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Third-Redo Laparoscopic Roux-en-Y Hepaticojejunostomy for Recurrent Anastomotic Stones: A Video-Based Case Report

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Data Interpretation D
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Conflict of interest: None declared

Patient: Female, 41-year-old
Final Diagnosis: Choledocholithiasis
Symptoms: Fever • icterus • pain
Clinical Procedure: —
Specialty: Surgery
Objective: Unusual clinical course

Background: Redo surgery after Roux-en-Y hepaticojejunostomy is technically demanding due to dense intra-abdominal adhesions and distorted anatomy. Repeated laparoscopic reoperations for recurrent biliary stones remain rarely reported, especially in patients undergoing multiple revisions. This study presents a video-based case highlighting technical strategies for a third laparoscopic redo hepaticojejunostomy.

Case Report: A 41-year-old woman with a history of laparoscopic Roux-en-Y hepaticojejunostomy presented with recurrent biliary stones, most likely secondary to progressive anastomotic stricture leading to bile stasis. She had previously undergone 2 laparoscopic revisions due to early recurrence. Imaging revealed a large filling defect above the previous anastomosis. A third laparoscopic exploration was performed. Severe adhesions were carefully dissected, and the previous anastomosis was identified with the assistance of indocyanine green fluorescence imaging. The impacted stone was removed, and intraoperative choledochoscopy confirmed complete clearance of the intrahepatic bile ducts. Reconstruction was performed using interrupted 4-0 polydioxanone sutures with a mucosa-to-mucosa technique, ensuring a wide and tension-free anastomosis to reduce the risk of restenosis. The postoperative course was uneventful. During the 6-month follow-up period, she remained asymptomatic without episodes of cholangitis or jaundice, and imaging confirmed a patent anastomosis with no evidence of stone recurrence.

Conclusions: A third laparoscopic redo hepaticojejunostomy can be feasible in carefully selected patients. Adequate anastomotic diameter, meticulous adhesiolysis, and precise identification of the previous anastomosis are critical to minimizing recurrence. Indocyanine green fluorescence imaging can be a useful adjunct in complex redo biliary surgery.

Keywords: Choledochostomy • Gallstones • Laparoscopy • Reoperation
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Introduction

Laparoscopic Roux-en-Y hepaticojejunostomy is widely performed for the management of benign and malignant biliary diseases, including bile duct injury [1,2], biliary strictures, and choledocholithiasis. Although this procedure provides effective biliary drainage, biliary-enteric anastomotic complications such as anastomotic stricture and recurrent biliary stones remain significant long-term concerns. Previous studies have reported that the incidence of anastomotic stricture after hepaticojejunostomy ranges from 2.6% to 11.9% [2], often leading to bile stasis and subsequent stone formation.

Management of recurrent stones after biliary-enteric reconstruction is challenging [3]. Endoscopic or percutaneous interventions may be attempted in selected patients; however, surgical revision is frequently required in cases of severe anastomotic stenosis or large impacted stones. Redo surgery following hepaticojejunostomy is technically demanding because of dense intra-abdominal adhesions, distorted anatomical landmarks, and an increased risk of vascular or biliary injury [2-4].

With the advancement of minimally invasive techniques, laparoscopic reoperation has gradually become feasible in experienced centers. Nevertheless, repeated laparoscopic revisions in the same patient remain rarely reported in the literature, particularly in cases involving multiple previous surgeries.

In this report, we present a rare case of recurrent biliary stones requiring a third laparoscopic redo Roux-en-Y hepaticojejunostomy. While previous studies have described redo hepaticojejunostomy, reports involving multiple consecutive laparoscopic revisions in the same patient remain extremely limited, and strategies to prevent repeated recurrence are not well established.

This case is of particular clinical relevance because repeated surgical interventions can create a vicious cycle of fibrosis, anastomotic narrowing, and stone recurrence, making subsequent procedures increasingly complex and prone to failure. Therefore, beyond demonstrating technical feasibility, this report aims to provide practical surgical insights into breaking this cycle.

Specifically, we highlight a set of technical strategies—including meticulous adhesiolysis, precise identification of the previous anastomosis with the aid of indocyanine green fluorescence imaging, and construction of a wide, tension-free mucosa-to-mucosa anastomosis—that can help reduce the risk of restenosis and further recurrence. These insights may be valuable for surgeons managing similarly challenging reoperative biliary cases.

