Biomedicine & Healthcare Research

Biomedicine & Healthcare Research 2025 July;5:41-45

https://doi.org/10.71599/bhr.v5i1.149

Open Access

Case series

Visceral artery aneurysms encountered in General Surgery Department: A case series

Mseddi Mohamed Ali, Nouri Takwa, Siala Rakia, Yacoubi Chaima, Guizani Rami, Sassi Karim, Ben Slima Mohamed

General surgery "B" Department, La Rabta University Hospital, Tunis, Tunisia

Summary:

Introduction: Visceral artery aneurysm (VAA) represents a complex clinical situation. On one hand, rupture can endanger the patient's life; on the other hand, therapeutic decision-making is often marked by hesitation due to the variety of available treatment options.

Methods: This is a retrospective study of prospectively recruited patients diagnosed with VAA. The aim is to present five cases of visceral aneurysms to familiarize the medical team with these rare entities and to support the implementation of an appropriate, yet non-hasty, therapeutic approach.

Results: All patients were male, and most had a history of cardiovascular disease. Infective endocarditis was the triggering factor for VAA formation in two cases. Abdominal pain was the most commonly reported symptom. Endovascular treatment failed in most of the attempted cases. Salvage surgery was required in two patients, and elective surgery was performed in one case.

Conclusion: Due to the potential complications and the limitations of each therapeutic procedure, it is crucial to assess the patient's overall condition, including vital signs, aneurysm location, underlying cause, arterial distribution, and the availability of both interventional radiology and surgery. This comprehensive evaluation is necessary to guide an adapted and effective therapeutic choice.

Keywords: Hepatic, Splenic, Artery, Aneurysm, Surgery, Endovascular, Embolization

Received: May 13, 2025; Accepted: July 25, 2025

1. Introduction

Visceral artery aneurysm (VAA) is a conflicting situation. On one hand, the breach occurrence may imperil the patient and on the other hand, reticence emanates from the choice of the therapeutic process due to different therapeutic paths. Their diagnosis in a general surgery department is uncommon, as they have a wide range of presenting symptoms. Herein, we publish this paper to unmask this blurring by providing different cases of VAA encountered in our general surgery unit with a special focus on used therapeutic tools along their subsequent hazards and proficiency. Moreover, their detectability has been increasing with the development of imaging modalities [1], thus more cases are popping up in routine practice demanding ad hoc management. Patients should be provided with prompt and proficient treatment. Through our manuscript, we aim to familiarize general surgeons of this disease to adapt their reasoning and treatment.

2. Material and methods

Study participants

This is a mono-centric descriptive retrospective study of prospectively recruited patients with VAA, hospitalized in the General Surgery "B" of Rabta Hospital, Tunis, between July 2022 and September 2024, spanning 27 months. Were included all patients who were diagnosed with a symptomatic VAA or a diagnosed VAA in the setting of a radiological inquiry of a causal affection.

The diagnosis of VAA was established based on radiological description of the matter in question on the abdominal CT scan. Are not included: VAA incidentally found during a routine radiological investigation. We have excluded: Medical records that could not be used due to poorly specified or missing data. Patients who died upon their admission in our department before undergoing any specific treatment.

Collected variables

We compiled demographic, clinical, biological, radiological and operative data on all our patients. The principal outcome measure was post-interventional or post-operative results.

3. Results

During the study period, 5 cases were included. All patients were males. The age distribution of the patients in our study ranged from 32 to 67 years, with a median of 48 years-old. Three patients were with a significant medical history. All most common recorded co-morbidity was of cardiovascular nature: one patient had hypertension treated

Correspondence: Dr. Mseddi Mohamed Ali. General surgery "B" Department, Rabta Hospital, Tunis, Tunisia. mseddibaka@gmail.com

with inhibitors of angiotensin converting enzyme and calcium channel blockers, and the other two were operated on for coarctation of the aorta and aortic heart valve replacement.

