


Distal right hepatic artery pseudoaneurysm in a post-cholecystectomy patient presenting with severe gastrointestinal hemorrhage: a rare case report.

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ABSTRACT

Background: Hepatic artery pseudoaneurysm (HAP) is an unusually rare vascular complication following laparoscopic procedures with a few yet gradually increasing incidences.

Case Presentation: We report a case of a 63-year-old male with distal right HAP-mediated massive gastrointestinal bleeding after a successful laparoscopic cholecystectomy. He was treated successfully with selective endovascular coil embolization and percutaneous thrombin administration.

Conclusion: The risk of rupture and bleeding from HAP can be a potentially life-threatening scenario and needs prompt diagnosis with emergent intervention. The documentation of this case may be useful for practicing surgeons to be cautious about the possibility of pseudoaneurysmal changes during the post-operative period.

Keywords: Case report, HAP, pseudoaneurysm, laparoscopic cholecystectomy, DSA, angiography, embolization.

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Background

Hepatic artery pseudoaneurysm (HAP) is a rare yet serious complication following acute and chronic surgical injury to the hepatic arteries [1]. It is nevertheless noteworthy that with the increasing propensity of hepatobiliary interventions in recent years, iatrogenic traumatic complications have increased up to 50% of all cases of haemobilia [2]. Especially the catastrophic vascular injuries with post-operative arterio-biliary fistula and pseudoaneurysms in this setting are being widely reported. So far 0.06%-0.6% cases of pseudoaneurysm following a laparoscopic procedure have been reported involving the hepatic and cystic arteries [3] and 50% of hepatic artery aneurysms are pseudoaneurysms [4]. On a note, the extrahepatic pseudoaneurysmal changes are significantly more common than the intrahepatic HAPs, which account for only about 20% of all HAPs; mostly as a complication of different percutaneous procedures including transhepatic cholangiography, percutaneous liver biopsy, or transhepatic drainage catheter placement [1,5,6]. Here we report a 63-year-old male with severe gastrointestinal bleeding due to underlying haemobilia in a case of post-laparoscopic cholecystectomy mediated intrahepatic HAP of

the distal segmental right hepatic artery (RHA); making it an extremely rare scenario in specialized literature. Haemobilia following laparoscopic cholecystectomy is associated with unpredictable outcomes, often necessitating emergency intervention with an average incidence within the first 4 weeks with 80% of right-HAP-related changes, following the surgical intervention [7]. So, such events need to be elaborated in clinical literature to augment the awareness of practicing surgeons.

Case Presentation

A 63-year-old non-diabetic and non-hypertensive male presented to our emergency with chief complaints of recurrent black stool for the past 1.5 months and hematemesis for the last 1 month. He underwent laparoscopic cholecystectomy 2.5 months back with successful post-operative recovery till day 38 when he first noticed an episode of blackish stool, that continued episodically, thereafter with gradually increasing frequency, followed by events of vomiting with bouts of blood. Gradually over the following days, episodes of blood vomiting progressed into recurrent massive hematemesis. During this

period, he was admitted to nearby local hospitals multiple times with an aggravated picture of severe anemia due to excessive blood loss and received 18 times of packed-RBC (PRBC) transfusion. On general and systemic examination, no significant findings were noted except visible pallor. He was admitted to the intensive-care unit for rigorous work-up with initial conservative management. Preliminary biochemical assessments showed normal aminotransferases, elevated alkaline-phosphatase of 474 (IU/l), INR-1.0, PT-13, and normal serum amylase and lipase with total normal bilirubin. Initial hemoglobin was 10.7 gm/dl despite having multiple transfusions. Upper gastrointestinal (GI) endoscopy was done which revealed no significant changes except the appearance of blood patches in Duodenal segment-1 and 2 (D-1 and D-2).

