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Pyogenic Liver Abscess Following ERCP and Biliary Stenting: A Case Series of Two Patients and Clinical Implications

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Case Report

Keywords: Endoscopic retrograde cholangiopancreatography, pyogenic liver abscess, biliary stent, endoscopic sphincterotomy, percutaneous drainage

Posted Date: September 24th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10317996/v1

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Additional Declarations: No competing interests reported.

Abstract

Introduction: Endoscopic retrograde cholangiopancreatography (ERCP) is a critical diagnostic and therapeutic modality for choledocholithiasis, acute cholangitis, and obstructive jaundice. Although pyogenic liver abscess is a rare complication following ERCP, it carries significant clinical implications. We present two cases of pyogenic liver abscess developing after ERCP and biliary stent-related procedures in patients with choledocholithiasis.

Case Presentation: Case 1 involved a 42-year-old female who developed a liver abscess in segment 4 following laparoscopic cholecystectomy, common bile duct exploration, intraoperative ERCP with stent placement, primary closure of the common bile duct, and drainage of a segment 4 hepatic cyst. The abscess manifested after stent removal and balloon sweeping of the bile duct, presenting with right upper quadrant pain, chills, and fever up to 39°C. Computed tomography (CT) confirmed a liver abscess in segment 4. Case 2 involved a 62-year-old male who underwent ERCP with sphincterotomy, basket stone extraction, and biliary stent placement for choledocholithiasis with obstructive jaundice. On postoperative day 6, he developed right upper quadrant pain, chills, and fever up to 39°C. CT revealed a new 32 mm × 26 mm abscess in the right hepatic lobe, with markedly elevated procalcitonin (63.7 ng/mL) and renal dysfunction. Both patients improved after percutaneous drainage, and Escherichia coli and Klebsiella pneumoniae were isolated from abscess cultures in both cases.

Conclusion: Although rare, pyogenic liver abscess should be considered in patients with biliary infection, stent placement or removal, sphincterotomy, complex biliary surgery, or pre-existing hepatic cystic lesions following ERCP. Early imaging evaluation with ultrasonography or contrast-enhanced CT is warranted when postoperative abdominal pain, chills, high fever, elevated inflammatory markers, or cholestasis abnormalities occur. Image-guided percutaneous drainage, combined with appropriate antimicrobial therapy, serves as an effective minimally invasive intervention for source control.

Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is an essential diagnostic and therapeutic procedure for common bile duct stones, acute cholangitis, and obstructive jaundice. However, it is associated with adverse events including pancreatitis, hemorrhage, perforation, and infection [1]. Pyogenic liver abscess is an uncommon early complication following ERCP, with isolated case reports documented in the literature [2, 3]. The pathogenesis may involve disruption of the duodenal-biliary barrier, bacterial colonization of the biliary tree, biliary stasis, biofilm formation on stents, residual stones, or inadequate biliary drainage. Case series and cohort studies have suggested that the risk of liver abscess may persist following endoscopic sphincterotomy and other biliary interventions [4–6]. We herein report two patients who developed pyogenic liver abscess after ERCP to enhance awareness of the clinical presentation and the importance of early imaging evaluation.

Case Presentation

Case 1

A 42-year-old female was admitted for comprehensive management of acute severe necrotizing pancreatitis complicated by gallbladder stones, common bile duct stones, and biliary dilation. Baseline CT demonstrated a 10 mm × 7 mm stone in the pancreatic segment of the common bile duct and a 7 mm cystic hypodense lesion in hepatic segment 4. On April 13, 2026, she underwent laparoscopic cholecystectomy, common bile duct exploration, intraoperative ERCP with biliary stent placement, primary closure of the common bile duct, and incision and drainage of the segment 4 hepatic cyst. On May 23, 2026, stent removal and cholangiography were performed, with balloon sweeping of the bile duct during the procedure.

