

Case Report

Successful recanalization of disconnected donor and recipient ducts due to severe anastomotic biliary stricture after liver transplantation using the rendezvous technique: novel solution to an old problem

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ABSTRACT

Biliary strictures are a common adverse event (AE) following liver transplantation (LT) and can be challenging to manage when severe. Standard treatment with endoscopic retrograde cholangiopancreatography (ERCP) and stenting may fail and require alternative approaches. A 27-year-old woman developed a severe biliary stricture six months post-LT for acetaminophen-induced acute liver failure. The patient's clinical course was complicated by cholangitis. ERCP and percutaneous transhepatic cholangiography (PTC) showed complete obstruction at the anastomosis level, resulting in disconnected donor and recipient ducts. A combined endoscopic-percutaneous rendezvous procedure successfully achieved biliary recanalization and stent placement, relieving obstruction and avoiding surgical revision or re-transplantation. The rendezvous technique is a safe, effective, and minimally invasive option for complex post-transplant biliary strictures when conventional methods are unsuccessful.

Keywords: Biliary stricture, Liver transplantation, Rendezvous technique, Endoscopic retrograde cholangiopancreatography, Percutaneous transhepatic cholangiography

INTRODUCTION

Bile duct stricture is a common adverse event (AE) following liver transplantation (LT), accounting for over 50% of biliary issues in both deceased and living donor transplants and occurs most often within the first year.¹⁻³ Because bile ducts rely solely on hepatic arterial flow, the biliary epithelium is particularly vulnerable to hypoperfusion and ischemic injury post-transplant.² These strictures are classified as anastomotic or non-

anastomotic, each with distinct etiologies, courses, and treatment responses.¹ Anastomotic biliary strictures (ABS) are frequent after LT and arise from multiple factors including impaired graft vascularization, anatomical variations, and early bile leaks. Donor characteristics, such as older age and prolonged ischemic times, further increase the risk, emphasizing the importance of adequate arterial perfusion.² Episodes of acute cellular rejection and technical factors such as long operative time, biliary size mismatch, and anastomotic tension also contribute to ABS development.²

Accurate diagnosis is typically achieved using magnetic resonance cholangiopancreatography (MRCP), which provides a high diagnostic accuracy with minimal risk. Management often begins with management often begins with endoscopic retrograde cholangiopancreatography (ERCP), using balloon dilation and sequential plastic stents. Endoscopic therapy offers a minimally invasive option with favorable outcomes, demonstrating a long-term success rate of 76.9% and an AE rate of only 1.2% in patients with ABS.⁴ These findings highlight the efficacy and safety of endoscopic treatment for complex post-transplant biliary diseases. When ERCP is unsuccessful due to severe stenosis, percutaneous transhepatic cholangiography (PTC) is pursued; if this also fails, surgical options, including re-transplantation, must be considered.^{1,5} Herein, we present a challenging case of post-LT biliary stricture that was successfully treated with a multidisciplinary endoscopic-percutaneous rendezvous procedure.

CASE REPORT

A 27-year-old female with a history of LT for acetaminophen overdose presented with progressive jaundice, nausea, and vomiting 6 months later. Laboratory evaluation showed cholestatic liver enzyme elevation, and imaging suggested a biliary obstruction. Initial ERCP attempts using fluoroscopic guidance without cholangioscopy demonstrated complete obstruction of the anastomosis with no upstream opacification (Figure 1). Subsequent standalone PTC performed in a separate session showed complete obstruction of the disconnected donor and recipient ducts.

Given the failure of conventional endoscopic and percutaneous approaches, the decision was made to proceed with a combined endoscopic-percutaneous rendezvous procedure, leveraging dual access pathways by simultaneously performing PTC and ERCP with direct cholangioscopy to converge at a common site. During this coordinated approach, the bile duct was deeply cannulated using a 0.035-inch×260 cm Dreamwire™ and Dreamtome™ (Boston Scientific Corporation, Marlborough, MA, USA) sphincterotome under fluoroscopic guidance. Contrast injection revealed a short (<5 mm) anastomotic stricture at the posttransplant site. Endoscopic cholangioscopy using the SpyGlass™ system (Boston Scientific Corporation, Marlborough, MA, USA) confirmed complete obstruction. A cholangioscope was introduced into the recipient duct and advanced to the stricture level, where the percutaneous biliary catheter was aligned under fluoroscopic visualization. Interventional radiology achieved percutaneous access with a 0.018-inch guidewire advanced into the donor duct, which was blindly directed toward the cholangioscope. Once the guidewire was visible inside the recipient duct, it was grabbed with SpyGlass™ forceps (Boston Scientific Corporation, Marlborough, MA, USA), allowing successful access to the biliary stricture and thereby establishing through-and-through access. The tract was sequentially dilated, and the stricture was dilated to 10 mm. A fully covered self-

expanding metal stent (10×6 cm) and a 7 Fr×7 cm double-pigtail plastic stent were placed across the stricture (Figure 2 A) with good bile flow confirmed fluoroscopically (Figure 2 B), completing successful recanalization of the disconnected donor and recipient ducts. The stents were left in situ for staged therapy and were subsequently removed after stricture resolution. Two years after stent removal, the patient continued to perform well.