Two patients were diagnosed during their hospital stay for an endocarditis: one with periprosthetic superinfection from coagulase-negative Staphylococcus and the other an infective endocarditis on his aortic prosthesis graft, where his blood cultures were positive for Streptococcus agalactiae and Streptococcus B. The patient known to have hypertension sought emergency care for abdominal pain. The other patient, with no prior history, consulted our emergency department on his 4th POD from left nephrectomy by posterior approach for a destroyed left nephrolithiasis. Consulting his anesthesia chart revealed a hypertensive crisis occurring during surgery which was managed intra-operatively with drug adjustment. The last patient was the victim of a domestic accident resulting in blunt abdominal trauma.

VAA location was hepatic in 3 cases and splenic in the remaining 2 patients. For hepatic artery aneurysm: it was intra-hepatic in one case and extra-hepatic in 2 cases. It was revealed through jaundice and fever in one patient (figure 1) while the other two reported acute abdominal pain. For splenic artery aneurysm: it was proximal in one case and intra-splenic in the other. On 2 occasions, collapse was noted but promptly recovered through resuscitative measures. Deglobalization was recorded in 2 cases but well responded to blood transfusion. One patient succumbed 2 days after diagnosis because of septicemia secondary to angiocholitis: he was put under effective antibiotic therapy and percutaneous radiological biliary drainage as a bridge to aneurysm repair.

One patient was operated on after stabilization: he had splenopancreatectomy with en bloc aneurysectomy. The remaining patients had an endovascular repair through packing. This procedure succeeded on the case of intra-hepatic aneurysm (figure 2) and failed on the remaining 2 cases: an extra-hepatic-aneurysm burst and was gushing out in full flow leading to shock and massive deglobulisation in the first case; the intra-splenic aneurysm remained patent after procedure in the second case. Both of these patients underwent open surgery afterwards: left hepatectomy and splenectomy. Median follow-up is 9 months (range: 3-20 months). All 4 patients are doing well, and recurrence was identified on radiological control (Table 1).

4. Discussion

Aneurysms can affect all supporting arteries but with different incidence. The splenic artery is the most common site of visceral artery aneurysms (VAA) (60%) followed by the hepatic artery (20%), gastroduodenal and pancreatico-duodenal arteries (6%), superior mesenteric artery (SMA; 5.5%), and celiac artery (4%) [2]. True aneurysms are caused mainly by atheromatosis. Microemboli inoculation into the vasa vasorum or implantation at the site of an intimal defect caused by a process such as atheromatosis [3], results in parietal ischemia leads to degeneration of the muscular elements of the vessel wall, resulting in ectasia of the artery [4]. False aneurysms, also known as pseudoaneurysms, only by the tunica adventitia. Whereas true aneurysms, which are bounded by all three layers of the arterial wall. Although rare, they can result as a complication from any surgical or radiological intervention or intra-abdominal inflammatory process as pancreatitis [5]. Aneurysms receive the descriptor “mycotic” when they form secondary to an infection [6], most frequently through intravenous drug use, bacteremia at a remote site of infection [3].

Among visceral aneurysms, hepatic artery aneurysms (HAA) are uncommon. They represent the second most common site for aneurysm in the splanchnic circulation following the splenic artery [7]. In 80% of HAA, the location is extrahepatic [8], 60% involve the common hepatic artery, 30% the right hepatic artery and 5% the left hepatic artery [9]. They have the highest (44%) reported rate of rupture [10]. Extrahepatic aneurysms rupture into the peritoneum and intrahepatic aneurysms tend to rupture into the biliary tract [11]. Such cases exhibit ictere by hemoblilia. Blood clots could be identified during endoscopy as shown in an Egyptian series [12]. It was noted that the presence of multiple aneurysms and non-atherosclerotic etiology have been described as risk factors for the rupture of hepatic artery aneurysm [13].

Clinical manifestations tend to be non-specific, depending on the size of the aneurysm [14]. VAAs can be treated either by surgery or endovascular techniques. Given the plethora of therapeutic tools offered, the treatment is based on individual rehabilitation measures and specific treatment according to the complication in question. Due to the potential complications and limitations of each therapeutic procedure, an assessment of the patient's status: vital signs, aneurismal location, inducing cause, arterial distribution and availability of both modalities are required in order to adapt the therapeutic choice. In fact, mortality raises from 1.2% to 15.5% in case of rupture [15], thus demanding prompt and suitable management to better the prognosis. This specific treatment must be articulated to an etiological investigation to avoid the emergence of other aneurysmal formations. The therapeutic requirement is to insure maintenance of perfusion to the distal organ. For this reason, a covered stent or reparative surgery is always preferable to coil embolization when there is no collateral vascularization to the organ involved.

