Trauma Case Reports 7 (2017) 3–6

Contents lists available at ScienceDirect

Trauma Case Reports

journal homepage: www.elsevier.com/locate/tcr

Case Report

# Open liver trauma causing hepatico caval fistula successfully treated by embolization

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ARTICLE INFO

*Article history:*
Accepted 2 January 2017
Available online 18 January 2017

*Keywords:*
Fistula
Trauma
Arteriovenous
Embolization

ABSTRACT

Introduction: Traumatic arteriovenous fistula results from a breach of vascular integrity between a vein and an adjacent artery. Hepato caval fistula is a rare entity. Open surgical approaches have increasingly given way to radiological embolization techniques in the treatment of these arteriovenous fistulae, especially in intrahepatic locations.

Case report: We report the case of a patient diagnosed with a fistula, from the right branch of the liver artery to the right hepatic vein, developed following an open liver trauma. Successful embolization through the transarterial route was achieved with simple outcomes.

Conclusion: The interventional radiology for endovascular management has revolutionized the treatment of hepatic liver traumas. The conservative treatment is henceforth the common approach even if hepatic artery or hepatic veins are involved in case of arteriovenous fistula.



## Introduction

Hepatic arteriovenous fistulae (AVF) are described as an abnormal communication between the hepatic artery and portal or hepatic vein. Congenital hepatic AVF are rare. Acquired ones are more common. They can occur secondary to iatrogenic causes, like percutaneous invasive vascular interventions such as cardiac catheterization, central venous catheterization or even percutaneous biopsies [1,2]. AVF occurs also following mechanical insult like blunt or penetrating trauma. Hepato-caval arteriovenous fistula is rarely observed (few cases are reported in literature). We herein report a case of hepato-caval fistula following a stab wound of the liver. We discuss the diagnostic approach and the therapeutic modalities taken at this situation.

## Observation

A 54 years old patient, with no significant pathological history, was admitted to the digestive and general surgery department for right thoraco-abdominal stab wound. At physical examination, there was a 1 cm linear sub-xiphoid wound, with clear shores, bleeding, with a subcutaneous hematoma. Blood pressure was 130/80 mm Hg, the heart rate measured to be 82 bpm and blood

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http://dx.doi.org/10.1016/j.tcr.2017.01.002

**Fig. 1.** Abdominal CT scan showing hepatic laceration (arrow) of segments IV, V and VIII without extravasation of contrast medium.

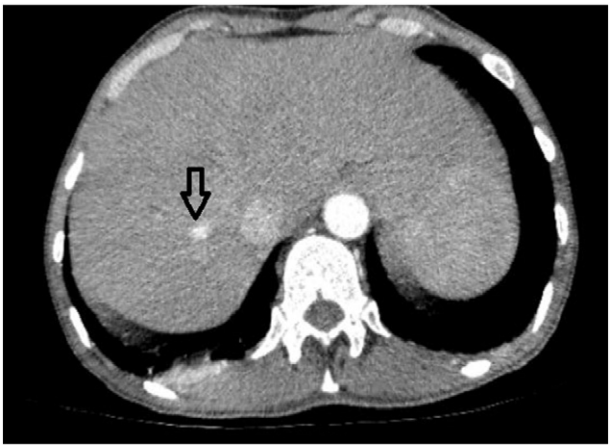

**Fig. 2.** Hepatic CT angiography showing opacification of the right hepatic vein (arrow) and the retrocaval vena cava in the early arterial phase.


**Fig. 3.** Vascular reconstruction from the CT angio-scan demonstrating a communication between the right branch of the hepatic artery (arrow) and the right hepatic vein (star).

