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BILIOUS PLEURAL EFFUSION FOLLOWING CHOLECYSTOSTOMY IN AN IMMUNOCOMPROMISED ELDERLY MALE

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ABSTRACT

A biliopleural fistula (BPF) is a rare, potentially life-threatening complication of hepatobiliary interventions, often presenting as bilious pleural effusion. Prompt diagnosis is essential, particularly in immunocompromised patients. We report a 74-year-old male with thrombotic thrombocytopenic purpura (TTP) who developed acute acalculous cholecystitis during treatment with plasmapheresis and rituximab. Due to severe thrombocytopenia, a percutaneous cholecystostomy was performed. Two days later, he developed a right-sided pleural effusion with recurrent fever. Thoracentesis yielded bilious fluid, and imaging revealed a hepatic abscess with a fistulous tract. The patient was treated with chest tube drainage, broad-spectrum antibiotics and endoscopic retrograde cholangiopancreatography (ERCP) for biliary decompression. This multidisciplinary approach led to closure of the fistula and full clinical recovery. This case highlights the importance of considering BPF in patients with new pleural effusion following hepatobiliary procedures. Early pleural fluid bilirubin analysis, targeted imaging and coordinated management with drainage and ERCP are crucial for favourable outcomes in high-risk patients.

KEYWORDS

Biliopleural fistula, bilothorax, cholecystostomy, thrombotic thrombocytopenic purpura, immunocompromised

LEARNING POINTS

- Biliopleural fistula should be suspected in patients with new right-sided pleural effusion after hepatobiliary intervention, particularly in immunocompromised hosts.
- Pleural fluid bilirubin analysis and advanced imaging are crucial for early diagnosis.
- A multidisciplinary management strategy incorporating ERCP and drainage is key to favourable outcomes.

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INTRODUCTION

A biliopleural fistula (BPF) is defined as the pathological communication between the biliary tract and the pleural cavity, resulting in the presence of bile within the pleural space. It is a rare but significant complication, most often secondary to trauma, hepatobiliary surgery, liver abscesses or invasive procedures[1]. Its rarity and non-specific presentation often delay diagnosis, leading to potentially severe complications such as sepsis and respiratory compromise. In recent years, minimally invasive hepatobiliary interventions such as percutaneous cholecystostomy have been increasingly used in high-risk surgical candidates[2]. While effective, these procedures can predispose patients to unique complications, including bile leaks and fistula formation, particularly in individuals with impaired immunity or healing capacity[3]. Patients with thrombotic thrombocytopenic purpura (TTP) undergoing immunosuppressive therapy represent a high-risk group.

This report describes a rare case of bilious pleural effusion secondary to BPF following percutaneous cholecystostomy in an immunocompromised elderly male. We highlight the diagnostic challenges, management strategies and the importance of early multidisciplinary intervention in preventing adverse outcomes.

CASE DESCRIPTION

A 74-year-old male with a medical history of hypertension, type 2 diabetes mellitus and newly diagnosed TTP presented with generalised fatigue, myalgia and laboratory findings consistent with haemolysis, thrombocytopenia and anaemia[2]. He was treated with plasmapheresis and rituximab. Six days into hospitalisation, he developed right upper quadrant pain, fever (38.4°C) and elevated inflammatory markers, including C-reactive protein (28 mg/dl) and procalcitonin (2.12 ng/ml). Liver function tests revealed aspartate aminotransferase of 474 U/l and alanine transaminase of 399 U/l.

Abdominal ultrasound and a hepatobiliary iminodiacetic acid scan confirmed acute acalculous cholecystitis[4]. Due to severe thrombocytopenia (platelets 34,000/µl) surgical cholecystectomy was deferred, and a percutaneous cholecystostomy tube was placed. Broad-spectrum antibiotics (meropenem) were initiated. Two days later, the patient developed recurrent fever and worsening right upper quadrant pain. Computed tomography (CT) imaging showed a 7.4 × 6.7 × 4.9 cm multiloculated hepatic abscess adjacent to the gallbladder fossa, as well as a new right-sided pleural effusion. Thoracentesis yielded 300 ml of bilious fluid, with pleural fluid bilirubin measuring 6.5 mg/dl (pleural-to-serum ratio >1), confirming bilothorax due to BPF[5]. The patient underwent chest tube drainage and continued antibiotic therapy. ERCP was performed to evaluate and decompress the biliary system[4]. Subsequent imaging CT and magnetic resonance imaging (MRI) confirmed resolution of the abscess and closure of the fistula. He was discharged in stable condition and remained asymptomatic on follow-up.

