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A case of post-traumatic pseudoaneurysm of the hepatic artery treated with endovascular embolization and review of the literature

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A case of post-traumatic pseudoaneurysm of the hepatic artery treated with endovascular embolization and review of the literature

AIM: *The pseudoaneurysm of the hepatic artery (HAP) is mainly associated with liver trauma. Post-traumatic HAP is usually asymptomatic and found at imaging follow-up. Its detection warrants correction, irrespective of size or symptoms.*
MATERIAL OF STUDY: *We report a case of post-traumatic liver pseudoaneurysm treated with endovascular embolization. An 80-year-old man developed pseudoaneurysm of the S6 branch of the hepatic artery, 14 days after a motorcycle accident.*
RESULTS: *The patient was treated with radiological embolization of the pseudoaneurysm, which completely disappeared. After the intervention, the patient developed acute anemia and leukocytosis. At discharge, the white blood cell count was normal, as well as hemoglobin and bilirubin concentrations.*
DISCUSSION: *Treatment options include endovascular embolization, ultrasound-guided thrombin injection, placement of an angiographic stent, surgical ligation, and surgical resection.*

KEY WORDS: Aneurysm, Pseudoaneurysm, Abdominal trauma, Liver, Post-Traumatic.

Introduction

An aneurysm is an arterial dilation to a size 1.5 times larger than the usual. A visceral artery aneurysm (VAAS) is most commonly observed in the splenic (60%) or the hepatic artery (14-20%) [1]. Pseudoaneurysms are due to hemorrhage from the injured artery into the surrounding tissues, with the leaking blood collecting in a cavity surrounding the artery. This newly formed cavity communicates with the arterial lumen; because of the extant high blood pressure its risk of rupture is high [1].

Pseudoaneurysm of the hepatic artery (HAP) is mainly described after liver trauma [2,3]. It is also reported after hepatobiliary surgery, pancreatitis, cholelithiasis, or invasive procedures such as liver biopsies [3]. Post-traumatic HAPs are usually asymptomatic and accidentally found at imaging follow-up. They have an unpredictable clinical course, including ruptures, which constitute an emergency challenge. As a result, when diagnosed, they should be promptly removed, as in this case in which endovascular embolization was the treatment of choice.

Case Report

An 80-year-old man was admitted to the hospital after falling off his motorcycle. In the emergency room, the patient was alert, oriented and cooperative. The abdomen

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ABBREVIATIONS:

VAAS-visceral artery aneuryms
HAP-hepatic artery pseudoaneurysm

was treatable and painful in right upper quadrant; there was no Blumberg's sign. A CT-scan showed extensive hypodense changes of the right hepatic lobe involving S6-S7, which were ascribed to a traumatized area, with discreet peritoneal blood effusion and splenic laceration. Clinical imaging also showed fracture of the posterior arch of III, V, VI, VII and VIII rib of the right side of the thorax and irregularities in the profile of the right ischiopubic branch.
Twelve days after the trauma a reassessment CT-scan showed size reduction of the extensive hypodense contusive area in the right hepatic lobe and a 14x10 mm pseudoaneurysm of the S6 branch of the right hepatic artery. The next day the lesion was treated with radiological embolization with metal coils. After the procedure, the patient underwent acute anemia, requiring transfusion of 2 units of concentrated RBC. The following days the patient developed leukocytosis, which abated with antibiotic therapy. There were no further episodes of anemia. Laboratory liver parameters did not change. At 18 days' follow-up, the patient was reevaluated radiologically, showing disappearance of the embolized pseudoaneurysm. Upon discharge the patient did not complain of abdominal symptoms, had stable hemoglobin values, with the differential count and and bilirubin concentration in the normal range.

Fig. 1: Post traumatic pseudoaneurysm of the hepatic artery.

