

## An Unusual Communication Of A Right Hepatic Artery Pseudoaneurysm With Left Hepatic Artery In A Post Cholecystectomy Patient Treated With Endovascular Coil Embolization (A Rare Case Report)

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**Abstract:** Hepatic artery pseudoaneurysm (HPA) is a rare vascular complication following cholecystectomy. We report a case of iatrogenic right HPA with additional feeder from branch of left hepatic artery in a 50 years female after complicated open cholecystectomy. She presented with postoperative gastrointestinal bleeding and jaundice. She was successfully managed with selective endovascular coil embolization. [Partha P SEAJCRR 2018; 7(4):26-29]

**Key Words:** Coil Embolization, Digital Subtraction Angiography, Hemobilia, Hepatic artery

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**Introduction:** Vascular injuries are rare after open cholecystectomy in comparison to laparoscopic surgery. The commonest vascular injuries are to the right hepatic artery and cystic artery stump. These are usually not recognized at the time of surgery and present later as a pseudoaneurysm complicated with hemobilia. Review of literature suggest that 80% of right HPA present acutely within 4 weeks with hemobilia often necessitating emergency intervention<sup>1</sup> Bleeding from HP can lead to life threatening situation if a prompt diagnosis is not made.

The diagnosis and treatment of this situation needs to be emphasized in clinical literature to increase the awareness of practicing surgeon. Contrast enhanced CT with angiography not only establishes the diagnosis but also helps in planning further management. However, selective angiography is considered the gold-standard as this enables accurate localization of the vascular pathology and success rates of pseudoaneurysm obliteration are also high in endovascular embolization compared to open surgical repair.

Here we report a rare case of post cholecystectomy HPA with retrograde filling from branch of left hepatic artery effectively managed by endovascular coiling.

This unusual connection from left hepatic artery is extremely rare because it is an end artery. According to our knowledge there is no such case

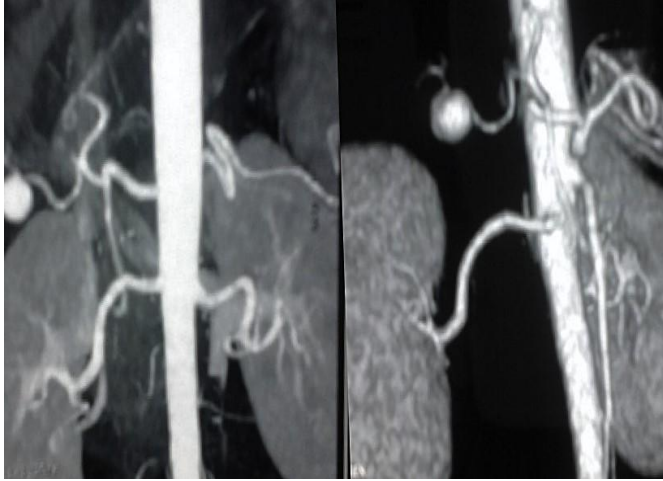
of iatrogenic HPA with such vascular connection reported yet in literature.

**Case Presentation:** A 5 years normotensive female patient underwent difficult open cholecystectomy in a tertiary hospital for chronic calculus cholecystitis with prior history of frequent acute attacks. She had difficult Callot's triangle dissection and abnormal preoperative hemorrhage with suspicion of inadvertent injury to the right hepatic duct as mentioned in her operative notes.

After optimal haemostasis cholecystectomy was completed with a T-tube insertion into the common bile duct. Suddenly on the second postoperative day fresh bleeding through the T-tube was noticed. She received four units of blood transfusion and adequate resuscitation to prevent haemodynamic collapse. She also developed jaundice, malena and upper abdominal pain in the subsequent days.

Patient was referred to the IR unit of our hospital with a provisional diagnosis of right hepatic artery injury. Triphasic CT scan of abdomen with CT angio was performed which showed a large wide neck pseudoaneurysm in the extrahepatic course of right hepatic artery proximal to its bifurcation. [Figure 1]

**Figure 1: Triphasic CT with Ct angio showing pseudoaneurysm arising from right hepatic artery proximal to its bifurcation**



**Material and Methods:** Usual right hepatic artery origin (Michel's type A) was seen without any accessory hepatic artery or aberrant hepatic artery. There were dilated IHBRs without any obvious hepatico-biliary fistula.

Considering the life threatening iatrogenic complication endovascular coil embolization of right

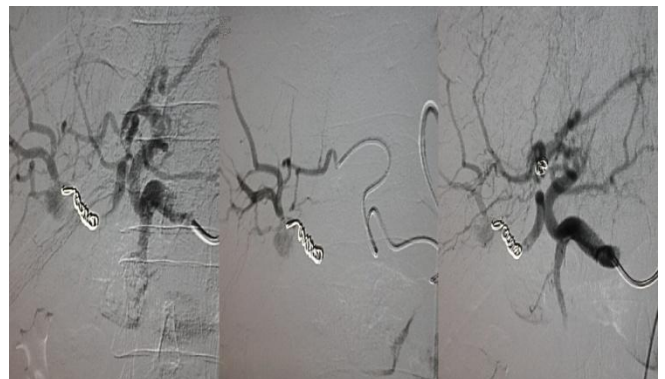
HPA was planned avoiding surgical intervention. On seventh post-operative day DSA and transcatheter selective coil embolization of right hepatic artery was done by using progreat microcatheter (2.3F) through the right common femoral artery route. A long metallic microcoil (018) was deployed near the neck of pseudoaneurysm. Post coiling DSA reveals total occlusion of reveals total occlusion of the pseudoaneurysm blood through the right hepatic artery but there was an unusual retrograde flow from the segment branch of the LHA. Additional feeders were annulated by the same microcatheter & occluded by a small (3 X 3) microcoil (018). [Fig 2-3]

There was a smooth recovery of the patient with gradual reduction of her malena and jaundice. T-tube cholangiogram was done on day 14 showed no evidence of any biliary tract injury [Figure 4] hence it was removed. Patient went home on day fifteen in a stable condition.

