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Serum lactate dehydrogenase as an early marker of posterior reversible encephalopathy syndrome: keep your eyes open on the score of severity brain oedema

We read with interest the commentary of Gao[1] regarding our letter about the possible value of serum lactate dehydrogenase (LDH) as an early marker of posterior encephalopathy syndrome[2]. We agree with the author on the association between serum LDH levels and endothelial injury in posterior reversible encephalopathy syndrome (PRES).

As reported by Gao, serum LDH was found to increase in different series of patients with PRES associated to eclampsia, sepsis, critical illness cancer therapy and other conditions. Previous studies reported the possible correlation between LDH increase and PRES in pre-eclamptic/eclamptic patients[3,4]. Although the pathophysiology is not clear, pre-eclamptic/eclamptic patients may be at risk of PRES.

Our study was the first reporting abnormal values of serum LDH of the third and the second day before the onset of PRES in a cohort of obstetric patients with no history of pregnancy-related disease. This finding may suggest that 1) PRES may also occur in non-eclamptic patients and 2) in these patients, the increase of LDH some days before PRES could be a marker of asymptomatic or subclinical endothelial damage predicting the onset of this syndrome.

In our analysis we did not find a clear association between LDH values and severity of brain oedema[2], despite the finding in Gao et al's study that serum LDH positively correlated with brain oedema score[5]. In our paper we used the score to assess the severity of brain oedema in PRES reported by Liman et al[6]. This score, taking into account the location, extension, diffusivity of lesions, contrast enhancement, presence of haemorrhage and topographic lesion pattern of brain oedema, classified magnetic resonance imaging of PRES in five grades: 1°=limited cortex and white matter oedema; 2°=white matter and cortex oedema with some deep white matter extension; 3°=white matter and cortex oedema with limited ventricle surface extension; 4°=white matter and cortex oedema, diffuse, widely confluent, extensive ventricle contact; grade; 5°=severe white matter and cortex oedema, diffuse confluence, ventricle deformity[6]. In the study of Gao et al, the severity of brain oedema was calculated according to the locations of magnetic resonance imaging abnormality regions[5]. Each side of brain region as frontal lobe, temporal lobe, parietal lobe, occipital lobe, cerebellum, brain stem, basal ganglia, deep white matter and corpus callosum involved by the oedema was scored with 1 point. It is probable that different scores produce different results. In order to standardise future correlations, we need a single and accurate evaluation score of severity of brain oedema in PRES.

In conclusion, LDH is present in different body tissues and its increasing level may be the expression of localised or systemic endothelial damage/dysfunction. The increase of LDH in PRES may suggest that the endothelial damage is mainly in brain tissue.

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Delirium and Takotsubo cardiomyopathy following cardiac surgery

We report a case of Takotsubo cardiomyopathy occurring in a 70-year-old female following elective coronary artery bypass surgery and bioprosthetic aortic valve replacement for severe aortic valve stenosis (aortic valve area of 0.44 cm^2), whose post-operative course was complicated by acute delirium. There was no preoperative cognitive impairment; hypothyroidism was her only medical comorbidity. Preoperative echocardiography demonstrated mild left ventricular (LV) hypertrophy, but normal LV size and systolic function. Cardiac catheterisation revealed 50% stenosis in the mid-left anterior descending artery, 70% stenosis in a large diagonal branch and 90% stenosis in the proximal right coronary artery, normal systolic function (LV ejection fraction 65%; Figure 1A) and a peak-to-peak aortic valve gradient of 40 mmHg. Consent for publication was obtained from the patient.

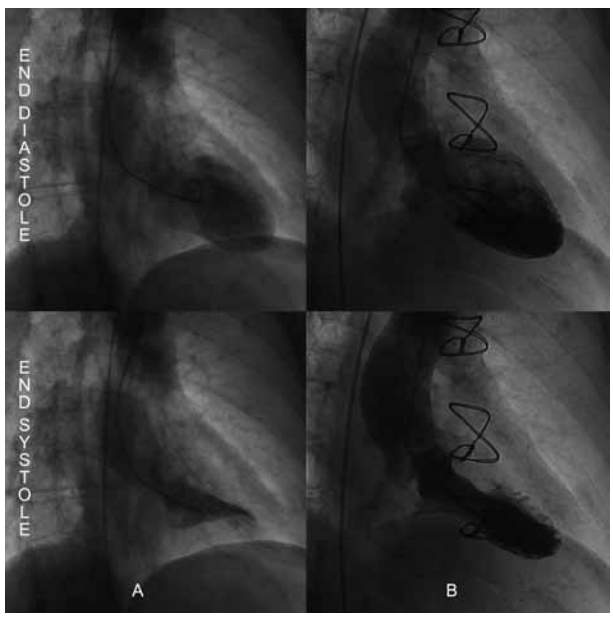

Figure 1: Comparison of end-diastolic and end-systolic images obtained during left ventriculography before (A) and after (B) the onset of Takotsubo cardiomyopathy. Ventriculography after the operation (B) demonstrated apical ballooning and hypokinesis with preserved basal contraction.

The patient underwent 23 mm St Jude Trifecta (St Jude Medical, Inc, St Paul, USA) bioprosthetic aortic valve replacement and triple coronary artery bypass grafting (left internal mammary artery to left anterior descending artery, saphenous vein grafts to first marginal circumflex artery and right posterior descending artery). Cardiopulmonary bypass time was 75 minutes and aortic cross-clamp time 69 minutes. Intraoperative transoesophageal echocardiography revealed good prosthetic aortic valve function and normal LV contraction. Post-operatively, she remained on a propofol infusion for the first six hours, after which she was successfully extubated. She did not require any inotropic or vasopressor support. On postoperative day 2, she became very agitated, with fluctuating levels of alertness and paranoid behaviour. Delirium was diagnosed and haloperidol prescribed for agitation. Investigations including computed tomography brain scan did not reveal an organic cause for her delirium. Her septic screen was negative. On postoperative day 3, her electrocardiogram showed widespread anterolateral ST elevation. An urgent echo-cardiogram again demonstrated normal LV systolic function. There was mild elevation in troponins (peak high sensitivity Troponin T: 283 ng/l, normal <14). However, her delirium persisted over the next five days and after she complained of worsening dyspnoea but no chest pain. A repeat chest X-ray was performed which revealed pulmonary oedema. A further echocardiogram on postoperative day 7 demonstrated akinesis of the apex, distal antero-lateral, septal and inferior walls with hyperdynamic contraction of the basal half of the ventricle. To exclude acute bypass graft occlusion, the patient underwent urgent cardiac catheterisation. This showed that all bypass grafts were patent, but confirmed apical hypokinesis (Figure 1B) consistent with a diagnosis of Takotsubo cardiomyopathy. She was commenced on bisoprolol, irbesartan and frusemide, with gradual improvement of dyspnoea. Repeat echocardiography performed on post-operative day 20 demonstrated complete recovery of LV systolic function.

Takotsubo cardiomyopathy is a syndrome of acute, usually reversible LV systolic dysfunction in the absence of obstructive coronary artery disease. It occurs more commonly in elderly women and is often temporally related to emotional or physical stress. Various aetiological factors including catecho-lamine-induced cardiotoxicity, multi-vessel epicardial coronary artery spasm, coronary microcirculatory abnormalities and neurogenic-mediated myocardial stunning have been implicated in the pathogenesis of this condition[1].