The ‘nick’ or ‘clip’? A giant hepatic artery pseudoaneurysm complicating laparoscopic cholecystectomy

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Abstract
Right hepatic artery pseudoaneurysm (HAPA) is a rare but potentially lethal complication following laparoscopic cholecystectomy. Its incidence is as low as 0.6%–0.8% and usually presents within the first month following the surgery due to iatrogenic injury to the concerned artery. A high index of suspicion is essential since it may often be missed leading to a catastrophic outcome. Often a contrast-enhanced computer-aided tomography of the abdomen done as evaluation of postcholecystectomy state suggests a pseudoaneurysm. We report a single case of a 27-year-old female who presented to us and deteriorated rapidly due to a ruptured right HAPA, with an acute abdomen and melena, who was surgically managed by exploration and excision of the pseudoaneurymsmal sac due to unavailability of transarterial embolization. During surgery, the cystic artery metal clip was seen eroding in hepatic artery producing pseudoaneurysm.

Keywords: Cholecystectomy, embolization, hemobilia, hepatic artery, laparoscopy, melena, pseudoaneurysm

INTRODUCTION
Laparoscopic cholecystectomy may be a gold standard surgery for treating gallbladder ailments with an excellent outcome, but it does come with its share of iatrogenic complications. Although vasculobiliary injuries are mostly associated with this procedure, exclusive vascular injuries are rare (0.6%–0.8%).[1] Some of them may lead to potentially fatal complications such as a hepatic artery pseudoaneurysm (HAPA), with a mortality rates as high as 50%, if they rupture. Evidences in favour of HAPA are presently limited to surgeon’s experiences in the form of case reports. This case report describes this unique complication of pseudoaneurysm in relation to a metal clip over cystic artery stump.

CASE REPORT
An unmarried 26-year-old thin built (57 kg; body mass index 20.2) female, with no known comorbidities, presented to the emergency department 4 weeks after undergoing a laparoscopic cholecystectomy, with a lump in the right upper quadrant of her abdomen and two episodes of malaena. Clinical Examination revealed that she was pale, anicteric, with a pulse rate of 120/min, blood pressure of 90/60 mm of Hg, respiratory rate of 25/min, and a tender lump in the right upper quadrant, raised a probable suspicion of an infected bilioma in a postcholecystectomy setting. There were no symptoms suggestive of hepatic failure. However, despite aggressive resuscitation in line...
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with sepsis management, the patient developed progressive pallor, hypotension and further episodes of melena over a span of 8 hours. A high index of suspicion for an iatrogenic vasculobiliary pathology was borne in mind of the treating surgical team, and an emergency ultrasound showed free fluid in lower abdomen with an encysted collection around liver with a bidirectional flow pattern on Doppler signal in centre of encysted collection. The rare ultrasound detection and observer variability led to an emergency computed tomography (CT) abdomen with vascular reconstruction.

Laboratory results showed a haemoglobin of 5.6 g/dl, slightly elevated hepatic enzymes with a normal coagulation profile. She was resuscitated with IV fluids and packed red blood cells were transfused. A contrast-enhanced computer-aided tomography, demonstrated perihilar collection, with contrast spillage in the gallbladder fossa [Figure 1a] which confirmed the presence of a HAPA, involving the right hepatic artery. The reconstructed image is shown in Figure 1b.

Despite best efforts of resuscitation in the intensive care unit, the patient gradually deteriorated, and an urgent unavailability of angio-embolisation warranted an urgent exploratory laparotomy. The abdomen was accessed with a right subcostal incision. The subphrenic and supracolic compartments containing altered clotted blood were evacuated. The right hepatic artery was isolated, controlled proximally, and the ruptured pseudoaneurysmal sac was opened with minimal back bleeding and excised [Figure 2a]. The pseudoaneurysm sac was identified in relation to cystic artery stump with a metal clip eroding in the right hepatic artery. The rent in the wall of the right hepatic artery was repaired after refashioning of the edges [Figure 2b]. No other associated visceral injuries were present. The arterial anatomy showed the most common prevalent pattern with a single right hepatic artery arising from trunk of common hepatic 5 cm after gastroduodenal artery branch. The pathology of the site did not allow to comment of ‘Moynihan hump/Caterpillar hump’ of short tortuous cystic artery/right hepatic artery. No active bile leak from cystic duct stump (ligated again) or liver bed was identified.

