results even in high risk patients with low morbidity and mortality rate. Furthermore, we have an excellent haemodynamic performance at 6 months even in small annulus with no severe PPM. PVL was zero at discharge and trivial in 1 patient at follow-up.

C172

HEART VALVE CLINIC: A CLINICAL PATHWAY FOR THE PATIENT WITH VALVULAR HEART DISEASE

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Objectives. To analyze the current management of patients with heart valve disease (HVD) and to produce a more efficient management model and clinical pathway that provides homogeneous treatment, quality of care, and allows a more rational use of resources.
Methods. From January 2010 to December 2012 we selected the medical records of patients with different HVD identified with ICD- 9 CM 2007. We reviewed the clinical history, highlighting the various transfers between different hospitals and department, the diagnostic tests performed, the average waiting time and the length of stay.
Results. In the period of our analysis 1524 patients with HVD were treated in our hospital. Among this, 792 patients were discharged medically, 671 undergone surgery and 61 undergone transcatheter procedure. For patients treated with surgical or interventional therapy, the average age was 69.4 years (range 18.5- 92.1 years). In 246 patients (33.6%) were performed other associated procedures The mean length of hospital stay was 23.6 days. The number of pre-operative echocardiogram for patient was 2.4. The average waiting time for pre-operative echocardiogram was 1.3 days, while for chest CT and cardiac MR was 4.2 and 3.7 days, respectively.
Conclusions. The concrete achievement of a clinical pathway and of a modern integrated approach alternative to current management is possible and easily applicable. This project provided the training of a dedicated group of specialists, the Heart Valve Clinics, experts on HVD, which ensure a multidisciplinary approach for the diagnosis, treatment and follow-up and furthermore coordinates the different clinical episodes taking responsibility of patient's care.

C173

RISULTATI CLINICI E IMPATTO ECONOMICO NELL'USO DELLE BIOPROTESI VALVOLARI AORTICHE SUTURELESS: CONFRONTO PROPENSITY MATCH CON LE PROTESI BIOLOGICHE CONVENZIONALI

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Background. L'utilizzo delle protesi valvolari aortiche sutureless può ridurre in modo significativo i tempi chirurgici. Questa riduzione potrebbe favorire un miglior outcome e conseguentemente influenzare i costi ospedalieri.

Metodi. Dal marzo 2010 ad aprile 2013, 566 pazienti sono stati sottoposti a sostituzione valvolare aortica con impianto di bioprotesi per stenosi valvolare aortica, di cui 166 con protesi sutureless e 400 con protesi convenzionale. Utilizzando l'analisi del propensity score sono stati identificati due gruppi di 82 pazienti ciascuno (sutureless e sutured) con caratteristiche preoperatorie simili. Sono stati analizzati i risultati intra- e postoperatori, e i costi ospedalieri sostenuti.

Risultati. Mortalità a 30 giorni dall'intervento è simile nei 2 gruppi (3 decessi nel gruppo sutured e 2 in quello sutureless;p=0.65). Il tempo di clampaggio aortico, circolazione extracorporea e tempo chirurgico totale è stato rispettivamente del 20%, 23% e 16% più breve nel gruppo sutureless (p<0.001). Nel gruppo sutureless sono stati registrati: minor degenza in terapia intensiva (2 ± 1.2 vs 2.8 ± 1.3 giorni; p<0.001), ridotto tempo di intubazione (9.5 ± 4.6 vs 16.6 ± 6.4 ore; p<0.001), minor necessità di trasfusioni (1.2 ± 1.3 vs 2.5 ± 3.7 unità di emazie concentrate; p=0.005), ridotta degenza ospedaliera (10.9 ± 2.7 vs 12.4 ± 4.4 giorni; p=0.001), minore incidenza di fibrillazione atriale post-operatoria (p=0.015), versamento pleurico (p=0.024) e di insufficienza respiratoria (p=0.016). L'incidenza di eventi neurologici ed impianto di pacemaker postoperatori non era statisticamente significativa (p>0.05). La minore incidenza di complicanze postoperatorie nel gruppo sutureless si traduce in una riduzione del consumo di risorse: costo di sala operatoria (5876 vs 5527 Euro), costo di degenza ospedaliera (9873 vs 6584 Euro), costi di procedure diagnostiche ed esami di laboratorio (2153 vs 1387 Euro). Il costo totale medio per paziente è stato 17905 vs 13498 Euro, con un risparmio di 4407 euro (circa-25%).

Conclusioni. Le bioprotesi sutureless garantiscono una riduzione dei tempi chirurgici e di conseguenza si associano ad un migliore outcome e, escludendo il costo delle protesi, un contenimento dei costi ospedalieri.

C174

MINIMALLY INVASIVE AORTIC VALVE REPLACEMENT VIA RIGHT ANTERIOR MINI-THORACOTOMY: AN INITIAL EXPERIENCE

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Background. Aortic valve replacement (AVR) through right anterior minithoracotomy (MT) is increasingly performed, becoming a feasible and popular alternative to conventional full sternotomy (FS). AVR through right anterior MT has been proved to have outstanding outcomes, minimizing patient trauma, improving recovery, and reducing hospital expenditures. We report our initial experience with AVR through right anterior MT.

Methods. From June 2012 to March 2014, 70 elective consecutive patients were operated on AVR through right anterior MT (4- to 6-cm incision) by a single surgeon. The population had an average age of 69.9 ± 11.9 years (range, 31 to 85), contained 38 (54%) men, and revealed a mean EuroSCORE II of 10.4 ± 7.2. Indication for AVR included stenosis in 31 patients (45%), mixed lesions in 29 (41%), and predominant regurgitation in 10 (14%). Arterial cannulation was accomplished with femoral artery or direct aortic cannulation performed through a right-sided MT, whereas venous drainage required femoral vein cannulation generally under transesophageal echocardiography guidance.

Results. Hospital mortality accounted for 1 patient only, 2 (4%) patients required a conversion to FS and other 4 (6%) a re-exploration for bleeding. Overall, cardiopulmonary bypass (CPB) was 108 ± 25 min and cross-clamp (ACC) time was 74 ± 14 min. Although not significant, a decrease in CPB time was observed with surgeon experience increasing (R2 = 0.2, p = 0.255). Postoperative stroke was registered in 1 (1.4%) patients, acute kidney injury in 8 (11%), and atrial fibrillation in 21 (30%). No MT wound infections were observed. Finally, mean hospital length of stay was 11.8 ± 8.4 days.

Conclusions. Our initial experience on AVR through anterior MT demonstrated excellent results with a reduced complication rate.

C175

AORTIC VALVE BYPASS USING A NOVEL AUTOMATED DEVICE FOR THE TREATMENT OF HIGH-RISK AORTIC VALVE STENOSIS ON A BEATING HEART

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Background. The number of high-risk patients requiring aortic valve replacement is increasing with increased prevalence of comorbidities in the elderly candidates or redo cases. The option of an apico-aortic bypass using valved conduits is not new. We report the results with the use of a novel device incorporating a bioprosthetic stentless valve and designed to be used on a beating heart.

Methods. From March 2012 to August 2013,15 patient were submitted to aortic-valve bypass (AVB) to treat a severe aortic valve stenosis using a novel system. It is structured into 2 components: a valved conduit incorporating a stentless bioprosthesis to be anastomosed of descending aorta and a ventricular conduit to be implanted on the left ventricular apex using an automated coring device. Patients mean age was 77 ± 7.2 years (33% males). Mean ejection fraction (EF) was 52 ± 13%. Mean preoperative NYHA class was 2.6 ± 0.89. The mean LogEuroSCORE was 16.45 ± 13.6%; mean STS score risk of morbidity/mortality was 26.6 ± 16.5%. All the patients received AVB through a mid-lateral thoracotomy. The design of the system makes cardiopulmonary bypass not necessary. In one patient a concomitant left anterior descending (LAD) stenosis was revascularized during the same procedure using a left internal mammary artery (LIMA without cardiopulmonary bypass). In another one LIMA-to-LAD graft, right superior pulmonary lobe trisegmentectomy and mediastinal limphadenectomy were performed. In one patient we planned to use ECMO to support lung function and in another CPB without aortic crossclamp.

Results. No intraoperative deaths occurred. Median ICU stay and intubation time were 42 (25-75° perc: 22-59.5) and 17 (25-75° perc: 16-19.7) hours, respectively. The mean hospital stay duration was 10 ± 6.8 days. No cerebrovascular events occurred. There were four in-hospital deaths: 2 for MOF, 1 for myocardial ischemia due to hemorrhagic shock and one for acute gastrointestinal bleeding. Two patients died during follow-up. One for silentic hepatocarcinoma (2 months) and one for necrotic pancreatitis (6 months). Nine patients (mean follow-up: 13.8 ± 6.1 months) were alive and only one patient is in NYHA class III.

Conclusions. AVB with automated ventricular coring system is an alternative to conventional aortic valve replacement in high risk patients in which there is some contraindication to transcatheter aortic valve implantation (TAVI) procedure or TAVI is not possible for technical reasons. Out of our best knowledge this is the largest single Center experience to now.

C176

CONVENTIONAL SURGERY VERSUS TAVI: CLINICAL AND ECONOMIC IMPLICATIONS AT ONE YEAR

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Background. Aortic valve replacement (AVR) is the gold standard in patients with severe symptomatic aortic valve stenosis. During the last few years TAVI have shown good clinical outcomes in selected patients. Aim of this study was to compare clinical outcomes, as for VARC definition, and costs of AVR to TAVI.

Methods. We analyzed data (2007-2012) from consecutive patients: 153 TAVI; 338 isolated AVR with biological prosthesis. Univariate analyses showed different populations. Logistic EuroSCORE and STS Score were 21.0 ± 12.2 vs 8.8 ± 6.7 (p<0.001) and 8.5 ± 5.9 vs 3.3 ± 2.2 (p<0.001) respectively; mean age 82.2 ± 6.4 vs. 75.5 ± 6.8 (p<0.001). Within the 53 pre-operative characteristics 12 were not statistically different; the most notable was gender: female 60.1% vs 52.1% (p=0.1). Main clinical outcomes and costs were analyzed with multivariate regression models with 10 baseline charactestics (age, gender, creatinine, ejection fraction, sPAP, peripheral vascular disease - STS and ES definitions, reintervention, COPD-STS definition, conduction rhythm disturbances, previous cerebrovascular accident) plus TAVI vs AVR as independent variables, trying to attenuate baseline differences.

Results. Results of the multivariate analyses for clinical outcomes are summarized in the table. At univariate analyses a higher sustained cost of €19,702/pt (€36,064 vs €16,362, p<0.001); resulted in TAVI; after multivariate analysis this difference decreased to €17,503/pt (p<0.001).

Conclusions. TAVI seems to have a higher risk of mortality at 30-day that becomes significant at one-year. This underlines the fact that comorbidities not taken into account in the operative risk scores are important in patient selection more than usual pre-operative characteristics. Higher costs do not justify widening of indications for TAVI at this time.

C177

LONG-TERM OUTCOMES AFTER TRANS-CATHETER AORTIC VALVE IMPLANTATION: FIVE-YEAR RESULTS IN OVER 300 PATIENTS

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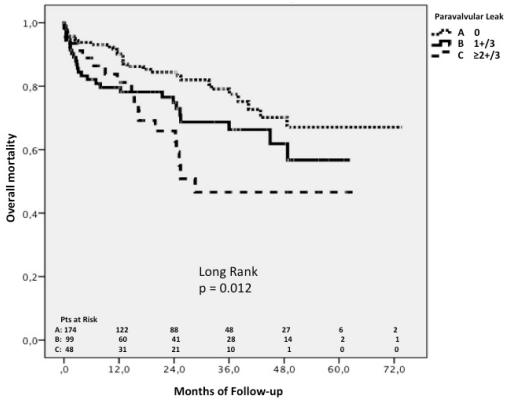
Background. Aim of this single-center retrospective study was to assess long-term (up to five years) clinical and hemodynamic outcomes of patients undergoing trans-catheter aortic valve implantation (TAVI).

Methods. Since 2007 through 2013, 321 consecutive patients underwent TAVI at our institution. Outcomes were reported according to VARC definitions. Patients underwent clinical and echocardiographic follow-up at our "TAVI-dedicated" outpatient clinic. Multivariate logistic regression analysis was performed to identify independent predictors of mortality at follow-up.

Results. Trans-femoral (TF) and trans-apical (TA) TAVI were performed in 221 (69%) and in 100 (31%) patients, respectively. All-cause 30-day mortality was 4.7%; 4.6% and 5.1% in TF and TA group, respectively (p=1.00). The incidence of 30-day cardiovascular death, stroke and myocardial infarction

was not different between groups. Acute kidney injury (AKI) rate was higher in TA patients (23% vs 8.1%; p<0.001), while access-related complications were more frequent in the TF group (35.8% vs 13%; p<0.001). VARC-2 early safety combined endpoint was 20.2%; 16.3% and 29% in TF and TA group, respectively (p=0.007). Combined efficacy endpoint at 1 year was 26.8%, with no differences between groups. Mean follow-up was 22.3 ± 17.8 months (range: 1-74). Patients with paravalvular leak of any grade had a significantly worse survival than patients with no leak (Fig. 1). Overall survival rates at 1, 3 and 5 years were 85.5 ± 2.1%, 69.9 ± 3.2% and 61 ± 4.3%, respectively. Independent predictors of all-cause mortality at follow-up were: previous myocardial infarction (OR 2.7, 95%, p=0.01), any grade of paravalvular leak (OR 2.5, p=0.01) and AKI (OR 3.1, p=0.02). Peak and mean gradients at follow-up were: 19.4 ± 9.8 and 10.7 ± 12.0, respectively. Mean effective orifice area at follow-up was 1.1 ± 0.9 cm^2/m^2.

Conclusions. Our data show that TAVI has good early and long-term clinical and hemodynamic outcomes in high-risk or inoperable patients with SSAVS. Paravalvular leak of any grade has a significant impact on survival.



C178

EVOLUTION OF AORTIC STENOSIS TREATMENT IN THE TAVI ERA: ROLE OF CONVENTIONAL SURGERY IN HIGH-RISK PATIENTS

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Background. Conventional cardiac surgery progressed to improve its results: valve prosthesis (sutureless prosthesis, SU-AVR); minimised cardio-pulmonary bypass (MCPB) to reduce the systemic inflammatory response syndrome and minimally invasive surgical cardiac approach (MICS). The aim of this study is to evaluate the outcomes of SU-AVR in high-risk patients and to focus on results in the population where all these issues were adopted.

Methods. From January 2012 to January 2014, we reviewed 25 SU-AVR performed in a population (SU group) affected by severe aortic stenosis with average age of 82 ± 4.4 and mean morbidity STS score (%) of 19.6 ± 5. In SU group, we identified 8 higher risk patients where SU-AVR was performed with MCPB and MICS (HR group). In HR group average age was 81.7 ± 4.6 and mean morbidity STS score (%) was 20.6 ± 5.8. We analysed the incidence of postoperative major events and glomerular filtration rate (GFR) trend as indicators of a good postoperative performance.

Results. No hospital mortality was observed. The mean hospital stay was similar in two groups: 8.4 ± 2.8 (SU group) vs 8 ± 2 days (HR group).No patient had major adverse events and postoperative renal function curve reveals no increase of clinical/subclinical serum creatinine. The mean GFR (ml/min) was 50.8 ± 21.3, 48.3 ± 19.2, 49.8 ± 23.6, 54.6 ± 22.4 in SU group and 49.7 ± 22.9, 47.1 ± 21.3, 49.9 ± 24.9, 55.1 ± 24 in HR group at pre-operative and at 1st, 3rd, 5th postoperative day. The pre-discharge echocardiogram has shown satisfactory results with 15.1 ± 5.4 (SU group) and 14.3 ± 4.4 (HR group) of mean aortic gradient (mmHg).

Conclusions. SU-AVR is a good option not only in hostile aortic anatomy (as small annulus) but also in high risk patients. To improve the advantages of conventional surgery, we can combine in a single approach SU-AVR, MCPB and MICS for patients with multiple comorbidities. This preliminary experience shows that an optimized approach for high-risk patients, including SU-AVR, MPCS and MICS, is safe and effective.

C179

RESULTS AND MID-TERM FOLLOW-UP IN 160 TRANS-APICAL AORTIC VALVE IMPLANTATIONS

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Background. Transcatheter aortic valve implantation (TAVI) has emerged as an alternative to surgical aortic valve replacement for patients with symptomatic severe aortic stenosis considered being at very high or prohibitive operative risk. Aim of this study was to evaluate the results and mid-term follow-up in 160 patients underwent trans-apical aortic valve implantations (TA-AVI) at San Camillo Hospital.

Methods. Between June 2009 and March 2014, 160 patients (mean age 84.4 ± 4.4year) underwent TA-AVI with Edwards SAPIEN heart valve. 146 patients were in NYHA class III, 4 patients in NYHA class IV. Ejection fraction was 43 ± 8% (range 16-61%) and Logistic EuroSCORE 35.7 ± 7.3% (range 16-61%). 22 patients had previous cardiac surgery and 15 patients underwent a valve in valve (VinV) procedures (8 aortic, 7 mitral position).

Results. The 30 day mortality was 7.5%. There were: 1 intraoperative death, 4 ECMO supports (emergency patients in NYHA class IV), 2 re-exploration for bleeding (no apex related), no periprocedural acute myocardial infarction, one vascular complication and one TIA. In O.R. fast truck was achieved in 79 patients. ICU stay was 38 hours, hospital stay 7.5 days. New PMK insertion in 5%. At mean follow-up (27 months, range 2-57months) 50% of patients was in NYHA class I and the remaining in NYHA class II; echocardiographic data: EF 48 ± 7%, mean aortic trans-valvular gradient 9.8 ± 2 mmHg, aortic insufficiency was absent in 50 patients (44.3%), trivial in 58 (51.2%) and moderate in 4 (3.89%). No structural valve deterioration was observed. All VinV procedures were uneventful and without residual insufficiency. At follow-up the global survival at 30 days, 6 months, 1, 2, 3 and 4.5 years was 92.5%, 84%, 80%, 75%, 70% and 65%, respectively.