Case Report

A 41-year-old woman with a history of laparoscopic Roux-en-Y hepaticojejunostomy was admitted to our hospital in December 2025 because of recurrent abdominal pain and intermittent fever lasting for more than 6 months. In 2022, she underwent laparoscopic Roux-en-Y hepaticojejunostomy for choledocholithiasis with common bile duct stricture, where the anastomosis was relatively narrow (less than 1 cm), performed using a continuous suturing technique. Six months after the initial surgery, follow-up magnetic resonance cholangiopancreatography (MRCP) revealed intrahepatic bile duct stones measuring approximately 1.9 cm, accompanied by stenosis at the bilioenteric anastomosis. She subsequently underwent a second laparoscopic exploration with stone removal and revision of the anastomosis.

Approximately 3 years after the second surgery, she again presented with recurrent symptoms, likely associated with progressive anastomotic stricture, resulting in bile stasis and stone formation. Physical examination revealed tenderness in the right upper quadrant without rebound tenderness. Laboratory tests showed mildly elevated liver enzymes (ALT 32 U/L, AST 44 U/L) and increased bilirubin levels (total bilirubin 26.4 μmol/L, direct bilirubin 7.1 μmol/L). Other laboratory parameters were within normal limits.

MRCP demonstrated a filling defect measuring approximately 3.3×2.3 cm located above the previous hepaticojejunostomy, suggesting recurrent biliary stones (**Figure 1**). Considering the patient's surgical history and imaging findings, a diagnosis of recurrent stones at the bilioenteric anastomosis was made.

Preoperative vascular assessment was performed using contrast-enhanced computed tomography to evaluate the hepatic artery and portal vein anatomy. After comprehensive preoperative evaluation and nutritional optimization, a third laparoscopic exploration with stone removal and reconstruction of the hepaticojejunostomy was planned.

Surgical Technique

Under general anesthesia, the patient was placed in a supine position with a slight reverse Trendelenburg tilt (**Figure 2A**). Pneumoperitoneum was established through a 12-mm trocar inserted above the umbilicus. Additional trocars were placed along the right and left subcostal margins to facilitate laparoscopic manipulation (**Figure 2B**).

Severe intra-abdominal adhesions caused by the patient's previous surgeries were encountered. Careful adhesiolysis was performed using a combination of blunt and sharp dissection with an ultrasonic scalpel to expose the subhepatic space.

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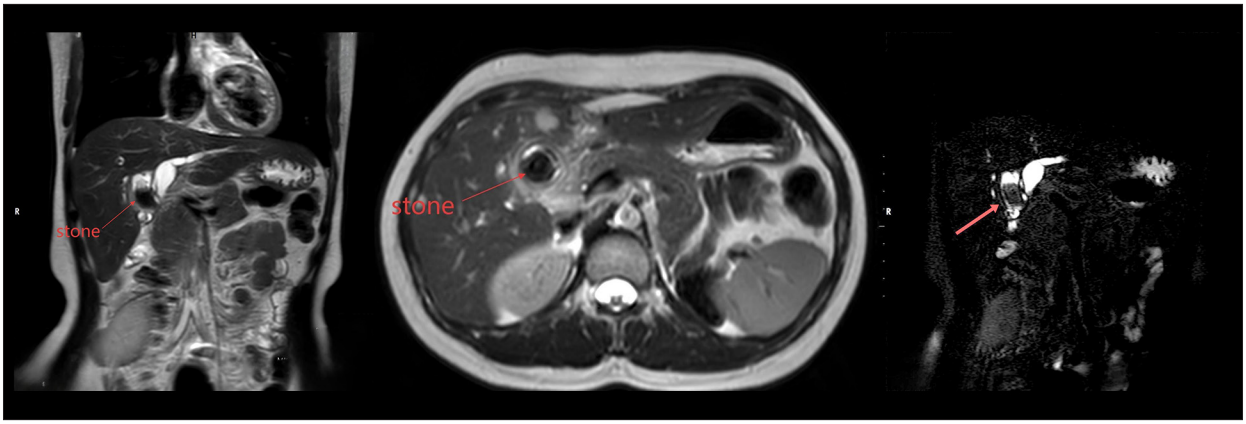

Figure 1. Magnetic resonance cholangiopancreatography demonstrating a large filling defect above the previous hepaticojejunostomy, consistent with a recurrent biliary stone.