Postoperatively, the patient developed right upper quadrant pain, chills, and high fever with a peak temperature of 39°C. Laboratory investigations on June 7, 2026, revealed a white blood cell count of 12.36 × 10^9/L, neutrophils 77.9%, high-sensitivity C-reactive protein (hs-CRP) 102.88 mg/L, alkaline phosphatase (ALP) 400 U/L, and gamma-glutamyl transferase (GGT) 191 U/L.(Figure. 4) Contrast-enhanced CT demonstrated a significantly enlarged abnormal density lesion in hepatic segment 4, consistent with a liver abscess, with subcapsular fluid collection. Ultrasonography confirmed a mixed echogenic area in segment 4. Ultrasound-guided percutaneous drainage was performed the following day, and culture of the drained pus yielded Escherichia coli and Klebsiella pneumoniae. Empiric antimicrobial therapy with ceftazidime was administered preoperatively (March 29 and April 13) and continued postoperatively (April 14–20). The drainage catheter remained in place for 4 days (April 14–17), with a total drained volume of 40 mL (10 mL on the first day over 18 hours 20 minutes, 5 mL on the second day, 20 mL on the third day, and 5 mL on the fourth day). Follow-up CT on June 14, 2026, demonstrated marked reduction of the abscess cavity to 18 mm × 12 mm. The patient's clinical condition improved steadily, and she was discharged on June 16, 2026. At 4-week outpatient follow-up, she remained asymptomatic with normal inflammatory markers and no radiographic evidence of abscess recurrence(Figure. 1).

Case 2

A 62-year-old male was admitted for gallbladder stones with common bile duct stones and obstructive jaundice. Laboratory tests showed alanine aminotransferase (ALT) 526 U/L, aspartate aminotransferase (AST) 179 U/L, and total bilirubin 307.6 μmol/L. Magnetic resonance imaging confirmed a distal common bile duct stone with intrahepatic and extrahepatic biliary dilation. On April 4, 2026, he underwent duodenoscopic sphincterotomy, basket stone extraction, and biliary stent placement.(Figure. 3)

On postoperative day 6 (April 10, 2026), the patient developed right upper quadrant pain, chills, and high fever with a peak temperature of 39°C. Postoperative CT, compared with baseline imaging, revealed a new heterogeneous hypodense lesion in the right hepatic lobe measuring approximately 32 mm × 26 mm. Procalcitonin was markedly elevated at 63.7 ng/mL, and serum creatinine was 159 μmol/L. The

patient was diagnosed with pyogenic liver abscess, extrahepatic bile duct stones with cholangitis, and hepatic and renal insufficiency. He underwent percutaneous drainage of the liver abscess and comprehensive medical management. Culture of the drained abscess yielded Escherichia coli and Klebsiella pneumoniae. Empiric antimicrobial therapy with ceftriaxone was initiated on April 23 and continued through May 8. The percutaneous drainage catheter was removed after 2 days (April 30–May 1), with a cumulative drained volume of 50 mL (0 mL on the first day over 19 hours 15 minutes, 50 mL on the second day). The patient's fever resolved within 48 hours of drainage initiation. By May 7, 2026, procalcitonin had decreased to 0.06 ng/mL, hs-CRP to 10.12 mg/L, and total bilirubin to 40.3 μmol/L. He was discharged on May 8, 2026. At 4-week follow-up, the patient remained afebrile with normalized renal function and complete radiographic resolution of the abscess(Figure. 2).

Discussion

Both patients in this series developed right upper quadrant pain, chills, and high fever up to 39°C following ERCP and stent-related procedures for choledocholithiasis. Imaging confirmed pyogenic liver abscesses, and both patients improved after percutaneous drainage. Escherichia coli and Klebsiella pneumoniae were isolated from abscess cultures in both cases; Case 2 was additionally characterized by markedly elevated procalcitonin (63.7 ng/mL) and renal dysfunction. These findings collectively support a diagnosis of biliary-origin pyogenic liver abscess (Figure. 4).

The development of pyogenic liver abscess after ERCP likely results from multiple concurrent mechanisms. Endoscopic sphincterotomy compromises the anatomical barrier between the duodenum and biliary tree, increasing the risk of retrograde translocation of enteric bacteria. Previous cohort studies have demonstrated that patients with choledocholithiasis undergoing endoscopic sphincterotomy have a higher risk of liver abscess compared to other ERCP indications [4–6]. Plastic biliary stents may also serve as a nidus for bacterial biofilm formation; stent occlusion, residual stones, biliary stasis, or incomplete drainage can further promote infection [2, 3]. The isolation of enteric Gram-negative bacilli from both cases is consistent with the typical biliary infection spectrum and supports the hypothesis of procedure-related bacterial dissemination. In Case 1, the initial combined procedure included incision and drainage of a segment 4 hepatic cyst, and the subsequent abscess developed precisely in segment 4, suggesting possible secondary infection of the cyst drainage cavity.