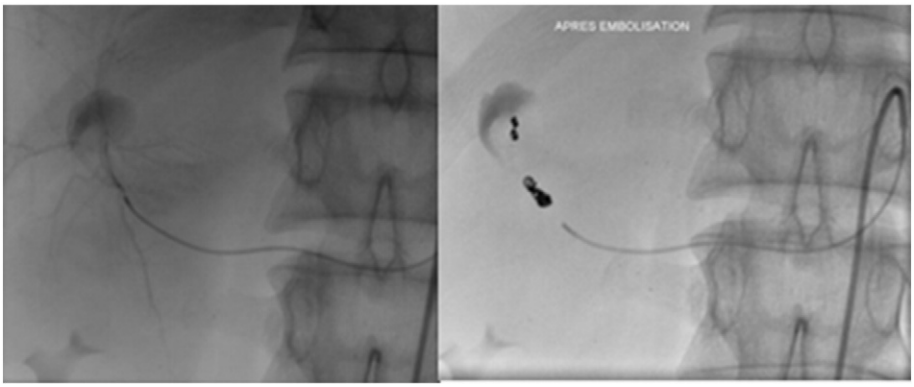


**Fig. 4.** Arteriography showing the arteriovenous fistula before and after embolization.

oxygen saturation was of 98%. The abdomen was checked to be soft with a sensitivity of the right hypochondrium. Blood count showed a haemoglobin at 12.3 g/dL. A chest X-ray showed no rind or pleural effusion. Then an abdominal CT scan was performed, which demonstrated a deep hepatic laceration of segments IV, V and VIII of the liver without extravasation of the contrast medium (Fig. 1). There were no other associated lesions.

Owing to the hemodynamic stability and the absence of peritoneal signs, a non-operative treatment was advised. Clinical status of the patient remained stable. Haemoglobin levels remained correct.

On day 12 post traumatic, the patient complained of pain of the right hypochondrium with fever at 38.5 °C. There was hyperleukocytosis at 23,000 cell/mm$^3$. Hepatic CT angiography showed a pseudo aneurysm of the right hepatic artery with an opacification of the right hepatic vein in the early arterial phase (Fig. 2).

Vascular reconstruction from the CT angio-scan showed a communication between the right branch of the hepatic artery and the right hepatic vein (Fig. 3).

The treatment consisted of a selective radiological embolization of the branch of the right hepatic artery, site of the fistula. The arteriography showed a complete disappearance of the extravasation of contrast media after embolization and coils in place (Fig. 4).

A checkup performed with an angioscanner at day 3 post-embolization, showed the absence of opacification of the right hepatic vein during the arterial phase. The patient had no complains with a decline of 3 months.

## Discussion

An arteriovenous fistula (AVF) is an abnormal communication between an artery and an adjacent vein. This communication can be congenital but it is frequently acquired from an iatrogenic or traumatic aetiology.

Intrahepatic arteriovenous fistulae are usually due to secondary rupture of an aneurysm of the hepatic artery into a vein. This usually happens in the portal vein or its branches. The hepatocaval post traumatic fistula has rarely been described in the literature. The symptoms of these fistulae depend on their site and size. The more central and wider the fistula is, the more symptomatic it could be [1]. These symptoms vary from the simple abdominal pain to the array of congestive heart failure at its severe degree. Indeed, a hepatocaval fistula with a high flow generates a volume overload, of the right heart. Inevitably, this leads to a right heart failure then an overall heart failure [3]. Treatment is warranted as an emergency management or in the development of portal hypertension or heart failure, in chronic cases.

Doppler ultrasound imaging, CT angioscan and magnetic resonance angiography are appropriate for the diagnostics of an arteriovenous fistula. However an arteriography remains mandatory to show its exact anatomical configuration [4,5].

In such cases, three treatment options are possible: monitoring, surgery and radiological embolization [6]. Monitoring is recommended for small central asymptomatic fistulae. Endovascular management is an alternative choice of treatment [4]. Surgery is required when the interventional radiology fails or in case of further associated complications, including hemorrhagic events.

## Conclusion

The interventional radiology for endovascular management has revolutionized the treatment of hepatic liver traumas. The conservative treatment is henceforth the common approach even if hepatic artery or hepatic veins are involved in case of arteriovenous fistula.

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