CASE REPORT

# Post Laparoscopic Cholecystectomy Hepatic Artery Pseudo-Aneurysm

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**Abstract**
**Hepatic Artery Pseudo-aneurysm is a rare and potentially life-threatening complication of Laparoscopic Cholecystectomy. Symptoms include right upper quadrant pain, hemobilia, gastrointestinal bleeding, intermittent jaundice, or bleeding from surgical drains. They can occur in the early or late postoperative course and often pose a considerable diagnostic and therapeutic challenge. We report a case of Hepatic Artery Pseudoaneurysm successfully treated by open surgical exploration and transfixing of right hepatic artery at its feeding point.**

**Keywords: laparoscopic cholecystectomy; bile leaks; infection; hepatic artery pseudo-aneurysm**

## Introduction

Hepatic artery pseudoaneurysm (HAP) is a serious complication of acute or chronic surgical injury to the hepatic artery.[1] It is also seen following blunt and penetrating abdominal injury as well as in patients with chronic pancreatitis, laparoscopic cholecystectomy (LC) and after orthotopic liver transplantation.[2]

The majority of the cholecystectomies are now being performed laparoscopically and advantages include earlier patient mobilization and hospital discharge. Despite its many advantages when compared to open procedure, there is an increase in the quoted incidence of 0.3%-1.0% of biliary and vascular injuries.[3,4] HAP is a rare and potentially life-threatening complication of Laparoscopic Cholecystectomy.[5] Vascular injuries during laparoscopic cholecystectomy can occur in an analogous fashion to biliary injuries with potential laceration, transaction and occlusion of blood vessels. Symptoms include right upper quadrant pain, hemobilia, gastrointestinal bleeding, intermittent jaundice, or bleeding from surgical drains.[6,7] They can occur in the early or late postoperative course and often pose a considerable diagnostic and therapeutic challenge.[8,9]

Transcatheter embolization has been considered the treatment of choice but we report a case of HAP successfully treated by open surgical exploration and transfixing of right hepatic artery at its feeding point.

## Case Report

One month after laparoscopic cholecystectomy with some bile spillage and uneventful recovery, a 35 years-old female patient presented in Emergency department with complains of nausea, vomiting, upper abdominal pain and yellow discoloration of the body. Her condition started to deteriorate after about 10 days of discharge. At that moment, she was febrile with temperature of 102F, blood pressure 130/60mmHg, pulse 120 beats/min and respiratory rate 36 breaths/min. Her General Physical Examination revealed dehydration, anaemia and jaundice. Abdominal examination showed tenderness at upper abdomen with diffuse palpable mass in upper and right side of upper abdomen.

Investigations showed a hemoglobin of 7.5gm/dl, Leukocyte count of 17.3 mm3 with total bilirubin of 10.1 mg, direct bilirubin 7.4 mg. Ultrasound abdomen showed a collection at

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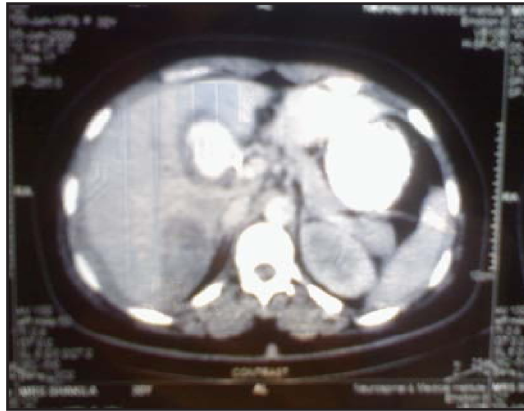

Figure 1: *CT scan of hepatic pseudo-artery aneurysm*

gall bladder bed. Intravenous contrast CT scan showed hematoma in gall bladder bed and right posterior perhepatic space 11 x 3.5 cm. Pseudoaneurysm of 3.5 x 3.5 cm at gall bladder bed from right hepatic artery and mass effect resulting in minimal dilatation of intrahepatic ducts (Figure-1).