Conclusions. The results and the survival at mid-term follow-up confirmed TAVI as good alternative treatment in high-risk patients with severe aortic stenosis or failed bioprosthetic valves. Longer follow-up is mandatory to confirm valve durability and hemodynamic performance.

C180

THE ASCENDING AORTA (DIRECT-AORTIC) AS AN EFFECTIVE AND PRACTICABLE ALTERNATIVE ROUTE FOR SURGEONS PERFORMING TAVI

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Background. Transcatheter aortic valve implantation (TAVI) has been designed to treat elderly patients with severe aortic stenosis at high risk for conventional surgery. These patients are also often affected by severe iliac-femoral arteriopathy, rendering the trans-femoral approach unemployable. In these cases, the ascending aorta (direct aortic approach) has been our preferred alternative route for TAVI in the last years. We evaluated our experience to evaluate feasibility and early to mid-term outcomes of these new surgical technique.

Methods. Since May 2008 two hundred and thirty-two patients (131 female) with severe symptomatic aortic stenosis and no reasonable surgical option due to excessive risk were evaluated for TAVI at our department. Fifty patients (28 female), mean age 81.2 ± 6.9 underwent CoreValve implantation directly from the ascending aorta through a right anterior mini-thoracotomy in the second intercostal space. A combined team of cardiac surgeons with expertise in hybrid procedures, cardiologists, and anesthetists performed all the procedures.

Results. Eleven patients (22%) were redo at TAVI. We used a 23-mm CoreValve Evolute in 3 patients, while the most used size valve was the 29 mm in 46% of patients. Mean transaortic gradient decreased lower than 5 mmHg in all patients. The paravalvular regurgitation was ≤ grade 1 in 46 patients as assessed by peri-procedural TEE. Seven patients required a permanent pacemaker implantation; 30-day mortality was 6% (3 patients). Seven patients died during follow-up. Actuarial survival at 2 years is 84.7 ± 5.3%.

Conclusions. TAVI with the direct aortic approach is safe and feasible, offering a new attractive option to treat selected high-risk patients with severe aortic stenosis and peripheral vasculopathy, including those requiring a re-do procedure. The ascending aorta is a practicable and familiar alternative route for surgeons performing TAVI.

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EARLY CD4/CD8 RATIO >1.5 AFTER ANTI-THYMOCYTE GLOBULIN INDUCTION THERAPY IS A WEAK MARKER OF ACUTE REJECTION AND CAV RISK IN HEART-TRANSPLANTED PATIENTS

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Background. To evaluate the predictive value of different T-lymphocyte subsets response to induction therapy with antithymocite globulines (ATG) with respect to acute rejections and coronary allograft vasculopathy (CAV) in heart-transplanted (HTx) patients (pts).

Methods. We analyzed 132 consecutive pts (91 males, mean age 48.6 years) undergoing HTx between 2008 and 2012 at our Centre. Patients younger

than 14 years and re-HTx were excluded. Patients were divided into two groups according to the first (1 to 3 days after HTx) CD4/CD8 ratio obtained after ATG administration (1 mg/kg in 8 hours, operative room). Our protocol also consists in steroid administration (methylprednisolone 500 mg, operative room) followed by i.v. methylprednisolone 250 mg x 3 in ICU and then per os (prednisone 0.8 mg/kg/die with tapering to 0.1 mg/kg/die in 2-6 months). Cyclosporine or tacrolimus are usually started on day 1 or 2, as well as mycophenolate or everolimus. During the first year, pts are followed up with 13 expected endomyocardial biopsies. Coronary angiography is performed at 12 months and then per clinical/instrumental judgment. Later, a clinical visit is performed every 6 months and two-dimensional echo every year.

Results. 67 pts had a CD4/CD8 ratio >1.5 (Group 1) while 65 had a ratio ≤1.5 (Group 2). In-hospital mortality was 14.9% in Group 1 and 9.2% in Group 2 (p=0.32). Treated rejections (TR) defined as acute cellular rejections requiring i.v. pulse steroid administration, were non-significantly more common (49.2 vs 43.1%, p=0.48) and occurred later (30 vs 20.5 days) in Group 1. Group 2 showed an increased tendency to repeat TR (>1 episode 26.2 vs 20.9%, >2 episodes 10.8 vs 6%, >3 episodes 7.7 vs 3%, respectively). CAV was non-significantly more frequent in Group 1 (57.2 vs 42.8%, p=0.12).

Conclusions. An early CD4/CD8 ratio >1.5 is a weak marker of acute rejection and CAV after HTx. Nevertheless, T-lymphocyte subsets analysis allows to modulate the overall immunosuppressive approach.

C182

EARLY GRAFT FAILURE IN ORTHOTOPIC HEART TRANSPLANTATION RECIPIENTS: A SINGLE CENTRE EXPERIENCE

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Background. Early graft failure (EGF) is a detrimental complication after orthotopic heart transplantation (OHT), and carries high morbidity and mortality. The aim of this study was to analyze our results in supporting patients affected with EGF after OHT.

Methods. We reviewed 114 consecutive patients receiving OHT between October 2004 and July 2013. In this period, 19 patients (16.6%) developed EGF requiring veno-arterial extracorporeal support (VA-ECMO). VA-ECMO was instituted in 18 patients while one received a biventricular centrifugal pump. Fifteen patients were male (mean age was 49 ± 11 years). General principles in treating the patients were based on a low dose of adrenaline (0.05 mic/kg/min) infusion to optimize residual cardiac function; femoral IABP placement to allow aortic valve opening to decompress the left ventricle (LV) and increase coronary flow (13/18 patients); a low dose of vasoconstrictors; careful fluid balance in order to avoid fluid overload; TEE monitoring of aortic valve opening, and of LV distension; and early detection of complications.

Results. The mean LV ejection fraction pre-VAECMO was 21 ± 15%. Mean recipient pulmonary vascular resistance was 3.6 ± 3.2 WU. Five patients had absolute contraindication to IABP placement. The mean VA-ECMO and IABP support times were 6.7 ± 3.2 and 9.2 ± 7.6 days, respectively. Mean VA-ECMO flow was 4164 ± 679 l/min. Lactate, creatinine and SGOT serum levels decreased during support, and the mean LV ejection fraction increased to 43.4% ± 17.7% at the end of support. Weaning and discharge rates in patients treated with VAECMO+ IABP were 85.7% and 57.1%, respectively. Causes of death were primarily MOF.

Conclusions. A multidisciplinary evaluation of ECMO patients done by intensivists, cardiologists, and surgeons and, whenever applicable, the general principles reported may influence weaning and survival rate when EGF occurs. Our approach seems to be a safe and reproducible strategy for avoiding LV distension and fluid overload, and for detecting complications that negatively affect outcomes.

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SAFETY OF RECOMBINANT COAGULATION FACTOR VIIA ADMINISTRATION FOR UNCONTROLLABLE BLEEDING IN PATIENTS UNDER ECLS THERAPY

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Background. Hemorrhagic complications are not uncommon among patients on ECLS and ECMO support. Recombinant coagulation factor VIIa (rFVIIa) is a pharmacological option to treat severe bleeding refractory to all other treatments, whose safety has not been fully demonstrated in patients under ECLS. We aimed at clarifying the impact of rFVIIa on the rate of thrombo-embolic events and ECLS circuit dysfunction in these patients.

Methods. A single-Institution prospective database was queried for 30 patients receiving rFVIIa during ECLS (26 cases) / ECMO (4 cases) therapy over the 2006-2013 period within all Intensive Care facilities of our hospital (0.9% of the ECLS activity). Patients treated by rFVII were initially managed by complete suspension of heparin while on ECLS. In-hospital and early follow-up clinical results were assessed.

Results. The majority of patients (60%) received ECLS post-cardiotomy (early cardiac graft failure in 30%). Sites of bleeding were the mediastinum in 87% of cases (after heart transplantation or cardiac operation) and others in the remainders (bronchi, abdomen, common carotid artery). Average ECLS/ECMO duration was 8.9 ± 7.3 days; circuit/oxygenator change was required in 5 cases requiring support duration >6 days. We observed no cases of circuit thrombosis and one thrombo-embolic event (3%). Survival was 66.7% at support explantation, 50% at the 30th post-implantation days and 46% at the latest follow-up (average: 3 months). Hemorrhage was the cause of death in 2 instances; other causes were multiorgan failure and mesenteric ischemia, loss and the risk of coagulopathy. These findings may contribute in the debate over the decentralization of ECLS/ECMO therapy into non-tertiary centers. At explantation, average blood hemoglobin content and platelets count were 9.8 ± 1.8 mg/dL and 80.9 ± 32.7 *100/mL.

Conclusions. The rFVIIa can be safely administered to treat life-threatening bleeding in patients under ECLS/ECMO therapy without increased rates of thrombo-embolic or circuit dysfunction events. In these patients, post-discharge survival is comparable to that observed among ECLS/ECMO patients who did not suffer refractory bleeding.

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IMPACT OF DIFFERENT LVAD TECHNOLOGIES ON THE COAGULATION SYSTEM: AXIAL VERSUS CENTRIFUGAL FLOW

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Background. Antithrombotic therapy is essential in LVAD recipients and must be carefully titrated in each patient. Different devices might influence the coagulation system distinctively. An awareness of this may allow early planning of the most appropriate antithrombotic approach according to LVAD type. We studied the impact of two different continuous flow LVADs on the coagulation system: Jarvik 2000, an axial flow pump, versus HeartWare HVAD, a centrifugal device based on magnetic levitation.

Methods. We collected data of thromboelastometric and aggregometric tests, and platelet count from 39 patients implanted with LVAD in our center between December 2008 and June 2013. Twenty-one patients received Jarvik 2000 and 18 HeartWare HVAD.

Results. At day 7, 14, 21 and 28 our data showed significantly higher levels of platelets, INTEM-EXTEM-FIBTEM MCF, TRAP and COL tests in patients with HeartWare when compared with Jarvik 2000 patients. We observed a remarkable reduction over time of coagulation and platelet activation in HeartWare patients.

Conclusions. The two pumps have markedly different effects on the hemostasis. HeartWare causes hyperactivation of the coagulation system compared to Jarvik. Accordingly, HeartWare patients usually need both anticoagulant and antiplatelet drugs, while Jarvik patients are usually managed only with anticoagulation. Further studies are necessary to determine the cause of such diversity.

C185

THE UNDERESTIMATED COST OF BLOOD PRODUCTS TRANSFUSION FOR PATIENTS UNDER ECLS AND ECMO SUPPORT

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Background. Patients on ECLS and ECMO support frequently require transfusion of blood products due to bleeding, anemia, coagulopathy or hemolysis. The economic and clinical cost of transfusions in these patients has not been estimated so far.

Methods. Our institutional prospective electronic database was queried over 363 patients receiving veno-arterial ECLS or veno-venous ECMO therapy during the 2005-2014 period for either cardiac or pulmonary failure, or both. Data about transfusions are prospectively entered in the database.

Results. Patients receiving ECLS had a higher rate of hemorrhagic and thrombo-embolic events (63.3%) than those who received ECMO (33.3%) (p<0.001). While the rate of transfusion of packed red blood cells (pRBC) was comparable among these groups (85.8% vs 86.8% respectively, p=0.8), ECLS patients presented higher rate of transfusion of platelets (65.1% vs 35.8%) and fresh frozen plasma (FFP) (64.2% vs 35.8%) (both p<0.001). Post-cardiotomy ECLS patients had greater rate of pRBC, FFP and platelets transfusion than other indication groups. Factors associated with pRBC transfusion were age >65 years, greater inotropes doses and lower blood hemoglobin at implantation. Factors associated with FFP transfusion were lower prothrombin time, lower blood hemoglobin and increased (>8 mmol/L) serum lactates at implantation. Factors associated with platelets transfusion were lower blood hemoglobin, prothrombin time and platelets at implantation. Non-survivors to discharge presented increased rate of FFP transfusion (p=0.03). Estimated average cost of blood products per patient was 2.221,50 ± 2.586,30 Euros (survivors to discharge) and 2.734,90 ± 3.209,40 Euros (non-survivors) (p=NS).

Conclusions. ECLS and ECMO are very demanding in terms of blood products transfusions, with remarkable associated economic costs. All precautions should be taken in order to minimize blood loss and the risk of coagulopathy. These findings may contribute in the debate over the decentralization of ECLS/ECMO therapy into non-tertiary centers.

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IMPACT OF MULTIPLE REOPERATION ON HEART TRANSPLANTATION LONG-TERM OUTCOME

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Background. In recent years, an increasing number of candidates for heart transplantation underwent one or more previous cardiac operations. The aim of this study was to compare long-term results of patients undergoing heart transplantation after multiple redo operations.

Methods. Between 1985 and 2013, in our transplant program, 339 patients had no operation before heart transplantation (group A), 118 had a previous operation (group B) and 25 patients had multiple redo operations (group C). Patients groups were analyzed regarding pre-, intra- and post-operative variables in addition to survival, and coronary allograft vasculopathy and coronary stenting rate.

Results. Pre-operative recipients findings in group A, B and C were respectively: mean age 53 ± 11, 56 ± 9, 58 ± 10 (p=0.03); male 80%, 86% and 84% (p=0.44), ischemic etiology 35%, 63%, 48% (p<0.01), emergent indication 20%, 26% and 22% (p=0.35%) Pre-operative donors findings in group A, B and C were respectively: mean age 37 ± 14, 39 ± 16, 39 ± 16 years (p=0.44), male 67%, 72%, 76% (p=0.38), ischemic time 187 ± 56, 205 ± 63, 196 ± 57 minutes (p=0.18).One year survival was 92%, 82% and 92% (p=0.12), 5-year survival was 81%, 70% and 63% (p<0.01), 10-year survival was 68%, 56% and 49% (p<0.01) and 15-year survival was 57%, 43% and 31% (p<0.01) in the 3 groups respectively. Coronary allograft vasculopathy was evidenced in 25%, 25% and 6% (p=0.02) of patients and coronary stenting was necessary in 9%, 15% and 0% (p=0.12)of patients in the 3 groups, respectively.

Conclusions. In our experience, multiple heart operations before heart transplantation even if had no impact on short-term results reduce 5, 10 and 15-year survival. Patients with multiple redo had a reduced risk of coronary allograft vasculopathy needing coronary stenting.

C187

THE EFFECTS OF INTRA-AORTIC BALLOON PUMP DURING CARDIOPLEGIC ARREST AT DIFFERENT FREQUENCIES OF COUNTERPULSATION

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Background. Pulsatile flow during cardioplegic arrest induced by intraaortic balloon pumping (IABP) is considered a potential mechanism of whole-body protection in patient undergoing cardiopulmonary bypass (CPB). We evaluated differences in organ function and endothelial activation in patients undergoing coronary artery bypass graft (CABG), at different frequencies of counterpulsation (at 60, 80 or 100 bpm) during cardioplegic arrest.

Methods. Seventy-five patients with CAD undergoing preoperative IABP were randomized between February 2013 and March 2014 to receive pulsatile cardiopulmonary bypass with IABP during cardioplegic arrest at 60 bpm (25 patients; group A), at 80 bpm (25 patients; Group B) and at 100 bpm (25 patients; Group C). Hospital outcome, need for noninvasive ventilation, renal function, transaminase, bilirubin, lactate, and endothelial markers (vascular endothelial growt factor [VEGF] and monocyte chemotactic protein [MCP-1]) were investigated.

Results. There were no hospital deaths, no IABP-related complications, and no differences in postoperative noninvasive ventilation (p=NS). Intensive care and hospital stay were comparable (p=NS). Group C showed lower creatine on the first (p=0.01) and second (p=0.005) postoperative days, higher creatinine clearance (first day: p=0.01), lower lactate after CPB termination (p=0.0001) and during the first day (p=0.001). The ALT, AST, and AMY were lower in group C (first day ALT: p=0.03; AST: p=0.03; AMY: p=0.02; second day ALT: p=0.01; AST: p=0.04; AMY: p=0.01), as well as total bilirubin (first day: p=0.043; second day: p=0.031). Group B showed lower VEGF and MCP-1 concentrations at the ICU arrival (p<0.001).

Conclusions. Automatic 100 bpm IABP during cardioplegic arrest improves creatinine clearance and splanchnic enzymes. There is evidence that the high frequency counterpulsation can be protective for the whole body-perfusion, if there are no other contraindications.

C188

CLINICAL OUTCOME AND QUALITY OF LIFE IN OLD TRANSPLANTED PATIENTS WITH LONG-TERM FOLLOW-UP

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Background. The number of heart transplantations with long-term follow-up is steadily increasing permitting to recipients to age. However, little is known about functional status, comorbidities and mortality of old recipient with long follow-up.

Methods. Among 505 heart transplanted patients in our center 43 reached an age >75 years and a follow-up longer than 10 years. Mortality, morbidity and quality of live were analyzed.

Results. At a mean follow-up of 17 ± 4 years tumors were diagnosed in 19 patients (44%), coronary allograft vasculopathy in 14 (32%), infections was detected in 18 (42%), renal failure in 26 (60%). After the first year 2 patients (4.6%) developed acute rejection 2R. Echocardiographic data were stable during follow up: mean LVEF was 60 ± 11%, systolic pulmonary arterial pressure was 33 ± 9 mmHg. At 10-year follow-up 42 patients (97%) were treated with cyclosporine, 24 patients (56%) purine-antimetabolite drugs and 7 patients (16%) prednisone. Twenty patients (46%) died after a mean follow-up of 17 ± 4 years. Risk factors of mortality was at univariate analysis renal failure (60% vs 35% p<0.01), higher level of cyclosporinemia (166 ± 54 vs 132 ± 40, p=0.02), and higher systolic pulmonary pressure (35 ± 10 vs 29 ± 6 mmHg, p=0.02) and at multivariate analysis higher cyclosporinemia (OR=3.6, 1.5-5.6) and renal failure (OR=2.54, 1.1-4.3). Score of SF36 test was physical functioning 75 ± 19, role-physical 63 ± 45, body pain 69 ± 28, general health 65 ± 22, vitality 63 ± 14 social functioning 78 ± 23, role emotional 85 ± 30, mental health 80 ± 13 with a physical health of 44 ± 11 (-0.6 SD from general population) mental health 53 ± 8 (+0.3 SD from general population).