Regarding diagnosis, the European Society of Gastrointestinal Endoscopy (ESGE) guidelines recommend abdominal ultrasonography or CT evaluation for patients with post-ERCP cholangitis; if conservative management fails, repeat ERCP should be considered with bile sampling for microbiological analysis [7]. In our series, both cases were identified through comparison of serial imaging studies: contrast-enhanced CT in Case 1 demonstrated significant enlargement of the segment 4 lesion, while CT in Case 2 revealed a new right lobe lesion not present on preoperative imaging. For patients with persistent postoperative abdominal pain, elevated CRP/procalcitonin, cholestasis laboratory abnormalities, or poor treatment response, contrast-enhanced CT is valuable for simultaneous evaluation of liver abscess, biliary obstruction, bile leak, stent position, and other complications.

The principles of management include source control, empiric antimicrobial therapy, and de-escalation based on culture results. Empiric regimens should typically cover Enterobacteriaceae, Streptococcus species, Enterococcus species, and anaerobes, with selection guided by local resistance patterns, prior biliary interventions, and renal function [8]. Abscess and blood cultures should ideally be obtained prior to antimicrobial adjustment. Both cases yielded Escherichia coli, providing etiologic confirmation and guiding targeted therapy. Both patients underwent image-guided percutaneous drainage with clinical improvement; systematic reviews have established percutaneous catheter drainage as an important minimally invasive modality for liver abscess management [9]. The optimal duration of antimicrobial therapy remains heterogeneous and should be individualized based on adequacy of drainage, bacteremia, abscess size, clinical response, and follow-up imaging [10].

For prevention and surveillance, routine pre-procedural antimicrobial prophylaxis is not recommended for all patients undergoing ERCP, but may be considered in cases of anticipated incomplete biliary drainage, severe immunosuppression, or cholangioscopy [7]. For patients with cholangitis, complex stones, multiple ERCP procedures, indwelling stents, or prior biliary surgery, meticulous documentation of drainage adequacy, residual stones, stent specifications, and planned removal date is essential. Patients should receive discharge education regarding warning signs including fever, chills, right upper quadrant pain, and jaundice.

Conclusion

Pyogenic liver abscess following ERCP and biliary stenting is rare, with clinical presentations ranging from chills, high fever, and right upper quadrant pain to isolated laboratory and imaging abnormalities. When infectious signs occur, early imaging evaluation should be pursued in the context of recent biliary intervention. Percutaneous needle aspiration or catheter drainage, combined with appropriate antimicrobial therapy, achieves effective source control. Comprehensive documentation of microbiology, antimicrobial agents, biliary drainage status, and imaging follow-up is essential for establishing causality, optimizing treatment, and generating high-quality case reports.

Declarations

Statement of Ethics

This study protocol was reviewed and approved by the Ethics Committee of the Second Affiliated Hospital of Hainan Medical University.

Ethics and Consent to Participate

Written informed consent was obtained from all patients for their participation in this case series. This study was conducted in accordance with the Declaration of Helsinki.

Consent to Publish

Written informed consent for publication of this case series, including the details of their medical cases and any accompanying images, was obtained from **all patients** under the relevant Creative Commons license (such that they will be freely available on the internet). A copy of the signed consent form will be made available for review by the Editor-in-Chief of this journal on request. The completed consent forms will not be sent unless requested.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

This study was not supported by any sponsor or funder.

Author Contributions

Chun qing Fu and Yu peng Li contributed to data collection and manuscript drafting Yu peng Li andDong ming Li contributed to patient management and clinical data interpretation Xian ke Lin and Bo Ran contributed to study design, critical revision of the manuscript, and final approval of the version to be published. All authors read and approved the final manuscript.

