

## Research Article

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# Tailored treatment of intestinal angiodysplasia in elderly

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**Abstract:** Background: Angiodysplasia of the gastrointestinal tract is an uncommon, but not rare, cause of bleeding and severe anemia in elderly. Different treatments exist for this kind of pathology.

**Methods:** The aim of this work was to study 40 patients treated for intestinal angiodysplasia with two different kind of endoscopic treatments: argon plasma coagulation (APC) and bipolar electrocoagulation (BEC).

**Results:** Age of patients was similar in both groups ( $76,2 \pm 10,8$  years vs  $74,8 \pm 8,7$  years,  $P = 0,005$ ). Angiodysplasia treated were located in small bowel, right colon, left colon, transverse colon and cecum. We analysed number of treatment, recurrence, hospital discharge, needs of blood transfusions before and after endoscopic treatment. Number of treatment was the same in both groups ( $1,2 \pm 0,2$  vs  $1,1 \pm 0,1$ ,  $P < 0,001$ ). We had more recurrence in patients treated with BEC ( $4/20$  vs  $2/20$ ,  $P < 0,001$ ). Hospital

discharge was comparable in both groups ( $5,3 \pm 3,1$  days vs  $5,4 \pm 2,8$  years,  $P < 0,001$ )

**Conclusions:** Treatment of angiodysplasia in elderly is not easy. Different kinds of treatment could be adopted. APC and BEC are both safe and effective. The choice of a treatment should consider several factors: age, comorbidity, source of bleeding. In conclusion we think that treatment of bleeding for angiodysplasia in elder population should be a tailored treatment.

**Keywords:** Angiodysplasia, Elderly, Bleeding, Tailored, Argon plasma coagulation

## 1 Introduction

Blood loss from the lower digestive tract is a common problem. Frequently angiodysplasias or arteriovenous malformations are cause of bleeding. Angiodysplasias or arteriovenous malformations are mainly found in the small bowel, especially in the lower ileum [1-4]. Most of Angiodysplasia lesions are restricted to the right colon but lesions spread throughout the upper, lower and middle gastrointestinal tract are present in one-third of cases [5-10]. Angiodysplasia can be asymptomatic and discovered incidentally during colonoscopy. Patients may present with hematochezia, melena, positive occult blood test or iron deficiency anemia. Angiodysplasia may present as an isolated lesion or multiple vascular lesions. The exact cause of vascular ectasia is not known but it is thought to occur due to ageing and degeneration of blood vessels [11-13]. Angiodysplasia is thought to result from chronic, intermittent, low-grade obstruction of submucosal veins. It may also be a complication of decreased mucosal blood flow and local ischemia. Most lesions are found in the cecum and ascending colon possibly due to increased wall tension of the right colon, but angiodysplasia can be found throughout the gastrointestinal tract. Patients with angiodysplasia are usually older than 60 years of age,

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with a more than 200 fold increase in incidence between the third and ninth decades of life. This increased incidence with age supports the theory that acquired angiodysplasias are due to degenerative changes [14-27].

Most colonic angiodysplasia are diagnosed by endoscopy. Colonoscopy has a sensitivity of greater than 80% when the entire colon is examined. Endoscopic therapy for bleeding angiodysplasia is successful, using a variety of treatment modalities. Therapy is generally indicated only when there is evidence of blood loss or active bleeding from a lesion and not for incidentally found, asymptomatic angiodysplasia [18-20].

## 2 Methods

In our Department of General Surgery, University of Naples “Federico II” we treated 40 patients affected by gastrointestinal angiodysplasia from March 2009 to March 2013. All of them were symptomatic, with gastrointestinal bleeding due to angiodysplasia. Out of these 40 patients [mean age 75 year (65-85year)] 17 were male and 23 were female. We performed two kind of endoscopic treatment: Argon Coagulation Therapy (APC) and Bipolar Electrocoagulation (BEC). Argon plasma coagulation (APC) allows an efficient coagulation without any contact with gastrointestinal (GI) tissues. Argon ions bring current to the tissues without any contact; in this way energy reach directly the angiodysplastic lesion. The power of coagulation is not deep (0.5–3mm) so we can reduce perforation risk (<0.5%) [14]. We use those power setup for different tissues:right colon, and small bowel: 0.6 L/min, 40W; left colon: 1 L/min, 60 W [12-16]. An other technique is bipolar electrocoagulation (BEC), in this system we have two electrodes, where on one side the electrode produces the coagulation current on the other side the opposite electrode is a receptor. In this way current does not need to pass through the human body [15-18].To perform coagulation we need to continue the contact between the bleeding vessel and our probe for sufficient time with enough power. The probe have to be in touch at 180° (tangential) with the lesion. 15 and 30 W is the correct power to treat bleeding vessels, power depends by the site. We need also 3–4 applications for 7–10 s. If current get in touch with the GI mucosa, we can modify its power and directly treat GI wall, f.e. for the right colon 5-20 W are necessary. Bipolar electrocoagulation is consider quite safe about tissue penetration risk.

Ethical approval: The research related to human use has been complied with all the relevant national regulations, institutional policies and in accordance the

tenets of the Helsinki Declaration, and has been approved by the authors’ institutional review board or equivalent committee.

Informed consent: Informed consent has been obtained from all individuals included in this study.

## 3 Results and Discussion

We studied a group of elder patients affected by angiodysplasia (age between 65 and 85 year). Exclusion criteria were: participant’s age < 65 year and > 85 year, neoplasms, end stage renal disease, cardiac failure. Patients were divided into two groups. First one was treated with Argon Plasma coagulation (APC), the second was treated with bipolar electrocoagulation (BEC).

