Case Report

Right hepatic artery pseudoaneurysm as complication of laparoscopic cholecystectomy

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ABSTRACT

Laparoscopic cholecystectomy complications include rare and fatal complication named hepatic artery pseudoaneurysm (HAPA). It is always iatrogenic. Mortality rates of about 50% of patients have been reported if rupture occurs. This report presents a case of a 42-year-old woman with history of laparoscopic cholecystectomy 6 months before. She has had few attacks of hematemesis; the last was one week prior to imaging. Multislice CT angiography (MSCTA) for the celiac trunk and CT portography (MSCTP) for portal venous system was requested aiming to locate the site of the bleeding.

1. Introduction

Vascular complications are reported in 0.8% of cases after laparoscopic cholecystectomy [1]. They can be caused by either thermal injury (electrocautery) or direct trauma [2]. Among these, hepatic artery pseudoaneurysm (HAPA) is considered a lethal one. It has been reported as uncommon complication in the literature that is usually not documented at the time of surgery and present later [3]. HAPA occurs after injury of the arterial wall and bleeding in surrounding tissues forming hematoma [4]. One fourth of cases suffering from bile duct injuries will have associated vascular complications [5]. The classical presentations include upper gastrointestinal bleeding, abdominal pain and hemobilia [3].

2. Case

A 42-year-old woman complaining of few attacks of hematemesis was referred to our practice. The last attack was one week before the performance of MSCTA and MSCTP examinations. She has had prior laparoscopic cholecystectomy 6 months before. The examinations were targeting the exact site of bleeding.

The examinations were performed using CT scanner Aquilion One 320 channels (Toshiba Medical System, New York, USA), with tube potential set at 120 kV, current at 330 mA, collimation at 1 mm and table movement at 1 mm/s. A 18-gauge cannula was placed at a superficial vein at the dorsum of the hand or ante cubital fossa, with the upper limbs placed over the head. Total amount of 100 ml of non ionic contrast material (iopromide, 300 mg iodine per ml, Ultravist 300; Schering AG, Berlin, Germany) was injected with an automatic injector at a flow rate of 2.5 ml/s. An automatically initiated (>100 HU) Smartprep trigger was used to begin scanning from the level of aortic arch down to the pelvis. The acquisition of an early arterial phase and second portal phase was performed.

An attached workstation and software were utilized to reconstruct early arterial phase and portal phase axial source images into 2D multiplanar coronal and sagittal maximum intensity projections (MIP) and 3D volume rendering (VR) images to obtain MSCTA and MSCTP images respectively.

During interpretation of the early arterial phase, a well defined contrast filled space was detected at the gall bladder fossa representing the operative bed (Fig. 1A and B). It was located just cranial to the metallic cholecystectomy clips in coronal 2D MIP reconstructed images (Fig. 1C). The portal venous system was patent with no current evidence of thrombosis on injuries (Fig. 1D). The reconstructed 3D VR images of early arterial phase revealed a bilobed pseudoaneurysm related to segmental branch of the right hepatic artery (Fig. 2A and B). The proximal smaller part measured about 3.7 mm in diameter while the distal larger part measured about 14.6 mm in diameter.

3. Discussion

Laparoscopic cholecystectomy is nowadays considered the preferred choice for gall bladder removal rather than open surgical
procedures and has been found to be safer with fewer complications and shorter recovery time. Biliary and vascular injuries have been reported [2]. Vascular complications include lacerations, transections, occlusions and pseudoaneurysms [6].

This report reveals a case of right HAPA post laparoscopic cholecystectomy. It is rare and has been recorded in 0.6% of cases [4]. Pseudoaneurysms occur at the right hepatic artery, common hepatic artery and cystic artery in descending order according to frequency [7].

The close proximity of metallic surgical clips in current case has been explained before. The close contact of clips to hepatic artery segmental branches may play a role in mechanism of injury by erosion as stated by Milburn et al. [4]. Srinivasaiah and coauthors [8] said that pseudoaneurysms are close to the clips in most of the time. They added a state about their sizes that may reach 7 cm in diameter much larger than current case which has bilobed configuration and consists of two components measuring 0.37 and 1.46 cm in diameters.

The current case started to complain 5 and half months after the procedure and was diagnosed two weeks later. This is considered a relative long time as Hewes and colleagues [3] stated that most of patients present within one month. Parthenis et al. [9] said that time of presentation varies from few days to months while the longest period reached 13 months and was recorded by Milburn et al. [2].

The signs and symptoms are variable. Abdominal discomfort, jaundice, anemia, hemorrhage and acute abdomen have been reported [10]. Hemobilia may appear in 90% of cases as upper gastrointestinal bleeding and melena, 70% as abdominal pain and 60% as jaundice [11]. Hematemesis attacks of presented case were also reported by Khan et al. [12] preceded by melena and rectal bleeding. Vomiting, bleeding per rectum and shortness of breath have been described by Davies et al. [13] presenting a similar case of right HAPA.

The final diagnosis was reached in this case using MSCTA examination. The axial CT images were helpful but not conclusive. Thus, angiographic studies are mandatory for correct diagnosis. The same situation was faced by Davies and colleagues [13] when they discovered hyperdense area adjacent to the metallic clips in CT images and chose to perform trans femoral angiographic study confirming the diagnosis and allowing embolization in the same setting.

The preferred line of treatment of HAPA is usually embolization, however, sometimes ligation or excision by open surgical intervention may be needed [13]. The current case was treated by trans femoral coil embolization the next day after the diagnosis after super selection of right hepatic artery via micro catheter and complete closure was achieved. The idea of pre operative study of hepatic artery anatomical variations has been evolved by Davies et al. [13] to prevent vascular injuries.

4. Conclusion

HAPA is considered a rare but possible complication after laparoscopic cholecystectomy. Everybody should be aware of its signs and symptoms including surgeons and radiologists. The doubt about its presence should be raised if the aforementioned presentations take place particularly various forms of gastrointestinal bleeding. It is ranked as an emergency situation and rapid
management has to be planned for, taking into consideration that trans arterial embolization is the best line of treatment.

References


Fig. 2. (A) 3D VR image for the abdominal aorta, celiac trunk and hepatic artery and (B) magnified image for the right hepatic artery and pseudoaneurysm. The bilobed pseudoaneurysm (dashed circle) is clearly identified regarding its size, direction and relation to the right hepatic artery. It is formed of smaller proximal part measuring about 3.7 mm in diameter and larger distal part measuring about 14.6 mm in diameter. This image can be used as road map for catheterization if endovascular treatment is justified.