ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 11, Issue – 1, January – 2026, Page No. : 93 – 97

Upper Gastrointestinal Bleeding Secondary to Enteroarterial Fistula Due To Pseudoaneurysm of the Right Hepatic Artery: Literature Review and Case Report

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Citation this Article: Dr. Carlos Javier Mata Quintero, Dr. Mario Gutierrez Hernandez, Dr. Obed Horacio Grajeda Chavez, Dr. Monica Lizbeth Zuniga Andrade, Dr. Alejandra Guadalupe Cervantes Zentella, "Upper Gastrointestinal Bleeding Secondary to Enteroarterial Fistula Due To Pseudoaneurysm of the Right Hepatic Artery: Literature Review and Case Report", IJMSIR - January – 2026, Vol – 11, Issue - 1, P. No. 93 – 97.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Visceral artery aneurysms are rare, with an estimated incidence of 0.1–2%, most frequently involving the splenic artery (approximately 60%), followed by the hepatic artery (around 20%). Among hepatic artery aneurysms, extrahepatic involvement is the most common, and the right hepatic artery is the vessel most frequently affected. Hepatoenteric fistulas secondary to hepatic artery pseudoaneurysms are exceptionally uncommon but may result in life-threatening gastrointestinal bleeding.

We report the case of an 86-year-old woman who presented with a four-day history of hematemesis, melena, and hematochezia with clots. Physical examination revealed pallor, asthenia, and tachycardia. Upper gastrointestinal endoscopy demonstrated active bleeding in the first portion of the duodenum associated with a duodenal ulcer. Contrast-enhanced computed tomography identified a saccular pseudoaneurysm arising from the right hepatic artery and protruding into the gallbladder bed. Surgical exploration confirmed an enteroarterial fistula between the pseudoaneurysm and the duodenum. The patient was successfully treated with ligation of the hepatic artery and duodenal exclusion with Billroth II reconstruction.

This case highlights a rare but severe complication following laparoscopic cholecystectomy and emphasizes the importance of maintaining a high index of suspicion in patients presenting with unexplained upper gastrointestinal bleeding.

Keywords: Gastrointestinal Bleeding, Enteroarterial Fistula, Right Hepatic Artery, Pseudoaneurysm

Introduction

Aneurysms in the splanchnic system are rare with an overall incidence of 0.1-2%, with a higher frequency of occurrence in the splenic artery (60%) followed by the hepatic artery (20%); the extrahepatic presentation is the

most common. The right hepatic artery is the most common affected (23%). [1]

Some cases may remain asymptomatic for a lifetime and are revealed incidentally after routine studies. In other cases, they may present with hemorrhages that can be fatal. They require a high index of suspicion with prompt diagnosis and expedient treatment, either surgical or endovascular. [2]

Hepatoenteric fistula has an extremely low recurrence rate. Usually due to traumatic or iatrogenic origin. Some often caused by inflammation and infection like cholecystitis, hepatic abscess, pancreatitis, etc. From the other side Hepatobiliary surgery complication like iatrogenic unnoticed lesion after a cholecystectomy is a even rarer and less reported cause. The incidence of pseudoaneurysm after laparoscopic surgery ranges from 0.06% to 0.6% [3]. Hepatic artery pseudoaneurysm have been successfully treated using a variety of interventional methods, including endovascular embolization, coil embolization, and arterial stent grafting.

Detailed Case Description

A 86-year-old female without previous systemic disease She comes to our office presenting with hematemesis for approximately 4 days, accompanied by stools with blood, clots, and a dark appearance. The patient has a surgical history of 2 previous cesarean, and a laparoscopic cholecystectomy performed approximately 1 year prior to the onset of her symptoms. During the directed physical examination, generalized pallor was evident as well as asthenia and adynamia. On abdominal examination, pain and resistance to deep palpation were present in the right upper quadrant, and during rectal examination, remnants of melenic-looking evacuations were identified, in addition to clots and traces of blood.

Laboratory evaluation revealed a hemoglobin level of 11.7 g/dL (previously 14.5 g/dL), hematocrit of 33.7%, leukocyte count of 7.3 $\times 10^3/\mu L$, platelet count of 171 $\times 10^3/\mu L$, and normal renal function, liver enzymes, bilirubin levels, and electrolytes.

An upper digestive tract endoscopy was performed where bleeding was found in the first portion of the duodenum (Figure 1), mass effect was identified between the second and third portion of the duodenum, subsequently between the first and second portion a duodenal ulcer was evident on the lateral side of the duodenum with the presence of an adhered clot and scant bleeding (Figure 2).