Conclusions. Old heart transplanted patients at long follow up had an acceptable outcome. Quality of life post-transplant seems to be similar to the general population. Considering that acute rejection is rare and renal failure and higher levels of cyclosporine correlate with higher mortality, a lower level of immunosuppression should be considered.

C189

EPIAORTIC FLOW PATTERN DURING IABP-PULSED CARDIOPULMONARY BYPASS: THE OPTIMAL CANNULA POSITION

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Background. Cerebral hypoperfusion during linear cardiopulmonary bypass (CPB) may lead to diffuse or localized brain damage. Pulsed CPB has been shown to offer better brain perfusion. However, no studies have been performed evaluating blood flow in the supraortic vessels with pulsed CPB in case of aortic cannula displacement. Aim of the current work was to numerically investigate how the CPB cannula orientation influences blood flow in aorta and epiaortic vessels during intra-aortic balloon pump (IABP)-induced pulsatile CPB.

Methods. The Computational Fluid Dynamics (CFD) model consisted of a 3D patient-specific aorta with the three epiaortic vessels, a 40 cm^3 intraaortic balloon and a 24 Fr arterial cannula in the traditional position and orientation (tilt angle of 45°, case I) and in case of accidentally greater inclination (60°, case II). The geometrical model was obtained from a series of in vivo contrast-enhanced axial CT-scan slices, done for clinical reasons, using commercial open source software (Itk snap software, http://www.itksnap.org). A comparative multi-scale study, realized coupling a 3D CFD analysis and a lumped-parameters model, was carried out to establish the hemodynamic modifications due to change of cannula orientation.

Results. Results revealed that when the cannula flow was directed to the epiaortic vessels (case I), the left subclavian artery and the thoracic aorta presented a mean flow increase of about 2.17% and 7.69%, respectively. Instead, when the flow cannula collided with the aortic arch concavity (case II), this area presented high WSS values and a greater amount of blood occurred in the ascending aorta, although for brachiocephalic and left common carotid arteries there was mean flow increase of 8.33% and 1.05%, respectively.

Conclusions. The different orientation of aortic cannula on sagittal plane reduces consistently blood flow to the brain. Therefore close attention should be reserved to cannula orientation and stabilization in order to reduce brain damage during IABP-pulsed CPB.

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HAS PSYCHOSOCIAL COMPLIANCE AN IMPACT ON LONG-TERM OUTCOME AFTER HEART TRANSPLANTATION?

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Background. Psychosocial assessment is actively used in decision making about patient suitability for transplantation. Moral and ethical issues arise when medical care is offered or denied to individuals on the basis of their psychosocial history or current status. We analysed the impact of psychosocial factors on survival after heart transplantation in our institution.

Methods. We analysed survival of 162 patients (82% male, mean age 59 ± 11 years) that underwent to heart transplantation between 2007 and 2014. All our patients are supported by a dedicated team of cardiac surgeons, cardiologists, psychologists and nurses. We analyzed the impact on survival of distance from the hospital (Area 1 <100 km, Area 2 <500 km, Area 3 >500 km), educational qualification, presence of family support, working and perception of own economical status, perception of own economical condition, and mental disorders. Survival proportion at 5 years, with 95% confidence interval, was estimated and the Kaplan-Meier survival curves were compared through log rank test.

Results. Five-year survival was 80% in patients of Area 1 patients vs 86% of Area 2 patients vs 80% of Area 3 patients (p=0.27), 85% in patients without high school degree vs 82% in patients with high school degree (p=0.72), 82% in patients with family support vs 94% in patients without family support (p=0.32), 80% in unemployed vs in 88% employed (p=0.26), 80% in patients with good economical condition vs 87% in patients with critical economical condition (p=0.59), 81% in patients with mental disorders vs 83% in patients without mental disorders (p=0.99).
Conclusions. In our experience, psychosocial compliance did not impact on outcome and should not be employed to define indications to transplantation but utilized to identify patients who need specific services or interventions to obtain the highest possible outcome.

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EXTRACORPOREAL LIFE SUPPORT TREATMENT FOR REFRACTORY CARDIAC ARREST: SURVIVAL AND QUALITY OF LIFE AFTER DISCHARGE

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Background. Extracorporeal life support (ECLS) is an emerging option to rescue selected patients with cardiac arrest refractory to advanced cardiopulmonary resuscitation. We aimed to clarify the survival and the quality of life among survivors after hospital discharge.
Methods. We analysed the prospectively collected data of 49 patients who were rescued from refractory cardiac arrest through implantation of veno-arterial ECLS during external cardiac massage (18.1% of the 2005-2013 ECLS activity within our Institution). Average SAPS score was 61.7 ± 29. In-hospital results and a prospective follow-up with administration of the SF-36 questionnaire were performed.
Results. Etiology was primary cardiac disease in 61.2% of cases (acute myocardial infarction in 28.6%), trauma in 14.3%, sepsis in 2%, and miscellaneous in 22.5%. Survival at ECLS explantation and hospital discharge was 42.9% and 36.7%; brain death occurred in 24.5%. Increased SAPS score, higher serum lactates and lower body temperature at implantation predicted 30-days mortality. Bridge to heart transplantation or implantation of long-term ventricular assist device was performed in 8.2%. No patient deceased during the post-discharge follow-up (36.7% survival; average duration was 15.6 ± 19.2 months). At the end of follow-up, average SF-36 scores were: Physical activity, 70.8 ± 27.4; Role limitation: 63.6 ± 23.2; Physical pain: 81.3 ± 23.6; General Health: 62.7 ± 16; Vitality: 56.5 ± 18.8, Social activity: 74 ± 23; Mental Health: 71.4 ± 17; Physical Component Summary: 45.2 ± 6.8; Mental Component Summary: 48.3 ± 7.7.
Conclusions. ECLS is a viable treatment for selected patients affected by cardiac arrest refractory to cardiopulmonary resuscitation. About one third of patients rescued with ECLS for failed cardiopulmonary resuscitation are alive at the average 6-month follow-up, and display satisfactory health-related quality of life. Rational selection of candidates is crucial to achieve adequate results. ECLS is a heavily demanding treatment whose place in the healthcare systems is still to be defined.

C192

INFLUENCE OF LONG-TERM INCOR® (BERLIN HEART) THERAPY WITH IMPLEMENTED PERIODIC FLOW CHANGES ON AORTIC VALVE FUNCTION

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Background. The INCOR® is equipped with periodic flow changes in order to maintain a periodic aortic valve opening. Therefore, we analyzed the influence of long-term INCOR® therapy on aortic valve function, the development and progress of AI in our patient cohort managed with an open aortic valve policy.
Methods. 16 male patients (mean age of 49.6 ± 13.9 years and BMI 24.3 ± 3.4 kg/m², in INTERMACS scale of 1 and 2 in 75%) undergoing INCOR-implantations from 09/2008 till 01/2012 were studied. Transthoracic echocardiograms from pre-LVAD staging, postimplant at discharge (c. day 30), 6 and 12 months later were reviewed by a single reader at each institution in a non-blinded manner. The open aortic valve policy consists of a speed setting adjusted in order to reach at least an intermittent aortic valve opening with a mean of 6665 ± 364 rpm and a mean flow of 4.0 ± 0.3 L/min under tight blood pressure control.
Results. Preoperatively, mild AI was present in 69% (n=11) of pts, the remaining pts had no AI (n=5). At discharge, mild AI was documented in 81% (n=13) and no AI was seen in 19% (n=3). At 6 months mild AI did not progress. Moderate AI occurred in 8% (n=1) at follow-up of 12 months. No case of severe AI was observed during the entire study period. The peak of at least intermittent valve opening including full valve opening was noted at 6-month follow-up in 94% of pts (n=15). At follow-up of 12 months, 94% of LVAD patients (n=15) survived. Of these, 69% (n=11) were still on the system and 25% (n=4) could be successfully transplanted. One patient deceased on the system. There were no device malfunctions, no pump thrombosis and no GI bleeding.
Conclusions. The presence of aortic insufficiency did not progress in our patient cohort under long-term INCOR therapy with a high survival. However, long-term studies are needed.

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TRICUSPID VALVE ANNULOPLASTY REDUCES WEANING TIME FROM TEMPORARY RIGHT VENTRICULAR ASSISTANCE IN PATIENTS IMPLANTED WITH LVAD

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Background. Right ventricular failure is a serious complication after implantation of left ventricular assist device (LVAD) and may require temporary mechanical assistance. We investigated the effectiveness of tricuspid valve annuloplasty in presence of mild to moderate tricuspid valve regurgitation in reducing the weaning time from right ventricular temporary support.
Methods. From 2002 to 2014, 48 patients, mean age 54 ± 7.3 years, underwent implantation of LVAD. Intention to threat was BTT (bridge to transplantation) in 40 patients and BTD (bridge to destination) in 8 patients. In 10 patients (group A) a magnetically levitated rotary pump, designed for temporary extracorporeal support, was implanted to support the right ventricular. In 6 patients (group B) the temporary right ventricular support was associated with tricuspid valve annulopasty. We compared the outcome of the two groups of patients.
Results. No significant differences were identified between the two groups regarding operative risk variables. 8 patients of group A and 5 patients of group B were successfully weaned from right mechanical support. Weaning time was significantly shorter for group B as compared to group A (9 ± 2.1 vs 21.1 ± 8.1 days; p<0.001).
Conclusions. The presence of tricuspid valve regurgitation and moderate impairment of right ventricular function may increase the risk of early complications following LVAD implant. Our experience suggests that the associated procedure of tricuspid annulopasty smoothens the early postoperative course and may reduce the time of temporary right ventricular support in patients implanted with LVAD.

C194

VASCULAR ACCESS COMPLICATIONS IN PATIENTS WITH CONTINUOUS-FLOW LEFT VENTRICLE ASSIST DEVICE UNDERGOING PERCUTANEOUS INVASIVE PROCEDURES

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Background. Continuous-flow left ventricle assist device (CF-LVAD) patients may require invasive procedures involving vascular access, such as endoventricular thrombolytic therapy (ETT), right heart catheterization (RHC), and catheter ablation (CA) of ventricular arrhythmia. Vascular access complications (VACs) can result from an increased risk of bleeding in these patients.
Methods. To evaluate the VACs rate after percutaneous procedures in CF-LVAD patients, data were retrospectively analyzed. Two subgroups, procedures complicated by VACs and those uncomplicated were compared.
Results. From November 2010 to March 2014, 20 patients underwent implantation of HeartWare CF-LVAD (HeartWare Inc, Framington, MA) at our institute. Sixteen patients (80%) underwent a total of 28 procedures with percutaneous vascular access: RHC (n=17; 15 patients), ETT (n=9; 4 patients), and CA (n=2; 1 patient) of recurrent ventricular tachycardia. Vascular access interventions were carried out via the femoral artery/vein (25 procedures) or the radial artery (3 procedures). Among 28 vascular access procedures, 7 were complicated by VACs (25%) including radial artery occlusion (n=2), groin hematomas (n=3), femoral arterio-venous fistula (n=1) and femoral false aneurysm (n=1). Patients in the VACs group had significantly higher liver function tests (p=0.02), INR level (p=0.03), and pre-procedural PTT (p=NS). Five/9 (55.5%) of ETT (p=0.01) and 50% of CA (p=ns) developed VACs. The complication rate for type of vascular access was 6/11 (54.5%) for arterial access vs 2/17 (11.7%) for venous access (p=0.01). One/15 patient (6.6%) receiving enoxaparin had a VAC (p=0.01) vs 6/7 (85.7%) patients receiving unfractionated intravenous heparin (p=0.02). Additional hospitalization and the effective increase in cost of patients developing VACs were 14 ± 10 days and €38,668, respectively.
Conclusions. The risk of VACs in CF-LVAD patients is considerable. Complex procedures that imply arterial access, heparinization, and thrombolysis carry a heavy burden of VACs. Specific protocols should identify patients at higher risk and minimize the occurrence of these iatrogenic events.

C195

DEVELOPMENT OF A SINGLE-CENTER PROGRAM OF LONG-TERM VENTRICULAR ASSIST DEVICES: EARLY AND FOLLOW-UP RESULTS

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Background. Ventricular assist device (VAD) programs require multidisciplinary collaboration and continued adaptation of clinical decision-making.

Methods. We analysed our Institutional prospectively-collected database in order to revise our experience with long-term mechanical circulatory support for end-stage heart failure.
Results. A total of 50 patients received either a LVAD (38 patients, 76%) or biventricular support (24%). Among those who received a LVAD, etiology of heart failure were ischemic cardiomyopathy in 66%, idiopathic dilated cardiomyopathy in 18% and others (myocarditis, cardiomyopathy following valve disease) among the remainders. Strategy was bridge-to-transplantation in the majority of cases (53%), followed by destination therapy in 45% and bridge-to-decision in the remainders. Devices were the HeartMate II (Thoratec Inc.) in 74% of patients, HeartWare VAD (HeartWare Inc.) and Jarvik 2000 VAD (Jarvik Heart, Inc.) in 13% both. Preoperative critical state occurred in a significant proportion of cases (55% were on inotropes and 12% were on ECLS therapy before implantation). INTERMACS profile was 3 in 34% of subjects and 29% for both profiles 2 and 4. Operative mortality was 5%. One patient dies of early right ventricular failure (which occurred in 13% of cases overall). Average hospitalization time was 47.9 ± 18.7 days. Average follow-up duration was 493 ± 542 days (up to 2.219 days). Eight patients (21%) were successfully bridged to transplantation (delay: 613 ± 716 days), while 28.9% (n=11) died on support due to adverse neurological events (4 cases), infection (2 cases), and multiorgan failure (2 cases). All transplanted patients were alive at the latest follow-up; overall, 2-year survival was 74.2% ± 8.1.
Conclusions. Appropriate candidates selection remains a determinant of results in a VAD program. VAD therapy is effective, but still associated with significant early and late morbidity. Novel devices with improved biocompatibility and less invasive approaches keep promise for improved clinical results.

C196

RIGHT VENTRICULAR TEMPORARY SUPPORT REMOVAL AVOIDING RE-STERNOTOMY IN PATIENTS IMPLANTED WITH LVAD. HOW TO DO IT

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Background. Right ventricular failure after LVAD implantation requires a temporary mechanical support in 40% of patients. After successful weaning, the conventional atrio-pulmonary cannulation requires a re-sternotomy for cannulas removal increasing the risk of wound infection. To avoid re-sternotomy we instituted right ventricular assistance by a femoral vein-pulmonary artery cannulation.
Methods. 16 patients implanted with LVAD HeartMate II required a right ventricular temporary support (Levitronix CentriMag). In 4 patients a multi-stage venous femoral cannula (Bio-Medicus®, Medtronic) was used as outflow and a flexible arch arterial cannula (DLP®, Medtronic) as inflow. Outflow cannula was secured inside a 8 mm graft anastomosed to pulmonary artery. After successful weaning the femoral cannula was withdrawn through a small groin incision. The inflow cannula was removed through a left minitoracotomy in the 2nd space and the 8 mm graft was cut and oversewn with a 5-0 prolene suture.
Results. No femoral or pulmonary thrombosis occurred. There was no infection at the site of femoral venous cannulation. No patient required a re-sternotomy for tamponade. All the patients were successfully weaned without any major complications.
Conclusions. Temporary right ventricular mechanical support by central cannulation can increase wound infection rate in patients implanted with LVAD. We experienced a new technique of peripheral inflow and central outflow cannulation with the aim of avoiding re-sternotomy. The results of our early experience encourage this new approach in the treatment of severe right ventricular failure.

C197

HEARTWARE LEFT VENTRICLE ASSIST DEVICE THROMBOSIS: A SINGLE CENTER EXPERIENCE

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Background. HeartWare® (HeartWare Inc, Framington, MA) continuous-flow left ventricle assist (HVAD) thrombosis is a treacherous occurrence whose causes and eventual treatment strategies remain unclear and controversial.
Methods. Data were analyzed to evaluate risk factors for HVAD thrombosis rate and the results of endoventricular thrombolysis (ET) as first line of treatment.
Results. Since November 2010, 20 patients underwent HVAD implantation at our institute. Four patients (20%) developed pump thrombosis and underwent ETs from 30 to 50 mg of rTPA. HVAD thrombosis occurred after a post-implant average time of 318 days (159-809 days). LVEDDi (41.9 ± 2.7 vs 37.2 ± 3.7 mm/m^2, p=0.03) and LVESD (72 ± 8.7 vs 63.7 ± 5 mm, p=0.03), were significantly higher in HVAD thrombosis patients. Pre implant RA/PCWP ratio was lower in HVAD thrombosis patients (0.2 ± 0.4 vs 0.4 ± 0.1, p=0.007). Apart from higher preoperative value of anti-B2 glycoprotein I antibodies (7.1 ± 3.2 vs 4.1 ± 2.5 RU/mL, p=0.03), none of the others preoperative thrombophilia markers were more frequent in HVAD thrombosis patients. The mean estimated HVAD flow, power demand, and pump speed pre- and post-ET were: 8.9 ± 2 vs 5.4 ± 2 L/min (p=0.002), 8.2 ± 5.7 vs 3.7 ± 0.6 W (p=0.04), and 2555 ± 72 vs 2555 ± 72.6 rpm (p=0.4), respectively. All patients survived thrombolysis and two patients (50%) required multiple ET.
Conclusions. In our limited experience, increased pre-operative LV dimensions and filling pressures are associated to HVAD thrombosis. No biological or genetic marker of thrombophilia could help us predicting HVAD thrombosis occurrence. In spite of a high recurrence rate, HVAD thrombosis can be safely managed with endoventricular thrombolysis and VAD performance parameters can be restored to normality without VAD change.