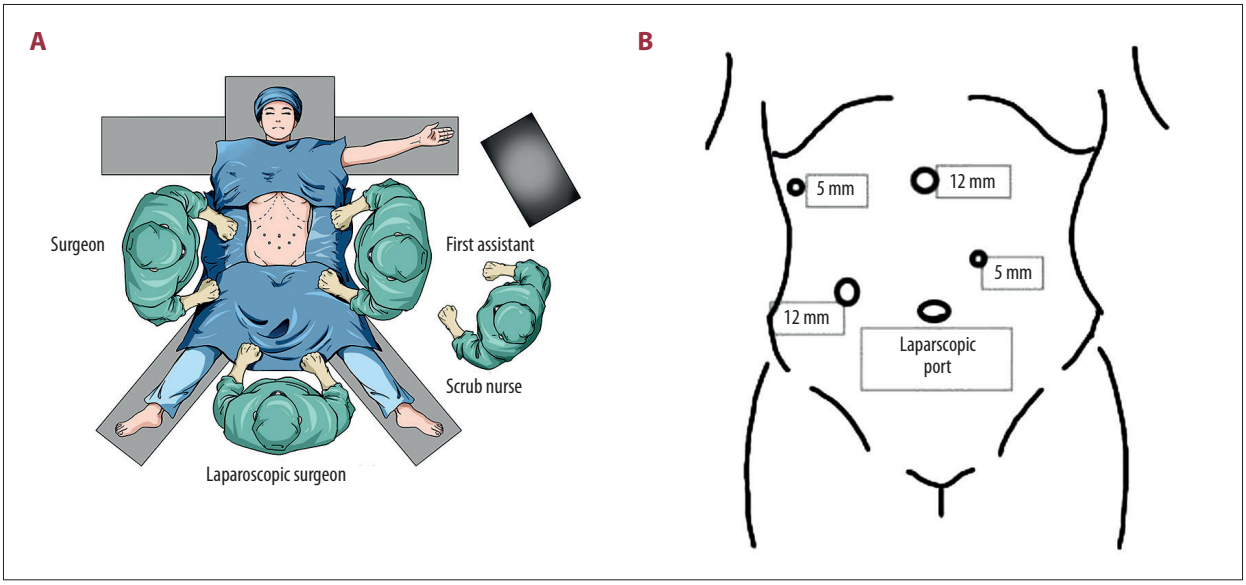

Figure 2. Surgical setup during the laparoscopic procedure. (**A**) Positioning of the surgical team. (**B**) Placement and configuration of laparoscopic trocars used for the redo hepaticojejunostomy.

Particular attention was paid to avoid injury to critical structures such as the hepatic artery, portal vein, and duodenum.

Identification of the previous bilioenteric anastomosis was challenging because of distorted anatomical landmarks. Initially, the Roux limb was traced proximally in an attempt to locate the anastomotic site. However, due to dense adhesions, the precise location remained unclear. Therefore, a quadrate lobe approach was adopted. In addition, indocyanine green (ICG) fluorescence imaging was used intraoperatively to assist in identifying the biliary tract and the previous anastomosis (**Figure 3D**).

After exposing the anastomotic site, a longitudinal incision of approximately 1.5 to 2.0 cm was made on the anterior wall of the previous hepaticojejunostomy (**Figure 3A**). A large impacted stone was identified and removed (**Figure 3B**). Intraoperative choledochoscopy was subsequently performed to examine the intrahepatic bile ducts and confirm complete stone clearance.

Reconstruction of the hepaticojejunostomy was performed using interrupted 4-0 polydioxanone absorbable sutures with a mucosa-to-mucosa technique. The diameter of the bile duct at the anastomotic site was greater than 0.8 cm, and therefore T-tube drainage was not required (**Figure 3C**). Special care was taken to ensure a tension-free anastomosis and a sufficiently wide lumen to reduce the risk of postoperative stricture (**Video 1**).