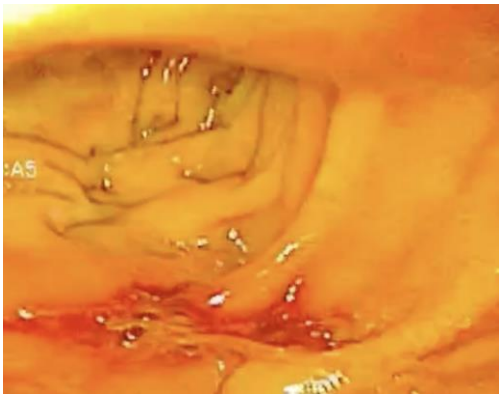

Figure 1: non-active bleeding in the first portion of the duodenum

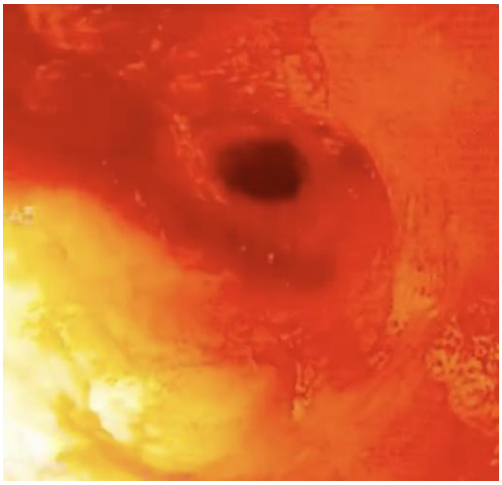

Figure 2: duodenal ulcer with adhered clot between 2 and 3 portions of the duodenum

A contrast-enhanced computed tomography scan was performed, revealing a saccular image apparently originating from the hepatic artery and protruding into the gallbladder bed. After the application of contrast

medium in arterial phase, it showed avid enhancement. It measured 4.4 x 3.5 x 2.7 cm and had a volume of 22 milliliters. (Figures 3,4)

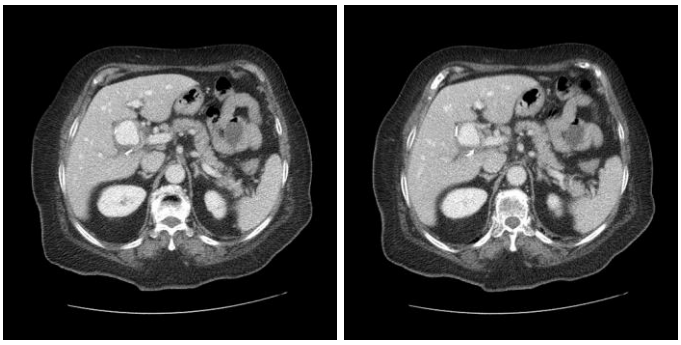

Figure 3: Contrast enhanced computed tomography showing pseudoaneurysm of right hepatic artery

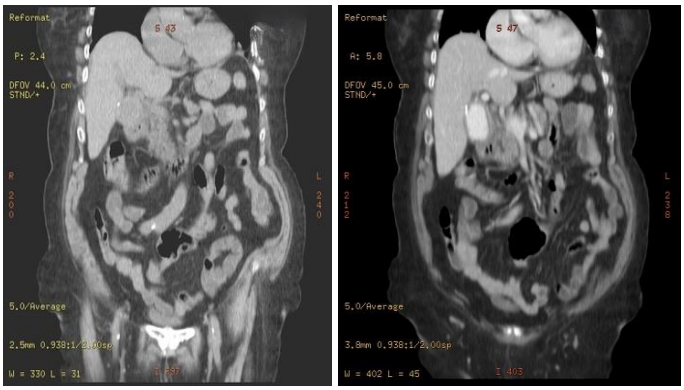

Figure 4: Coronal view of a pseudoaneurysm of the right hepatic artery

Given the patient's ongoing bleeding, the absence of a vascular surgeon and the anatomical findings, an exploratory laparotomy was performed. Intraoperatively, a firm clot adherent to the duodenal wall was identified, corresponding to an enteroarterial fistula. Ligation of the proper hepatic artery was performed, followed by duodenal exclusion and Billroth II reconstruction to definitively manage the fistula and associated ulcer. The patient was monitored in an intermediate care unit for five days and experienced transient melena during the early postoperative period, without further hemoglobin decline. She was discharged in stable condition and remained asymptomatic at six-month follow-up, with normal laboratory parameters and no recurrence of gastrointestinal bleeding.