Subsequently, an elective contrast-enhanced computed tomography (CECT) (*W/A*) with computed tomography (CT)-angiography was planned. CECT showed a few sub-centimetric simple hepatic cysts on both lobes with the localized pocket of peripherally enhancing collection of a few air-foci within, measuring approximately $3.0 \times 1.4 \times 1.5$ cm; anterior to the left lobe of the liver. Minimal fluid is seen in the peri-hepatic region. A large space-occupying lesion measuring approximately $10.8 \times 6.9 \times 7.1$ cm showed internal areas of hemorrhagic attenuation around gall-bladder (GB) fossa (GB is not visualized except clips in the region) abutting adjacent hepatic segments of III and IV along with compressive changes toward adjacent parts of the antero-pyloric region of stomach and D-1. Posteriorly it was found to be compressing common hepatic and right portal veins. Interestingly, CT-angiography revealed an eccentric, enhancing, and oval-shaped structure measuring approximately $2.2 \times 2.0 \times 1.5$ cm with evident arterial enhancement in relation to the posterior aspect of branches of RHA, suggestive of RHA-pseudoaneurysmal changes (Figure 1a,b). On the arterial phase, the lesion was seen

being supplied from subsegmental distal branches of RHA via a narrow neck approximately 3.7 cm distal to the origin of RHA. The proximal part of RHA just before the origin of this lesion showed narrowing most likely due to spasmodic changes. The left hepatic artery (LHA) was mildly hypertrophic with normal common bile duct.

Digital subtraction angiography (DSA) with elective endovascular coil embolization of proximal-RHA was planned accordingly, based on our initial assessment of abundant open collaterals between segmental branches of RHA and LHA, as well as a better measure to prevent further bleeding and chances of rupture (Video 1). Subsequently, upon proximal-RHA colling, patency of the collaterals was carefully monitored and was found optimal along with slow filling of pseudoaneurysm via distal communications. Thereafter, ultrasound-guided (USG) percutaneous delivery of reconstituted inj. Thrombin-1ml (500 IU) was done in order to prevent further hepatic-artery embolization-mediated hepatic infarction (Figure 2a,b) [8]. The entire procedure was done under local anesthesia with satisfactory post-procedural recovery.

Further follow-up after the procedure was uneventful with gradual overall improvement. During this period, he was conservatively managed with 2 units of PRBC, Inj. Ondansetron-8 mg (I/V BD), inj. Ranitidine (I/V TDS), and maintenance fluid of 60 ml/hour (for 4 hours), and was subsequently discharged after 2 days with a scheduled follow-up.

Discussion

HAP is most commonly associated with unexpected damage of the hepatic arterial wall during any open or laparoscopic hepato-pancreatico-biliary (HPB) interventions and mostly develops later in the timeline based on the extent of inciting injury. This results in the maintenance of higher intravascular pressure, forcing blood to percolate

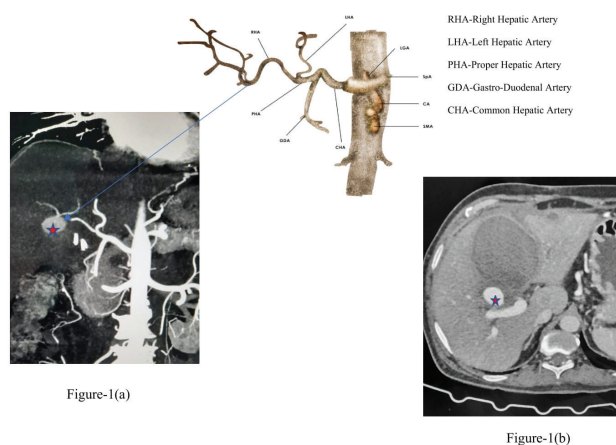


Figure 1. CT-angiography reveals: (a) Distal segmental RHA pseudoaneurysm of $2.2 \times 2.0 \times 1.5$ cm with feeder branches from sub-segmental RHA via a narrow neck 3.7 cm distal to the origin of RHA in coronal plane and (b) in axial plane with its prominent intra-hepatic inclusion.