The total operative time was approximately 156 minutes, and the estimated blood loss was about 50 mL. The postoperative course was uneventful. The drainage tube was removed on postoperative day 5, and the patient was discharged on

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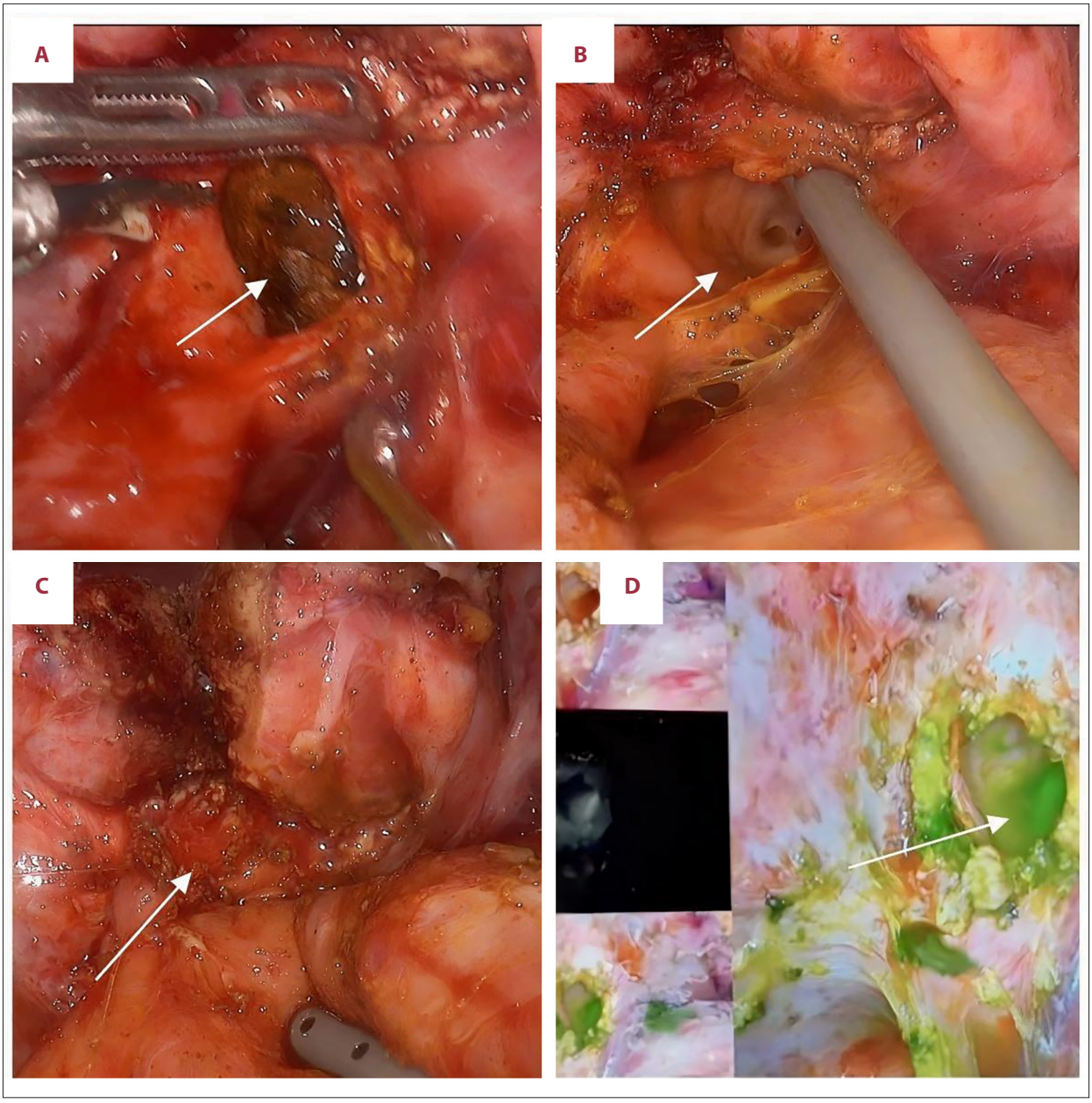

Figure 3. Key intraoperative findings and surgical steps during the redo laparoscopic hepaticojejunostomy. (**A**) The anterior wall of the previous bilioenteric anastomosis showing an impacted stone (white arrow). (**B**) The anastomotic site after complete stone removal and choledochoscopic exploration (white arrow). (**C**) Reconstruction of the hepaticojejunostomy using interrupted mucosa-to-mucosa sutures (white arrow). (**D**) Identification of the biliary tract using indocyanine green fluorescence imaging (white arrow).

postoperative day 8. No recurrence was observed during 6-month follow-up.