Peritoneal lavage was given, and a wide bore drain was kept in the Morrison’s pouch. Haemostasis was achieved, and the wound was closed in two layers.

The patient received 3 units of packed red blood cells postoperatively, and the post-operative course was uneventful except occurrence of superficial surgical site infection which needed wound dressings. She was discharged on day 12 following her surgery.

On follow-up as outpatient at 6 months, she did not reveal signs of delayed biliary stricture or liver dysfunction. Ultrasound and Doppler assessment at hepatic hilum revealed a bidirectional flow. We plan to follow-up the patient for at least 2 years to detect any signs of delayed stricture.

DISCUSSION

HAPA is generally attributed to direct, thermal or indirect injury, to the artery of occurrence. We speculate that the mechanism of injury in our case was possibly due to loose cystic artery clip with a slow, sustained blood leakage, leading to pseudoaneurysm. Erosion of metal clip though reported less commonly in bile duct or duodenum is extremely rare occurrence in hepatic artery. The presence of an intact clip in the area of hepatic artery defect probably points at this possibility, though rare. In literature review, most of the lesions are found in close proximity to the metallic clips and are produced due to the erosion from the clips.[2,3] The right hepatic artery is the most commonly affected artery followed by the common hepatic artery and the cystic artery.[2,4] Patients generally present with haemobilia (90%) that may be manifested as gastrointestinal haemorrhage or melena followed by pain (70%) and jaundice (60%).

![Figure 1: (a) Contrast enhanced computer-aided tomography scan of the abdomen showing intraperitoneal collection and an enhancing pseudoaneurysm in the right hepatic artery. (b) Three-dimensional arterial reconstruction image of the computed tomography angiogram demonstrating an aneurysm in the right hepatic artery](image1)

![Figure 2: (a) Intraoperative image of the pseudoaneurysm that was leaking blood (Yellow arrow), in the subhepatic space. (b) Postoperative image of the pseudoaneurysm, after resection. The black arrow demonstrates the metallic LiGACLI® clip and the blue arrow represents the wall of the pseudoaneurysm](image2)
Our patient presented with a similar clinical episode, comprising of abdominal pain and anemia. An upper gastrointestinal endoscopy may aid in eliminating other causes of haemorrhage. A CT scan is a key element in the diagnostic evaluation, which involves the use of an angiographic reconstruction. A hyperdense areas are visible adjacent to the metallic clips from the preceding surgery.

These patients may be managed with transarterial embolisation and coiling; however, in an event of failure of these methods, it is best to explore the patient and excise the aneurysm and repair the artery as in our case.[9] A prompt management is the key to success since these patients will often present with a ruptured pseudoaneurysm that may be potentially fatal.

**CONCLUSION**

Being a rare clinical entity, HAPA has a predilection to be missed. A high index of suspicion is essential, and prompt management is the key to managing such patients because they can suddenly deteriorate due to exsanguination.

**Acknowledgements**

The authors would like to acknowledge the Department (s) of Radiodiagnosis and General Surgery for their aid in managing this patient and providing the valuable images for this case report.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initial will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**

1. Connor S, Garden OJ. Bile duct injury in the era of laparoscopic cholecystectomy. Br J Surg 2006;93:158‑68.
2. Kassem TW. Right hepatic artery pseudoaneurysm as complication of laparoscopic cholecystectomy. Egypt J Radiol Nucl Med 2017;48:931‑3.
3. Sansonna F, Boati S, Sguinzi R, Migliorisi C, Pugliese F, Pugliese R. Severe hemobilia from hepatic artery pseudoaneurysm. Case Rep Gastrointest Med 2011;2011:925142.
4. Milburn JA, Hussey JK, Bachoo P, Gunn IG. Right hepatic artery pseudoaneurysm thirteen months following laparoscopic cholecystectomy Eur J Vasc Endovasc Surg 13;2007:1‑3.
5. Davies O, Batt J, Bethune R, Courtney E. Hepatic artery pseudoaneurysm post laparoscopic cholecystectomy JSM Clin Case Rep 2014;2:1050.