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Post-cholecystectomy vascular and biliary injury resulting in hepatic artery pseudoaneurysm presenting with hemobilia and bile leak- a rare complication and surgical management

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Abstract
Iatrogenic injuries to common bile duct (CBD) and hepatic artery system may occur separately or simultaneously. Although rare, vascular injuries may lead to pseudoaneurysm formation. These are serious complications and are difficult to detect.
Review of the literature reveals fifty-four more cases of cholecystectomy related pseudoaneurysms. The site of injury was the right hepatic artery (RHA) in 61% of the cases. And two-thirds of these patients presented with hemobilia. In management of such cases, angiographic embolization is the first line of treatment, while surgery is reserved for more complex injuries and cases with life-threatening rupture of the aneurysm. Out of those presenting with hemobilia, 82% were treated with embolization and surgical management was required in the remaining 18%. Knowledge of the condition should result in early diagnosis and thus limit the resultant morbidity. We present a case of Post-cholecystectomy hemobilia and bile leak resulting from pseudoaneurysm following hepatic artery and bile duct injury, requiring surgical correction.

Keywords: Cholecystectomy, bile duct injury, hepatic artery pseudoaneurysm, Hepp- Couinaid procedure

Introduction
Laparoscopic cholecystectomy is a very safe procedure. Although, occasionally it may lead to complications, causing morbidity or mortality. We present a case of Post-cholecystectomy bile duct and hepatic artery injury, leading to biloma and pseudoaneurysm. Patient presented with hemobilia. Considering the complexity of injury, surgical treatment with the Hepp-Coiunaud procedure and pseudoaneurysmal excision was done.

Case history: A 35-year-old male was admitted at another institute for a biliary fistula on the fifth day after difficult laparoscopic cholecystectomy. Endoscopic retrograde cholangio pancreaticography (ERCP) revealed CBD cut-off. The patient was treated with controlled external biliary drainage and discharged after 15 days. Five days later, the patient presented with bleeding in the drain. Patient required 2 units of PCV and was referred to our hospital for further management.

Patient presented with complaints of pain in right upper abdomen, fever and 100 cc bile mixed blood in abdominal drain. He was haemodynamically stable. A triphasic CT scan (Figure 1) revealed 2.2×2.0 cm RHA pseudoaneurysm with subhepatic collection. Laboratory investigations showed Hb-9.7 mg %, TLC- 11900 with predominant neutrophilia, abnormal liver function tests(LFT) [ALT-325 u/L, AST-206 u/L, Bilirubin (T) – 2.8 mg %, Direct Bilirubin – 1.6mg%, Alkaline phosphatase – 767 IU/L], coagulation profile was normal.

Patient was started on antibiotics as per culture and sensitivity. Drain output remained around 10-15 cc/day. He was operated 2 days later. Embolization was not done in view of complex vascular and biliary injury. Intraoperative findings were - a) RHA pseudoaneurysm 2.2×2.0 cm with 8 mm defect in RHA b) Supracolic infected biloma with blood clots within and wall formed by stomach, duodenum, and transverse colon. c) Walled off pelvic abscess d) CBD and part of Common hepatic duct (CHD) was sloughed off with 2 clips at either end. e) Less than 2 cm stump of CHD present below confluence with thickened fibrotic walls. (FIGURE. 2)

Pseudoaneurysm repair and Roux-en-Y Hepaticojejunostomy was done. Defect in RHA wall repaired with 5-0 prolene and pseudoaneurysm was excised. Hepp - couinaud procedure was performed. Stent placed in Right and left hepatic ducts and brought out through end of the roux-en-y jejunal limb and through the epigastrium. Pelvic and subhepatic drains were placed. Postoperative period was uneventful. LFTs returned to normal on postoperative day 5. The patient was discharged on postoperative day 14. A tube cholangiogram done on postoperative day 22 showed no bile leak. Drains were removed. Patient remained well thereafter.

Discussion
CBD injury is a serious complication of cholecystectomy that may result in biliary leak or stenosis. Incidence is 0.2–0.3% after open procedure and 0.5–0.8% after laparoscopy [1]. Vascular injury is another surgical complication of cholecystectomy, the most commonly the disruption of the RHA [2].