Acknowledgements

The authors would like to express their gratitude to the multidisciplinary team of the Department of Hepatobiliary Surgery for their dedicated patient care and clinical support.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

References

1. Rivas A, Pherwani S, Mohamed R, et al. ERCP-related adverse events: incidence, mechanisms, risk factors, prevention, and management. Expert Rev Gastroenterol Hepatol. 2023;17(11):1101–1116. doi:10.1080/17474124.2023.2277776.
2. Asenov Y, Jelev G, Vasilev I, et al. Percutaneous drainage of a post-ERCP liver abscess: successful management of a rare complication—a case report. Clin Case Rep. 2026;14(1):e71814. doi:10.1002/ccr3.71814.
3. Ren W, Wei Y, Lian G, et al. Lactobacillus plantarum liver abscess following ERCP: a case report and review. BMC Infect Dis. 2025;25(1):704. doi:10.1186/s12879-025-11094-z.
4. Liu AC, Tai WC, Chiu SM, et al. The clinical presentations of liver abscess development after endoscopic retrograde cholangiopancreatography with choledocholithiasis: a 17-year follow-up.

Infect Drug Resist. 2023;16:6167–6174. doi:10.2147/IDR.S428125.

5. Wu CK, Hsu CN, Cho WR, et al. Increased risk of pyogenic liver abscess after endoscopic sphincterotomy for treatment of choledocholithiasis. Infect Drug Resist. 2021;14:2121–2131. doi:10.2147/IDR.S312545.
6. Peng YC, Lin CL, Sung FC. Risk of pyogenic liver abscess and endoscopic sphincterotomy: a population-based cohort study. BMJ Open. 2018;8:e018818. doi:10.1136/bmjopen-2017-018818.
7. Dumonceau JM, Kapral C, Aabakken L, et al. ERCP-related adverse events: European Society of Gastrointestinal Endoscopy (ESGE) Guideline. Endoscopy. 2020;52(2):127–149. doi:10.1055/a-1075-4080.
8. Gomi H, Solomkin JS, Schlossberg D, et al. Tokyo Guidelines 2018: antimicrobial therapy for acute cholangitis and cholecystitis. J Hepatobiliary Pancreat Sci. 2018;25(1):3–16. doi:10.1002/jhbp.518.
9. Lin JW, Chen CT, Hsieh MS, et al. Percutaneous catheter drainage versus percutaneous needle aspiration for liver abscess: a systematic review, meta-analysis and trial sequential analysis. BMJ Open. 2023;13:e072736. doi:10.1136/bmjopen-2023-072736.
10. Curran J, Mulhall C, Pinto R, Bucheeri M, Daneman N. Antibiotic treatment durations for pyogenic liver abscesses: a systematic review. JAMMI. 2023;8(3):224–235. doi:10.3138/jammi-2023-0004.