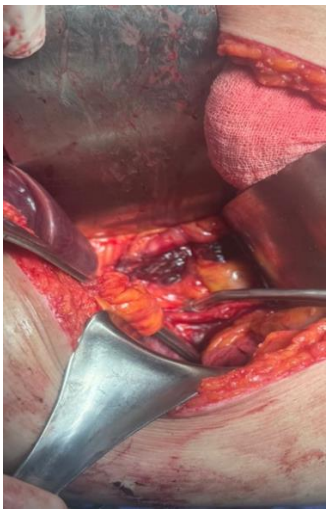

Figure 5: Adhered clot to duodenum (arrow)

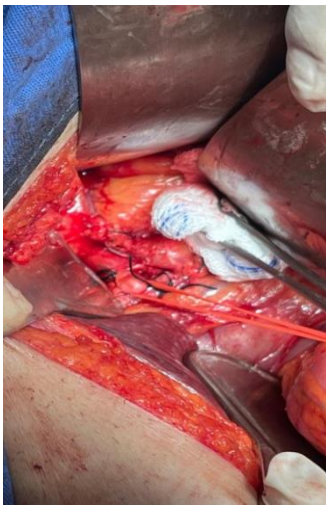

Figure 6: Ligation of proper hepatic artery

Discussion

Laparoscopic cholecystectomy is a routinely performed surgical intervention with associated complications. Major complications include bleeding from the adjacent tissue (2.83%), cystic artery (0.67%), abdominal wall port (1.21%), and, rarely, ligaments of the liver (0.54%). Other complications comprise iatrogenic perforations of the gallbladder (5.27%), injuries to the common bile duct (0.13%), and spilled gallstones (2.02%). Pseudoaneurysm of the hepatic and/or cystic artery represents a rare complication following laparoscopic cholecystectomy. A pseudoaneurysm is formed when a damaged artery bleeds

into the surrounding tissues and forms a cavity outside the vessel wall. It can be distinguished from a hematoma because it continues to communicate with the arterial lumen, forming a high-pressure cavity with a risk of rupture. [4]

The laparoscopic procedure is the gold standard for cholecystectomy and HAP is a rare but serious complication associated with laparoscopic cholecystectomy and bile duct injury. The pathogenesis and risk factors of post cholecystectomy HAP is unclear. Direct vascular injury, erosion due to clip encroachment and infection associated with diathermy shortening on clips are likely to be precipitating factors. Bile leak and secondary infection are the most important factors. Bile is cytotoxic when present in abnormally high concentrations either intracellularly or extracellularly and the toxicity of bile acids is attributed to their complex solubility properties. Bile can be responsible for the weakening of a suture line or the site of surgical clips in vessels. The infection can contribute to the formation of Hepatic artery pseudoaneurysm due to the erosive property on the vascular wall [5].

The clinical presentation can vary from going unnoticed only being identified incidentally, presenting with diffuse abdominal pain, anemia, hemobilia (most common 85%), intermittent intestinal bleeding, to massive bleeding that endangers the patient's life. In the case described, the patient remained asymptomatic for approximately one year until she began experiencing upper gastrointestinal bleeding with no improvement on proton pump inhibitor and with rapid clinical deterioration including abundant melenic stools and a decrease in hemoglobin count. The time between cholecystectomy and clinical signs can range from six days to five years, with an average of 36 days. [6]

The diagnosis is initially made with imaging studies such as ultrasound, tomography and magnetic resonance imaging, with angiography being the gold standard. Regarding the suspicion of gastrointestinal involvement, it is vitally important to perform a panendoscopy to verify as soon as possible. [7]

Surgical treatment used to be the mainstream approach for managing visceral aneurysms, and due to advances in technology, embolization has become the preferred treatment for such lesions. For patients at high risk of complications, such as liver failure or liver abscess, following hepatic artery embolization, implantation of covered stent grafts can be a viable alternative, as demonstrated in this case. Patients with a history of gastrointestinal surgery resulting in hepatic artery or bile duct injury who present with gastrointestinal bleeding, shock, or unexplained abdominal pain should be evaluated for a possible pseudoaneurysm. [8] Although surgical interventions (ligation of hepatic artery, liver resection) were used to treat HAP, endovascular embolization is the current first line treatment. Embolization is associated with a 25% lower mortality and 67% less morbidity in comparison with surgical intervention. [9,10] Surgery still plays an important role particularly if embolization fails or is not feasible. [3]

Conclusion

Hepatic artery pseudoaneurysm with enteroarterial fistulization is a rare but severe cause of upper gastrointestinal bleeding, particularly following laparoscopic cholecystectomy. Early recognition and prompt intervention are crucial to prevent fatal outcomes. Although endovascular embolization is the preferred treatment, surgical management remains a valuable and effective option when endovascular therapy is not feasible or when associated gastrointestinal fistulas are present.

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