Initially we planned for therapeutic embolization of right hepatic artery pseudo-aneurysm but due to deteriorating condition of patient urgent exploratory laparotomy was performed. Patient was explored and operative findings included hematoma in the gall bladder bed adherent to surrounding structures. While we trying to separate it from the surrounding structures, it started bleeding profusely and patient went into shock with BP less and Pulse less. Bleeding site was packed and patient was resuscitated with seven pints of blood. On further exploration, feeding point from the right hepatic artery was found which was transfixed. After insertion of drain, patient's abdomen was closed and patient shifted to Surgical Intensive Care Unit. After one day she was shifted to the ward and had uneventful post operative recovery and her jaundice subsided. She was discharge on 8th post operative day.

**Discussion**

HAP is a rare complication following LC. Most reported arterial complications are due to direct injury or diathermy shortening on surgical clips[10]. There has recently been a steady increase in the incidence of iatrogenic hepatic artery pseudo-aneurysms since laparoscopic cholecystectomy became popular. Following cholecystectomy, the injury may occur at any level in hepatic arteries or cystic artery.[11] True incidence of cholecystectomy related HAP might even be higher since many small, subclinical HAP thrombose and resolve spontaneously. Most of the patients have a history of a difficult cholecystectomy operation. Time intervals between cholecystectomy and onset of symptoms were variable; however, most of the patients were readmitted approximately one month after the initial laparoscopic cholecystectomy.

The pathogenesis of post cholecystectomy HAP is unclear. Direct vascular injury, erosion due to clip encroachment and diathermy shorting on clips associated infection[12] are likely to be precipitating factors. Bile leak and secondary infection are the most important factors. Bile is cytotoxic and the amphipathic properties of bile acids make them powerful solubilizers of membrane lipids causing cell death. It has been shown by Sandblom et al[13] that bile delays healing of liver wound in a canine study which could be attributed to the fibrolytic or cytotoxic effects of bile. Bile can therefore cause weakening of suture line or site of surgical clips in vessels. The presence of infection is another contributing factor for development of HAP[14] . Most likely cause of HAP in our patient was due to bile leak.

The classical clinical triad (right upper quadrant pain, jaundice and hemobilia) described by Quinke in 1871[15] has been reported only in 20-30% of patients with laparoscopic cholecystectomy related hepatic artery pseudoaneurysm[16] . The clinical presentation of HAP is because of bleeding. If discovered early the bleeding may be intermittent, but if not identified massive hemorrhage may occur with rupture and the reported mortality rate following rupture of HAP could be as high as 50%[17] .

Treatment of HAP is an acute emergency as the patients may exsanguinate with rupture. Early recognition is key to management. Patients with hematemesis or malena following LC should prompt an urgent endoscopy and if no cause is identified, abdominal CT and hepatic angiogra-

phy should be performed. Definitive treatment with radiologic embolization is the treatment of choice of HAP, although some reports of conservative management have been recorded.[18,19] Some authors recommend surgery first as it allows surgical repair of the bile duct. However in an emergency situation when pseudoaneurysm has just bled it is easier to achieve hemostasis with selective embolization of HAP.

The main concern is the prevention of the iatrogenic injury. Awareness of the anatomical variations of the hepatic and cystic arteries encountered in 50% of individuals is important in prevention of iatrogenic injury.[20] Three important anatomic variations are double cystic artery (20%), "caterpillar hump" of right hepatic artery and cystic artery course anterior to common hepatic duct. Laparoscopic cholecystectomy can safely be performed if some rules, like keeping the dissection plane near the gallbladder wall, freeing the infunibulum first in order to widen Calot's triangle (pediculization) and meticulous dissection without bleeding to visualize all the structures within, are applied. At best, cystic artery is followed until it enters gallbladder wall before clipping. Separate clipping of the cystic duct and artery is performed to avoid arteriobiliary fistula. When bleeding occurs, the surgeon should never attempt blind clipping or coagulation, and not hesitate to convert to open cholecystectomy especially in complicated patients.

## Conclusion

In conclusion, HAP is a rare and life-threatening complication of LC. Bile leaks and infection are predisposing factors. Hematemesis following LC should arouse the suspicion of HAP. Embolization of pseudoaneurysm is the treatment of choice and early access to this reduces the morbidity and mortality of this complication. But where these facilities are not available, HAP can be managed successfully by surgical exploration as in our case.

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