Figures

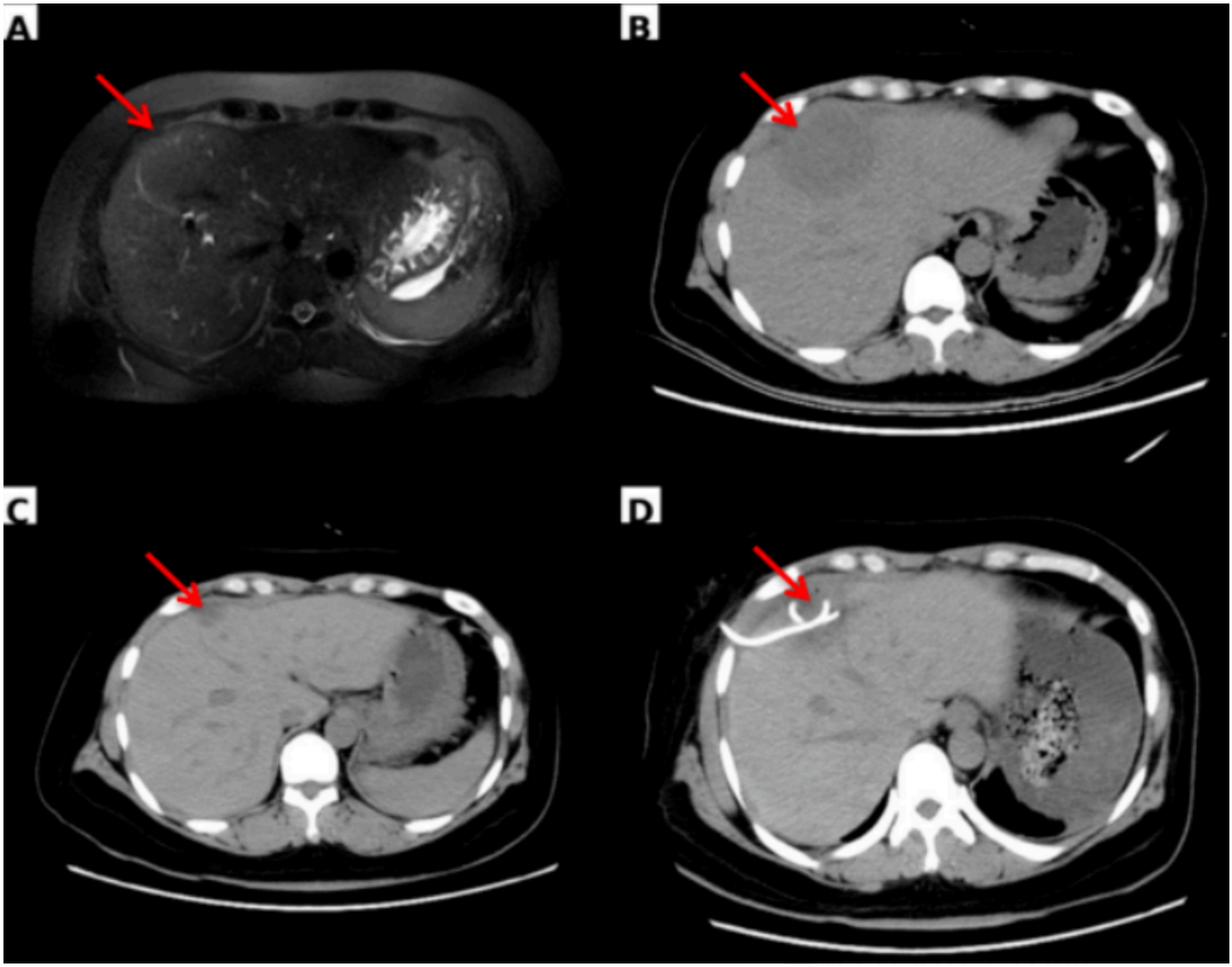


Figure 1

Imaging evolution of the patient. **(A)** Preoperative CT demonstrating a hepatic S4 cyst. **(B)** Postoperative CT after incision and drainage of the hepatic cyst. **(C)** CT obtained after stent removal with symptom onset, showing a hepatic S4 abscess. **(D)** Post-drainage CT showing reduction of the abscess cavity.

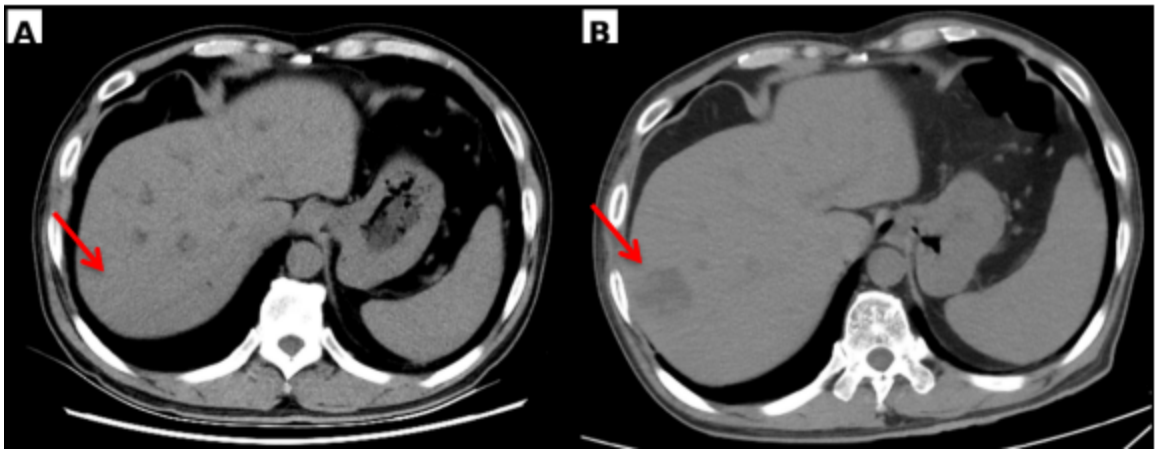


Figure 2

(A) Preoperative CT before ERCP, no abscess in the right hepatic lobe

(B) Post-ERCP CT, showing a newly developed hepatic abscess in the right lobe measuring approximately 32 mm × 26 mm

