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Case Report

Complex endovascular treatment of a celiac trunk artery aneurysm with splenic artery rescue ☆,☆☆ Santini et al.: Celiac trunk artery aneurysm treatment - endovascular approach

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ABSTRACT

Visceral arterial aneurysms are uncommon pathologies, with an uncertain ethology and no clear treatment guidelines. As in our case, where we treated a 70 y.o. male patient, who came to us for un unspecific abdominal pain. So, he practiced a CT total body with contrast, presenting a celiac trunk aneurysm with involvement of the hepatic and splenic artery and therefore the team decided for an endovascular treatment, successfully obtained. Our experience is about the description of a case in its most practical and technical aspect, especially in complicated or rare conditions.

Introduction

Visceral artery aneurysm is an uncommon vascular pathology, caused by trauma, inflammatory conditions, iatrogenic conditions, splenomegaly, pregnancy, pancreatitis, hypertension [1]. Celiac trunk aneurysm is the rarest one (4% incidence) [1].

Patients affected by present some unspecific or uncommon symptoms, from abdominal pain to acute rupture and haemorrhagic shock. In the last years, the increasing in using CT

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☆☆ Patient consent: The patient was informed in a clear and comprehensive way of the three types of treatments and other possible surgical and conservative alternatives. In the surgical consent was reported that clinical data can be used for scientific studies but remain anonymous. The manuscript contains no individual patient's information, nor identifiable images.

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Fig. 1 – A The celiac trunk aneurysm (arrow) B-Splenic (arrow) and hepatic (slim arrow) arteries originating from the aneurysm sac.

and MRI individuates VAAs occasionally [1,2]. Nowadays the approach is more aggressive in diagnosis and in treatment, because already the symptomatic patient should be treated [1,2].

The aim of this case report was to show the details of an endovascular procedure in a complex case.

Case presentation

A 70 years old patient, male, smoker with diabetes and hypertension, came at "Ospedale del Mare" Emergency Department for violent abdominal pain, with normal laboratory values, including haemoglobin value, in absence of leucocytosis.

An abdominal CT with contrast was performed and it showed the presence of a celiac trunk aunerysm (diameter about 3cm) at its origin, with the hepatic and splenic arteries originated from the aneurysm sac (Fig. 1).

The team therefore decided for an endovascular treatment, due to the patient's comorbidities and according to the guidelines(3), which provide for treatment in case of asymptomatic aneurysmatic formation (>2cm).

An arterial access to the right inguinal site was arranged, under local anaesthesia (10ml lidocaine). An introducer (Flexor Ansel Guiding Sheath, 7F, 55cm, Cook Medical) was positioned through the right femoral artery. Then, a selective arteriography of the celiac trunk confirmed the presence of celiac trunk aneurysm at its origin with the hepatic and splenic arteries originating from the aneurysm sac (Fig. 2). Through the same arterial access, two guidewires (a Hi Torque Supra Core, 0.035", 260cm, Abbott in splenic artery; a

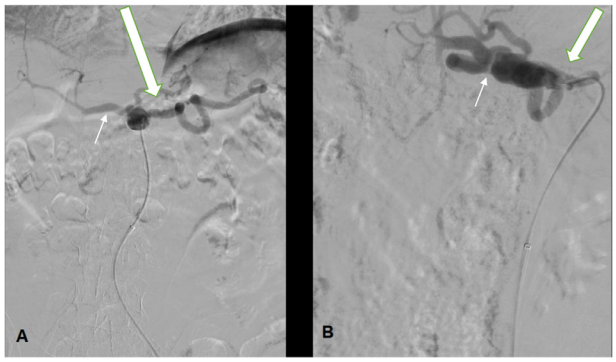

Fig. 2 – A The celiac trunk arteriography shows the anueyrsm and the origin of the hepatic (slim arrow) and splenic arteries from the sac (arrow) on AP projection Figure 2B The celiac trunk arteriography shows the anueyrsm (arrow) and the origin of the hepatic and splenic arteries from the sac (slim arrow) on LL projection.

