

## Hepatic Artery Pseudo Aneurysm as Complication of Cholecystectomy: A Case Report

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### Abstract

### Case Report

This manuscript discusses a rare complication of cholecystectomy, hepatic artery pseudoaneurysm (HAPA), which occurs as a result of thermal injury or direct trauma to the arterial wall. The case report of a 72-year-old woman who presented with melena and abdominal pain after a laparoscopic cholecystectomy is described. The patient was diagnosed with a false intrahepatic aneurysm via abdominal ultrasound and confirmed by CT angiography. The signs and symptoms, diagnostic techniques, and management options of HAPA are also discussed. The case was treated by trans femoral coil embolization artery embolization with superselection of the right hepatic artery by microcatheter and complete occlusion. The manuscript highlights the importance of identifying HAPA as a potential complication of cholecystectomy, and the efficacy of endovascular treatment for HAPA.

**Keywords:** hepatic artery pseudo aneurysm, cholecystectomy, CT scan, angiography.

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## INTRODUCTION

Blood vessel complications occur 0.8% of the time following cholecystectomy [1]. They may be the result of either by thermal injury (electrocautery) or by direct trauma [2]. The most lethal is considered to be hepatic artery pseudoaneurysm (HAPA). It is reported in the literature as an unusual complication that is usually not documented at the time of surgery and presents later [3]. HAPA occurs after injury to the arterial wall and hemorrhage into the surrounding tissue, resulting in a haematoma [4]. A quarter of cases have vascular complications associated with biliary injuries [5]. The classic presentation includes bleeding in the upper gastrointestinal tract, haemobilia and abdominal pain [3]. This complication required surgical liver resection with high morbidity until the advent of radiological embolization [6].

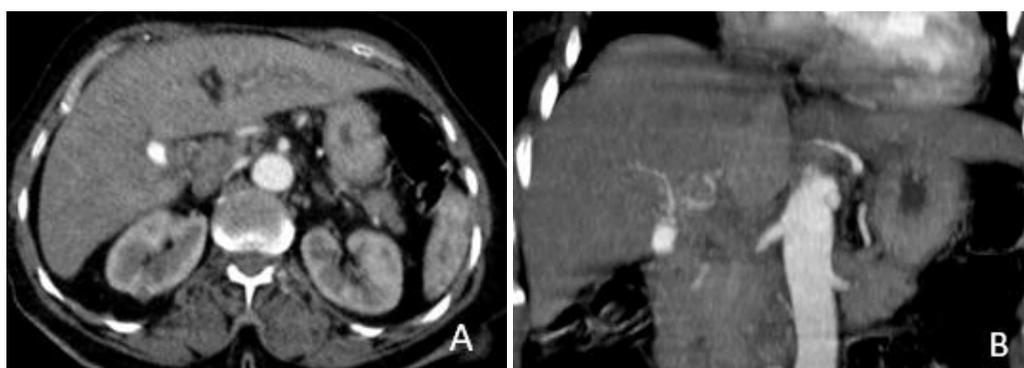
We report the case of a patient with a symptomatic false intrahepatic aneurysm, diagnosed after a cholecystectomy.

## CASE REPORT

A 72-year-old woman complaining of few attacks of melena and abdominal pain was referred to our practice. She has had prior laparoscopic cholecystectomy. The clinical examination revealed a hemodynamically stable patient, who was afebrile with tenderness of the right hypochondriac region without a detectable mass an initial blood test was carried out, including a complete blood count (CBC), an infectious disease test and a complete liver test, which were found to be normal. An abdominal ultrasound was performed to search for the source of the bleeding. It showed a sacular image touching the hepatic vessels, well circumscribed with anechoic content and mixed vascularization on color Doppler showing the Yin-Yang sign, suggesting a false aneurysm (Figure 1). Abdominal CT angiography was performed to support the diagnosis. Early arterial phase interpretation revealed a well-defined contrast filled space in the gallbladder fossa (Fig 2A) and Coronal 2D MIP image showing contrast filled area apparently connected to one of the right hepatic artery branches.



