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Subcapsular Hepatic Hematoma Post-ERCP: Case Report and Review of the Literature

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Abstract

Introduction Hepatic hematoma is a rare but possible complication of ERCP. We describe the case of a 75-year old man with a large, 8 × 12 cm, sub-capsular and intra-parenchymal hematoma post ERCP, affecting the right liver segments and treated conservatively.

Areas covered A review of literature has been performed, highlighting two possible mechanisms: hematoma may occur as the result of accidental laceration of a small intrahepatic vessel by the guidewire, whereas the other hypothesis posits that the hepatic damage is secondary to traction on the biliary system exerted by the balloon. We speculate that in case of anomalies of the biliary tree, the incidence of this complication is higher than expected.

Expert commentary In case of hepatic hematoma post ERCP, a conservative approach should always be considered before proceeding to interventional radiologic procedures or to surgical therapy.

Keywords Hepatic hematoma · ERCP · Abdominal pain · Endoscopic procedure · Pancreatitis

Abbreviations

EKG	Electrocardiogram
AST	Aspartate aminotransferase
ALT	Alanine aminotransferase
NG tube	Nasogastric tube
CT	Computed tomography scan
ERCP	Endoscopic retrograde cholangiopancreatography
EGD	Esophagogastro-duodenal endoscopy
Hgb	Hemoglobin
US	Ultrasound
PM	Pacemaker
IV	Intravenous
GI	Gastrointestinal

Case Report and Evolution

A 75-year-old man was admitted on to the Emergency Department of St. Orsola University Hospital-Bologna due to stabbing, continuous, and worsening epigastric and thoracic pain. During clinical evaluation, he had an episode of vomiting. Vital signs were unremarkable. Relevant past medical history included acute myocardial infarction treated with angioplasty and stents, followed by pacemaker implant for Luciani–Wenckebach second-degree atrioventricular block. He took daily low-dose aspirin. Admission EKG, chest and abdominal X-rays did not reveal significant pathology. Physical examination was remarkable for upper abdominal pain with no rebound tenderness or other signs of peritonitis. Blood tests included Hgb 15.2 g/dL, amylase 1661 U/L, AST 166 U/L, ALT 106 U/L, and total bilirubin 1.8 mg/dL. The patient was admitted to the Internal Medicine Department with the diagnosis of acute pancreatitis. The initial treatment was conservative with fasting without nasogastric tube insertion and therapy with intravenous piperacillin/tazobactam due to low-grade fever. An abdominal CT scan showed evidence of pancreatic inflammation and suspicion of partial biliary obstruction due to choledocholithiasis involving the common bile duct with mild ductular dilation (10 mm) and cholelithiasis. Aspirin therapy was immediately discontinued; 3 days later, ERCP

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Fig. 1 ERCP procedure with Fogarty balloon (**a** stones inside main bile duct; **b** stone removal)

was performed during which the biliary duct was cannulated with a 0.35 inch hydrophilic guidewire (NaviPro™-Boston Scientific) with a sphincterotome (Ultratome™XL-Boston Scientific). Cholangiography revealed a slightly dilated common bile duct with pre-papillary and medium-proximal filling defects. A sphincterotomy was performed with endocut current type using an Erbe™ generator. Eventually, an extraction Fogarty balloon (Extractor™Pro XL-Boston Scientific) was inserted through the guidewire to extract the stones. No residual stones were observed at control cholangiography and a good outflow of contrast dye through the duodenum was documented at the end of the procedure. The immediate post-procedural course was uneventful; the patient left the endoscopic suite asymptomatic with stable vital signs. The ERCP findings and the related cholangiogram are depicted in Figs. 1 and 2.

In the following 2 days, the patient reported the discharge of semifluid dark feces without abdominal pain. Digital rectal examination was negative; since a CBC showed acute severe anemia (Hgb 8.3 g/dL), 1 unit of blood was transfused even though the patient was hemodynamically stable. In order to exclude hemobilia, an EGD was performed, with no signs of active or recent bleeding in the foregut. A repeat abdominal CT scan showed a large 12×8 cm subcapsular and intraparenchymal hematoma affecting the right liver segments (VI/VII/VIII) without active bleeding. Pneumobilia was reported, particularly in the left lobe (Fig. 3).

