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Case report

Subcapsular Hematoma Following Endoscopic Retrograde Cholangiopancreatography (ERCP): Complex Cases Requiring Open and Endovascular Intervention – Case Reports

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Abstract

Endoscopic retrograde cholangiopancreatography (ERCP) is an essential diagnostic and therapeutic procedure for managing biliopancreatic disease; however, it carries a complication rate of up to 6.85%. Subcapsular hepatic hematoma is a rare occurrence, which in most cases can be effectively managed with conservative and expectant medical care. In certain exceptional situations, invasive corrective interventions such as angiography with vascular embolization or open surgical exploration are required. This report presents two cases of young adult female patients with no significant pre-existing comorbidities who developed abdominal pain, anemia, and hypotension following ERCP. They were subsequently diagnosed with post-ERCP subcapsular hepatic hematoma. Both patients underwent comprehensive treatment through a multidisciplinary approach, requiring different interventions—one with percutaneous endovascular management and the other with open drainage—both yielding equally favorable outcomes.

Keywords

Abdominal pain, endoscopic retrograde cholangiopancreatography, hematoma, therapeutic embolization.

INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) is essential in the treatment of biliopancreatic diseases. The performance of ERCP carries a potential risk of complications, which can range from trivial incidents to life-threatening conditions. The overall complication rate (pancreatitis, bleeding, perforations, and infections) occurs in approximately 6.85% of cases, with a related fatality rate of 0.33%[(1)]. Hepatic subcapsular hematoma post-ERCP is an uncommon event; however, like any bleeding, it has the potential to lead to fatal outcomes. Treatment is typically conservative, while invasive interventions such as angiography, endovascular approaches, or open surgical interventions are reserved for patients with refractory hemorrhage. Two cases involving young patients with different clinical courses are presented.

DESCRIPTION OF CASES

Case 1

This is a 31-year-old female patient in late puerperium who presented with abdominal pain in the epigastrium and right hypochondrium. The hepatobiliary ultrasound revealed cholelithiasis without cholecystitis, with intrahepatic biliary and common bile duct dilation of 7.7 mm. The magnetic resonance cholangiopancreatography (MRCP) showed evidence of a normal-caliber intrahepatic bile duct, with heterogeneous material within the common bile duct. The patient underwent ERCP, which revealed a type 1 papilla with successful bile duct cannulation on the first attempt, a wide medial papillotomy, and extraction of biliary sludge with a balloon extractor. The procedure ended without complications, and no contrast was observed in the pancreatic duct. Eight hours after the procedure, the patient developed sharp, high-intensity pain in the right hemithorax extending to the ipsilateral shoulder, associated with nausea and epigastric pain. Therefore, a contrast-enhanced abdominal computed tomography (CT) scan was performed, which identified an extensive subcapsular collection in the hepatic lobe with hypodense areas lacking enhancement with contrast medium (**Figure 1**). In addition, in association with the imaging findings, a 5 g/dL decrease in hemoglobin was documented.

Figure 1. Hepatic hematoma (206 x 81 x 160 mm) involving the right hepatic lobe on the axial CT scan. Contrast densities associated with the hematoma are observed, showing signs of active bleeding. The image is the property of the authors.

Medical management was initiated, and surgery was not considered necessary initially. The patient received hydration resuscitation and empirical antibiotic coverage. During monitoring, there was hemodynamic deterioration, requiring transfusion support with three units of red blood cells. An aortogram with selective hepatic artery angiography was performed, revealing intraoperative findings of a flush in the area related to hepatic segments VII and VIII, prompting selective embolization of the segment VII and VIII hepatic artery with helix coils (**Figure 2**). The procedure was completed without complications. The patient showed satisfactory progress following the intervention.

Case 2

This is a 35-year-old female patient who underwent laparoscopic cholecystectomy for cholecystitis six months prior to admission. She presented with a one-day history of epigastric and right hypochondrium pain, associated with nausea, multiple emetic episodes, and choluria. Upon initial evaluation, no signs of peritoneal irritation were found. Paraclinical studies revealed leukocytosis (19,260 WBC/mm^3) and neutrophilia (86%), along with abnormalities in the liver profile (elevated alanine aminotransferase [ALT], aspartate aminotransferase [AST], and alkaline phosphatase). A possible obstructive biliary syndrome was suspected, with an intermediate suspicion of choledocholithiasis. Therefore, an MRCP was performed, showing dilatation of both intrahepatic and extrahepatic bile ducts (common bile duct 11 mm) due to the presence of multiple stones smaller than 10 mm in the intrapancreatic portion of the common bile duct. The patient then underwent ERCP, during which a selective biliary cannulation was successfully performed, followed by cholangiography. The common bile duct was identified as 14 mm, with a 12 mm mobile filling defect inside and distal bile duct disproportion. In addition, a sphincterotomy was performed, revealing bile sludge and abundant pus drainage. A retrieval basket was advanced, and yellow pigment stones were extracted. Subsequently, a 10 Fr x 9 cm plastic biliary stent was placed, with adequate drainage.