The splanchnic vascular bed, given the numerous redundancy arches, often allows for the liberal exclusion of aneurysms from circulation. This is especially true in aneurysms of the gastroduodenal or pancreaticoduodenal arch, which are supplied by both the celiac axis and the superior mesentery artery - celiac axis or superior mesentery artery connected through the gastroduodenal artery and pancreaticoduodenal arch - splenic artery as the spleen after proximal exclusion remains supplied by blood via the short gastric and gastroepiploic artery [2].

Given the invasiveness-free of interventional treatment, it is the first choice procedure. In fact, endovascular techniques yield promising results. In a bi-centric study comparing open repair to endovascular technique, with two groups of 16 and 15 patients respectively having no significant different demographic or clinical features, there was no significant difference in terms of 30-day post-operative mortality rate and peri-operative complications [15]. The only evolutive difference was recorded in mean length of stay, which was significantly higher after open repair as compared with endovascular repair (17 days, range

Table 1. Particularities of patients with visceral artery aneurysms

Number of case	Age	Gender	Medical history	Chief complaint	Hemodynamic status	Biological disturbance	Aneurysm cause	Aneurysm's size (in mm) and location	Endovascular repair, technique and result	Surgery, procedure and result	Outcome	Follow-up duration
1	35	Male	- Drug user - Coarctation of the aorta repair	Jaundice and fever	Stable	Inflammatory syndrome Cholestasis	Infective endocarditis	52 x 45 Hepatic	None	None	Deceased from septicemia	-
2	60	Male	Left nephrectomy	Abdominal pain	Stable	None	Hypertensive . .	27 Hepatic	Yes (packing) - Failed	Left hepatectomy	Survived	20 months
3	67	Male	- Hypertension - Stroke	Abdominal pain	Collapse	Deglobalization Acute renal injury	Hypertensive crisis	200 Splenic	None	Splenopancreatectomy with en-bloc aneurysectomy	Survived	8 months
4	32	Male	- Nasopharyngeal carcinoma - Aortic valve replacement	Abdominal pain	Collapse	Deglobalization	Infective endocarditis	27 Splenic	Yes (packing) – failed (aneurysm's permeabilization)	Splenectomy	Survived	4 months
5	45	Male	None	Abdominal blunt trauma	Stable	None	Trauma	10 Hepatic	Yes (packing)	None	Survived	3 month

8-56 days vs. 4 days, range:2-6; p=0<0.001) [15]. Nevertheless, it is worth to note that 72.8% of ruptured cases were treated surgically [15], so longer hospital stays are expected. Moreover, in longer follow-up periods, it yields promising results as exhibited by a study where 75% of patients treated with endovascular stent-grafts, had patent stents and complete exclusion and shrinkage of the aneurysms at 24 months follow-up. [16]. When the access is easy, implanting a balloon-expandable covered stent is suitable. Whereas, in case of difficult access because of a narrow neck, packing is preferred. However, two major features should recuse endovascular techniques: mycotic origin and non-suitable arterial anatomy to access the aneurismal site. In mycotic aneurysms, surgical resection is the routine treatment as the coils or stents may serve as a source of nidus for infection [6]. Surgery in this case should ensure that revascularization of the downstream territory with a graft whose anastomosis will be distant from the infected area [4].

Three cases of HAA with different clinical presentations were registered in our department last year. Both patients were admitted for acute onset of troublesome symptoms, but neither raised high suspicion of hepatic artery aneurysm. Another patient was incidentally labeled as a carrier for HAA in CT scan control following abdominal trauma. This highlights the polymorphic clinical features attributed to diverse inherent symptomatology and infrequent incidence. Therapeutic options include open surgery, endovascular stent placement, endovascular embolization or a combination of these [17]. According to the latest systematic meta-analysis published in 2019 by the Society of Vascular Surgery [18], short-term and long-term mortality rates were

low and not significantly different between the two interventions modalities. Pseudoaneurysms tended to have higher mortality and reintervention rate [18].