The patient was transferred to the Emergency Surgery Unit, where he was treated conservatively due to clinical stability (subsequent Hgb 8.3 g/dL without additional blood transfusions). In the following days, his clinical condition improved accompanied with increasing Hgb (10.4 g/dL). Abdominal ultrasound with SonoVue™ contrast documented a stable hematoma. The patient was discharged in good clinical condition after 7 days of antibiotic therapy. A CT scan performed after 1 week from discharge showed a stable hematoma.

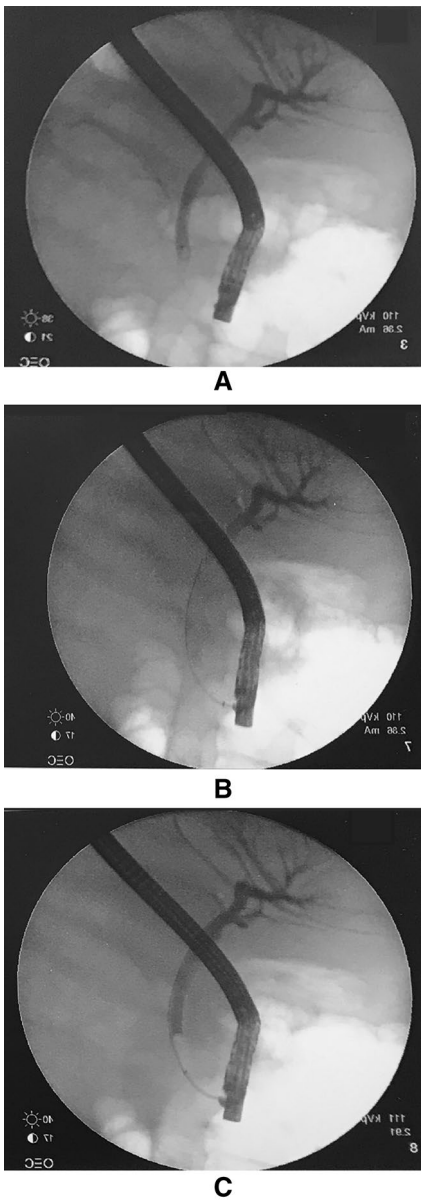

Fig. 2 ERCP cholangiogram (**a–c** different phases of contrast dye injection in main bile duct)

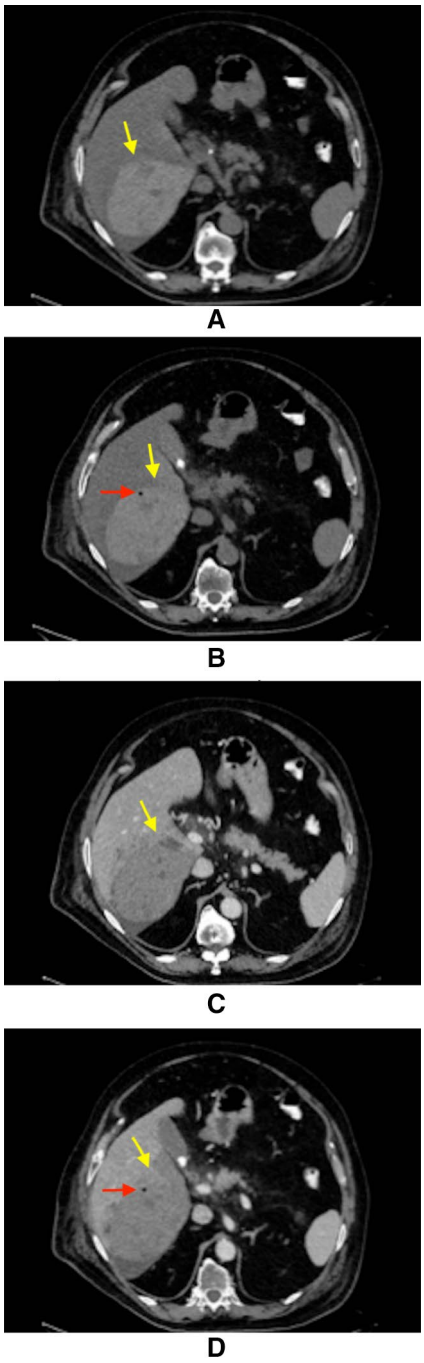

Fig. 3 Different CT sections with and without contrast dye. **a** CT scan showing the presence of hepatic hematoma (yellow arrow) without contrast dye, **b** CT scan showing the presence of hepatic hematoma (yellow arrow) and intra-hematoma air (red arrow) without contrast dye, **c** CT scan showing the presence of hepatic hematoma (yellow arrow) with contrast dye, **d** CT scan showing the presence of hepatic hematoma (yellow arrow) and intra-hematoma air (red arrow) with contrast dye