Approximately 3 to 4 hours after the procedure, the patient developed sudden right hypochondrium abdominal pain, accompanied by marked hypotension. A hemoglobin drop from 12 g/dL to 9 g/dL was recorded. Finally, a contrast-enhanced abdominal CT scan was performed, revealing a large subcapsular hepatic collection, of approximately 1055 mL in volume, with hyperdense content consistent with a subcapsular hepatic hematoma (**Figure 3**).

The patient was transferred to the intensive care unit for hemodynamic monitoring, where conservative management was initiated with fluid resuscitation, transfusion support, and empirical antimicrobial therapy with piperacillin-tazobactam. Given the persistent decline in hemoglobin levels (down to 7.9 g/dL despite receiving transfusion

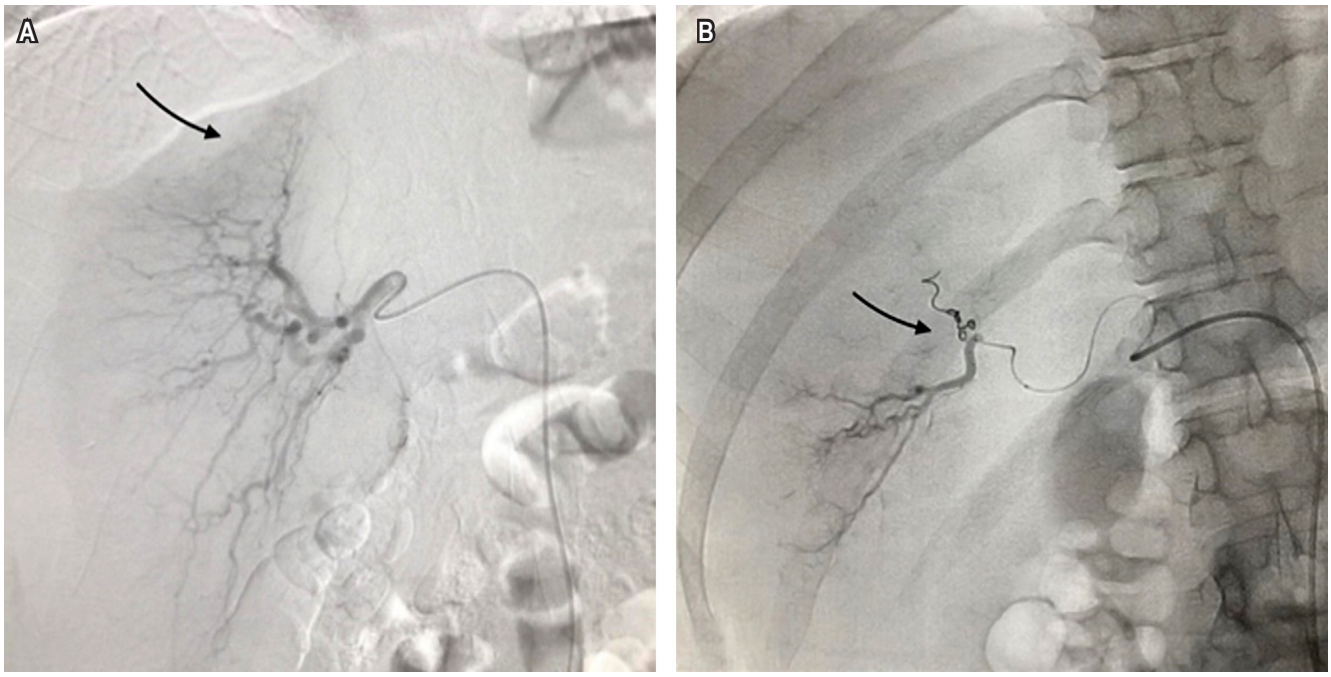

Figure 2. A. Supraselective arteriography. Note the right hepatic artery. Poor contrast washout at the level of the hepatic segment (arrow), suggestive of hepatic bleeding. **B.** Selective embolization of the hepatic artery branches for segments VII and VIII. Images property of the authors.