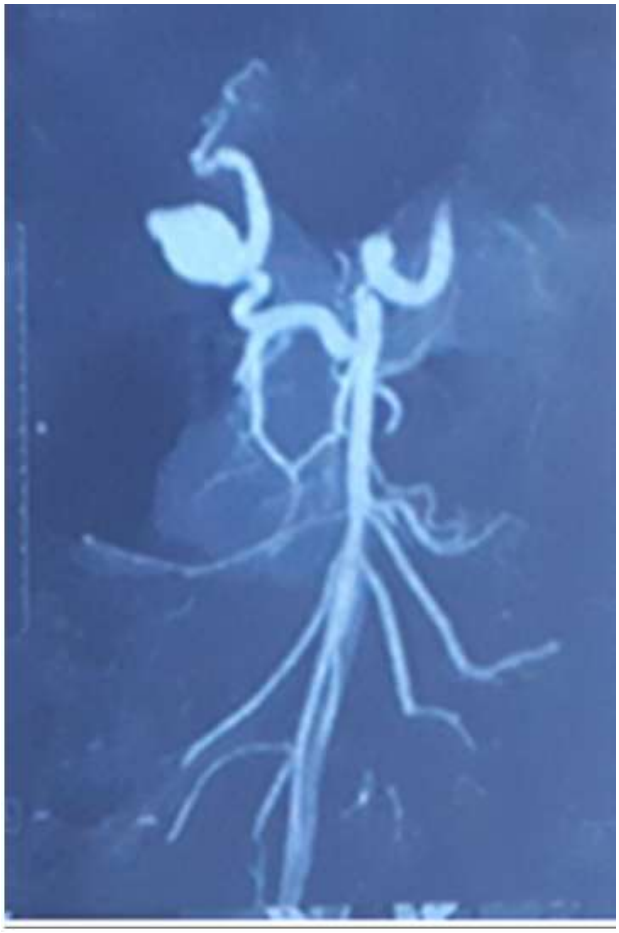

Fig. 1. Hepatic artery aneurysm at hilar level responsible for biliary obstruction.

Fig. 2. Successful intra hepatic artery aneurysm packing.

In a recent Egyptian series, interventional treatment of pseudoaneurysms was attempted in 91.6% of 12 cases, it was successful only in 41.7% of the cases, and surgical intervention was needed in 58.3% [12]. For intrahepatic aneurysms, embolization is the accepted treatment [19], because surgery will consist hepatectomy of involved segments. This is furthered supported by the absence of serious parenchymal ischemia because of the dual blood supply of the liver [2]. But, in case of large aneurysm, hepatectomy is to be considered to avoid significant liver necrosis [20]. More details concerning surgical approach in case of hepatic artery involvement is brought forward by Hulsberg et al. [21]. Ligation is only recommended when the aneurysm is solely located in the common hepatic artery, that is, proximal to the gastroduodenal artery to provide collateral blood supply to the liver from the superior mesenteric artery. If the aneurysm is located distally to the gastroduodenal artery, methods other than ligation must be used to restore arterial flow to the liver. These include endoaneurysmorrhaphy with restoration of the lumen, excision with end-to-end anastomosis or bypass with autologous or prosthetic graft interposition, excision with splenohepatic anastomosis, aortohepatic artery bypass or interposition grafting with gastroduodenal artery reimplantation [21]. Necrosis of the gallbladder is a risk when either the proper hepatic artery or the right hepatic artery is ligated; thus, cholecystectomies could be conducted on the same narcosis.

Splenic artery aneurysm (SAA) share the same flow of logics. Coil embolization (packing) of the aneurysm alone, or with stent assistance, can be used to exclude aneurysms of the main artery or close to the hilar region [2]. If unsuitable for packing, coiling the afferent and efferent segments can be attempted [2]. For intra-splenic aneurysms, coil embolization is indicated [2]. Surgery can be offered in underequipped facilities not carrying vascular access platform, patients not responding to resuscitative measures or inaccessible aneurysms. It consists in either ligation with or without arterial bypass in proximally located aneurysms and splenectomy for hilar or distal ones [2].