Discussion

The most frequent complications of ERCP are pancreatitis, cholangitis, GI hemorrhage, or duodenal perforation, with risks of 0.08–10% [1, 2]. Hepatic hematoma after ERCP is a rare but serious complication [3, 4]. Thus far, 29 cases have been described in the international literature (Table 1) with a reported mortality rate of 4% (1/29). The mechanism is still debated as shown in Fig. 4. Hematoma may occur as the result of accidental laceration or rupture of a small intrahepatic vessel by the tip of the guidewire during ERCP [5, 6], explaining the coexistence of air inside the hematoma and the liver. The other hypothesis posits that the hepatic damage is secondary to the traction performed by the balloon inside the main bile duct when trying to remove the stones. This force would rupture bile ductules and vessels with consequent bleeding [7, 8].

ERCP with sphincterotomy represents a procedure with an intermediate risk of hemorrhage; according to guidelines [9–11], it is not mandatory to stop aspirin. In our case, aspirin was stopped 3 days prior to the procedure. During ERCP, stone removal was uneventful without evidence of intraductal bleeding. Analyzing published data describing cases of hepatic hematoma following ERCP, 89.6% of patients reported right upper quadrant or upper abdominal pain as the first clinical symptom, whereas some patients described right shoulder pain, often accompanied by acute anemia (24.1%) [3, 12, 13]. In agreement with most authors, the incidence of this complication might be underestimated, as many patients might display no symptoms at the time of procedure [13–15]. The symptoms usually develop a few hours after ERCP, or in a few cases up to 15 days later [12] as shown in Table 1. Our case is very unusual since the patient reported semifluid dark feces without abdominal pain, delaying the diagnosis up to 48 h. The frequency of biliary infections after ERCP, which is not a sterile technique, is reported in the literature as up to 1.4% [1, 16]; some patients developed fever (20.6%) with or without other signs of sepsis [4, 16]. In such cases, the literature recommends the use of prophylactic antibiotics [17], given the risk of infected hematoma. The treatment must be personalized depending on the case. Orellana et al. [13] described a 96-year-old

Table 1 Twenty-nine cases of post-ERCP hepatic hematoma described in the medical literature

#	Authors (References)	Age and sex	Anticoagulants	Indication for ERCP	Use of guidewire	Onset after ERCP	Symptoms	Treatment	Antibiotics
1	Horn et al. [14]	F 88	N/A	Pancreatic pseudocyst	Yes	48 h	Abdominal pain/anemia	Conservative	Yes
2	Ertuğrul et al. [15]	M 41	N/A	Cholangiocarcinoma	Yes	48 h	Fever/abdominal pain	Conservative	Yes
3	McArthur et al. [25]	M 71	No	Common bile duct stones	Yes	12 h	Pain/leukocytosis	Conservative	Yes
4	De la Serna et al. [6]	F 71	N/A	Common bile duct stones	Yes	48 h	Pain/leukocytosis	Conservative	Yes
5	Cárdenas et al. [26]	F 54	N/A	Bile leak	Yes	24 h	Pain/anemia	Conservative	Yes
6	Nari et al. [27]	F 15	N/A	Pancreatitis	N/A	N/A	Fever/anemia	Conservative	Yes
7	Revuelto et al. [28]	M 41	N/A	Common bile duct stones	N/A	6 h	Pain	Conservative	Yes
8	Del Pozo et al. [17]	M 76	Yes	Common bile duct stones	Yes	5 days	Pain/anemia	Conservative	Yes
9	Orellana et al. [13]	M 96	N/A	Periampullary tumor	Yes	4 h	Pain	Conservative	Yes
10	Orellana et al. [13]	F 55	N/A	Gallbladder cancer	N/A	N/A	Pain	Conservative	N/A
11	Del Moral-Martínez et al. [8]	F 37	No	Common bile duct stones	N/A	6 h	Abdominal pain	Conservative	N/A
12	Servide et al. [12]	M 83	N/A	Common bile duct stones	N/A	15 days	Abdominal pain/anemia	Conservative	Yes
13	Ortega-Deballon et al. [21]	M 81	N/A	Common bile duct stones	N/A	N/A	Abdominal pain	Percutaneous drainage	Yes
14	Petit-Laurent et al. [5]	M 98	N/A	Common bile duct stones	Yes	N/A	N/A	Percutaneous drainage	N/A
15	Bhati et al. [22]	F 51	N/A	Common bile duct stones	Yes	N/A	Pain/hypotension	Percutaneous drainage	N/A
16	Oliviera et al. [16]	M 84	Yes	Common bile duct stones	Yes	10 days	Pain/fever	Percutaneous drainage	Yes
17	Fei et al. [20]	M 56	N/A	Common bile duct stones	Yes	2 h	Fever	Percutaneous drainage	Yes
18	Del Moral-Martínez et al. [8]	F 60	N/A	Cholangitis	N/A	7 days	Abdominal pain/fever	Percutaneous drainage	Yes
19	Carrica et al. [30]	F 37	N/A	Common bile duct stones	Yes	72 h	Pain/fever	Percutaneous drainage	Yes
20	Chi et al. [23]	F 43	N/A	Pancreatic cancer	Yes	N/A	Abdominal pain	Embolization	Yes
21	Baudet et al. [7]	F 69	No	Common bile duct stones	Yes	24 h	Pain/fever/anemia	Embolization/surgery	Yes
22	Orellana et al. [13]	M 49	N/A	Biliary stent exchange	N/A	2 h	Pain/hypotension	Embolization	N/A
23	Imperatore et al. [4]	F 75	N/A	Choledocolithiasis	Yes	2 days	Abdominal pain	Embolization	Yes
24	Klimová et al. [18]	M 54	N/A	Main pancreatic duct stones	Yes	6 h	Anemia/pain/hypotension	Embolization surgery/percutaneous drainage	Yes
25	Zizzo et al. [3]	F 52	N/A	Common bile duct stones	N/A	15 days	Pain	Embolization	Yes