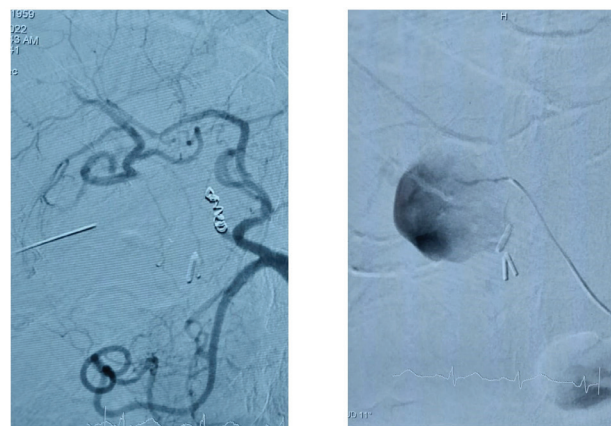


Figure 2. (a) DSA-guided proximal RHA-Coil embolization followed by (b) USG percutaneous thrombin delivery, visualized on DSA.

through the intima of the injured artery into the tissues, forming a perfused sac that connects with the arterial lumen. In most cases, this sac is enclosed by the media or adventitia or by the surrounding soft tissue layer [9].

Rupture of HAP is associated with high mortality of up to 50% and mandates an early diagnosis and thorough intervention [10]. Several works of literature have shown a paradoxical higher association of post-operative HAPs in laparoscopic procedures than open surgeries [11,12]. The association of such incidence is significantly rare in laparoscopic cholecystectomy. Evidentially the delayed presentations of HAPs that take place between weeks to several months following the procedure with a most common presentation of mild to severe gastro-intestinal bleeding secondary to haemobilia; may lead to misdiagnosis or delayed intervention [7]. With an increasing number of similar incidences following post-laparoscopic HPB interventions, prospective vigilance is required on the part of surgeons and interventional radiologists alike.

Clinical investigation of HAPs is mostly done non-invasively with CECT, doppler-US, and selective arteriography but selective catheter angiography remains the gold standard modality in accurate and earliest detection. Current developments in high-resolution vascular imaging, 3D angiography, and advanced US with turbulent arterial waveform, could be more helpful in the coming times [3].

Conclusion

This clinical case displays a rare yet potentially life-threatening complication of a common surgical procedure. Hence, a high index of suspicion is increasingly becoming essential to rule out any possible development of pseudoaneurysm and related changes in the case of haemobilia after cholecystectomy. As evident through our case, DSA is definitively superior to CT-angiography in delineating hidden crossflow or any vascular-anatomical aberrances from any additional vascular feeder to HAP. Besides DSA can accurately identify collateral feeder vessels which may be important in clinical decision-making toward selective arterial embolization to avoid any visceral tissue ischemia. As in our case, the possibility of any subsequent hepatic ischemia following the procedure was effectively ruled out. On this note, it is simultaneously important to do routine selective angiography to rule out any unusual remnants of communicating feeder vessels in subsequent follow-ups.

What is new?

Haemobilia following laparoscopic cholecystectomy is associated with unpredictable outcomes, often necessitating emergency intervention with an average incidence of the first 4 weeks and 80% of right hepatic artery pseudoaneurysm involvement, following surgical intervention. So, such events need to elaborate in clinical literature to augment the awareness of practicing surgeons.

List of Abbreviations

GI	gastrointestinal
CT	computed tomography

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

None.

Consent for publication

Written informed consent was obtained from the patient.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

Author details

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Summary of the case

1	Patient (gender, age)	Male, 63
2	Final diagnosis	Post-operative distal right hepatic artery pseudo-aneurysm
3	Symptoms	Massive GI bleeding with severe anemia
4	Medications	Conservative management
5	Clinical procedure	Endovascular coiling embolization with percutaneous thrombin administration
6	Specialty	Interventional radiology

Supplementary Material

Video 1. DSA with proximal-RHA coil embolization. <https://www.youtube.com/shorts/hM9hS4DLWzE>