Unlike biliary injuries, vascular injuries do not usually lead to significant complications and therefore remain unnoticed in most patients [3]. Its incidence after open cholecystectomy has been estimated to be 7% in an autopsy series [2]. This incidence increases with a simultaneous bile duct injury, ranging between 12% and 39% [4]. As angiographic studies are not routinely performed, the exact figure is unknown.

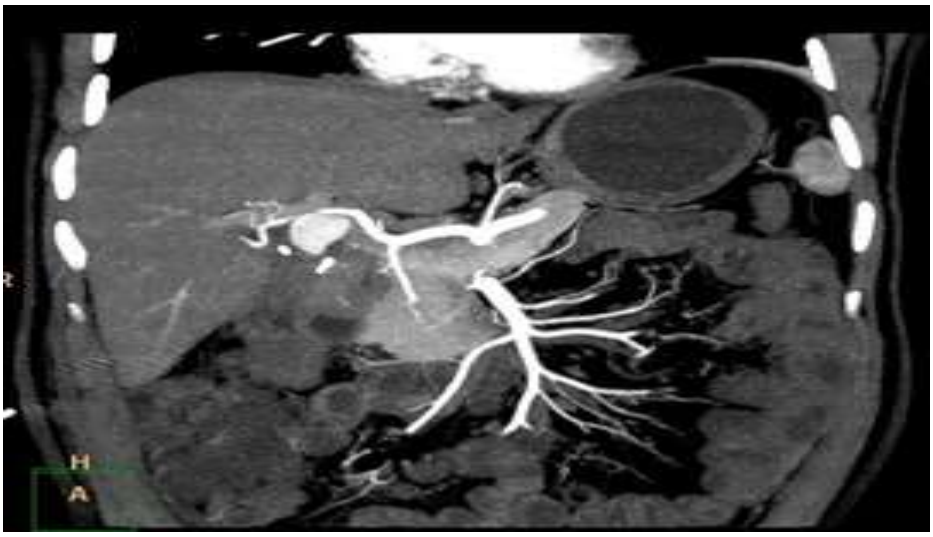

Fig 1: Triphasic CECT: Right hepatic artery pseudoaneurysm

Patients with hepatic artery pseudoaneurysm present with abdominal pain or discomfort, GI bleeding and alterations in the LFTs [5, 6]. The classical Quinke's triad described in 1871- right upper quadrant pain, jaundice and hemobilia present only in 20-30%. Ultrasound may reveal a hypoechoic, pulsatile mass within the liver, with bidirectional flow on Doppler. Although contrast-enhanced CT will not demonstrate the erosive vascular changes as seen on arteriogram, it may demonstrate hemorrhage or pseudoaneurysm formation. The most reliable diagnostic test is selective celiac and SMA angiography.

The exact mechanisms responsible for postcholecystectomy hepatic artery pseudoaneurysm are not well understood. Contributing factors include vascular erosion secondary to clip encroachment, direct lesion of the vascular wall during surgery and electric current diffusion through clips placed in close proximity to the vascular pedicle [6].

Treatment of a specific vascular aneurysm depends on its location, vascular anatomy, aetiology and coexisting conditions. Embolization is a treatment of choice for intrahepatic aneurysms [6]. Whereas its role in treatment of extrahepatic lesions is less well described. Endovascular stenting or embolization can be used for isolated extrahepatic hepatic artery aneurysm, depending on the site and morphology. Surgery remains appropriate for complex injuries.

Fig 2: Intraoperative findings: Yellow loop – right hepatic artery and common hepatic duct in prolene thread.

Bile duct injuries are classified according to Strasberg classification. Bile duct injury may be identified intraoperatively and managed accordingly. Postoperatively it may present early or late, in the form of biliary peritonitis or as a stricture. Hepp-couinaid procedure is performed in injury at or above the level of hepatic duct confluence [6].

Conclusion

In conclusion, although the incidence of hepatic artery injuries in laparoscopic cholecystectomy is not as high as common bile duct injuries, pseudoaneurysms of the hepatic vascular system should be addressed as a rare complication. Untreated pseudoaneurysms frequently enlarge and subsequently rupture. Radiological embolization is the treatment of choice in most centres while surgery remains appropriate for complex injuries and complicated cases. The discovery of a disruption of the RHA should not affect management of the biliary stricture when a Hepp–Couinaud repair is performed.

Conflict of Interest

The authors certify that they have no involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this paper.

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