C198

USE OF ECMO TO INCREASE KIDNEY DONOR POOL: PAVIA EXPERIENCE WITH NON-HEART BEATING DONORS

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Background. Shortage of organs suitable for transplantation prompted physician towards a new type of donor: the NHBD. However organs from NHBD may suffer from severe normothermic ischemia. To reduce ischemic damage organs perfusion by means of ECMO has been proposed.
Methods. Patients aged 18-60 years, with out of hospital refractory cardiac arrest (cardio-pulmonary resuscitation not performed within five minutes) and without signs of vitality (end-tidal CO_2 <20 mmHg, absence of cardiac electrical activity, absence of gasping) were considered eligible for organ donation. After declaration of cardiac death by 20 minutes ECG registration and informed consent signature by relatives, femoral vessels were cannulated either surgically or percutaneously and veno-arterial ECMO was started. To limit perfusion to the abdominal organs a balloon occluder catheter was inserted in the contralateral femoral artery and positioned in the aorta at the level of diaphragm. ECMO flow was set to 2.5 l/min. Then the patient was transported in operatory room and the organs were harvested within four hours.
Results. From January 2008 to December 2013, 19 ECMO were implanted. Donor mean age was 51.2 ± 7.1 years. Mean no flow time was 8.4 ± 0.7 minutes, whereas time from cardiac arrest to hospital arrival was 70.9 ± 2.8 minutes. Thirteen kidneys were eventually transplanted. Reason for missed use was in all but one case (lung cancer suspicion) organ ischemic damage.
Conclusions. ECMO may increase the scarce donor pool by allowing use of NHBD. Kidney transplantation may be achieved with good results. In the future, we intend to evaluate NHBD lungs for transplantation by the essential means of ex vivo lung perfusion.

Aorta and arch 3

C199

DIFFERENTIAL GENE EXPRESSION PROFILING IN ASCENDING AORTIC ANEURYSMS OF PATIENTS WITH BICUSPID AND TRICUSPID VALVE

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Background. The aim of this study is to ascertain differences in gene expression between patients with bicuspid aortic valve (BAV) and tricuspid aortic valve (TAV), as well as gene expression in different regions of the same aortic circumference.
Methods. A ring of ascending aorta obtained from 33 patients; (14 with BAV aneurysm, 14 with TAV aneurysm and 5 normal); convexity and concavity were identified and marked. mRNA expression of Transforming growth factor beta 1 (TGFB1) and its receptors (TGFBR1-TGFBR2), metallopeptidase-2 (MMP-2), TIMP metallopeptidase inhibitor 1 (TIMP-1) and TIMP-2; pathway of differentiation SMCs myocardin (MYOCD), smoothelin (SMTN), actin, alpha 2, smooth muscle aorta (ACTA2), and fibronectin isoform ED-A (ED-AFN) were measured using RT-PCR.
Results. Aneurysms in BAV patients, compared to normal, exhibited in the aortic concavity significant higher levels of MYOCD, SMNT, MMP-2, TIMP-1, TIMP-2 and TGFBR2, and in the aortic convexity significant higher levels of MMP-2 and TIMP-2. In contrast, TAV aneurysms, compared to normal, demonstrated on aortic convexity higher levels of ED-AFN, lower levels of ACTA-2 and TIMP-1. Further analysis showed in BAV concavity significant higher levels of MYOCD, SMNT, ACTA-2, MMP-2, TIMP-1 and TIMP-2 and lower levels of ED-AFN. BAV convexity proved higher significant levels of SNMT, ACTA-2 and TIMP-1. Comparison between aortic concavity and convexity in BAV group showed significant higher levels of SMTN, TGFBR2 in concavity and higher levels of ED-AFN in convexity.
Conclusions. AAA has different gene expression according to the aortic valve morphology and the site of aortic circumference. BAV patients show a remodeling process more active in the aortic concavity.

C200

FROM SURGICAL TECHNIQUE TO TISSUE ANALYSIS IN PATIENTS AFFECTED BY MARFAN SYNDROME

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Background. The index to aortic disease progression, risk of dissection and surgical indication are assessed in Marfan syndrome (MFS) by measurement of the aortic root (AR). This is particularly justified due to the magnification of the AR as compared to a small distal ascending aorta (AA). Nevertheless no strict relations exist between timing of dissection in patients affected by MFS and the degree of cystic degeneration of the aortic wall.

Methods. From June 2007 to December 2013, 21 MFS patients according to Ghent criteria (14 males, mean age 36 years) underwent David type-I reimplantation procedure (n=19) and Bentall operation (n=2). Indication to David procedure was given for AR between 45-49 mm in 11/19 patients with family history for aortic dissection, in 2/19 (44 and 45 mm) subjected to mitral valve repair, in 2/19 for progression in dilation and in 4/19 because >50 mm. The resected segment of aorta sent for histological examination was greater for post-junctional AA (2.5-3.0x2.0-2.5 cm), and very fragmented for the root (0.5-1.0x0.5-1.0 cm).

Results. On preoperative echocardiographic examination post-junctional AA dimensions were normal in 16/19 cases (<21 mm/m^2) with 4/16 <15 mm/m^2. In 3/19 cases AA was dilated (>21 mm/m^2). Elastic fibers fragmentation and loss were significantly present in all cases; in addition, in dilated AA a more diffuse extracellular alcianophilic mucopolysaccharides-like deposition in intima and media layers was expressed.

Conclusions. Due to wide fragmentation of aortic root in David procedure, the post-junctional AA was in fact routinely examined. A high degree of elastic tissue degeneration was significantly present in all cases, also in normal size AA; the amount of mucopolysaccharides-like deposition was variable but significantly present in dilated AA. The described no relation between tissue degeneration, AR dilation and aortic rupture in MFS may depend on the different aortic segment assessed for indication and histological analysis. Other hemodynamic mechanisms could contribute to AR dilation.

C201

SURGERY FOR BICUSPID AORTIC VALVE DISEASE: WHAT'S THE AORTIC ROOT FATE AT LONG TERM?

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Background. The real progression of the aortic root diameter and related increased risk of adverse events after aortic surgery in the bicuspid valve is not clear. Our aim was to compare the risk of late adverse events with the progression of aortic dilatation after isolated aortic valve or with concomitant ascending aorta replacement for bicuspid aortic valve disease.

Methods. Three hundred thirty consecutive patients with bicuspid aortic valve underwent cardiac surgery from 1994 through 2008 at our institute. 199 patients (60%, mean age 63.8 ± 12 years) underwent isolated aortic valve replacement (Group A), 73 patients (22%, mean age 59.9 ± 12 years) underwent aortic valve with concomitant supracoronary ascending aorta replacement (ascending aorta diameter>45 mm, Group B). The pre-operative mean diameter of the root was 37.3 ± 5 mm in group A and 39.3 ± 5 mm in group B. Patients undergoing concomitant aortic root surgery were excluded.

Results. Overall survival was 78 ± 3%, 56 ± 4% in the group A and 81 ± 6%, 74 ± 8% in the group B at 10 and 15 years (p=0.08), respectively. Progressive dilatation of the aortic root was not significant in both groups (mean diameter 39.5 ± 5 mm in group A and 35.8 ± 5 mm in group B at mean follow-up 118 ± 58 and 99 ± 43 months, respectively). Neither a subgroup of patients with preoperative moderate dilatation of aortic root (mean diameter 43.2 ± 3 mm in group A and 42.8 ± 3 mm in group B) had significant aortic dilatation at mean follow up of 97 ± 41 months (42.7 ± 5 mm and 39.1 ± 4 mm, respectively). Early aortic dissection occurred in one patient in group A with a preoperative aortic diameter of 46 mm.

Conclusions. Patients with bicuspid aortic valve disease and mild to moderate aortic root dilatation have low risk of progressive dilatation of the aortic root and adverse events after isolated valve or with concomitant ascending aorta replacement at long-term follow-up. Supracoronary ascending aorta replacement seems to be favorable for the stability of aortic root even in younger patients and in aortic insufficiency.

C202

BICUSPID AORTIC VALVE DISEASE AND ASCENDING AORTIC ANEURYSM: SHOULD THE AORTIC ROOT REPLACEMENT BE MANDATORY?

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Background. The higher risk of adverse aortic events in patients with bicuspid aortic valve (BAV) disease and ascending aorta aneurysm is known, but the management of moderate aortic root dilatation in the younger patients is a controversial issue.

Methods. We reviewed 166 consecutive patients with BAV disease and concomitant ascending aorta aneurysm (mean ascending-aorta-diameter 54.0 ± 8mm) undergoing cardiac-surgery from 1994 through 2008. A total of 77 patients underwent Bentall-procedure (91% male, mean-age 55.7 ± 12 years, Bentall-Group), whereas the remaining 89 patients underwent aortic valve replacement with supracoronary ascending-aorta replacement (93% male, mean-age 60.5 ± 11 years, SAAR-Group, p=0.032). The pre-operative mean-diameter of the root was 44.0 ± 6 mm in Bentall and 38.9 ± 5 mm in SAAR (p=0.002).

Results. In-hospital-mortality was 2.6% in the Bentall and 2.3% in the SAAR. Overall-survival was 83.7 ± 4%, 70.1 ± 8% in the Bentall (mean follow-up 118 ± 61 months) versus 81.7 ± 6%, 75.4 ± 8% in the SAAR (mean follow-up 99 ± 43 months) at 10 and 15 years (p=0.61) respectively. The mean cardiopulmonary-bypass-time was 201 ± 56 min and 173 ± 57 min (p=0.0036), the mean cross-clamp-time 155 ± 42 min and 131 ± 38 min (p=0.0003) in the Bentall and SAAR respectively. Eight sudden-death have occurred in the Bentall-group and in 5 in the SAAR-group (p=0.39). Progressive dilatation of the aortic-root in the SAAR was not significant (post-operative mean-diameter 35.9 ± 4 mm). Neither a subgroup of patients in the SAAR with preoperative moderate dilatation of aortic-root had significant aortic dilatation at mean-follow up of 97 ± 41 months (pre-operative diameter 42.8 ± 3 mm versus post-operative 39.1 ± 4 mm). One patient in Bentall and one in SAAR were operated for endocarditis.

Conclusions. In patients with BAV disease, ascending aorta aneurysm and moderate dilatation of the root, the significant reduction of CPB and CC time, the stability of the residual root at long-term and the low risk of adverse aortic-events in the SAAR compared with Bentall leads us to consider the isolated aortic valve replacement with supracoronary aorta replacement an alternative strategy to Bentall procedure, especially in high risk and older patients.

C203

SINGLE CENTER EXPERIENCE WITH AORTIC VALVE SPARING OPERATION (DAVID I PROCEDURE: MEDIUM-TERM FOLLOW-UP

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Background. Aortic valve sparing operation, known as the David I procedure, is being used increasingly in patients with ascending aorta aneurysms and aortic valve regurgitation. The aim of this study is to evaluate our early and mid-term outcomes with this technique based on a clinical and echocardiographic follow-up.

Methods. We have analyzed the first 72 consecutive patients in whom a David I procedure was performed from 2001 to 2013. Median age was 61 ± 15 years, 61 had a chronic aneurysm of the aortic root and ascending aorta while 11 had acute type A aortic dissection (15%). Mean follow-up was 3.55 ± 3.23 (range 1 to 6) years. Clinical and echocardiographic evaluation was performed in all survivors.

Results. Early mortality was 2.8% (2 patients, both after emergency procedures); no deaths occurred in elective cases. A straight tube was used in 17 patients (24%) while a Valsalva graft was employed in 55 (76%); aortic valve plasty was performed in 8 (11%) while in 12 (17%) additional procedures were associated. Mean extracorporeal circulation and cross-clamping times were 153 ± 33 and 126 ± 29 minutes, respectively. No incidence of stroke or myocardial infarction was observed early post-operatively. All patient were discharged with no or mild aortic regurgitation. Six patients died during follow-up (8.6%); 4 required aortic valve replacement, 3 due to endocarditis and 1 due to cusps prolapse at 3 years. Freedom from ≥2+ aortic regurgitation at follow-up is 93 ± 2%.

Conclusions. The David I procedure has shown a low rate of mortality and morbidity. Freedom from significant aortic regurgitation seems to be excellent at mid-term follow-up. The rate of early and late endocarditis represents an issue that should be further investigated. We think that the David I is a safe and reproducible procedure and should be considered for all patients with proximal aortic root pathology and non-calcific aortic insufficiency.

C204

A MINIMALLY INVASIVE APPROACH FOR MAJOR SURGERY: BENTALL-DE BONO OPERATION AND VALVE-SPARING PROCEDURE PERFORMED THROUGH PARTIAL UPPER J MINISTERNOTOMY

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Background. Aortic valve replacement through an upper "J" sternotomy approach has been widely described in literature but more complex procedures are currently being performed by the same minimally invasive access only in few centers. We describe our experience using a minimally invasive approach for aortic valve (AV) and ascending aorta replacement using either David I (reimplantation) or Bentall technique.

Methods. 55 patients who received both an ascending aorta and aortic valve replacement at our Institution between January 2010 and March 2014 were retrospectively reviewed. Twenty one of them underwent an aortic valve-sparing surgery and the remaining 34 a Bentall operation (33 Bio-Bentall with biological Mitroflow bioprosthesis and 1 mechanical Carbomedics). Forty eight were male (89.3%), mean age was 58.3 ± 12.4 years (range: 24-79 years). In case of AV-sparing procedure the ascending aorta was replaced with a Vascutek Terumo Gelweave Valsalva graft up to the origin of the brachio-cefalic artery.

Results. Two patients died in hospital (3.6%) and 1 within 30 days (1.8%). Overall cardiopulmonary bypass lasted 120.2 ± 46.9 minutes and aortic cross clamping 103.4 ± 39.2 minutes. Median intensive care unit stay was 45 (15-960) hours and median total length-of-stay was 7 (2-160) days. Four patients needed a re-exploration for mediastinal bleeding. Postoperative outcomes (blood loss, transfusions and sternal complications) have been recorded. No conversion to full sternotomy was necessary.
Conclusions. A partial upper sternotomy is considered a safe option for aortic valve replacement. Our experience confirms that a partial upper "J"-shaped sternotomy can be chosen also for complex aortic root surgery like David I reimplantation and Bentall technique without affecting the patient's outcome and proving to be as safe as standard procedure in terms of hospital morbidity and mortality rates.

C205

AORTIC ROOT REPLACEMENT WITH THE MODIFIED BENTALL TECHNIQUE: A 19-YEAR FOLLOW-UP

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Objective. Replacement of the aortic root with a composite graft has been extensively used to treat a wide variety of lesions involving the aortic valve and ascending aorta. We have evaluated the long-term clinical outcomes of the modified Bentall procedure with a mechanical conduit at our institution.
Methods. Between November 1993 and May 2012, 243 patients (87% males) with a mean age of 62 ± 12 years (25-84) underwent a modified Bentall procedure. Main indication for operation was aortic root ectasia in 66% and acute aortic dissection in 34%; moderate to severe aortic regurgitation was present in 64%. Mean NYHA class was 2.5 ± 1.1, with a mean Log EuroSCORE of 18% ± 15%. In all patients a mechanical composite graft was used; since 2006 a St. Jude Valsalva graft was routinely employed. There were 25 re-operations (10.3%). Marfan syndrome and a bicuspid aortic valve were found in 17 (7%) and 33 (17%) patients, respectively. Concomitant procedures were performed in 35 patients (14%). Mean follow-up was 7.4 years (max: 19.5) and is 99% complete.
Results. In-hospital mortality occurred in 28 patients (11%), being 4% in elective cases. Age, prolonged cardiopulmonary bypass times and mechanical ventilation > 96 h, were independent risk factors for early mortality. Actuarial survival was 86%, 70% and 55% at 5, 10 and 15 years respectively, risk factors for late mortality being age and emergency operation. Actuarial freedom from thromboembolic episodes, anticoagulant related hemorrhages and reoperation at 15 years was 82%, 89%, and 96%, respectively.
Conclusions. The modified Bentall technique has shown excellent early and long-term results with a low incidence of procedure-related complications at a maximum follow-up of 19 years. For this reason it is a safe and valid option to treat aortic root disease, whenever valve-sparing procedures are not feasible.

C206

TYPE A ACUTE AORTIC DISSECTION REPAIR IN ELDERLY PATIENTS

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Background. We evaluated our experience in spontaneous acute type A aortic dissection (ATAAD) repair in elderly patients. The role of clinical presentation and surgical strategies in determining patients' outcome was further assessed.
Methods. A retrospective analysis of patients over 75 years who underwent emergency repair of ATAAD at Southampton General Hospital between November 2000 and November 2013 was performed. Forty-five patients (mean age 79 ± 3 years; 26 females) were identified. Aortic dissection was complicated in 17 patients (37%) with new neurologic deficit (n=5), cardiac tamponade (n=12), acute myocardial infarction (n=5) and acute renal failure (n=2). The ascending aorta was replaced in all patients and hypothermic circulatory arrest was employed in 22 patients. The aortic replacement needed extension to hemiarch in 11 patients and the aortic valve was replaced in 9 patients; in three cases full root replacement was performed.
Results. In-hospital mortality was 15% (n=7). Pre-operative acute neurological deficit was the only statistically significant risk factor for mortality (p=0.003) and it was confirmed as an independent risk factor for mortality upon logistic regression analysis (p=0.006). Age >80 years old per se was not associated with a poor outcome. Surgical strategies and extension of aortic wall resection did not affect the operative mortality. The postoperative course was complicated in 23 patients (51%). Median follow up of 57 months was 100% complete and there were 3 late deaths. The cumulative 1-year, 5-year and 8-year survival rates (including hospital mortality) were 82%, 76% and 68%, respectively.
Conclusions. Emergency surgical repair of ATAAD resulted in acceptable early mortality rate and satisfactory intermediate survival in patients aged over 75 years. Pre-operative acute neurological deficit predicts a worse outcome. Advanced age alone should not be considered as a contraindication to AAD repair.