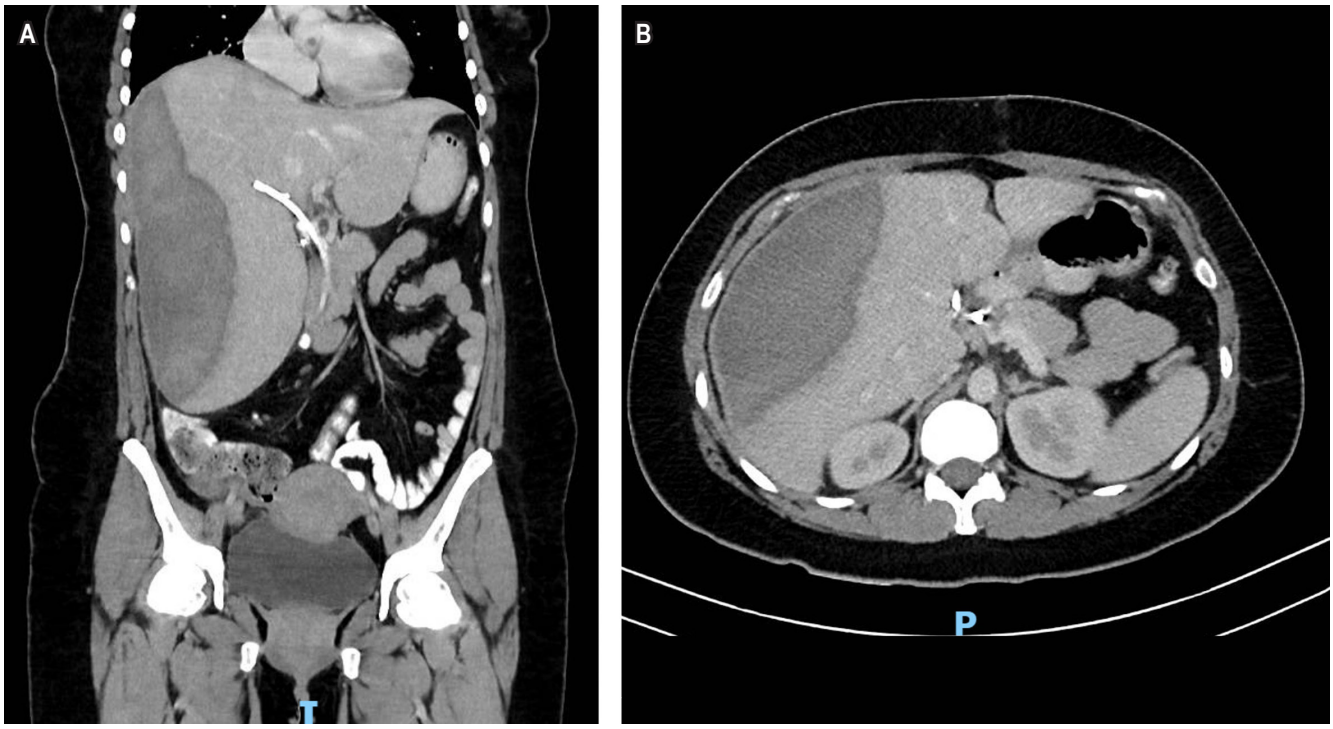

Figure 3. Subcapsular hepatic hematoma measuring 246 x 127 x 65 mm in the right hepatic lobe. **A.** Coronal section. **B.** Axial section view. Images property of the authors.

support), along with progressive thrombocytopenia (down to 42,000 platelets/μL), the surgical team considered the need for exploratory laparotomy. During the surgical exploration, findings of a ruptured subcapsular hepatic hematoma and layered bleeding in segments IV and V were identified, and bleeding control was performed along with drainage of 2500 mL of hemoperitoneum and cavity packing. In the second surgical procedure, complete hemostasis was achieved with Surgicel® and drainage of the residual hemoperitoneum of 800 mL with closure of the cavity. The patient subsequently showed progressive improvement until discharge.

DISCUSSION

ERCP is a diagnostic and therapeutic medical procedure currently useful for the management of biliopancreatic disease. Its origins date back to 1968, when it was initially used as a tool for the direct observation of the biliary tree. Subsequently, the technique was modified with the introduction of sphincterotomy in 1974, leading to the expansion of the procedure[2].

Compared to other endoscopic procedures, ERCP carries a potential risk of complications ranging from trivial or minor to major or life-threatening. The most common ERCP-related adverse event is acute pancreatitis (AP). Infection is one of the most morbid complications of ERCP, with an associated fatality rate of 7.85%. On the one hand, septic complications of ERCP include ascending cholangitis, hepatic abscess, acute cholecystitis, infected pancreatic pseudocyst, and infection following perforation of a viscus. On the other hand, hemorrhagic complications may occur, with post-sphincterotomy bleeding being the most frequent, reported in 1.4% of all procedures, indicating moderate, non-severe bleeding[1].