Table 1 (continued)

#	Authors (References)	Age and sex	Anticoagulants	Indication for ERCP	Use of guidewire	Onset after ERCP	Symptoms	Treatment	Antibiotics
26	Priego et al. [24]	F 30	N/A	Obstructive jaundice	N/A	N/A	Abdominal pain	Surgery	Yes
27	Pérez-Legaz et al. [29]	F 72	N/A	Common bile duct stones	Yes	72 h	Pain/anemia	Surgery	Yes
28	Imperatore et al. [4]	M 45	N/A	Cholestasis	Yes	2 h	Abdominal pain	Surgery	N/A
29	González-López et al. [31]	F 30	N/A	Benign strictures after surgery	Yes	72 h	Pain/hemodynamic shock	Surgery	Yes

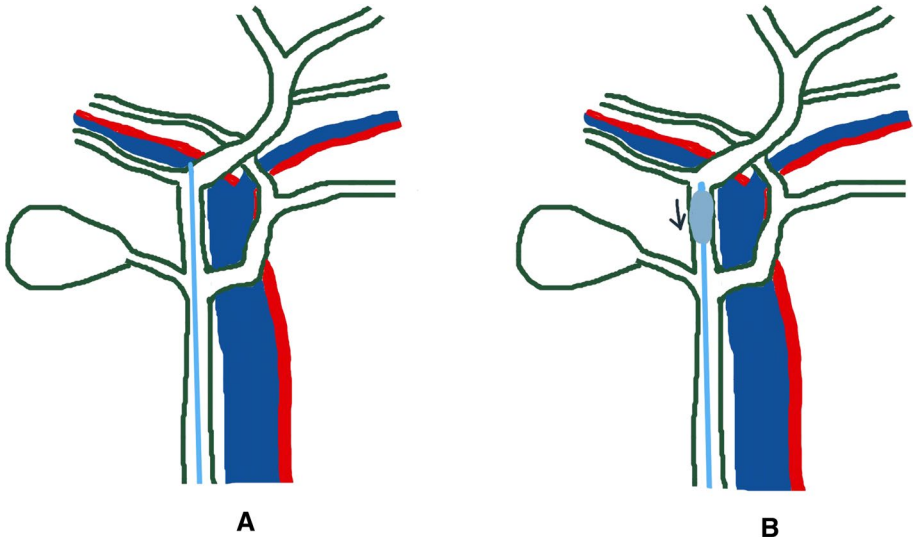

Fig. 4 Mechanism by which the hematoma could occur (**a** guidewire; **b** balloon)