Technical considerations

Several technical points are important for successful redo laparoscopic hepaticojejunostomy:

1) Careful adhesiolysis is essential to prevent vascular injury.
2) Tracing the Roux limb can help identify the previous anastomosis.
3) ICG fluorescence imaging can facilitate anatomical orientation.
4) A sufficiently wide mucosa-to-mucosa anastomosis should be ensured to prevent postoperative stricture.

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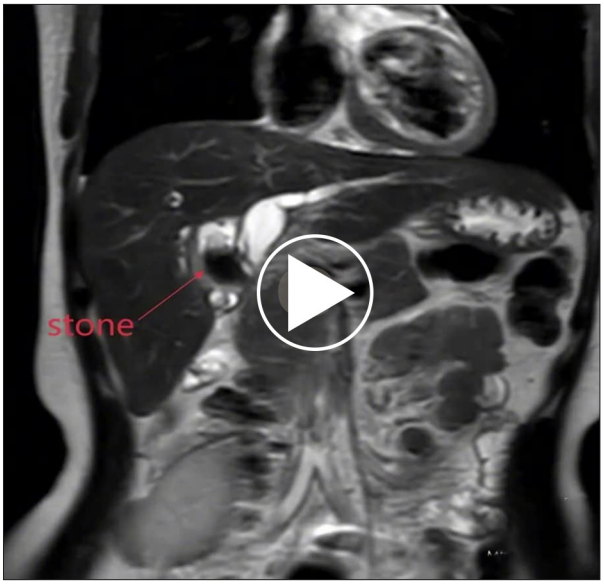

Video 1. Video demonstration of a third-redo laparoscopic Roux-en-Y hepaticojejunostomy. The video highlights key surgical steps including adhesiolysis in the subhepatic space, identification of the previous bilioenteric anastomosis using indocyanine green fluorescence imaging, removal of the impacted stone, and reconstruction of the hepaticojejunostomy.

Discussion

Biliary-enteric anastomotic stricture and recurrent stone formation are well-recognized long-term complications after Roux-en-Y hepaticojejunostomy [3-5]. Previous studies have reported that the incidence of anastomotic stricture ranges from 2.6% to 11.9% [4,6], which can subsequently lead to bile stasis and stone formation.

In patients undergoing repeated biliary reconstruction, the mechanism of recurrence is often multifactorial but follows a progressive and self-perpetuating pattern. In the present case, a relatively small initial anastomotic diameter likely predisposed the patient to early narrowing. Subsequent fibrosis and cicatricial contraction further reduced the luminal caliber, resulting in bile stasis. This impaired bile flow promotes bacterial colonization and stone formation, which in turn exacerbates local inflammation. Repeated surgical interventions can further compromise the microvascular supply at the anastomotic site, impair healing, and accelerate restenosis. These factors collectively form a "vicious cycle" in which anastomotic stricture, bile stasis, inflammation, and stone recurrence reinforce one another, ultimately leading to repeated clinical failure.

Breaking this cycle is essential to prevent further recurrence. In the present case, several technical strategies were deliberately employed to address each contributing factor. First, a wide, tension-free mucosa-to-mucosa anastomosis was constructed using interrupted sutures to maximize luminal diameter and reduce the risk of postoperative stenosis. Compared with previous operations, where the anastomosis was relatively narrow and created using continuous sutures, this approach prioritizes long-term patency. Second, meticulous adhesiolysis was performed to preserve the vascular supply around the anastomotic site, which is critical for optimal healing and prevention of ischemia-related fibrosis. Third, intraoperative choledochoscopy was used to confirm complete clearance of intrahepatic stones, thereby eliminating potential niduses for recurrence. Together, these measures directly target the key mechanisms of recurrence—luminal narrowing, impaired bile flow, residual stones, and compromised blood supply—and can help reduce the likelihood of further restenosis and stone formation.

Management of recurrent stones after bilioenteric anastomosis remains challenging [4]. Although endoscopic or percutaneous approaches can be effective in selected cases, surgical revision is frequently required when large impacted stones or significant anastomotic stenosis are present. Traditionally, open surgery has been considered the standard approach for redo procedures because of severe adhesions and distorted anatomical landmarks [5]. However, with advances in minimally invasive techniques and increasing surgical experience, laparoscopic reoperation has gradually become a feasible option in specialized centers.