**Figure 2: Super selective angiography of RHA showing the aneurysm, post coiling DSA reveals total occlusion of the pseudoaneurysm blood flow through the right hepatic artery.**



**Figure 3: 3A After deployment of first coil, hepatic artery DSA reveals retrograde filling of the aneurysm from a branch of the left hepatic artery; 3B Superselective angiography of LHA clearly showing the additional feeder; 3C coiling of that feeder**



**Figure 4: T tube cholangiogram done on 14<sup>th</sup> post-operative day reveals no obvious abnormality**



Follow up DSA was done at 8 weeks. Post embolisation showed no blood to the pseudoaneurysm. [Figure 5].CT scan abdomen revealed reduction of dilated IHBRs without any atrophy of right lobe of liver. Her Liver function test was also within normal limit. She is now leading a normal comfortable life without any major discomfort.

**Figure 5: Follow up DSA after 8 weeks interval reveals complete occlusion of the pseudoaneurysm**



**Discussion:** Right HPAs occur in up to 0.6% of patients after laparoscopic cholecystectomy and 85% of iatrogenic HPAs involve the right hepatic artery<sup>2</sup>. Time of presentation varies from first few days to months after surgery. HPA with hemobilia is a rare but serious complication associated with cholecystectomy. Incidence of iatrogenic vascular and biliary complications is reported more in case of laparoscopic cholecystectomy compared to open cholecystectomy.

Pseudoaneurysms arise as a consequence of visceral inflammation adjacent to the arterial wall, which leads to damage to the adventitia and thrombosis of the vasa vasorum resulting in localized weakness in the vessel wall. They are prone to rupture into biliary tree causing gastrointestinal bleeding. The pathogenesis of

HPA after cholecystectomy is unclear. Direct vascular injury, erosion due to clip encroachment and thermal injury are likely to be precipitating factors. Bile leakage and secondary infection have also been reported as potentially important factors<sup>3</sup>. Unrecognized bile duct injuries present with bile leakage causing damage to the vascular wall and therefore delay the healing of injured arteries leading to pseudoaneurysm formation. However, these complications may be seen due to anatomical variations or insufficient exposure of the surgical field.<sup>4</sup>

The likely cause in this patient was direct vascular injury followed by arterial pseudoaneurysm with hemobilia. Typically, the clinical manifestations of HPA include abdominal pain, jaundice, and gastrointestinal bleeding (hemobilia) which were observed in our patient. But this classical triad described by Quincke in 1871 presents in only 32% of such patients<sup>5</sup>. Though endoscopy is usually the initial investigation in presence of hemobilia, it is often inconclusive<sup>6</sup>

Ultrasonography with colour Doppler can often detect the lesion but may not localize the vessel involved. Contrast enhanced CT scan with CTA is the standard non-invasive investigation to detect the pseudoaneurysm and may suggest the vessel involved. But CTA cannot demonstrate hidden crossflow from any additional feeder which is effectively unmasked by selective angiography. Thus selective angiography (DSA) is considered gold-standard as this enables accurate localization of the vascular pathology and delineates any hidden connection<sup>7</sup>.

Endovascular embolization being a minimally invasive procedure is superior to open surgery as it can effectively detect all the possible feeders to the pseudoaneurysm and enables selective embolization ensuring complete occlusion. Open surgical procedure on the other hand can fail to recognize small hidden feeder and thus result in subsequent recurrence. However there is scope of surgical approach when HPA is too large to be treated by endovascular coiling and in case of

failed endovascular embolization or recurrence following embolization. Endovascular stent grafting is an effective and safe option for the treatment of pseudoaneurysms. The stent graft provides occlusion of the pseudoaneurysm and maintains patency of the vessel, lowering the risk of ischemia and infarction of the liver. However endovascular stent grafting is expensive and it is ineffective in case of HPA with multiple vascular supplies.

USG or CT guided percutaneous glue injection is a cheap and convenient method to occlude HPA but is mostly suitable for more peripherally located lesion. However, in our case pseudoaneurysm was in a deeper location and was inaccessible for this procedure. This case elicits a rare but possibly life-threatening complication of a surgery which is very common. High index of suspicion is necessary to diagnose pseudoaneurysm in case of hemobilia after cholecystectomy. Treatment with embolization is the best available minimally invasive technique especially when patient is clinically and hemodynamically unstable. However more extensive study and longer duration follow up is necessary to prove effectiveness and superiority of endovascular coil embolization to treat iatrogenic pseudoaneurysm.

**Conclusion:** Inadvertent hepatic artery injury is a fatal complication of difficult cholecystectomy. DSA is proved to be superior to CTA in demonstrating hidden crossflow from any additional vascular feeder to HPA. Exploratory surgical ligation of right hepatic artery would have been an incomplete treatment in the presence of left hepatic artery collateral resulting in postoperative recurrence. DSA can readily identify such collateral feeder which may then be successfully occluded by endovascular coiling.

Hence, endovascular coil embolization should be preferred over open surgery in management of HPA with multiple feeders. Routine selective angiography of LHA after coiling of Right HPA is of immense importance to look for any unusual communication.

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