C207

OPEN AORTIC ARCH REPLACEMENT IN HIGH RISK PATIENTS: THE GOLD STANDARD

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Objective. Open total aortic arch replacement (TAR) in high-risk patients is considered by some to be associated with a prohibitively perioperative risk. Recent reports describe hybrid techniques to treat this group. We reviewed our outcomes of open surgery in a "high-risk" group of patients.
Methods. All patients who underwent open-TAR between 2000 and 2013 were identified from our prospectively maintained database. Patients comparable with the ones who underwent hybrid repair in previous studies (logistic EuroSCORE between 20 and 60 without intervention on the aortic root or on the mitral/tricuspid valve) were selected for analysis.
Results. Sixty-one patients were identified. Mean logistic EuroSCORE was 29.3 (range 20-57) and mean age was 70 years (36.1% male). There were 15 re-sternotomies (24.6%) and 21 procedures were urgent/emergency (34.5%). Preoperative comorbidities included COPD (31.1%), coronary artery disease (19.7%), peripheral vascular disease (44.3%), previous stroke (10%), previous myocardial infarction (8.9%) and left ventricular dysfunction (10.6%). Concomitant procedures included AVR/resuspension (49.2%), CABG (16.4%), open descending aorta replacement (9.8%) and frozen elephant trunk (21.3%). Overall in-hospital mortality, permanent stroke and spinal cord injury rate were 6.6%, 1.6% and 0% respectively. There were no deaths or stroke in the elective group. One-year, 5-year and 10-year estimates of survival were 83.5%, 72.1% and 49.3%, respectively.
Conclusions. Open TAR can be performed with low mortality and morbidity and excellent long-term results even in high-risk patients. Total endovascular repair may represent an option for patients not suitable for open surgery.

C208

MANAGEMENT OF ABERRANT RIGHT SUBCLAVIAN ARTERY DURING OPEN ARCH REPLACEMENT WITH THE FROZEN ELEPHANT TRUNK TECHNIQUE

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Objective. Presence of an aberrant right subclavian artery (ARSA) represents an additional technical challenge during open arch replacement. Not infrequently the ARSA origin is aneurysmatic requiring treatment at the time of arch repair. The frozen elephant trunk technique (FET) allows single-stage repair of both conditions. We review our experience of these cases.
Methods. Interrogation of our prospectively maintained database identified 41 FET procedures between 2006-2013.
Results. Six patients (13.9%) had an ARSA. Mean age was 62 years (range 58-79). Indications for intervention were chronic dissection in two and degenerative aneurysm in four. Five patients had the ARSA ligated and reimplanted on the ascending aorta through an interposition graft whilst one patient had a preoperative extra-anatomical bypass and intraoperative ligation of the ARSA. Concomitant procedures included ascending aorta replacement (6; 100%) and root replacement (3; 50%). Mean ± standard deviation for cardiopulmonary bypass, aortic cross-clamp, deep hypothermic circulatory arrest and selective antegrade cerebral perfusion times were 333 ± 76, 248 ± 71, 6 ± 3 and 93 ± 19 minutes, respectively. There were no hospital deaths, stroke or paraplegia. At follow-up, all patients are alive, all epiaortic vessels and reimplanted ARSA are patent.
Conclusions. The use of FET allows a single-stage repair of arch disease with concomitant ARSA which can be performed safely with low-risk. Strict perioperative management is essential to avoid the risk of paraplegia. Long-term follow-up is crucial to identify complication in the distal aorta, which may need further intervention.

C209

COMPARISON OF SINGLE-STAGE OPEN VERSUS HYBRID REPAIR OF AORTIC ARCH AND DESCENDING AORTA DISEASE

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Objective. Combination of open replacement of aortic arch (AR) and stent-grafting of descending thoracic aorta (DTA) disease allows one-stage hybrid repair of combined AR and DTA disease. Whilst these conditions can be treated with open surgery, these operations are invasive and have not gained popularity. We aim to review our experience with both the open and the hybrid technique.
Methods. All patients who underwent single-stage open or hybrid repair of AR and DTA were identified from our prospectively maintained database (1998-2013).
Results. There were 43 hybrid (median sternotomy) and 17 open repairs (median sternotomy, followed by thoracotomy). Mean age was 64.2 and 60.5 years, respectively (male 51.2%vs.41.8%). Mean LogEuroSCORE was 24.0 vs 24.2. All cases were performed with deep hypothermic circulatory arrest (DHCA) supplemented by selective antegrade cerebral perfusion in 56 cases (87.5%). Mean cardiopulmonary bypass, cross-clamp, DHCA and SACP times were 335 vs 272 min (p=0.016), 207 vs 235 min (p=0.02), 19 vs 15 min (p=0.057) and 97 vs 40 (p=0.001) min, respectively. There was a trend of

lower operative mortality and paraplegia in the open repair group, but this did not reach the statistical significance (16.3% vs 5.9% and 2.3% vs 0%, p=NS). Stroke rate did not differ between groups (4.6% vs 5.9%, p=NS). Reintubation was more frequent after open repair (7.0% vs 29.4%, p=0.035).
Conclusions. In our cohort, open repair is characterized by prolonged operative times seemingly without an increase in mortality. Open repair is more invasive and complicated by a higher rate of respiratory complications.

C210

USE OF A NOVEL HYBRID VASCULAR GRAFT FOR RAPID EPIAORTIC VESSEL DEBRANCHING AND ARCH ENDOGRAFTING FOR COMPLEX ANEURYSMS

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Background. The aim of this study was to assess the efficacy and short-term effectiveness of a novel hybrid vascular graft performing a sutureless distal anastomosis used to address epiaortic debranching followed by stent coverage of aortic arch for complex aneurysms.
Methods. Between March 2013 and March 2014, 5 patient (4 men, mean age 49 ±8) underwent to cardiac surgery for complex aneurysm of thoracic aorta involving the arch. In patient with important copathology we prefer translocating the great epiaortic vessels (debranching) to the ascending aorta followed by second-stage with endografting of the arch. The Gore Hybrid Vascular Graft (GHVG) was used for the debranching. The GHVG are polytetrafluoroethylene graft with a self-expanding nitinol-reinforced deployment segment that deploys as a sutureless outflow anastomosis. 4 patient needed replacement of ascending aorta with routinely used vascular graft. 2 of those needed circulatory arrest for hemiarch resection. 1 patient was operated on for DeBakey type I aortic dissection. Patients had completion on the operation with endografting of aortic arch using the vascular graft as ascending aorta, when used, as proximal landing zone and the distal descending thoracic aorta as distal landing zone. 2 patients had the endovascular approach 2 week later the surgical time, the others just following the surgical procedure.
Results. No patients had cerebral ischemia. At 1 month, computed tomography had patency for the GHVG vessels, no false aneurysm were revealed. No GHVG complications requiring reintervantion, in 1 case brain hemorrhage at 30 days.
Conclusions. Epiaortic debrancing for arch endografting utilizing the GHVG with sutureless anastomosis is feasible, especial in case of aortic dissection, remote location of the vessels and severe atherosclerotic disease of the ostium.

C211

EARLY AND LATE OUTCOME AFTER TEVAR FOR ACUTE AND CHRONIC TYPE B AORTIC DISSECTION

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Background. Open surgery of the type B Aortic Dissection (tB-AD) is still challenging with high morbidity and mortality, thoracic endovascular aortic repair (TEVAR) has shown improved early and late results, compared with open surgery or medical therapy, mostly in complicated patients. To assess the outcome after TEVAR for tB-AD, we retrospectively reviewed our long term experience.
Methods. From March 2001 to December 2012, out of 165 patients undergone TEVAR, 75 patients were treated for tB-AD, 49 for complicated acute dissection occurring within 14 days after onset of symptoms and 26 for chronic dissection after 14 days from first symptoms. A spiral computed tomographic (CT) scan, were performed preoperatively to assess suitability for TEVAR, for measuring and localizing purposes and determining the size of the implanting stent grafts. The procedure was performed in a hybrid operating room. Patients received general anesthesia and mechanical ventilation. Patients were followed in a clinical registry. Clinical outcomes, including primary end point (early and late mortality) and secondary end points (early and late major complications) were evaluated.
Results. The procedure was successfully completed in all patients with no periprocedural death or surgical conversion. The overall 30-days mortality was 2.7% (2 patients). Intentional partial or full left subclavian artery overstenting, without previous revascularization, was achieved in 24 patients (32.0%). A secondary endovascular or conventional procedure was required in 5 patients (6.7%).
Conclusions. The early and mid-term technical and clinical results support the safety and effectiveness of TEVAR that is revealed immediate therapeutic resolution also in the treatment of the acute and chronic type B aortic dissection. However, long-term follow-up and additional studies are mandatory to detect late failure and to confirm clinical safety of this procedure.

C212

A STAGED DUAL-PROCEDURE STRATEGY REDUCES THE RISK OF SPINAL CORD ISCHEMIA IN TOTAL ENDOVASCULAR REPAIR OF THORACO-ABDOMINAL ANEURYSM

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Objectives. Spinal cord ischemia (SCI) represents a severe complication of endovascular of thoraco-abdominal aortic aneurysms (TAAA). We aim to review the impact of a staged procedure approach on the incidence of SCI.
Methods. We interrogated our prospective database to identify all consecutive patients who underwent fenestrated/branched (FEVAR/BEVAR) endovascular repair for TAAA between June 2007 and February 2014.
Results. Eighty-six high-risk patients (73 men; median age 73, range 54-84 years) underwent FEVAR (n=49) or BEVAR (n=37) for non-ruptured (asymptomatic and symptomatic) TAAA [extent I-III (n=43), IV (n=43)]. Twenty-eight patients (32.5%) had undergone previous aortic procedures. A total of 320 target vessels were preserved with scallop (n=16), fenestration (n=202) and branches (n=102) and 297 vessels were stent-grafted. The 30-day mortality was 2.3% (n=2), stroke rate 2.3% (n=2). There were no postoperative endoleaks. Two patients commenced post-operative dialysis, which was planned in both cases. There were no cases of unplanned postoperative dialysis. SCI developed in 4 (4.7%) patients. With the introduction of staged repairs, SCI has not occurred in the most recent 46 patients. The actuarial 1-, 2- and 3-year survival was 91%, 88% and 81%, respectively. The actuarial 3-year freedom from re-intervention was 95%.
Conclusions. In high-risk patients with TAAA, fenestrated and branched EVAR is associated with low early mortality and requirement for renal support. The risk of SCI is not insignificant but staged procedures seem to reduce the risk of SCI. Mid-term outcome appears satisfactory, in particular regarding the patency of the target vessels.

C213

FROZEN ELEPHANT TRUNK TECHNIQUE WITH THORAFLEX HYBRID PROSTHESIS: OUR FIRST 10 CASES EXPERIENCE

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Background. The surgical treatment of the complex thoracic aorta lesions remains one of the main challenges for the heart surgeon. In the last years hybrid procedures have been introduced for the treatment of these complicated aortic diseases. We present our initial experience, including the short-term follow up, with the frozen elephant trunk (FET) technique using the last commercially available hybrid prosthesis, The Thoraflex hybrid device.
Methods. Between March 2013 and March 2014, 10 patients (male: 80%; mean age: 60.7 ± 10.46 years) underwent thoracic aorta surgery using the FET approach with the Thoraflex hybrid device. The indications for surgery were: residual type A chronic dissection (8 pts), degenerative aneurysm of the thoracic aorta (1 pt), and type B chronic aortic dissection (1 pt). Eight patients had already undergone aortic interventions through a median sternotomy. Antegrade selective cerebral perfusion (ASCP) and moderate hypothermia were used in all cases. Mean cardiopulmonary by-pass and cross-clamp times were 226.9 ± 98.36 min and 121.2 ± 56.64 min, respectively. Mean visceral ischemia and ASCP times were 41.75 ± 5.84 min and 81.44 ± 29.52 min, respectively.
Results. Overall, in-hospital mortality was 0%. No patient presented paraplegia, paraparesis or major neurological events. Only one patient experienced transient ischemic attack (temporary decrease in visual acuity). Two patients underwent reoperation for bleeding. All ten patients were discharged at home with an average hospital stay of 12.7 ± 4 days. Bentall procedure was performed in 3 patients and aortic valve prosthesis-sparing root surgery in one patient. All postoperative angio CT-scan confirmed the desired results.
Conclusions. Our initial experience, although based on only ten patients, demonstrated excellent survival at 30 days with absence of paraplegia and major neurological events. This combo of endovascular prosthesis with a four-branched arch graft increases the spectrum of techniques available for the surgeon for the treatment of complex diseases of the thoracic aorta.

C214

SURGEON-MODIFIED FENESTRATED ENDOGRAFTS FOR ACUTE SYMPTOMATIC THORACO-ABDOMINAL AORTIC ANEURYSMS

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Objectives. To report the outcome of surgeon-modified fenestrated endovascular aneurysm repair (SM-FEVAR) for acute symptomatic thoraco-abdominal aortic aneurysms (TAAA).
Methods. Interrogation of a prospective database of 174 consecutive patients who underwent fenestrated or branch EVAR for juxtarenal or TAAA in a single institution between August 2006 and April 2014.
Results. A total of 11 patients (9 men; median age 70, range 60-84 years) underwent SM-FEVAR [extent IV (n=9), extent II (n=1), visceral patch aneurysm (n=1); median diameter 77, range 55-110 mm]. Five patients had undergone prior open aortic surgery and six were treated for mycotic aneurysm. Thirty branch vessels were preserved with scallops (n=1; SMA), fenestrations (n=24; renal 11, SMA 10, coeliac 3), chimney grafts (n=3; all coeliac) and bypasses (n=2; 1 renal, 1 SMA). No target vessels occluded intra-operatively. The in-hospital mortality was 18% (n=2). One patient commenced planned dialysis post-operatively. There were no spinal cord ischaemia. None of the nine survivors have required re-intervention at mean follow-up of 16 months.
Conclusions. SM-FEVAR is associated with good early outcomes and represents an acceptable alternative to open, hybrid and chimney techniques in this challenging group of patients.

C215

ENDOVASCULAR REPAIR OF TRAUMATIC AORTIC RUPTURE: A SINGLE CENTER EXPERIENCE

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Background. Traumatic aortic rupture (TAR) leads to immediate death in 75 to 90% of cases. Conventional surgery for TAR still carries high risk of serious complications and mortality. Thoracic endovascular aortic repair (TEVAR) has emerged as a valid alternative compared with open surgical treatment.

Methods. From March 2001 to December 2013, out of 165 patients undergone TEVAR, 18 patients (19.9%) were treated for a TAR after road accident. Clinical outcomes, including primary end point (early and late mortality) and secondary end points (early and late major complications) were evaluated. To evaluate the risk we follow: the Injury Severity Score (ISS) in patients with multiple injuries and the American Society of Anesthesiologist classification (ASA class) to describe the perioperative physical status. 12 patients (66.7%) showed an unstable clinical picture (ISS ≥40); head injury (with stupor or coma) was present in 6 patients (GCS ≤12); multitrauma with leg, arm and/or vertebral fractures occurred in 11 (61.1%) and abdominal blunt trauma in 12 (66.7%). Two patients (11.1%) had a delayed TEVAR, the remaining 16 (88.9%) required an urgent or emergency treatment from 12 to 48 hours.

Results. There were no operative deaths or surgical conversion. Any neurological complication, including paraplegia, was observed. One patient died after 48 hours for the intracranial associated lesions. One vascular complication occurred requiring a rescue prosthetic ileofemoral bypass. Eight patients (44.4%) required prolonged mechanical ventilation and 2 (22.2%) required temporary haemodialysis. At follow-up (6-143 months), a patient showed a late type I endoleak, requiring a secondary TEVAR.

Conclusions. TEVAR is a safe procedure in TAR patients, mostly in instable/emergent conditions. Moreover, TEVAR allows for prompt treatment of associated lesions in complex multitrauma patients. Most frequently the associated lesions especially of intracranial or intra-abdominal organs became prognostically predictive of postoperative outcome.

C216

SURGICAL REPAIR OF THE DESCENDING AND THORACO-ABDOMINAL AORTA IN PATIENTS WITH CONNECTIVE TISSUE DISORDERS

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Objective. Patients with connective tissue disorders (CTD) are at increased risk of developing aneurysm or dissection of the descending and thoraco-abdominal aorta (DTA/TAAA). We aim to review our result of open surgical repair in this group of patients.

Methods. We interrogated our prospectively maintained database (1998-2014) and identified 35 patients with CTD who underwent open DTA/TAAA repair.

Results. Twenty-seven patients underwent TAAA and eight patients DTA surgery. Mean age was 39.7 years (48.5% male). Indications for surgery were non-dissected aneurysm (4; 11.4%), acute type B dissection (1; 2.8%) and chronic type B dissection (30; 86.6%). Twenty-nine patients (82.9%) had undergone one or more prior cardiovascular operation via median sternotomy. Two (5.6%) had had previous abdominal aortic surgery. One case had left heart bypass and all others full cardiopulmonary bypass. Deep hypothermic circulatory arrest was utilised in 9 cases (25.7%). Thirteen patients (37.5%) were urgent/emergency cases. There were no in-hospital deaths and one case of permanent spinal cord injury in a patient who underwent repair of a Crawford type II TAAA.

Conclusions. Open repair of DTA and TAA in patients with CTD can be performed safely. These patients usually present with residual dissection. Endovascular therapies, although less invasive, should be carefully considered and offered only when open repair is not feasible.

Miscellanea 2

C217

ASSESSMENT OF ANTIPLATELET EFFECTS OF TICAGRELOR IN PATIENTS WITH RENAL FUNCTION IMPAIRMENT UNDERGOING ISOLATED OFF-PUMP CABG FOR STABLE CORONARY ARTERY DISEASE

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Background. Chronic kidney disease (CKD) is frequent in atherosclerotic patients with coronary artery disease (CAD). As reported by several studies, patients with mild-to-moderate CKD can advantage from the use of ticagrelor (the recent oral direct inhibitor of P2Y12 receptor) due to more uniform and greater platelet inhibition and the less ischemic event occurrence as compared to clopidogrel. The aim of this study was evaluate the antiplatelet effect of ticagrelor and its impact on renal function when used in addition to aspirin as dual antiplatetel therapy in patients with mild-to-moderate CKD (stage 2 or 3) who underwent off-pump coronary artery bypass graft (CABG) for CAD.

Methods. From March 2011 to July 2013, 124 consecutive patients with mild-to-moderate CKD (stage 2 or 3), undergoing isolated off- PUMP CABG for stable coronary artery disease, were randomly assigned to aspirin plus clopidogrel or aspirin plus ticagrelor after surgery. Serum creatinine levels, glomerular filtration rate (GFR) and antiplatelet activity, evaluated by VerifyNow, were evaluated serially after surgery. Drugs adverse effects were collected and analysed as well.