Discussion

Post traumatic hepatic pseudoaneuryms occurs in 1% of hepatic trauma cases [4]. Its clinical presentation is variable. Secondary signs such as tiredness, abdominal pain, nausea, and back pain are often overlooked by the patient [2]. Other common symptoms are hematemesis, anemia, hypovolemia and jaundice [4]. Most HAPs are extrahepatic (80%), and they may open in the peritoneum causing acute hypovolemia. Intrahepatic rupture of hepatic aneurysms in the biliary tree can cause Quinke's triad of pain, jaundice and hemobilia [1]. Delayed trauma complications associated with HAP can be hemorrhage, hepatic abscesses, hemobilia and biliary complications such as bilioma and biliary peritonitis [4]. After non-iatrogenic trauma, pseudoaneurysm can develop in association with artero-venous or duodenal fistula, a rare condition with few reported cases in the literature [5-10]. Mine and Hulkower describe the concurrent development of pseudoaneurysm and arterio-venous fistula [7,8]. Patients complain of diarrhea, intestinal ischemia, cirrhosis, cavernous hemangioma, hemobilia and symptoms of portal hypertension.
Pseudoaneurysms and arterio-venous fistula can also occur several years after liver trauma. Ping and Hulkower report cases of this condition with symptoms appearing only 5 and 43 years after trauma [5-8]. Treatment is the same as for simple pseudoaneurysm, and the surgical approach is mainly endovascular. In cases of high flow arterio-portal fistula careful planning of the surgical strategy must be carried out in order to avoid embolism through the fistula [6]. A rarer occurrence is enteric fistulization [10].
Detection of HAP is in most instances an incidental finding after CT-scan or abdominal ultrasound (US) in the follow-up of abdominal trauma. Østerballe published a retrospective study of 259 patients who suffered from liver trauma. Of a total of 188 such patients who underwent CT-scan or US 4-5 days after trauma, 4% of them developed HAP and were treated accordingly. No correlation was found between severity of the liver injury and development of HAP. In conclusion, follow-up CT-scan is recommended as part of a conservative management of blunt and penetrating liver injuries [3]. Since the clinical course of HAP is unpredictable and rupture can occur causing acute hemodynamic failure, detection of hepatic pseudoaneurysm warrants a definitive intervention irrespective of the severity of symptoms [2].

Endovascular Embolization

The first-line treatment is endovascular embolization by coil. Some of the reported complications of endovascular hepatic artery embolization are distal coil migration, hepatic abscess, hepatic ischemia, gallbladder ischemia, and secondary biliary cirrhosis [1-7]. Occasionally, coils do

not allow complete thrombosis of the pseudoaneurysm and vascular occlusion because the lesion is fed by collaterals [4].

Ultrasound-Guided Thrombin Injection

Mohanty and Lloret describe the use of US-guided thrombin injection in the treatment of HAP [2-4]. The procedure is less invasive than endovascular embolization, but is rarely used. Undesirable effects of thrombin injection are rare and include thrombotic and immunologic complications.

Angiographic Stent Placement

There are two types of stents that can be used for treatment. With covered stents the pseudoaneurysm is excluded from blood flow; with uncovered stents the lesion is not excluded from the bloodstream, but the lesion is accessed through the stent mesh and embolized with microcoils. Stent implantation is not always feasible because it may not be easy to perform it distally in a twisted vessel; in addition, stents are not readily available in all sizes [2-4].

Surgical Ligation

Surgical ligation can be done in emergency for vascular control of a ruptured aneurysm if the HAP is located near the common hepatic artery. In fact, retrograde flow from the upper mesenteric artery through the gastroduodenal branch can maintain the hepatic arterial flow [1].

Surgical Resection of Aneurysm

Arterial reconstruction can be performed by point-to-point anastomosis or by using an autologous vein graft or a prosthetic interposition graft. The prosthetic material can be used in the absence of local contamination. The long-term results of arterial reconstruction for VAAS are excellent with 95% patency at 10 years [11].

Conclusions

Post-traumatic liver pseudoaneurysms occur in 1% of liver trauma cases. The clinical course of HAP is unpredictable with the possibility of rupture and acute hemodynamic impairment. Detection of liver pseudoaneurysm warrants prompt intervention, irrespective of the severity of symptoms.

Performing CT-scan 4-5 days after trauma should be part of the conservative management of blunt and penetrating liver lesions. Treatment options for this condition include endovascular embolization, ultrasound-guided thrombin injection, placement of the angiographic stent, surgical ligation and surgical resection.

Riassunto

Il riscontro di pseudoaneurisma dell'arteria epatica, dopo trauma epatico è raro (1% dei casi).
Viene preso in considerazione un caso di trauma addominale in incidente della strada (caduta da motociclo). La comparsa dello pseudoaneurisma si è evidenziata, all'esame TC, dodici giorni dal trauma. Si è scelto il trattamento mediante embolizzazione radiologica. Dopo l'intervento è stata riscontrata anemia e temporanea leucocitosi.
Vengono analizzati i possibili sintomi e discusse le varie tecniche interventistiche e chirurgiche, nonché la revisione della letteratura sull'argomento.

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