patient with a subcapsular hepatic hematoma in the right hepatic lobe measuring 17 × 13 × 5 cm after ERCP. The only reported symptom in this case was right shoulder pain. The patient was hemodynamically stable and was managed conservatively, with analgesia and broad-spectrum antibiotics. Clinical evolution was uneventful; follow-up CT scan documented complete resolution of the hematoma. In our case, the patient received antibiotic therapy due to low-grade fever without signs of sepsis during the admission. Many hematomas are treated conservatively (41.3%), [12, 13, 18], considered to be the standard-of-care in hemodynamically stable patients. A more aggressive approach should be followed among cases in which overall clinical deterioration, hemodynamic instability, severe infection, or a high risk for hematoma rupture occurs [19, 20]. Surgical therapy includes drainage of the hematoma followed by hemostasis. An alternative to surgery is the selective or superselective embolization of involved vessels that was reported in 20.7% of cases, or percutaneous drainage of hematoma using ultrasonic or CT guidance that was reported in 27.6% [18]. In our case, the patient was treated conservatively due to the stability of the size of the hematoma and his overall good clinical condition.

In the case of a marked drop of Hgb levels after an ERCP, a sub-hepatic hematoma should be considered in the differential diagnosis. Our hypothesis is that in case of anomalies of the biliary tree, the incidence of this complication could be higher than suspected, although this opinion is not supported by the literature. Our patient had an anatomical variant represented by a biliary trifurcation [19]. Even though there are no studies reporting an increased risk of this endoscopic complication in the presence of this anomaly [21–31], we think that particular attention should be paid during operative maneuvers in subjects with this and similar biliary anomalies.

Key Messages

- Since hepatic hematoma is a rare but possible complication of ERCP with 29 reported cases, this adverse event should be included in the differential diagnosis since it is treatable and may be associated with severe morbidity.
- Biliary anomaly could represent a hypothetical predisposing factor to hepatic hematoma. A conservative approach should be always considered before proceeding to interventional radiologic procedures or to surgical therapy.

Compliance with Ethical Standards

Conflict of interest None of the authors have any conflicts of interest pertaining to this work.