The latest Society of Vascular Surgery guidelines, published in 2020 [20], recommend repair of visceral aneurysms exceeding 3cm in diameter in case of SAA or 2cm in case of HAA. Their repair is equally recommended in gestating women, whatever their size, because of the risk of complications that could disrupt the fetal outcome. In an outdated review, splenic aneurysm rupture marks 70 and 90% of maternal and fetal mortality [22]. Pseudoaneurysms should be treated regardless of their size or location or cause, because of their propensity to rupture. This specific treatment should follow elective conditions in non-ruptured cases, but ought to be urgent in case of vascular rupture.

Limitations: It is noteworthy that our study has some limitations, including its small sample size and short follow up period.

5. Conclusion

The purpose of this paper is to introduce two location of visceral artery aneurysm, with different presentation and cause, in order to familiarize the medical team with these rare entities, and to provide support for an appropriate, but not hasty, therapeutic approach. As endovascular therapy is gaining more popularity, it became an alternative to open surgery. However, given the plethora of location, size, characteristics of parent vessel, symptomatology and general well-being of the patient, every patient requires a personalized treatment strategy that prioritizes organ blood flow preservation, supported by appropriate study of vascular anatomy, with a good incorporation of their comorbidities and risks.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Funding

None.

Conflict of interest

The authors declare that there are no conflicts of interest.

Authors' contribution

The authors participated equally.

Availability of data and materials

All data underlying the manuscript are available as part of the article.

References

[1] Piasek E, Sojka M, Kuczyńska M, Światłowski Ł, Drelich-Zbroja A, Furmaga O, et al. Visceral artery aneurysms – classification, diagnosis and treatment. J Ultrason. 2018;18(73):148–51. https://doi.org/10.15557/JoU.2018.0021

[2] Mikolaj Wojtaszek. Managing Visceral Artery Aneurysms. Endovascular Today. 2013. https://evtoday.com/articles/2013-oct/managing-visceral-artery-aneurysms. Accessed 6 August 2024.

[3] Philippe Boisvert. Anévrismes infectés multiples de l'aorte thoraco-abdominale : évolution rapide documentée à la tomodensitométrie. Société des sciences vasculaires du Québec. 2016. https://www.ssvq.org/ressources/anevrismes-infectes-multiples-de-laorte-thoraco-abdominale-evolution-rapide-documentee-a-la-tomodensitometrie/. Accessed 10 September 2022.

[4] Akoudad H, Lajou J, Cherti M, Balafrej K, Benmimoun EG, Arharbi M. Anévrysmes mycotiques périphériques compliquant une endocardite infectieuse : à propos d'un cas. Act. Méd. Int. 1999;4(15):1-2.

[5] Bulut T, Yamaner S, Bugra D, Akyuz A, Acarli K, Poyanli A. False aneurysm of the hepatic artery after laparoscopic cholecystectomy. Acta Chir Belg. 2002;102(6):459–463. https://doi.org/10.4103/0972-9941.26652

[6] Serena TJ, Antypas E, Malay N, Jr EL. Endovascular Intervention of a Mycotic Pseudoaneurysm of Accessory Left Hepatic Artery Arising from the Left Gastric Artery Presenting Secondary to Clostridium difficile Colitis: A Case Report. Cureus. 2020;12(4). https://doi.org/10.7759/cureus.7802

[7] Rosenberg A, Trebska-McGowan K, Reichman T, Sharma A, Cotterell A, Strife B, et al. Management of hepatic artery aneurysm: A case series. Ann Hepatobiliary Pancreat Surg. 2020;24(3):333–8. https://doi.org/10.14701/ahbps.2020.24.3.333

[8] Bernal ADPA, Loures P, Calle JCO, Cunha B, Córdoba JC. Right hepatic artery aneurysm. Rev Col Bras Cir. 2016;43(5):401–3. https://doi.org/10.1590/0100-69912016005006