Results. The greatest change in PRU from baseline occurred within 24h after aspirin-ticagrelor administration, and PRU was significant lower (65PRU vs 239PRU, p<0.001). The major cardiac and cerebral adverse events rates were not different between study groups as well as major blending incidence. Significant increasing in serum creatinine and decreasing in GFR from baseline occurred in aspirin-ticagrelor group (1 month follow-up: p=0.05 and p=0.05, 6 months follow-up: p=0.04 and p=0.03, respectively).

Conclusions. Aspirin plus ticagrelor is actually considered as the best choice for dual antiplatelet therapy. Special care, however, should be paid in patient with CKD who need also to be carefully followed during drug administration.

C218

INFLUENCES OF INFLAMMATION, COAGULATION, FIBRINOLYSIS AND OXIDATIVE STRESS ON RENAL FUNCTION WORSENING AFTER CARDIAC SURGERY IN HIGH RISK PATIENTS

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Background. Acute kidney injury (AKI) following cardiac surgery is a common complication associated to short and long-term mortality. Cardiopulmonary bypass elicits coagulation, fibrinolysis, inflammatory systems activation and oxidative stress increase, all of them involved in AKI development but never simultaneously assessed. Aim of the study was to evaluate relations between oxidative stress, inflammatory and coagulation systems activation and post-operative renal function in patients with normal renal function at higher risk to develop AKI, specifically patients with higher EuroSCORE points (>6) and pre-operative anaemic status (pre-operative Hb <12 g/dL in women, <13 g/dL in men).

Methods. Forty-one patients were prospectively enrolled. Twenty-six patients with estimated glomerular filtration rate (eGFR) reduction <25% were included in Group A and 15 patients with eGFR reduction >25% were included in Group B. Plasma pro-thrombin fragment 1.2 (PF 1.2, coagulation activation marker), interleukin 6 (IL-6, pro-inflammatory marker), interleukin 10 (IL-10, anti-inflammatory marker), 8-oxo-2'-deoxyguanosine (8-oxo-dG, oxidative stress marker), urinary interleukin 18 (IL-18) and neutrophil gelatinase-associated lipocalin (NGAL) were evaluated until post-operative day 5.

Results. No differences were found between groups for inflammatory markers. Post-operative oxidative stress was slightly increased in B group. PF1.2 levels 24 hours after the operation were significantly higher in B group (506.6 ± 548 vs 999 ± 704.1 pmol/L; p=0.018) and they were independently associated with eGFR reduction at multivariable analysis. Twenty-four hours PF1.2 values had an Area under the Receiving Operating Characteristic of 0.744 for eGFR reduction. IL-18 values were similar in both groups 2 hours after the operation but NGAL increase (2hours – baseline) was significantly higher in B group patients (0.3 vs 4.4 pg/mL; p=0.03).

Conclusions. Thrombin generation is higher in patients with renal function worsening and it is an independent risk factor for AKI in anemic patients, probably having a role in microcirculation impairment and tubular cells damage.

C219

LOW-DOSE ASPIRIN THERAPY AFTER BIOPROSTHETIC AORTIC VALVE IMPLANTATION: IS A SAFE CHOICE?

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Background. The American College of Cardiology, American Heart Association and American College of Chest Physicians recommend the prescription of low-dose acetyl-salicylic (ASA) instead of vitamin K antagonists (VKA) in the first three months after aortic valve replacement (AVR) with a bioprosthesis, while the European Society of Cardiology recommends an initial regimen of VKA for three months, followed by low-dose ASA.

Methods. We analyzed 495 patients (75 ± 6 years old, 53% male) consecutively submitted to tissue aortic valve replacement, between May 2010 and December 2012, without risk factors for thromboembolic or hemorrhagic events. Patients were treated from the first postoperative day with low-dose ASA (100 mg daily). To assess the safety of this approach, we performed a follow-up of patients discharged. The mean flow-up time was 17 ± 9 months and was 97% complete.

Results. 34 patients were switched to therapy with VKA after discharge, mainly due to episodes of atrial fibrillation. Thromboembolic events occurred in seven patients with antiplatelet therapy (one pulmonary embolism and six

stroke events). There were not major bleedings. There were 27 deaths (19 due to cardiovascular events). Cumulative survival at 18 months was 97 ± 0.9%. In two cases death was caused by thromboembolic events. Freedom from thromboembolism was 99 ± 0.3% at 18 months. Freedom from major bleeding was 100%. Only one thromboembolic event (the pulmonary embolism) occurred within the first three months after surgery.
Conclusions. Observational studies suggest that bioprosthetic valves have a 1% to 5% annual risk of thromboembolic complications, even with the use of early antithrombotic prophylaxis. The routine use of ASA in our large series does not seem to lead to an increased risk and may be considered as a viable alternative to anticoagulants in patients at low risk.

C220

USE OF HUMAN MESENCHYMAL STEM CELLS, BONE-MARROW BLOOD-DERIVED, AS AN ALTERNATIVE SOURCE OF CARDIOMYOCYTE CELLS FOR TISSUE ENGINEERING

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Background. Adult stem cell-derived cardiomyocyte cells may be a promising source of cells for applications in regenerative medicine, including cardiovascular tissue engineering and primary progenitor cells from native vessels may have limited proliferative capacity and reduced collagen production.
Methods. Bone-marrow blood samples were collected by patients in need of vascular grafts due to coronary disease or peripheral arterial disease. Based upon our findings regarding growth factors and cytokines a two-phases culture protocol including a 2 week proliferation and 2 week differentiation phase was develop to optimize proliferation and cardiomyocytes differentiation of human mesenchymal stem cells (MSCs) cons cutely.
Results. Our work showed the ability of human bone-marrow-derived mesenchymal stem cells to differentiate by various growth factors and cytokines. Efficient recovery of MSCs from cryopreserved intact teeth and second-passage MSCs cultures was achieved. These studies indicate that MSCs isolation is feasible for patients submitted to cardiovascular surgery, and imply that processing immediately after blood collection is required for successful banking of MScs. Further, the recovery of viable MScs after cryopreservation of intact teeth suggests that minimal processing may be needed for the banking of samples with no immediate plans for expansion and use.
Conclusions. These initial studies will facilitate the development of future protocols for the clinical banking of MSC.

C221

OPEN HEART SURGERY IN CANCER PATIENTS: RESULTS AT 10-YEAR FOLLOW-UP

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Background. In open heart surgery (OHS) enhanced inflammatory response to extracorporeal circulation with increased release of cytokines and immunity suppression has been advocated. As a consequence rapid progression of malignancy could be expected. We retrospectively evaluated the potential influence of OHS on the progression of malignancy, the impact of malignancy on in-hospital mortality, and long-term results up to 10-year follow-up.
Methods. Out of 7078 patients referred for OHS from January 2001 to December 2012, 241 consecutive patients (3.4%) (mean age 72.1 ± 8.3 years, males 170, 70.5%) had malignancy either known before or detected during hospital stay. Organ malignancies (OM) were present in 201 patients (83%), hematological malignancies (EM) in 40 (17%). Early stages of cancer (I-early II, in remission by therapy) were present in 180 (75%) patients, advanced stages (III-IV for OM, multiple organ involvement for EM) in 61 (25%). OHS consisted in isolated (n=176) or multiple procedures (n=65). Follow-up (mean 57 ± 40 months) was 99% complete.
Results. In-hospital mortality was 5% (n=12); 2% (n=5) died from cancer-related causes (4/40 EM vs 1/201 OM, p=0.0001). Overall 10-year survival was 80 ± 4%, freedom from cardiac death 92 ± 3.5%. Freedom from malignancy-related death was 86 ± 4% for patients operated on in early stages of cancer vs. 61 ± 8.5% for those operated on in advanced stages (p<0.0001), and 89 ± 3% for OM vs 50 ± 12% for EM (p=0.0005). Progression of malignancy was observed in 23/227 patients (10%) at 18 ± 10 months after surgery.
Conclusions. OHS in cancer patients is not associated with increased in-hospital mortality, provides very satisfactory freedom from cardiac death. Long-term survival in early stages cancer patients is excellent. A rapid progression towards advanced stages of cancer was not observed after OHS. Moreover, time interval between OHS and progression of malignancy during follow-up should apparently exclude negative effects of extracorporeal circulation on cancer progression. EM seems to have a negative impact on the overall outcome.

C222

LONG-TERM OUTCOMES FOLLOWING HIGH INTENSITY FOCUSED ULTRASOUND (HIFU) AND RADIOFREQUENCY (RF) ABLATIONS FOR ATRIAL FIBRILLATION

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Objective. The aim of this study is to assess safety and efficacy of different surgical ablations followed with clinical and electrophysiologic studies (EPs) during our 7 years' experience.
Methods. From December 2006, 122 patients undergoing concomitant L-Maze surgical ablation were matched in two groups. Group A (36 patients), HIFU procedure has been performed and Group B (86 patients), RF ablation was employed. Paroxysmal AF was present in 23%, Persistent AF in 23% and, longstanding AF in 54%. Ninety-seven procedures were performed through a midsternotomy and 25 with minimally invasive approach in right mini thoracotomy. Associated procedures included myocardial revascularization and mitral and tricuspid repair or replacement. The follow-up was done with 24 Holter monitor after 3, 6, 12 and yearly.
Results. We have 3 deaths (1 Group A, 2 Group B) but none of these related with ablation procedure. At follow-up (3467 to 29 days), 92 patients were on sinus rhythm with 100% of conversion of paroxysmal AF to sinus rhythm. The other 30 patients who showed AF were scheduled for electrical cardioversion (CVE) after 3 months. During follow-up 9 patients revealed AF burden or persistent AF and were referred to EPs. In those patients one or more gaps were found in the box lesion or in the mitral isthmus. Atrial flutter was found in one patient, more often in longstanding group.
Conclusion. HIFU and RF L-Maze ablation are effective for paroxysmal and persistent AF with good long term results, for survival, thrombus embolism, freedom from AF recurrence, and antiarrhythmic medications. Postoperative EPs permits to extend indications for longstanding AF and to stabilize the long-term results. Close follow-up and partnership with electrophysiologists are highly recommended.

C223

LEFT ATRIAL APPENDAGE MANAGEMENT FOR LONG-TERM STROKE PREVENTION DURING THORACOSCOPIC SURGICAL ABLATION FOR ALONE ATRIAL FIBRILLATION: SINGLE CENTER EXPERIENCE

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Background. Stroke and TIA are obnoxious complications of atrial fibrillation. Long-term neurological adverse event risk remains a frightening condition despite successful AF ablation. With this study we show experience on left atrial appendage (LAA) management for stroke prevention during thoracoscopic video-assisted epicardial lone atrial fibrillation ablation.
Methods. This is a retrospective study of prospectively collected data. Between August 2010 and June 2013, 25 consecutive patients (age 60 ± 7 years, left atrium dimension 47 ± 6 mm, $CHADS_2$ 1 ± 0.6) with persistent or long-standing persistent (median 41 months) isolated atrial fibrillation underwent to thoracoscopic, closed chest, video-assisted, epicardial surgical ablation either after catheter ablation failure or as part of a hybrid procedure. LAA exclusion was performed with AtriCure® AtriClip® LAA exclusion system. Complete LAA exclusion was confirmed intra-operatively by trans-esophageal echocardiography. Oral anticoagulant therapy (OAC) was discontinued after 6 months in case of stable sinus rhythm. Prospective follow-up was conducted by clinical evaluation, trans-telephonic interview and Holter-ECG monitoring every 6 months.
Results. There were no major complications, nor deaths. In 23 (92%) patients LAA was successfully excluded. We reported 2 failures in device positioning during the initial experience, reflecting our learning curve with this technology. No minor morbidity was directly associated to LAA exclusion. Mean LAA orifice diameter was 37 ± 4 mm. Device dimension were 40 mm (40%) and 45 mm (52%). After a mean follow-up of 12 ± 7 months (100% completed), 20 (80%) patients were in stable sinus rhythm, OAC discontinuation rate was 64%, no neurological event were noticed, neither left appendage related adverse event.
Conclusions. LAA exclusion can be safely performed in the setting of minimally invasive lone atrial fibrillation surgical ablation. In this context, adding such a procedure may help in maximizing immediate clinical result and improving long-term outcome.

C224

POSTOPERATIVE ATRIAL FIBRILLATION AFTER AORTIC VALVE REPLACEMENT AND LATE THROMBOEMBOLIC EVENTS: AN ANALYSIS ON ANTITHROMBOTIC THERAPY

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Background. One of the most frequent complications after aortic valve replacement (AVR) is the onset of postoperative atrial fibrillation (POAF). Aim of our study is to analyze rhythm and late thromboembolic events (TE) at long term follow-up (FU) and their relation with antithrombotic therapy.

Methods. In this single center study we retrospectively selected 899 patients without story of AF who underwent isolated AVR with or without CABG or surgery on the thoracic aorta, from January 2001 to December 2012. Mechanical and biological prosthesis are used (22% and 78%). For each patient we analyzed: preoperative echocardiographic and clinical features, the possible postoperative passage to AF, the efficacy of cardioversion, the rhythm and the antithrombotic therapy at discharge. Data about antithrombotic therapy and rhythm at follow-up were collected by phone-interviews.
Results. Three-hundred-two patients (35%) had a perioperative passage to AF. At discharge 67 patients (7%) presented AF, 832 patients (93%) were at sinus rhythm (SR). Mean follow-up was 5.8 ± 4.4 years and it was complete for 872 patients (97%). At this time 664 patients (76%) were at SR and 22 of them (3%) had late TE; 208 patients (24%) presented AF and 24 of them (12%) had late TE (p=0.01). Patients who taken antiplatelet therapy were 83 (23%) in AF group and 518 (78%) in SR group and the late TE were significantly major in the first group (13, 14.5% vs 20, 3.9%; p<0.001). Patients who taken oral anticoagulants were respectively 125 (77%) in AF group and 146 (22%) in SR group and there isn't a significant difference of late TE between the two groups (11, 12% vs 2, 2%; p=0.062).
Conclusions. According to our data, the occurrence of late TE in patients with POAF is significantly related to antithrombotic therapy. These findings have to be considered in management of patients with POAF.

C225

VENTRICULAR RESTORATION WITH ASSOCIATED MITRAL ANNULOPLASTY: DETERMINANTS OF LATE OUTCOME

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Background. Mitral annuloplasty may be associated to surgical ventricular restoration (SVR), but risk-to-benefit ratio remains poorly defined. We sought to outline outcome determinants in this high-risk population.
Methods. Twenty-six patients with ischaemic cardiomyopathy, prior anteroseptal AMI, NYHA class III-IV, and EF ≤35% who underwent SVR and prosthetic ring mitral annuloplasty were analyzed. Associated cardiac surgical procedures except CABG were excluded. Risk factors for adverse events were identified with logistic and Cox regression. Probabilities of late events were estimated with the Kaplan-Meier method. Primary endpoints were death and hospitalisation for recurrent HF.
Results. Preoperative characteristics: age 66 ± 8 years; NYHA class 3.2 ± 0.4; EF 27 ± 5%; WMSI 2.4 ± 0.2; end-systolic volume index (ESVI) 80 ± 25 ml/m^2; MR degree 3.3 ± 0.5; EuroSCORE II 15 ± 11. CPB and aortic cross-clamp times were 203 ± 68 and 131 ± 28 min. Operative mortality was 11%. No independent predictors of early death emerged. High-dose inotropic support, IABP, and ECMO were necessary in 13, 12, and 1 case. At a mean follow-up of 49 ± 3 months (longest, 112 months), the probability of survival at 1, 3, 5, and 7 years after the operation were 84%, 76%, 72% and 54%, whereas the corresponding probabilities of rehospitalisation for HF were 81%, 52%, 48% and 12%. Baseline ESVI (p=0.03; HR=1.02) and cross-clamp time (p=0.02; HR=1.04) were outlined as independent predictors of late death, but no predictor of recurrent heart failure emerged.
Conclusions. Surgical mitral-ventricular restoration can be performed with a near-10% operative risk, and results in over 50% survival at 7 years in advanced ischemic cardiomyopathy. Myocardial viability testing likely represents a crucial additional tool to stratify and optimize patients' selection with respect to late outcome.

C226

RIGHT VENTRICULAR SYSTOLIC FUNCTION EVOLUTION AFTER MITRAL VALVE REPAIR: WHAT IS THE ROLE OF THE MODALITY OF PERICARDIAL OPENING AND OF MYOCARDIAL PROTECTION IN POSTOPERATIVE TAPSE REDUCTION?

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Objectives. The aim of the present study was to investigate the importance of the modality of pericardial incision (lateral versus anterior) onto postoperative right ventricular (RV) systolic function by comparing echocardiographic parameters in patients undergoing minimally invasive or traditional mitral valve repair (MVR) with different type of myocardial protection.
Methods. The study was prospective and randomised. 30 consecutive patients with severe mitral degenerative regurgitation were scheduled for MVR and were randomly assigned into 3 different groups of 10 patients each: Group A sternotomy and Buckberg cardioplegia; Group B sternotomy and Custodiol cardioplegia; Group C (MIS mini invasively surgery) right antero-lateral thoracotomy and Custodiol cardioplegia. Pericardial incision differed between groups A-B and C groups: anterior T-reversed in traditional surgery and lateral pericardial approach in MIS. The myocardial protection type was also different: in group B and C we used Custodiol protocol (single anterograde administration of cardioplegia), while in group A we used Buckberg protocol (anterograde administration of cardioplegia, follows by repetitions each 15-20 min of retrograde cardioplegia). Two-dimensional transthoracic echocardiography was performed pre- and 3-months post MVR to evaluate RV function by tricuspid annular plane systolic excursion (TAPSE).
Results. All patients underwent successful and uncomplicated MVR. Preoperative RV function was normal in all patients. At two-dimensional analysis a postoperative TAPSE fall was found in all groups; MIS patients experienced a statistically significant less marked variation (22.7 ± 3.8 post; 23.8 ± 3.3 pre) versus traditional surgery (group A 17.9 ± 3.2 post, 28.8 ± 2.6 pre; Group B 15.4 ± 3.5 post, 25.30 ± 5.9 pre), even after adjustment for age, sex, body surface area and basal TAPSE (p<0.0001). There is no statistically significant difference of delta-TAPSE between group A and B.
Conclusions. Mini-invasive MVR with lateral pericardial opening reduces postoperative RV longitudinal function decrease (TAPSE) independently from the modality of myocardial protection.