**Figure 1: Diagram: the yin-yang sign (A), An abdominal ultrasound showed a saccular image touching the hepatic vessels, well circumscribed with anechoic content (B) and mixed vascularization on color Doppler (Yin-Yang sign), indicates bidirectional flow due to the swirling of blood within the true or false aneurysm (C)**



**Figure 2: Abdominal CT angiography: (A) Axial image in early arterial phase showing a well-defined rounded enhancing area (is seen at the gall bladder fossa. (B) Coronal 2D MIP image of early arterial phase showing contrast filled area apparently connected to one of the right hepatic artery branches**

## DISCUSSION

A false aneurysm or pseudo aneurysm is a mass of blood that forms after a vascular injury and is retained by the tissue surrounding the affected vessel. It is distinguished from a true aneurysm, which is confined by the vessel wall or one of its layers, and includes dissecting and sub adventitial aneurysms.

Laparoscopic cholecystectomy has been shown to be safer with fewer complications and shorter recovery time than open surgery. Injury to the bile ducts and vessels has been reported [2]. Vascular complications include occlusion, transections, lacerations and false aneurysm [7].

A case of right HAPA after laparoscopic cholecystectomy is presented in this report. It is rare, and has been reported in 0.6% of cases [4]. Pseudoaneurysms occur in descending order in the right hepatic artery, common hepatic artery and cystic artery [8].

The signs and symptoms are variable. Abdominal discomfort, anaemia, jaundice, bleeding and acute abdomen have been reported [9]. Hemobilia may appear in 90% of cases as upper gastrointestinal bleeding and melena, 70% as abdominal pain and 60% as jaundice [9].

The CT scan can also be used to identify a recent rupture in the presence of high density of the surrounding tissue, to try to identify the artery responsible and to analyse the coelio-mesenteric tree [10]. Davies and al. when they discovered high dense area adjacent to the metallic clips in CT images, chose to perform trans femoral angiographic study confirming the diagnosis and allowing embolization in the same setting [12]. Despite its lower sensitivity, Doppler ultrasound can be used to identify the presence of flow within the false aneurysm in some cases [11]. Magnetic resonance angiography allows to perform a non-invasive angiography in high resolution and to complete the vascular assessment with a visceral and biliopancreatic study [11].

The potential evolution of pseudo aneurysms towards rupture requires adapted and rapid management. Surgery has been replaced by interventional radiology in this indication. If selective endovascular catheterisation is possible, embolization is performed with coils of the feeding artery on both sides of the pseudo aneurysm [12].

The current case was treated by trans femoral coil embolization artery embolization with superselection of the right hepatic artery by microcatheter and complete occlusion.

If endovascular treatment fails, a direct transhepatic approach to the pseudo aneurysm under echographic or fluoroscopic control allows its embolization with thrombin or coils [13]. This direct transhepatic approach has only been reported about ten times in the literature [6]. The use of cyanoacrylate [13]. Complications related to the endovascular use of this embolic agent are limited here by the distal and intrahepatic nature of the false aneurysm [13].

The recanalisation rate of radiologically treated splanchnic aneurysms varies in the literature from 1 to 15% [2, 3]. This has not been observed in the first transhepatic embolization of a false aneurysm using vascular adhesive [8]. In our case, the 1-month follow-up was objective: complete filling of the false liver aneurysm by the embolization material.



**Figure 3: Selective angiography of the hepatic artery (A and B): Confirmation of pseudo aneurysm supplied by the segmental artery of the IV (A) a complete embolization with coils of the pseudo aneurysm. Axial abdominal CT scan for monitoring at 1 month after trans hepatic embolization (C): Complete filling of the false hepatic aneurysm by the embolization material**

## CONCLUSION

Intrahepatic pseudo aneurysm is a rarely occurring but possible and emergency complication following laparoscopic cholecystectomy. Radiologist and surgeon should be aware of its signs symptoms. Minimally invasive approach under radiological guidance are the mainstay of treatment today, considering that trans-arterial embolization is the best line of treatment.

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