References

1. Talukdar R. Complications of ERCP. *Best Pract Res Clin Gastroenterol*. 2016;30:793–805.
2. Manoharan D, Srivastava DN, Gupta AK, et al. Complications of endoscopic retrograde cholangiopancreatography: an imaging review. *Abdom Radiol (NY).* 2019. (Epub ahead of print).
3. Zizzo M, Lanaia A, Barbieri I, et al. Subcapsular hepatic hematoma after endoscopic retrograde cholangiopancreatography. *Medicine*. 2015;94:1041.
4. Imperatore N, Micheletto G, Menes G, et al. Systematic review: features, diagnosis, management and prognosis of hepatic hematoma, a rare complication of ERCP. *Dig Liver Dis*. 2018;50:997–1003.
5. Petit-Laurent F, Scalone O, Penigaud M, et al. Sub-capsular hepatic hematoma after ERCP: case report and literature review. *Gastroenterol Clin Biol*. 2007;31:750–752.
6. De La Serna-Higuera C, Fuentes A, Rodríguez S, et al. Subcapsular hepatic hematoma secondary to the use of hydrophilic guidewires during endoscopic retrograde cholangiopancreatography. *Gastroenterol Hepatol*. 2008;31:266–267. **(article in Spanish)**.
7. Baudet JS, Arguiñarena X, Redondo I, et al. Subcapsular hepatic hematoma: an uncommon complication of endoscopic retrograde cholangiopancreatography. *Gastroenterol Hepatol*. 2011;34:79–82.
8. Del-Moral-Martínez M, Delgado-Maroto A, Cervilla-Sáez-de-Tejada ME, et al. Hepatic hematoma after ERCP: two new case reports. *Rev Esp Enferm Dig*. 2017;109:470–473.
9. Veitch AM, Vanbiervliet G, Gershlick AH, et al. Endoscopy in patients on antiplatelet or anticoagulant therapy, including direct oral anticoagulants: British Society of Gastroenterology (BSG) and European Society of Gastrointestinal Endoscopy (ESGE) guidelines. *Endoscopy*. 2016;48:385–402.
10. Veitch AM, Vanbiervliet G, Gershlick AH, et al. Endoscopy in patients on antiplatelet or anticoagulant therapy, including direct oral anticoagulants: British Society of Gastroenterology (BSG) and European Society of Gastrointestinal Endoscopy (ESGE) guidelines. *Gut.*. 2016;65:374–389.
11. Fujita M, Shiotani A, Murao T, et al. Safety of gastrointestinal endoscopic biopsy in patients taking antithrombotics. *Dig Endosc*. 2015;27:25–29.
12. Servide MJ, Prieto M, Marquina T. Hepatic subcapsular hematoma: a rare late complication after ERCP. *Rev Esp Enferm Dig*. 2016;108:234–235. **(article in Spanish)**.
13. Orellana F, Irarrazaval J, Galindo J, et al. Subcapsular hepatic hematoma post ERCP: a rare or an underdiagnosed complication? *Endoscopy*. 2012;44:108–109.
14. Horn TL, Pena LR. Subcapsular hepatic hematoma after ERCP: case report and review. *Gastrointest Endosc*. 2004;59:594–596.
15. Ertuğrul I, Parlak E, Ibiş M, et al. An unusual complication of endoscopic retrograde cholangiopancreatografy. *Dig Dis Sci*. 2006;51:1167–1168.
16. Oliveira-Ferreira A, Tato-Marinho R, Velosa J, et al. Infected hepatic hematoma 10 days after ERCP. *Endoscopy*. 2013;45:402–403.
17. Del Pozo D, Moral I, Poves E, et al. Subcapsular hepatic hematoma following ERCP: case report and review. *Endoscopy*. 2011;43:164–165.
18. Klìmovà K, Padilla Suárez C, González Asanza C, et al. Subcapsular hepatic hematoma after ERCP: a case report and revision of literature. *Sci Res*. 2014;3:161–166.
19. Chaib E, Fligelman Kanas A, Henrique Ferreira Galvão FH, et al. Bile duct confluence: anatomic variations and its classification. *Surg Radiol Anat*. 2014;36:105–109.
20. Fei BY, Li CH. Subcapsular hepatic haematoma after endoscopic retrograde cholangiopancrea-tography: an unusual case. *World J Gastroenterol*. 2013;19:1502–1504.
21. Ortega Deballon P, Fernández Lobato R, García Septiem J, et al. Liver hematoma following endoscopic retrograde cholangiopancreatography (ERCP). *Surg Endosc*. 2000;14:767–768.
22. Bhati CS, Inston N, Wigmore SJ, et al. Subcapsular intrahepatic hematoma: an unusual complication of ERCP. *Endoscopy*. 2007;39:150.
23. Chi KD, Waxman I. Subcapsular hepatic hematoma after guide wire injury during endoscopic retrograde cholangiopancreatography: management and review. *Endoscopy*. 2004;36:1019–1021.
24. Priego P, Rodríguez G, Mena A, et al. Subcapsular liver hematoma after ERCP. *Rev Esp Enferm Dig*. 2007;99:53–54.
25. McArthur KS, Mills PR. Subcapsular hepatic hematoma after ERCP. *Gastrointest Endosc*. 2008;67:379–380.
26. Cárdenas A, Crespo G, Balderramo D, et al. Subcapsular liver hematoma after endoscopic retrograde cholangiopancreatography in a liver transplant recipient. *Ann Hepatol*. 2008;7:386–388.
27. Nari GA, Preciado VJ, Rosendo BN. A rare complication of ERCP: sub-capsular liver haematoma. *Cirugia Española*. 2009;85:261–262.
28. Revuelto Rey J, Gordillo Escobar E, Batalha P. Subcapsular hepatic hematoma after ERCP. *Med Intensiva*. 2010;34:224.
29. Pérez-Legaz J, Santos J, Ruiz-Tovar J. Subcapsular hepatic hematoma after ERCP (endoscopic retrograde cholangipancreatography). *Rev Esp Enferm Dig*. 2011;103:550–551.
30. Carrica SA, Belloni R, Baldoni F, et al. Intraparenchymal hepatic haematoma after endoscopic retrograde cholangiopancreotography overinfected by *Citrobacter freundii* and *Klebsiella pneumoniae* BLEE. *Acta Gastroenterol Latinoam.*. 2014;44:125–128.
31. González-López R, García-Cano E, Espinosa-González O, et al. Surgical treatment for liver haematoma following endoscopic retrograde cholangiopancreatography; An unusual case. *Cirurgia y Cirujanos*. 2015;83:506–509.