Table 1 shows main characteristics of our patients. Age was similar in both groups ( $76,2 \pm 10,8$  vs  $74,8 \pm 8,7$ ,  $P = 0,005$ ). 12 males and 8 females in first group, 11 males and 9 females in second group ( $P = 0,875$ ). Prothrombin time was  $11,4 \pm 1,3$  in the group of patients treated with APC,  $11,2 \pm 1,5$  in BEC group ( $P = 0,555$ ). APTT (full form) was  $30,9 \pm 6,1$  in APC group,  $28,2 \pm 2,6$  in BEC group ( $P = 0,088$ ). Hb (full form) was  $9,5 \pm 2,1$  in the first group of patients,  $9,3 \pm 1,9$  in the second group ( $P = 0,612$ ). Four patients treated with APC and two treated with BEC were affected by hepatic cirrhosis. Diagnosis was recognized with colonoscopy and enteroscopy. Sources of bleeding were different for each group. Patients treated with argon plasma coagulation: 5 right colon (25%), 5 left colon (25%), 2 transverse colon (5%), 4 cecum (20%), 5 small bowel (25%). Patients treated with bipolar electrocoagulation: 4 right colon (20%), 5 left colon (25%), 2 transverse colon (10%), 1 cecum (5%), 8 small bowel (40%).

Table 2 shows results of evaluated parameters. First of all, number of treatments required was clinically similar for both groups. In APC group  $1,2 \pm 0,2$ , in BEC group  $1,1 \pm 0,1$  ( $P < 0,001$ ). Most of patients needed one cycle of therapy to have a good control of bleeding. Patients treated with argon plasma coagulation had 10 % of recurrence (2/20), versus patients treated with bipolar electrocoagulation who had 20 % of recurrence (4/20). So BEC shows a higher value of recurrence ( $P < 0,001$ ). Generally a patient with bleeding for angiodysplasia need a good evaluation pre and post treatment with a complete control of blood chemistry and coagulation. After a complete resolution of all parameters, patients can be discharged. Considering hospital discharge in our study, comparison of two groups of patients shows clinically similar values. Patients treated with APC had a recovery of  $7,3 \pm 3,1$  days. In the other group, patients were discharged after

Table 1:

Patients' characteristics	APC (n = 20)	BEC (n = 20)	P
Age	76,2 ± 10.8 years	74,8 ± 8,7 years	0,005
Gender (Male/Female)	12/8	11/9	0,875
Prothrombin time	11,4 ± 1,3	11,2 ± 1,5	0,555
APTT	30,9 ± 6,1	28,2 ± 2,6	0,088
Hb	9,5 ± 2,1	9,3 ± 1,9	0,612
Cirrhosis	4/20 (20%)	2/20 (10%)	0,442
<b>Source of bleeding n/N (%)</b>			
Small Bowel	5/20 (25%)	8/20 (40%)	
Right colon	5/20 (25%)	4/20 (20%)	
Left colon	5/20 (25%)	5/20 (25%)	
Transverse colon	1/20 (5%)	2/20 (10%)	
Cecum	4/20 (20%)	1/20 (2%)	

APC: Argon plasma coagulation, BEC: bipolar electro coagulation

Table 2:

Study variables	APC (n = 20)	BEC (n = 20)	P
Number of treatment	1,2 ± 0,2	1,1 ± 0,1	< 0,001
Recurrence n (%)	2 (10 %)	4 (20 %)	< 0,001
Hospital discharge (day)	7,3 ± 3,1	6,8 ± 2,8	< 0,001
Blood transfusions before treatment n (%)	5 (25%)	4 (20%)	< 0,001
Blood transfusions after treatment n (%)	2 (10%)	2 (10 %)	< 0,001

APC: Argon plasma coagulation, BEC: bipolar electro coagulation

6,8 ± 2,8 days (P < 0,001). In fact most of patients affected by angiodysplasia need transfusions and a complete evaluation of blood test results is necessary. Finally considering the blood transfusion, pre and post treatment, five patients treated with APC needed blood transfusion before treatment, two of them needed transfusion also after the treatment. In the BEC group, four patients needed a blood transfusion before endoscopic treatment, two of them needed blood transfusion also after the treatment. So we had clinically comparable values also for these elements. The evaluation of the parameters analyzed shows that both treatments are safe and effective. The

patients had a good response to treatment and recovery took place quickly. We believe that the choice of a treatment should be “tailored”. A good evaluation of the patient is always important before treatment. Choice of treatment should be based on patient characteristics. The main factors to consider are definitely the age, comorbidities, the source of bleeding, the amount of bleeding. However these two treatments can be used to solve the bleeding caused by this type of vascular malformation. Elder population shows a good response to the endoscopic treatment.

## 4 Statistical analysis

Standard deviation (SD) and mean are used for continues data Mann–Whitney U test was used to analyzed continuous variables. Chi-square test or Fisher's exact test were used for continuous data, which were reported in totals and percentage. Recurrent bleeding after APC treatment was studied using univariate and multivariate logistic regression. P value less than 0.05 is considered statistically significant. All statistical analyses were performed in SPSS 17.0 (SPSS, Inc., Chicago, IL, USA).

## 5 Conclusions

Treatment of angiodysplasia in elderly is not easy. Different kinds of treatment could be adopted. Argon plasma

coagulation and bipolar electro coagulation are both safe and effective. The choice of a treatment should consider several factors: age, comorbidity, source and amount of bleeding. In conclusion we suggest a tailored treatment of bleeding for angiodysplasia in elder population, according to the main characteristics of patients [28-37].

**Conflict of interest statement:** Authors state no conflict of interest.

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