Redo laparoscopic surgery is technically demanding due to dense intra-abdominal adhesions and altered anatomical landmarks. In this case, the patient had undergone 2 previous laparoscopic procedures, resulting in severe adhesions in the subhepatic space. Careful adhesiolysis using a combination of blunt and sharp dissection was essential to safely expose the operative field and avoid injury to major vascular structures such as the hepatic artery and portal vein [7]. These steps are critical to ensure procedural safety in complex re-operative settings [8,9].

Accurate identification of the previous bilioenteric anastomosis is a critical yet challenging step during redo surgery due to distorted anatomy and dense adhesions [4,10]. Conventional approaches, such as tracing the Roux limb, may be unreliable in this setting. In the present case, ICG fluorescence imaging was used as an adjunct to enhance intraoperative visualization of the biliary tract. ICG binds to plasma proteins and is excreted into bile, enabling real-time delineation of biliary anatomy under near-infrared imaging. This technique is especially valuable in complex re-operative scenarios, where anatomical landmarks are often obscured. Compared with conventional methods, ICG fluorescence imaging provides improved spatial orientation and can reduce the risk of inadvertent bile duct or vascular injury. Furthermore, it facilitates more precise

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localization of the anastomotic site, thereby contributing to safer and more efficient surgical dissection.

Conventional methods, such as tracing the Roux limb, may be insufficient in cases with extensive adhesions. In the present case, a quadrate lobe approach was adopted, which provided an alternative anatomical pathway to locate the anastomotic site. In addition, ICG fluorescence imaging was used to enhance intraoperative visualization of the biliary tract. ICG binds to plasma proteins and is excreted into bile, allowing real-time delineation of biliary anatomy under near-infrared imaging. This technique is particularly valuable in redo surgery, where normal anatomical landmarks are often obscured [11,12]. Previous studies have demonstrated that ICG fluorescence imaging can improve anatomical orientation and potentially reduce the risk of bile duct injury during complex hepatobiliary procedures. Another critical aspect of preventing further recurrence is the reconstruction of the hepaticojejunostomy [13]. In the present case, a wide, tension-free mucosa-to-mucosa anastomosis was created using interrupted sutures [14]. Ensuring an adequate anastomotic diameter is essential to reduce the risk of postoperative stenosis and bile stasis. In addition, intraoperative choledochoscopy was performed to confirm complete clearance of intrahepatic stones, which is important for minimizing the likelihood of residual stones serving as a nidus for recurrence [15]. Compared with previous operations, the emphasis in this procedure was placed on maximizing anastomotic patency and minimizing factors that can contribute to restenosis.

This case also highlights several important technical considerations for redo laparoscopic hepaticojejunostomy. First, meticulous adhesiolysis is fundamental to safely access the operative field. Second, alternative anatomical approaches, such as the quadrate lobe approach, may facilitate identification of the anastomosis when conventional methods fail. Third, adjunctive technologies such as ICG fluorescence imaging can enhance intraoperative navigation [10]. Finally, reconstruction should prioritize a wide, well-vascularized, and tension-free anastomosis to reduce the risk of recurrence.

Despite these findings, several limitations should be acknowledged. This report describes a single case; therefore, the generalizability of the conclusions is limited. In addition, the duration of postoperative follow-up is relatively short, and long-term outcomes remain to be determined. Further studies with larger sample sizes and longer follow-up are needed to validate the safety and efficacy.

Conclusions

This case demonstrates that a third laparoscopic redo Roux-en-Y hepaticojejunostomy can be technically achievable in highly selected patients when performed by experienced surgeons. However, given the complexity of re-operative biliary surgery and the limited evidence from a single case, these findings should be interpreted with caution. Our experience suggests that meticulous adhesiolysis, accurate identification of the previous anastomosis, and construction of a wide, tension-free mucosa-to-mucosa anastomosis are important for reducing the risk of recurrence. In addition, ICG fluorescence imaging can be a useful adjunct to improve intraoperative orientation in complex redo procedures. Further studies with larger cohorts and longer follow-up are required to validate these observations.

Department and Institution Where Work Was Done

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Patient Permission/Consent Declarations

The patient provided written informed consent for the use of clinical data in this manuscript.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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