C227

SHORT- AND LONG-TERM RESULTS OF TRIPLE VALVE SURGERY: A SINGLE CENTER STUDY, WITH INITIAL EXPERIENCE IN MINIMALLY INVASIVE APPROACH

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Background. Triple valve surgery (TVS) is still a challenge for surgeons due to prolonged cardiopulmonary bypass (CPB) and myocardial ischemic times. Reported operative mortality for TVS ranges between 2.5% and 25%; long-term survival is also diminished, with reported survival at 5 and 10 years of 75-82% and 61-75%, respectively. Objective of our study is to define early and late clinical outcomes, reporting the initial experience in the treatment of triple valve disease through a minimally invasive approach.
Methods. A retrospective, observational, cohort study was undertaken of prospectively collective data on 106 patients who underwent TVS at our institution between October 2001 and June 2013. 101 procedures were done through the standard median sternotomy; instead in 5 patients, the surgical procedure was carried out through a right minithoracotomy. Univariate and multivariable analyses were performed to identify predictors of early and late survival.
Results. In-hospital mortality rate was 5.6% (6/107 patients). Multivariable analysis failed to reveal variables associated with an increased operative mortality. Five-year and 10-year survival was 85 ± 3% and 65 ± 9%. In stepwise Cox proportional hazards multivariate analysis, female gender (p=0.045), concomitant CABG (p=0.034), prolonged CPB (p=0.002) and cross-clamp times (p=0.038) were found to be significant predictors of late mortality following TVS. The freedom from valve-related complications and reoperation at 10 years was 95 ± 2% and 97 ± 2%, respectively. Ten-year freedom from thromboembolism and anticoagulation-related hemorrhage were 88 ± 5% and 88 ± 4%, respectively.
Conclusions. TVS offers encouraging short-term and long-term patient survival; these good results after triple valve operation in patients with advanced valvular heart disease justifies aggressive surgical therapy in these patients. TVS with a minimally invasive approach is feasible and it could be another treatment option especially for high risk patients that would improve the results of surgery.

C228

FUNCTIONAL TRICUSPID REGURGITATION AND THE RIGHT VENTRICLE: AN UNSOLVED ISSUE

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Background. The interest in functional tricuspid regurgitation (FTR) is growing, though results are sometimes disappointing. The aim of this study was to evaluate the impact of the right ventricle (RV) on clinical outcome after surgical FTR repair.
Methods. From May 2009 to December 2012, 447 patients with mitral valve disease underwent FTR repair. RV dilatation, RV systolic dysfunction, or both were present in 30.6% of patients.
Results. After a mean of 23 ± 11 months, 219 patients underwent echocardiographic evaluation. The proportion of patients with FTR ≥2+ reduced from 78.5% to 17.8%. At follow-up, patients with preoperative FTR ≤2+ (n=94) had a mean FTR of 0.5 ± 0.7 (FTR ≥2+ 6.4%), whereas patients with preoperative FTR ≥3+ had a mean FTR of 1.2 ± 1 (FTR ≥2+ 16.8%) (p<0.001 and p=0.015, respectively). On multivariate analysis, RV dilatation and FTR ≥2+ at discharge were identified as risk factors for FTR return, whereas preoperative FTR ≥3+, systolic pulmonary artery pressure and RV dilatation were found to be risk factors for FTR ≥2+ at discharge. Surgical techniques used for FTR correction did not affect recurrence of FTR ≥2+. The combination of RV dilatation and RV systolic dysfunction was found to be a risk factor for early and late mortality.
Conclusions. Clinical outcome of FTR repair mainly depends on RV abnormalities rather than surgical technique. RV dilatation is the most important risk factor for FTR return and, if associated with systolic dysfunction, for mortality. The only way to improve the outcome is to anticipate surgery when the RV is still normal.

C229

SUCCESSFUL LONG-TERM VACUUM TREATMENT OF MULTIRESISTANT GRAM-NEGATIVE DEEP STERNAL WOUND INFECTION

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Background. To review our experience in the treatments of deep sternal wound infections (DSWI), focusing on gram-negative bacteria aetiology.

Methods. Between October 2004 and February 2014, 8488 patients underwent mayor cardiac surgery operations through full median sternotomy at our institution; 71 patients developed post cardiotomy deep sternal wound infection (DSWI) (0.89% incidence). All of them were primarily treated by vacuum therapy. In 25 patients (14 female, 11 male) the aetiology was represented by gram-negative bacteria (GNB) (35.2%), and in 18 of them was a polymicrobial GNB infection (72%). The most frequent pathogens were: E. coli and Acinetobacter baumanii (11 and 7, 44% and 28%, respectively). Mean age was 68 ± 7 years. The mean interval between operation and infection was 28 ± 12 days, with no statistically significant difference between the other DSWI observed ($p>0.05$).

Results. We observed one death due to multi-organ failure (4-1.7% overall mortality). The median healing time observed was 20 ± 8.5 days. DSWI recurred in 6 cases following vacuum therapy. In all recurrence cases, an Acinetobacter baumanii was among the causative micro-organisms. Recurrence was treated by simply prolonging vacuum therapy, even at home with periodic outpatient controls.

Conclusions. Gram-negative DSWI showed a more aggressive infection and longer healing time, especially in the patients with Acinetobacter baumanii aetiology, usually responsible for a secondary colonization of the wound, with consequent healing times between 3 and 5 months, using vacuum therapy. Negative pressure wound treatment represented the destination therapy even more in this subset of infections.

C230

HEALTH-RELATED QUALITY OF LIFE AFTER LEFT SUBCLAVIAN ARTERY OVERSTENTING WITHOUT PREVIOUS REVASCULARIZATION DURING TEVAR

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Background. Sometimes intentional overstenting of left subclavian artery (LSA) may be necessary to create a satisfactory proximal landing zone during thoracic endovascular aortic repair (TEVAR). Onset of vertebrobasilary insufficiency and arm ischemia following LSA overstenting has been reported so that primary surgical revascularization of the LSA is recommended by numerous authors. On the other hand subclavian revascularization is not without complications and most patients with an ultrasound documented subclavian steal are asymptomatic. Our policy is to cover the LSA without previous revascularization when there are no specific indications. We investigate health-related quality of life (QOL) to evaluate our results in our patients undergone to LSA coverage without revascularization.

Methods. From March 2001 to December 2012, 165 patients underwent TEVAR. Forty-seven patients (28.4%) required intentional complete LSA overstenting. No patient had prophylactic surgical revascularization. QOL was assessed with the Short Form 12-item Health Survey (SF-12) and a specific form to investigate signs and symptoms that arise from LSA occlusion.

Results. There were no postoperative neurological complications, steal phenomena or critical arm ischemia. Minor complications (temporary arm claudicatio or dizziness) occurred in 3 (6.4%) patients. No patient required a secondary revascularization. Patient perceived QOL was evaluated in 43 of the 47 patients. All patients had better QOL scores post-operatively. Our patients indicated they would make the same choice about endovascular surgery if they had to do it all over again.

Conclusions. No reliable technique is available to assess the individual risk of stroke and paraplegia in case of LSA coverage, so that no consensus exists on indications for LSA revascularization. We believe that appropriate management of aortic arch vessels is mandatory and that primary LSA revascularization is reserved for those patients who develop ischemic symptoms or who have supra-aortic vascular pathologies with a potentially compromised circle of Willis or collateral arm supply.

C231

PRE AND POSTOPERATIVE REHABILITATION IN CARDIAC SURGERY

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Background. In patients undergoing open cardiothoracic surgery postoperative pulmonary complications remain an important cause of morbidity and mortality, impacting upon hospital length stay and health care resources. An adequate preoperative respiratory muscle strength may help to protect against the development of pulmonary complications and therefore preoperative inspiratory muscle training and postoperative rehabilitation has been suggested to be of potential value in improving outcomes.

Methods. In our institute all patients in schedule to cardiac surgery in preoperative evaluation perform: physiatric evaluation with spirometry and respiratory exercises including muscle training (IMT), exercises of deep breathing, cough, earlier ambulation and physiotherapeutic orientations and incentive spirometry. In Intensive Care Unit in first postoperative day after extubation, restart immediately IMT and incentive spirometry that continue in ward daily from second day associate to rapid and active mobilization under careful control of physical therapist. During the hospitalization was evaluated: inspiratory capacity value with incentive spirometry in 2th, 4th, 6th postoperative days, pulmonary complications and functional recovery.

Results. 107 patients were enrolled in our program: 92 pts (86%) completed our program, 7 (6%) patients drop out and 8 pts (7%) discontinued. Among the patients that completed the program 62 patients (67%) had rapid achievement of preoperative inspiratory capacity value >70% in 6th postoperative day and total functional recovery in 4.4 days after surgery.

Conclusions. Respiratory and functional rehabilitation is an integral part in the care management of the patients underwent cardiac surgery, either in the pre or postoperative period, since it contributes significantly to reduce postoperative morbidity and mortality, impacting upon hospital length of stay and health care resources.

C232

UNSELECTED TOTALLY VIDEO-GUIDED MINIMALLY INVASIVE CARDIAC SURGERY: IS IT TIME FOR A PRIMARY APPROACH?

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Background. Minimally invasive thoracotomy is not the standard approach in cardiac surgery yet, despite less traumatism and advantages of sternal sparing. At our Institution since 2010 the minimally invasive completely video-guided approach is the standard of care for every cardiac pathology except for CABG and aortic valve surgery. We do not perform any patient selection.

Methods. From January 2010 to December 2013, 631 consecutive patients underwent minimally invasive cardiac surgery through a small 4 cm right mini-thoracotomy. In each patient a peripheral arterio-venous femoral cannulation or in tricuspid and redo surgery an additional internal jugular vein drainage was performed. In low ejection fraction patients a beating heart procedure was performed and in the minimally invasive candidates no additional preoperative examinations were performed.

Results. Surgery was 530 mitral valve repair, 49 replace, 98 tricuspid valve repair and 7 replace. Thirteen isolated atrial septal defects were performed, and 125 in association with mitral valve surgery. Atrial fibrillation was treated in 70 patients and in 6 patients a subaortic myectomy was performed. Five patients underwent surgery for left sided atrial neoplasms and 8 underwent aortic valve replacement. Three patients were converted to standard sternotomy for intraoperative bleeding. Expected mortality was 5.95 ± 8.0%, overall crude mortality analysis showed 3.0% of in-hospital mortality.

Conclusions. Completely video-guided mini-thoracoscopic approach in cardiac surgery is safe and feasible. It is suitable either for young and elderly and fragile patients. In high volume centers it can simply be the primary approach for mitral, tricuspid, atrial septal and most of aortic surgery with excellent results.

C233

MANAGEMENT OF COMPLICATIONS OF PULMONARY ENDARTERECTOMY SURGERY

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Background. Pulmonary endarterectomy (PEA) is the treatment of choice for chronic thromboembolic pulmonary hypertension (CTEPH). Some patients may develop severe complications after surgery, either from severe airway bleeding (AB), right ventricular failure (RVF), persistent severe pulmonary hypertension (PSPH), or lung reperfusion edema (LRE). Extracorporeal membrane oxygenation (ECMO) represents the last treatment when other therapeutic options fail. We review our experience of early ECMO support in severely compromised patients following PEA.

Methods. From April 1994 to March 2014, 546 consecutive PEA were performed. ECMO support was placed in 21 patients (3.8%). The indications to ECMO were: AB (6 patients), RVF (6 patients), PSPH (6 patients), and LRE (3 patients).

Results. Patients assisted with ECMO had more severe CTEPH compared to patients with uncomplicated outcome (preoperative mean pulmonary arterial pressure: 55 ± 10 vs 44 ± 12 mmHg, preoperative pulmonary vascular resistance: 1495 ± 723 vs 909 ± 415 dyne/s/cm^{-5}). Survival after successful weaning from ECMO was 17%, 50%, 60%, and 67% after AB, RVF, PSPH, and LRE, respectively. In case of PSPH indeed, the outcome of patients with indication to lung transplantation was excellent (survival 100% after transplantation), whereas mortality was 100% in case of contraindication to transplantation.

Conclusions. ECMO has a role as rescue therapy following severely complicated outcome in patients who would probably otherwise die. ECMO is a successful bridge-to-recovery in case of LRE and RVF. In case of PSPH following surgery, ECMO should be placed as bridge-to-transplant only when transplantation is not contraindicated. It is therefore essential that PEA is performed in experienced centers where a concomitant lung transplantation program is available. In case of airway bleeding, ECMO support is

unsuccessful, and alternative strategies have been developed. In particular, for pulmonary hemorrhage secondary to arterial disruption during PEA, the delivery of a fluid surgical adhesive directly into the sub-segmental injured vessel proved to be effective.

C234

THE 20TH ANNIVERSARY OF PULMONARY ENDARTERECTOMY

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Background. Chronic thromboembolic pulmonary hypertension (CTEPH) occurs in 0.5% to 3.8% of patients after acute pulmonary embolism and can be cured by pulmonary endarterectomy (PEA). Because the CTEPH diagnosis is often difficult, the diagnostic workup and the most appropriate treatment should be undertaken only at experienced centers. The identification of patients with surgically accessible thromboembolic obstructions remains an issue. As the surgeon's experience plays an important role toward a successful outcome, PEA is routinely performed in few centers worldwide. Here we present the outcomes of PEA at a single institution over the past 20 years.

Methods. From April 1994 to March 2014, 546 consecutive patients diagnosed with CTEPH underwent PEA. Patient referrals remarkably increased over the years, and we became more confident with the procedure. Since 2009, about 60 PEAs were performed each year. Operability rate of CTEPH patients increased from 74% (year 2004) to 93% (year 2013).

Results. Hospital mortality depends on preoperative conditions (13.7% for WHO class IV patients, 6.4% for class III, and no mortality for class II, overall 8.6%). There was an increase in the number of the patients presenting with distal type-3 CTEPH (currently 36.0%) and the elderly (>70 years) patients (currently 34.1%), over time. A significant and sustained decline in mean pulmonary artery pressure (23 ± 8 vs 45 ± 12 mmHg) and pulmonary vascular resistance (273 ± 172 vs 936 ± 451 dyne/s/cm^{-5}) was observed after PEA. Long-term survival was 86.4%, 79.5%, 74.7%, and 74.7% at 5, 10, 15, and 20 years, respectively.

Conclusions. For a proper patient selection, operability assessment has to be achieved by an experienced surgeon. In experienced centers, performing at least 50 procedures per year, PEA results in significant pulmonary hemodynamic improvement, with favorable outcomes even in the elderly and in patients with distal segmental-level chronic thromboembolic disease. Referral of elderly patients should not be discouraged.

Congenital 3

C235

PRE-OPERATIVE NT-PROBNP LEVELS AS A PREDICTIVE BIOMARKER IN CONGENITAL HEART DISEASE SURGERY

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Background. Technological innovations have allowed the development of less invasive procedures for the treatment of congenital heart disease. However, in many cases, surgery, even if related to a higher risk of complications, still represent the only approach that permits the recovery of normal cardiac biomechanics. The purpose of this study is to evaluate the correlation between the preoperative NT-proBNP levels and the hospitalization time in ICU and whether the variations of these levels after operation could be used as a marker for monitoring the recovery of normal cardiac physiology over time.

Methods. From January 2013 to December 2013, a prospective study was carried out on 87 patients between 0 and 12 years who had to undergo congenital heart disease surgery. The patients were divided into 4 groups (30, 24, 15, 18) based on the type of congenital heart. NT-proBNP was measured 24 hours before the operation, during the operation and 12, 24, 48, 36 and 72 hours after the operation. Then, each patient's hospitalization time in ICU was recorded.

Results. In all 4 groups, patients with pre-operative NT-proBNP levels greater than the upper limit had much longer hospitalization time in ICU compared with those with levels in the range ($p<0.001$). Furthermore, the study demonstrated that the progressive decrease of these levels after operation is strictly linked to the improvement of the clinical and hemodynamic condition of these patients.

Conclusions. BNP is a hormone released by the ventricle after the stretching of myocardial fibers to reduce blood volume, modulating the hydro-electrolytic excretion. This study proved not only that the pre-operative levels of this peptide could be used as a predictive biomarker since they correlate with the hospitalization time in the ICU but also that post-operative NT-proBNP monitoring is a valid instrument for quantifying the progress made by the young patients towards recovery.

C236

RELATION BETWEEN ALDH 2 ACTIVITY AND ISCHEMIC AND RADICAL INJURIES DURING PEDIATRIC HEART SURGERY

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Background. Mitochondrial aldehyde dehydrogenase enzyme (ALDH 2) is an enzyme with a central role in the organism's detoxification and in cellular protection during radical damage, as happens, for example, during tissue ischemia. It is particularly expressed in the heart where it seems to play a key role in the neutralization of the radicals that form due to ischemia. The purpose of this study is to evaluate whether the presence and the activity of this enzyme affects the degree of cardiac damage during CPB and therefore on prognosis of the patients undergoing congenital heart disease surgery.

Methods. From April 2012 to January 2014, a prospective study was carried out on 32 patients aged between 0 and 12 years who had to undergo surgery for tetralogy of Fallot. This type of malformation was chosen since longer CPB times are necessary thus allowing a better evaluation of heart ischemic damage. During surgery, samples of myocardial tissue are taken before starting the bypass and after cardiac reperfusion. The presence and the activity of ALDH 2 and the quantity of glutathione were evaluated. Then, during recovery in ICU the hemodynamic parameters and each patient's hospitalization time were recorded.

Results. Patients with higher ALDH 2 enzyme activity showed a less extensive radical damage ($p<0.001$), evaluated through the accumulation of glutathione, compared with the children whose enzymatic activity was much lower. The histologic result was confirmed by the fact the first patients presented much better ventricular function during echography and much shorter recovery time in ICU ($p<0.002$) compared with the second.