[9] Huang YK, Hsieh HC, Tsai FC, Chang SH, Lu MS, Ko PJ. Visceral artery aneurysm: risk factor analysis and therapeutic opinion. Eur J Vasc Endovasc Surg. 2007;33(3):293-301. https://doi.org/10.1016/j.ejvs.2006.09.016

[10] Arneson MA, Smith RS. Ruptured hepatic artery aneurysm: case report and review of literature. Ann Vasc Surg. 2005;19(4):540–545. https://doi.org/10.1007/s10016-005-5043-5

[11] Graham I, Kanitra J, Berg R, Haouilou J. Management of a common and proper hepatic artery aneurysm. JVS-CIT. 2021;7(2):283–5. https://doi.org/10.1016/j.jvscit.2021.02.012

[12] Khalil A, Fawzy FS, Zaid MH. Management of iatrogenic hepatic artery pseudoaneurysm. Egypt. J. Surg. 2021;40(3):954. https://doi.org/10.4103/ejs.ejs_144_21

[13] Pasha SF, Gloviczki P, Stanson AW, Kamath PS. Splanchnic artery aneurysms. Mayo Clin Proc. 2007;82(4):472–479. https://doi.org/10.4065/82.4.472

[14] Haghighatkhah H, Sanei Taheri M, Kharazi SM, Zamini M, Rabani Khorasgani S, Jahangiri Zarkani Z. Hepatic Artery Aneurysms as a Rare but Important Cause of Abdominal Pain: a Case Series. Arch Acad Emerg Med. 2019;7(1):e25.

[15] Cochennec F, Riga CV, Allaire E, Cheshire NJW, Hamady M, Jenkins MP, et al. Contemporary management of splanchnic and renal artery aneurysms: results of endovascular compared with open surgery from two European vascular centers. Eur J Vasc Endovasc Surg. 2011;42(3):340–346.

[16] Rossi M, Rebonato A, Greco L, Citone M, David V. Endovascular exclusion of visceral artery aneurysms with stent-grafts: technique and long-term follow-up. Cardiovasc Intervent Radiol. 2008;31(1):36–42. https://doi.org/10.1007/s00270-007-9167-6

[17] Dwivedi AND, Srinivasan A, Jain S. Multiple Mycotic Aneurysms of the Abdominal Aorta Illustrated on MDCT Scanner. J Clin Imaging Sci. 2015;5:49. https://doi.org/10.4103/2156-7514.163993

[18] Barrionuevo P, Malas MB, Nejim B, Haddad A, Morrow A, Ponce O, et al. A systematic review and meta-analysis of the management of visceral artery aneurysms. J Vasc Surg. 2019;70(5):1694–1699. https://doi.org/10.1016/j.jvs.2019.02.024

[19] Dolapci M, Ersoz S, Kama NA. Hepatic artery aneurysm. Ann Vasc Surg. 2003;17(2):214-6. https://doi.org/10.1007/s10016-001-0296-0

[20] Chaer RA, Abularrage CJ, Coleman DM, Eslami MH, Kashyap VS, Rockman C, et al. The Society for Vascular Surgery clinical practice guidelines on the management of visceral aneurysms. J Vasc Surg. 2020;72(1S):3S-39S. https://doi.org/10.1016/j.jvs.2020.01.039

[21] Hulsberg P, De La Garza-Jordan J, Jordan R, Matusz P, Tubbs RS, Loukas M. Hepatic Aneurysm: A Review. The American Surgeon. 2011;77(5):586–91.

[22] Holdsworth RJ, Gunn A. Ruptured splenic artery aneurysm in pregnancy. A review. Br J Obstet Gynaecol. 1992;99(7):595-7. https://doi.org/10.1111/j.1471-0528.1992.tb13828.x

Cite this article as: Mseddi MA, Nouri T, Siala R, Yacoubi C, Guizani R, Sassi K, Ben Slima M. Visceral artery aneurysms encountered in general surgery department: a case series. Biomedicine Healthcare Res. 2025;5:41-5. https://doi.org/10.71599/bhr.v5i1.149