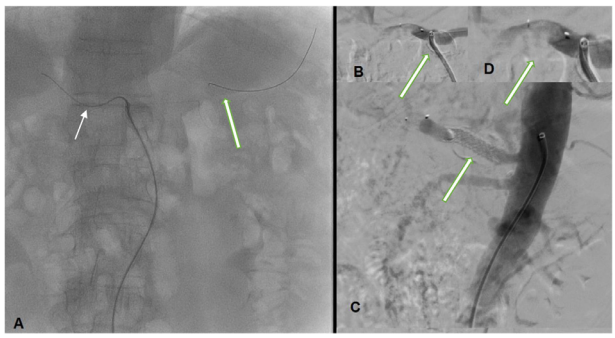

Fig. 3 – A Two guidewires into hepatic (slim arrow) and splenic arteries (arrow). Figure 3B-D Microplug opened into hepatic artery (arrows, B, D). Figure 3C Covered stent opened into splenic artery (arrow, C).

Choice PT Floppy, 0.014", 300cm, Boston Scientific in the hepatic artery) were inserted and brought separately into the hepatic and splenic artery (Fig. 3).

Then, a micro plug (Microvascular Plug, 9mm, Medtronic) was positioned, through a microcatheter (Progreat, 2.7F, Terumo), in the hepatic artery, before the origin of the gastroduodenal artery and a covered stent (Advanta V12, 8 × 38mm, Atrium) was positioned from the proximal part of the celiack trunk before the aneurysm up to the healthy part of the splenic artery (Fig. 3).

The procedural angiographic control showed total exclusion from the circle of the celiac trunk aneurysm and the total stop flow of the proximal hepatic artery that was filled in the distal portion to the plug thanks to the retrograde blood flow of the gastro-duodenal collateral circulation (Fig. 4).

Finally, the system was pulled out and a manual compression was performed in the arterial access area. After the application of a compression bandage, the patient was placed in the hospitalization ward and was discharged the next day.

A first 6 months control CT with contrast (Fig. 5) and another one at 2 years showed the total exclusion of the

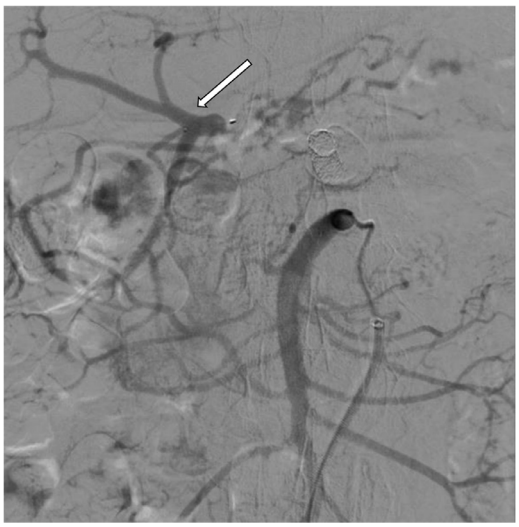

Fig. 4 – Retrograde gastro-duodenal flow irrigates the liver (arrow).