Conclusions. ALDH 2 is a key enzyme in the tissue reaction to ischemia. In fact, those patients with lower enzymatic activity were more susceptible to radical damage. For these reasons ALDH 2 could represent a future target to work on for reducing radical damage during ACS or pediatric heart surgery.

C237

OUTCOME OF MECHANICAL CARDIAC SUPPORT IN CHILDREN USING MORE THAN ONE MODALITY AS BRIDGE TO HEART TRANSPLANT

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Background. Mechanical cardiac support (MCS) has been increasingly used to bridge to transplantation (BTT) children with life-threatening heart failure. A "bridge-to-bridge" strategy is sometimes used in emergency situation and when uncertainty occurs about transplantation but in the interim children with a catastrophically failing circulation need support. We compared the outcome of children who underwent single MCS with those who required multiple MCS as BTT.

Methods. A retrospective study was conducted in patients less than 18 years of age. Several combinations of bridge-to-bridge strategies have been used: VA-ECMO the conversion to Berlin Heart EXCOR (BHE) for prolongation of support; BHE then conversion to VA-ECMO due to lung function deterioration; LVAD then upgraded to BIVAD; conversion from pulsatile to continuous flow pumps.

Results. From 1998 to 2013, 120 patients received MCS with 20 (17%) receiving more than one modality. Median age at support was similar in both groups: 60 months (range 1-191) vs 40 months (range 3-203) (p=NS). Median duration of support was longer in multiple MCS group: 38 days (range 1-187) vs 60 days (range 9-140) ($p<0.04$). Usage of multiple MCS in dilated cardiomyopathy was 12% and in other diagnosis was 26%, without statistical difference in outcome (p=NS). Survival to transplantation or explantation did not differ between single MCS and multiple MCS groups (75% vs 60%, p=NS). Incidence of major morbidity (hematologic sequelae, cerebro-vascular events and sepsis) was similar in both groups.

Conclusions. BTT with multiple MCS does not does alter the overall likelihood of a successful outcome in our population. However, children receiving more than one modality are supported for longer duration and this latter observation may reflect longer donor organ waiting times in the modern era.

C238

OUTCOME OF PEDIATRIC CARDIAC RE-TRANSPLANTATION IN THE MECHANICAL SUPPORT ERA

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Background. Re-transplantation (reOHTx) for graft failure in the pediatric population is rare and associated with poor survival compared with primary transplantation. We describe our experience and outcome of paediatric cardiac reOHTx in the mechanical cardiac support (MCS) era.

Methods. A retrospective study of children who underwent reOHTx in our Institution. Data were obtained from departmental databases and hospital medical records.

Results. From 1999 to 2013, 10 patients underwent reOHTx. Diagnoses

leading to first transplant were dilated cardiomyopathy in 7 (5 idiopathic, 1 post-chemotherapy, 1 related to viral myocarditis) and congenital heart disease in 3 patients. Mean age at first OHTx was 7.7 ± 4.9 years. Prior to primary transplant, one patient was supported with Levitronix Centrimag LVAD and a child with VA-ECMO followed by Berlin Heart EXCOR LVAD. Mean time course between first and second OHTx was 5.3 ± 4.6 years. Six patients were mechanically supported as a bridge to reOHTx: 3 with Levitronix Centrimag BIVAD (1 from VA-ECMO), 2 with VA-ECMO, 1 with Berlin Heart EXCOR BIVAD. Median time on support was 32 days (3-94). Early survival after reOHTx was 100%. One patient required 2 VA-ECMO runs due to acute graft failure. Three patients required renal replacement therapy. One suffered a cerebrovascular accident resulting in mild left hemiparesis. Mean follow-up is 5.0 ± 4.8 years. There were 2 late deaths (at 1.4 and 3.9 years post-reOHTx) for rejection due to poor compliance with immunosuppressive treatment.

Conclusions. Re-transplantation in children carries a very good early outcome. With mechanical cardiac support we can bridge children to reOHTx more effectively. Furthermore, MCS can be also used in acute graft failure or for immunological manipulation in acute rejection.

C239

RISK FACTORS FOR DEATH OR STROKE IN CHILDREN SUPPORTED WITH VENTRICULAR ASSIST DEVICE

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Background. Identification of risk factors for death or stroke in children supported with VAD.

Methods. A retrospective single centre study from 2005-2013 was conducted. Stroke was defined as new neurologic deficit lasting >24 hours (or <24 hours if infarction on neuroimaging). Probability of death or stroke was analysed using logistic regression. Age, weight and length of VAD support were analysed as covariates. Other variables analysed as binary factors. Age was considered as a binary factor (≤1 and >1 year).

Results. 88 children received VAD in 93 episodes. Forty-eight (54.6%) patients had diagnosis of dilated cardiomyopathy (DCM), 53 (60.2%) were supported with BIVAD. Twenty-one (23.9%) died before transplant or VAD explant. Thirty (34.1%) sustained a stroke (thromboembolic in 23, haemorrhagic in 7). Twelve (13.7%) died and had a stroke. Median age at support was 1.2 years (0-16.9) and weight was 9 kg (3-90). Median duration of VAD support was 39 days (3-240). Berlin Heart EXCOR was used in 80 children, Levitronix Centrimag in 7, Heartware in 1. Neither weight nor duration of support correlated with death or stroke. Significant factors for death were diagnosis different from DCM (16/40, 40.0%) and BIVAD (18/53, 34.0%). Significant factors for stroke but not for death were LVAD and age. VA-ECMO and sepsis were not significant factors for stroke or death.

Conclusions. Risk factors for death in children supported with VAD are diagnosis other than DCM and need for BIVAD (or univentricular support in single ventricle physiology). Risk factors for stroke are LVAD vs BIVAD in two-ventricle physiology and age <1 year.

C240

CAN WE PREDICT FROM LABORATORY PARAMETERS THOSE CHILDREN SUPPORTED WITH A VENTRICULAR ASSIST DEVICE WHO SUSTAIN A STROKE?

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Background. To identify if routine haematological parameters can predict children at risk of stroke whilst supported with VAD.

Methods. Laboratory parameters measured in 20 children aged 0-8 years sustained a stroke between 2007 and 2013 whilst receiving VAD support were compared with parameters measured at the same duration of VAD support in 20 contemporaneous case-matched controls supported with a VAD who did not sustain a stroke. The Mann-Whitney U-test was used to compare data.

Results. Six children sustained a haemorrhagic stroke, 13 sustained a thromboembolic stroke, and one child sustained a haemorrhagic stroke followed by haemorrhagic stroke at later date. The median duration of VAD support when a haemorrhagic stroke occurred was 27 days (17-79). Thromboembolic stroke occurred significantly earlier at a median of 20 days (70-75).

Laboratory parameter (median)	Stroke Group	Control Group	p (Mann Whitney U-test)
Hb	10.5	10.3	NS
WCC	16.1	13.5	0.04
Platelet count	190	268	0.02
Fibrinogen	5.2	3.6	0.016
Antifactor Xa activity	0.54	0.44	NS
% ADP inhibition of platelet activity on thromboelastography	25	44	NS
% Arachnidonic acid inhibition of platelet activity on thromboelastography	23	20	NS

Conclusions. Markers of inflammation are significantly elevated compared to case matched controls in children sustaining a stroke on VAD. Platelets are significantly reduced in children sustaining a stroke. There is no significant difference in measurements of heparin activity or anti-platelet drug effect between the 2 groups. We conclude that suspicion of infection or inflammation in children supported with a VAD should alert clinicians to an increased likelihood of a stroke occurring.

C241

SURGICAL MANAGEMENT OF SEMILUNAR VALVE REGURGITATION IN CHILDREN ON VAD SUPPORT

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Objective. Development of semilunar valve regurgitation (SVR) during ventricular assist device (VAD) support may occur, determining a circulatory loop, which causes systemic hypo-perfusion and increased filling pressures. The optimal management of SVR is still debated. We report on our experience in surgery for SVR during VAD support in children.

Methods. A retrospective analysis of patients <18 years, who developed SVR before VAD placement or while on VAD support. Clinical, surgical and postoperative data were collected.

Results. Among 18 patients who required VAD support for ESHF, 3 children (mean age 6 ± 4.6 years, M/F=3/0) required surgical management for SVR. Main diagnoses were as follows: Shone complex post Ross operation (1), hypoplastic left heart syndrome (HLHS) post Norwood operation (1), dilated cardiomyopathy (1). Surgical techniques included: aortic valve closure with a PTFE patch in 1; aortic valve replacement with Contegra and PTFE patch pulmonary valve closure in 1; off pump external ligation of neo-aorta below the coronary arteries in HLHS patient. Postoperative course was uneventful. Two patients underwent heart transplantation after 29 and 133 days of support, and are doing well at a median follow-up of 23 months. One patient affected by HLHS died after 284 days of VAD support for multiorgan failure. Semilunar valve competence was permanent and confirmed by serial echocardiography monitoring in all.

Conclusions. Surgical management of SVR during VAD support in children is feasible with low operative risk, and it is mandatory in order to optimize VAD support and improve clinical conditions and organ perfusion while on waiting list.

C242

BIVENTRICULAR REPAIR AFTER NEONATAL HYBRID PALLIATION FOR BORDERLINE HYPOPLASIA OF THE LEFT VENTRICLE

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Objective. To report our preliminary experience with hybrid palliation (HP) of neonates with left ventricular borderline hypoplasia (LVBH).

Methods. From July 2007 to date, 33 newborns underwent HP for hypoplastic left-heart complex. Among them, 5 (15%) underwent subsequent biventricular repair. Primary diagnosis was LVBH with either interrupted (Type-A, n=1, Type-B, n=2) or severely obstructed (n=2) aortic arch. Subaortic obstruction coexisted in 2. Left ventricular end-diastolic volume index (LVEDVI) and diameter of the mitral (MV z-score) and aortic valve (AV z-score) were evaluated by 2D-ECHO before HP and repair by the same investigator. Median interval from HP and follow-up after repair were 189(188-208) and 262(27-431) days respectively.

Results. Median LVEDVI (mL/m^2) varied from 17.4 (16-17.5) to 41.5 (36-41.6) (p=0.001), MV z-score from -2.3 (-2.8-2.1) to -0.32 (-0.89-0.22) (p=0.06), and AV z-score from -2.9 (-2.9-2.2) to -1.4 (-1.4-0.81) (p=0.08). Pre-repair NMR measurement of flow volume in ascending aorta was performed in 2 patients. Repair was accomplished by PA debanding and aortic arch repair in all cases, associated with VSD closure in 4, PA reconstruction in 2, Ross-Konno in 1, and mitral ring resection in 1. All patients survived and presented in good clinical condition at last follow-up.

Conclusions. Surgical treatment of neonates with LVBH by HP may be helpful to postpone the decision about biventricular repair beyond neonatal age. Our preliminary data suggest that HP promotes a favorable evolution of LVEDVI in this setting of patients, which represents the main requirement for biventricular repair and whose inadequacy may preclude its feasibility

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LIVER STIFFNESS EVALUATION AFTER FONTAN OPERATION

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Background. Fontan circulation is characterized by a wide spectrum of biohumoral and haemodynamic derangements. Hepatic damage, consisting in a gradual development of fibrosis, is still poorly understood. To investigate

this problem, a group of our patients with total cavopulmonary connection (TCPC) underwent hepatic transient elastography (FibroScan) to evaluate liver stiffness. We sought to find out whether this tool could be useful in estimating and monitoring hepatic damage after Fontan.

Methods. Forty-two patients, who underwent extracardiac TCPC between January 2000 and February 2014, were evaluated by Fibroscan at a mean age of 12.46 ± 5.39 years (range 4.00-26.13). Mean interval from operation was 7.62 ± 3.84 years (range 0.39-13.80). Mean age at operation was 5.38 ± 2.54 years (range 2.45-13.70) and mean weight 17.70 ± 6.07 kg (range 10.00-35.00). Fenestration was obtained in 37 cases. The last 3 patients underwent also preoperative Fibroscan evaluation and hepatic biopsy was obtained in one.

Results. Postoperative mean liver stiffness was 17.01 ± 6.14 kPa (range 8.00-34.30), with 7 patients in Metavir class F2, 8 in F3 and 27 in F4. The patient who underwent hepatic biopsy (class F4) was confirmed to have a cirrhotic evolution. The 3 patients evaluated before operation were in class F2, suggesting a mildly increased liver stiffness even before Fontan. A good correlation was evidenced between liver stiffness and time from Fontan. Hepatic enzymes (AST, AST/ALT ratio, γGT) and fibrinogen variations in the perioperative period showed a positive correlation with Fibroscan results. No significant correlation was evident with pulmonary pressure, postoperative drainage, presence of fenestration or size of conduit.

Conclusions. Liver stiffness increases with time after Fontan. Perioperative variations in liver enzymes and fibrinogen positively correlate with this evolution. Fibroscan represents a useful tool for both diagnosing and monitoring hepatic fibrosis. However its results must be evaluated with care since liver stiffness may be increased also by congestion, always present in Fontan patients.

C244

SINGLE STAGE SURGICAL TREATMENT OF TRACHEAL STENOSIS AND CONGENITAL HEART DEFECT

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Background. We sought to investigate the impact of concomitant surgical treatment of congenital tracheal stenosis (CTS) and congenital heart disease (CHD).

Methods. From February 2011 to November 2013, 6 patients with CTS associated with CHD, underwent combined surgical treatment of cardiac lesion and slide tracheoplasty at our Institution. Patients' data are reported in the table enclosed. They were followed for a mean interval of 278 days (25th-75th: 201-439) postoperatively.

Results. Median age and weight at surgery were 104 days (25th-75th: 16-179) and 4.4 kg (25th-75th: 4.4), respectively. Chromosomal anomalies were associated in 3 cases (Goldenhar, n=2, Down syndrome, n=1). All patients survived. Four (67%) underwent multiple reoperations for left pulmonary artery reconstruction (n=3), delayed VSD closure (N=1), left diaphragm plication (n=1), chest revision for mediastinitis (n=1), ECMO institution (n=1), bilateral reconstruction of the origin of the mainstem bronchi (n=1). Three (50%) patients required a total of 9 balloon dilatations of the trachea and/or the origin of the right mainstem bronchus. Four (67%) patients were discharged home in good cardiorespiratory conditions, whereas 2 (33%) with persistent respiratory insufficiency underwent tracheostomy and were eventually transferred to step-down units. Serial bronchoscopic assessments showed adequate surgical results in all patients.

Conclusions. CTS associated with CHD represents a rare and potentially fatal clinical condition. Although limited by the small number of patients, our series suggests that single stage correction of tracheal and congenital heart anomalies represents a feasible and safe surgical approach.

C245

USE OF CORMATRIX® PATCH FOR RECONSTRUCTION OF RIGHT OUTFLOW TRACT AND PULMONARY ARTERIES IN PEDIATRIC CARDIOTHORACIC SURGERY

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Background. Patches are actually a needful device in the treatment of congenital heart diseases. They are usually biological or synthetic tissues. However, recently, various types of patches have been introduced, such as Cormatrix®, formed of engineered ECM where all cellular and antigenic components are removed. For these reasons Cormatrix® has a negligible immunoreactivity and it acts as scaffolding that can be repopulated by endogenous cells. The purpose of this study is to evaluate whether this type of patch adapts and transforms itself on the growing anatomic structures to which is applied.

Methods. Between January 2012 and October 2013 a prospective study was carried out on 44 patients of 0 to 12 years who had to undergo a reconstruction of the pulmonary branches and right outflow tract. Patients were randomized in 2 groups (31 vs 33). In one group Cormatrix® patch was used while in the other bovine pericardial patch was applied. In one patient Cormatrix® was used off-label in so much as it was sutured directly on to prosthesis. During the follow-up (to 6 and 12 months) the growth of the patch were evaluated through echography.

Results. The follow-up echocardiogram showed that in the patients treated with Cormatrix®, compared with those treated with bovine pericardium, the patch grew and adapted ($p<0.001$) simultaneously with the patient's growth thus confirming the hypothesis that Cormatrix® can be repopulated by endogenous cells. This also occurred where the patch was applied on prosthesis.

Conclusions. Because of its capacity to stimulate an almost perfect tissue regeneration, Cormatrix® seems to be a very valid device for the treatment of congenital heart diseases. In fact it is not only much safer but it also cuts costs and risks since it eliminates the need to re-operate for the removal of a patch that does not adapt itself to the growing anatomic structures.

C246

SURGERY FOR COMPLICATION OF DEVICE RELEASE AFTER TRANSCATHETER INTERVENTIONAL PROCEDURE

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Background. Interventional procedures for congenital heart disease in pediatric population are improved a lot, and today are to be considered as the first approach for some pathologies. These procedures are generally considered safe even if, as in all invasive treatments, involve significant risks that may occur at all steps. The devices, however, have been associated with a wide array of both early and late complications, which have necessitated surgical intervention. The aim of this study is to review our experience in surgical treatment of complication related to device release after transcatheter interventional procedure.

Methods. We analyzed 3205 interventional procedures performed over a period between January 2000 and December 2013. The procedures include 2205 ASD closures, 218 VSD closures, 355 PDA stents, 199 coarctation or re-coarctation stents, 154 pulmonary arteries stents, 74 pulmonary valve replacements. Several risk factors related to the patient or catheterization were analyzed.

Results. Thirty-eight patients (1.2%) required surgical procedure, 30 immediate intervention and 8 for late complications. The most common complication occurred after ASD closure in 21 patients principally for residual shunt (n=8) or embolization (n=6). Other complications were tricuspid valve regurgitation, complete AV block or residual shunt after closure of VSD, aortic rupture, embolization, aortic or atrial erosion, coronary compression. Late reoperation was necessary in a period between 7 days and 4 years after device implantation, all in ASD closure patients. In 11 patients (0.4%) was performed a vascular surgery procedure for peripheral complications. All patients undergoing rescue surgery are alive and have had no other complications.

Conclusions. Transcatheter interventional procedures are an excellent approach to some congenital diseases, but the risk for surgical complications is not negligible and in our series is about 1%. Our experience suggests that these devices should only be inserted in facilities where cardiac surgical support is immediately available. Lifelong follow-up of patients in whom ASD have been closed with devices is mandatory.