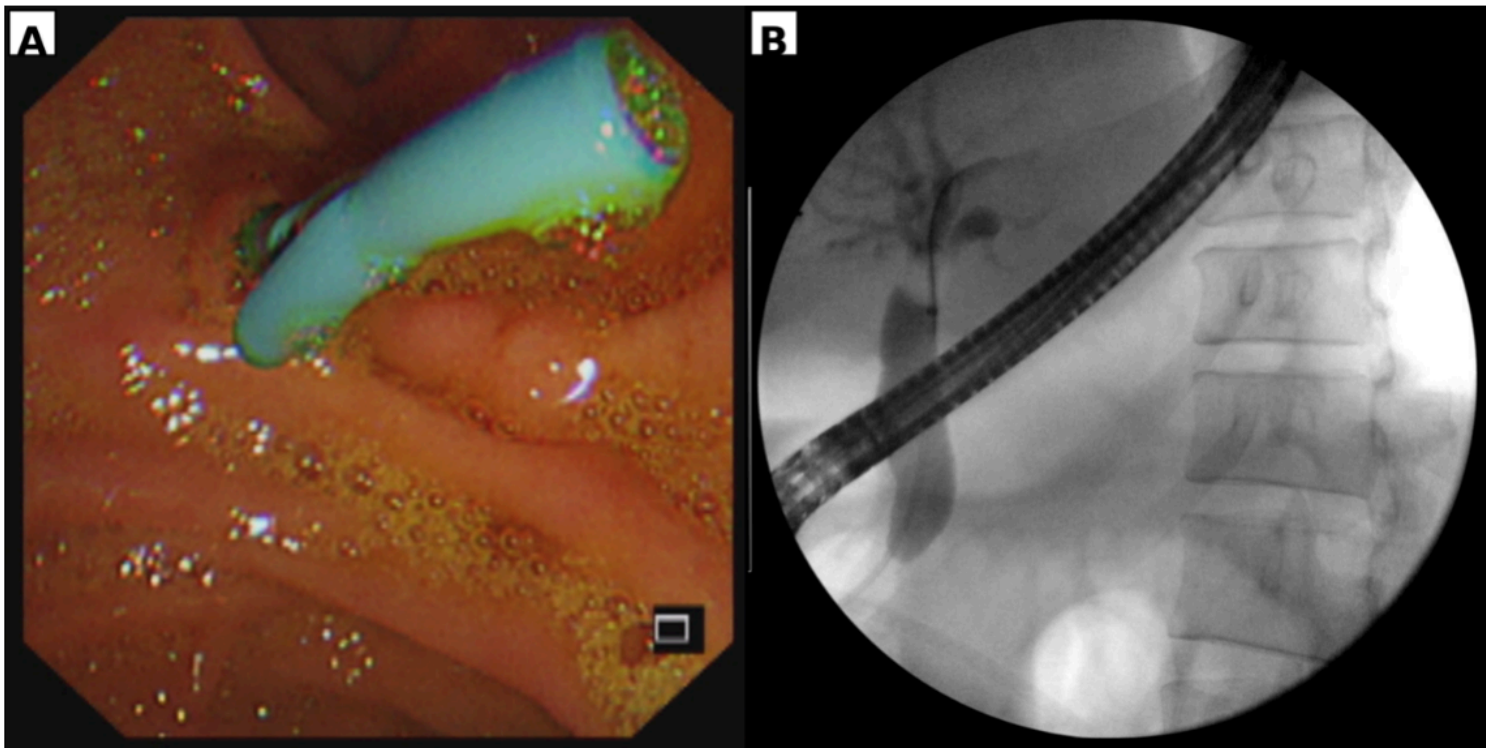


Figure 3

Stent removal and balloon sweeping of the bile duct

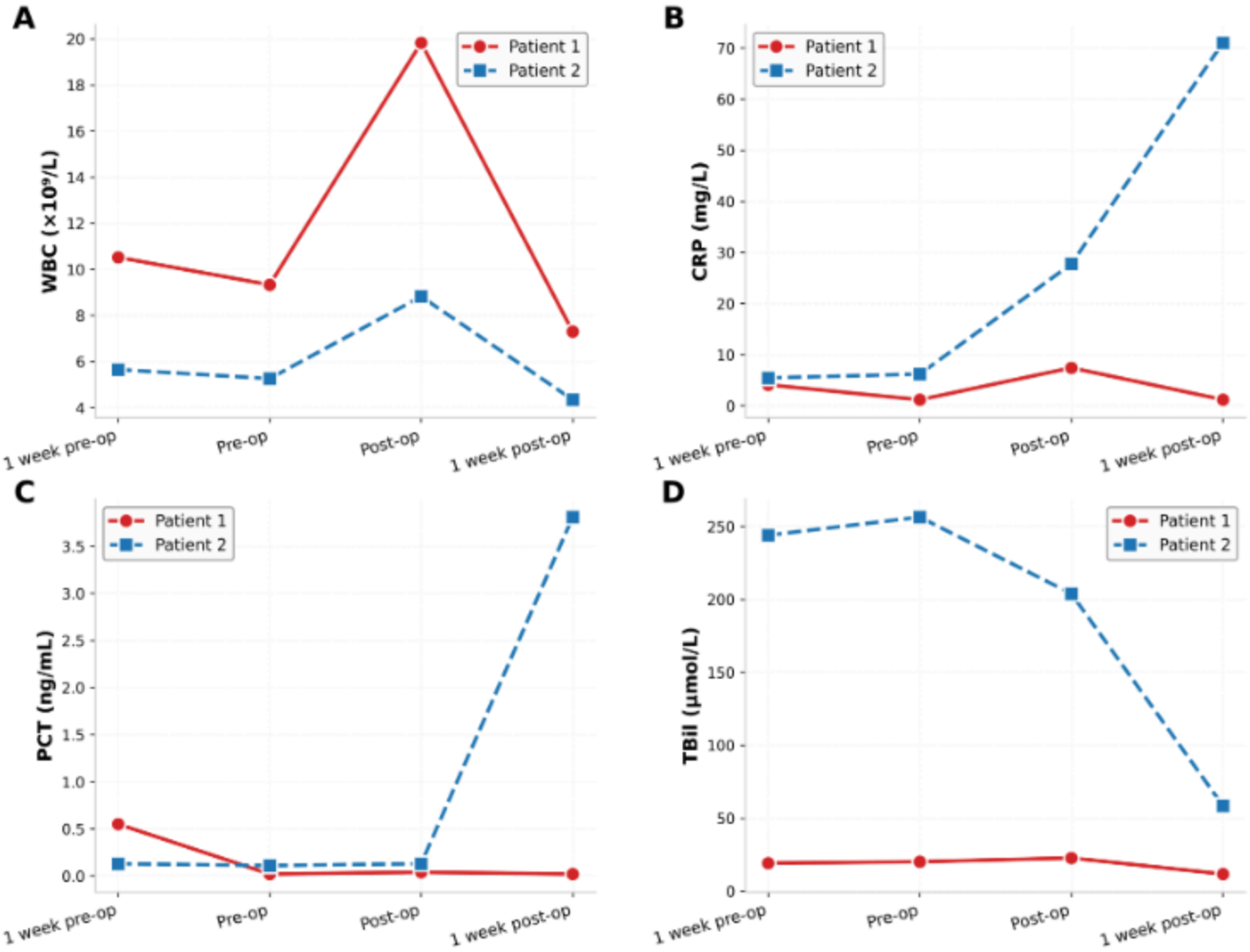


Figure 4

Changes in clinical indicators for both patients. **(A)** White blood cell (WBC) count. **(B)** C-reactive protein (CRP). **(C)** Procalcitonin (PCT). **(D)** Total bilirubin (TBil). Both patients showed elevated inflammatory markers after ERCP, with distinct temporal patterns.