Among the main post-ERCP complications is gastrointestinal bleeding, which can be clinically significant and accounts for 0.1% to 2% of complication cases; other non-clinically significant bleeding events are more frequent, accounting for 10% to 30% of cases[3].

Post-ERCP hepatic subcapsular hematoma is a very rare but potentially serious complication. The actual incidence of subcapsular hematomas is likely underestimated, and the currently available literature on this condition mainly consists of case reports. It is considered that this complication may result from accidental puncture of intrahepatic vessels by the guidewire during exploration of the biliary tree; however, cases of post-ERCP hepatic subcapsular hematoma without prior guidewire use have been documented, leading some authors to suggest that it may also result from hepatic contusion during traction-extraction with the retrieval basket[3,4].

The clinical presentation of this complication may initially be nonspecific, as it shares common postoperative symptoms such as abdominal pain, nausea, and vomiting. However, it is important to recognize alarm symptoms that, according to reported cases, appear within hours after the procedure and may guide early diagnosis. The most frequent findings include abdominal pain (91.7%), anemia (43.8%), hypotension (29.1%), and fever (20.8%). It can be concluded that most cases of post-ERCP hepatic subcapsular hematoma occur early, within the first 72 hours after the procedure, although in unusual cases, diagnosis may be delayed up to five days post-procedure[3-5].

In our reported cases, the onset of abdominal pain occurred early, within the first 12 hours. In Case 1, the onset of abdominal pain was recorded 8 hours after the ERCP procedure, whereas in Case 2, abdominal pain began within 6 hours after ERCP. In both cases, hypotension was identified, accompanied by symptoms suggestive of low cardiac output, along with clinically significant anemia, characterized by a hemoglobin drop >2 g/dL. Laboratory findings, in addition to the clinical presentation, can further support diagnostic suspicion and may include expected abnormalities such as leukocytosis and cholestasis. The diagnostic methods of choice for post-ERCP hepatic subcapsular hematoma involve ultrasound evaluation, contrast-enhanced abdominal computed tomography, or abdominal magnetic resonance imaging. Contrast-enhanced abdominal CT offers certain advantages due to its ability to specifically define the hematoma's size, location, and any particular patterns of parenchymal involvement. A review found that, in most cases, hematomas are located in the right hepatic lobe (95%), with an average size of approximately 116 x 93 mm. Development of a post-ERCP hepatic subcapsular hematoma in the left hepatic lobe was rarely identified[5].

The management of post-ERCP hepatic subcapsular hematoma should always involve a multidisciplinary approach focused on the patient's specific needs, depending in a particular and individualized manner on the patient's hemodynamic status and clinical progression. Standard comprehensive management typically includes early interventions such as strict bed rest and pain control, monitoring of hemodynamic variables in intermediate care units, aggressive intravenous fluid resuscitation (preferably with balanced crystalloids as the fluid of choice), broad-spectrum empirical antibiotic coverage (targeting anaerobes, gram-negative, and gram-positive bacteria) based on laboratory findings, and transfusion support with blood components as needed[6].

In the cases described, a broad and comprehensive multidisciplinary approach was implemented, based on goal-directed resuscitation and empirical antibiotic coverage. Additionally, due to a significant drop in hemoglobin

levels in the acute postoperative setting, early transfusion of blood components was performed.

It is essential to assess the response to the established management, closely monitor hemoglobin levels, and maintain continuous surveillance of the hemodynamic status in the intermediate or intensive care unit. However, it is not possible to reach a definitive conclusion regarding the strict indications for the need for invasive intervention or percutaneous drainage due to the significant clinical heterogeneity in the limited published cases. In any case, it can be conceptualized that, once non-invasive clinical interventions have been ensured, a more invasive approach (open exploration or percutaneous intervention) should be considered in cases documenting hemodynamic instability, signs of peritoneal irritation, or lack of improvement with conservative management. Nonetheless, management should be individualized based on each patient's particular conditions, the availability of services, and local expertise[5].

CONCLUSIONS

Post-ERCP hepatic subcapsular hematoma is a potentially fatal condition that must always be considered in patients presenting with clinical deterioration following the procedure. Clinical suspicion should be high in cases presenting with the triad of abdominal pain, anemia, and hypotension. The management of this condition requires a comprehensive and multidisciplinary approach, which should include hemodynamic surveillance, monitoring of perfusion parameters, transfusion support if necessary, and optimal collaboration between medical and surgical services.

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