DISCUSSION

BPF remains a diagnostic challenge due to its rarity and non-specific symptoms, which often mimic infectious or pulmonary processes[1]. The diagnosis hinges on the detection of bile in pleural fluid, typically when pleural fluid bilirubin exceeds serum bilirubin levels. Imaging modalities such as CT, MRI and ERCP are invaluable for delineating the source of the leak and guiding intervention[6].

In immunocompromised patients, such as those with TTP or those receiving immunosuppressive therapy, impaired tissue healing and a heightened risk of infection contribute to complications such as BPF[3]. Management is usually multidisciplinary, involving interventional radiology, gastroenterology and thoracic teams. The cornerstone of treatment includes pleural and abdominal drainage, broad-spectrum antibiotics and biliary decompression via ERCP[4,6]. Recent studies emphasise the importance of early endoscopic intervention. ERCP, with sphincterotomy or stent placement, helps reduce biliary pressure and promotes healing of the fistula. Non-operative management is highly effective in most cases, although surgery may be reserved for persistent or complicated cases[7].

CONCLUSION

BPF is a rare but serious complication following hepatobiliary procedures, particularly in immunocompromised patients. Clinicians should maintain a high index of suspicion in cases of unexplained pleural effusion after biliary interventions. Early diagnosis using pleural fluid bilirubin analysis, timely imaging and a coordinated multidisciplinary approach – incorporating drainage, antibiotics and ERCP – are essential for favourable outcomes.

REFERENCES

1. Acharya R, Kafle S, Sedhai YR, Shrestha DB, Walsh K, Shamsi WE, et al. Bilothorax: A case report and systematic literature review of the rare entity. *Pulm Med* 2024;**2024**:3973056. doi: 10.1155/2024/3973056
2. Kazemi K, Rasekhi A, Nazari SS, Lashkarizadeh MM, Shamsaeefar A, Alikhani M, et al. Nonoperative management of biliopleural fistula following living-donor liver transplantation: a case report. *Clin Case Rep* 2023;**11**:e8210. doi: 10.1002/ccr3.8210
3. Tesfaye S, Tiruneh AG, Tesfaye M, Gulilat D. Biliopleural fistula after penetrating thoracoabdominal injury: A case report. *Int J Surg Case Rep* 2022;**94**:107126. doi: 10.1016/j.ijscr.2022.107126
4. Marcos-Ramírez ER, Téllez-Aguilera A, Ramírez-Morín MA, Treviño-Martínez MI, Vásquez-Fernández F, Hernández-Guedea MA, et al. Endoscopic retrograde cholangiopancreatography for treatment of biliopleural fistulas. *Cir Cir* 2021;**89**:89-96. doi: 10.24875/CIRU.20000055
5. Srivali N, De Giacomi F. Bilothorax: A rare complication of gallstone disease. *Arch Bronconeumol (Engl Ed)* 2021;**57**:433. doi: 10.1016/j.arbr.2020.08.018
6. Yang Y, Chen Q, Hu Y, Zhao L, Cai P, Guo S. Cholecystopleural fistula: A case report and literature review. *Medicine (Baltimore)* 2024;**103**:e39366. doi: 10.1097/MD.0000000000039366
7. Chen DX, Chen SX, Zhang GJ, Liang YW, Han YM, Zhai YQ, et al. Endoscopic management of bile duct leaks: Current strategies and controversies. *World J Gastrointest Endosc* 2025;**17**:110172. doi: 10.4253/wjge.v17.i10.110172