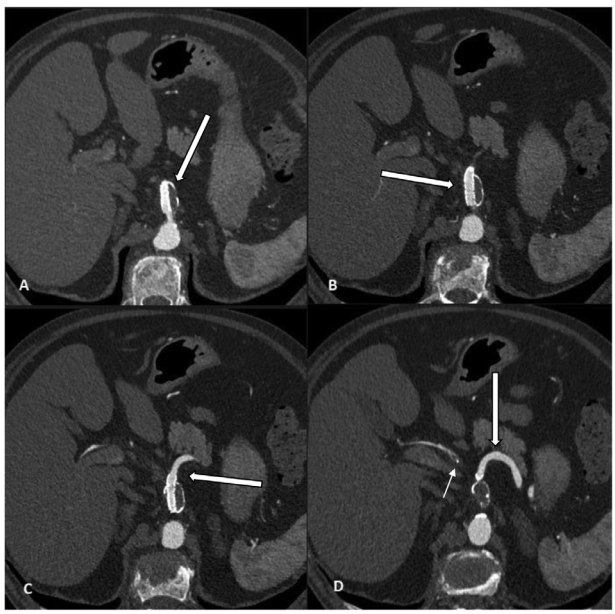

Fig. 5 – CT angio 2 years control shows: A-B the perfect positioning of the stent (arrow); C-D the patency of the splenic artery (arrow) and the presence of the microplug (slim arrow), stable, in the hepatic artery.

aneurysm sac, not expanded, and the retrograde filling of the hepatic artery.

Discussion

Visceral artery aneurysms (VAAs) (0.01-0.2% prevalence) are an often-asymptomatic entity, that can be diagnosed as a casual finding on imaging based on other symptoms and pathologies [4].

Other studies suggests that one-third of patients with a VAA have generalized vascular pathologies [5]. Histopathologic ally, VAAs are divided into two categories: true aneurysms and pseudoaneurysms [5]. True aneurysms, in particular, are strictly connected to atherosclerosis and in these cases, they expand while arterial wall is intact [5]. There's also a pathological division into two groups: rupture or not rupture. In the first case, it has to be treated as an emergency, with a mortality from 25% to 70% [5]. Endovascular therapy (EVT) is a more recent option that brings some benefits: minimally invasiveness, shorter hospital stay. In literature some limitations are described concerning EVT, as the lack of adequate resources in emergency treatment, contrast toxicity, end-organ embolization's risks, prolonged imaging surveillance [5].

Based on our experience and anatomical knowledge, we know that an end-to-end embolization can be carefully avoided and that the presence of anastomic and compensatory circles still allows a minimally invasive approach that does not necessarily lead to the resolution of the pathology on a single track. In fact, the placement of a plug in the common hepatic artery, however, allowed our patient a perfect compensatory hepatic vascularization thanks to the gastro-duodenal circulation.

Furthermore, regarding the complication of following patients over time, in our case a control angio-CT was performed at 3 years and still showed perfect hepatic vascularization and the stop flow in the hepatic artery given by the plug remained motionless where positioned. About the techniques, Venturini et al. [4] describes different modalities in planning, such as putting a covered stent across the focal aneurysmatic dilatation, or coiling in case of two or more efferent vessels to prevene the retrogade revascularization [4]. That is pretty correct and it is the rationale on which our work is based, to sew a whole procedure to the patient's pathology.

The placement of the plug was also carefully planned, calculating the placement of a device 1mm wider than the measured lumen of the artery, to prevent migration and iatrogenic damage.

This is why venturini et al talks about a 100% clinical and technical success for endovascular interventions on VAAs [4].

The literature is also dramatic and clear about the risk of rupture of celiack trunk aneurysms (20%) and about the 50% mortality in case of bleeding [6].

The treatment is indicated in the case of symptomatic aneurysms with a diameter greater than 2 cm [3,5].

The surgical open treatment which, according to Maen et al, remains the gold standard, provides for the revascularization of the tripod in case of election and the total exclusion from the circle with ligature if the operation occurs in case of hemodynamic instability.

Maen et al also speaks of an endovascular approach which is not preferable in case of occlusive damage to the splenic, hepatic and left gastric arteries.

Our case report and the studied used technique is interesting for this very reason: an open surgery approach would have been better in avoiding devascularization of vital organs.

On the other hand, it has been shown that, thanks to the patient's evident survival and excellent health, the endovascular approach is preferable and usable even in the most complex cases.

Conclusions

Any patient who is approached from an endovascular point of view request a tailored treatment as already reported in the literature [7].

Studies concerning the execution and the intervention technique already exist [4], where our study in the singularity of this case report focuses scientific attention on how to re-elaborate and deal with a complex treatment based on a disease with multiple pathological variants, a rarity.

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