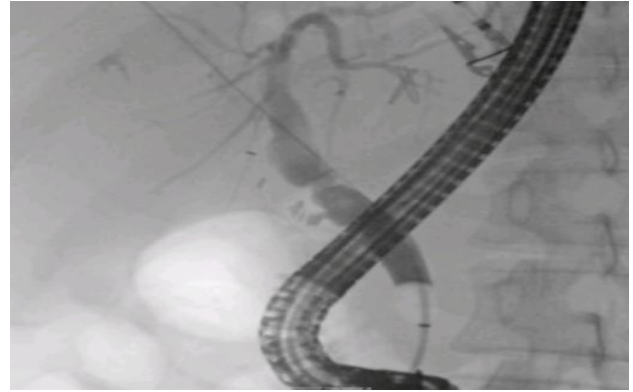


Figure 1: Rendezvous-assisted recanalization of post-transplant biliary stricture.

*Pre-stent cholangiogram demonstrating complete obstruction at the biliary anastomosis.

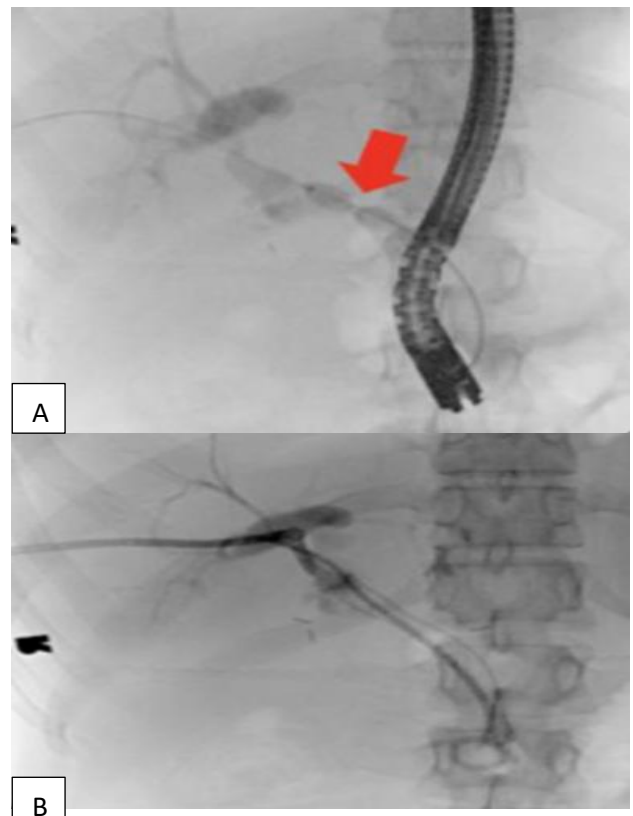


Figure 2 (A and B): Fluoroscopic cholangiogram demonstrating complete post-transplant biliary anastomotic stricture. (A) Rendezvous procedure in our patient (arrow marks the stricture) and (B) successful stent placement across biliary stricture.

DISCUSSION

Biliary AEs remain a significant cause of morbidity in LT recipients, occurring in approximately 5%-15% of deceased donor LT and 28%-32% of living donor LT (LDLT).^{6,7} In cases of complete biliary obstruction or severe stenosis that cannot be crossed using ERCP or PTC alone, a combined rendezvous approach may be warranted.^{7,8} This combined approach, which uses both percutaneous and endoscopic techniques, helps achieve access to the bile duct in situations in which standard endoscopic methods are unsuccessful. Studies have shown that the rendezvous technique is effective and safe for the treatment of biliary strictures after LDLT. Additionally, modified tools such as metal ball-tip cannulas and Kumpe catheters have been introduced to improve the outcomes in complex anatomical cases.⁹

Kim et al demonstrated that the rendezvous technique is a highly effective and safe option for severe biliary anastomotic strictures after LT, when conventional ERCP fails. Among 29 patients with guidewire-inaccessible strictures, the technique achieved 100% technical success even in complex anatomies.⁵ Although stent duration was longer (mean 14.9 months), this reflects the complexity of post-transplant strictures.⁵ Recurrence was uncommon, occurring in only two patients, and the approach avoided surgery or prolonged percutaneous drainage, offering a minimally invasive and durable solution.⁵ In another study, the rendezvous technique was successful and safe in managing complex biliary strictures following LDLT, particularly in patients with sharp or twisted anastomotic angles. In a cohort of 20 patients, biliary stents were successfully placed in all cases using this approach, with a median procedure time of less than 30 min.⁸ Notably, the technique was well tolerated, with only minimal AEs reported, and 65% of patients ultimately achieving stent-free status with good long-term outcomes.⁸

A limitation of our report is that, as a single-case experience, it cannot define the overall technical success, durability, or long-term stent-free outcomes of the rendezvous approach. Larger retrospective series in other obstructive systems have shown that although rendezvous procedures can achieve high immediate technical success and avoid major surgery, a subset of patients still require long-term stenting or subsequent reconstruction, emphasizing the need for cautious interpretation of long-term generalizability.¹⁰ The reported technical success rates may vary across studies and centers, reflecting differences in operator expertise, case complexity, and institutional volume.¹⁰ A recent review reported an 81% technical success rate for rendezvous, with a 10% AE rate, most commonly in malignant cases.¹¹

In our patient, the rendezvous technique enabled successful stent placement after prior endoscopic attempts failed due to severe stenosis, avoiding the need for prolonged external drainage or surgery. This minimally invasive approach improved patient comfort

and outcomes and demonstrated its value in selecting post-transplant patients with a complex anatomy. As techniques advance, the rendezvous procedure may play an increasingly important role in managing challenging biliary strictures after LT.

CONCLUSION

Severe post-transplant biliary strictures with complete ductal disconnection present a significant therapeutic challenge when conventional endoscopic or percutaneous approaches fail. This case demonstrates that a combined endoscopic-percutaneous rendezvous technique can successfully restore biliary continuity, allowing effective recanalization and stent placement while avoiding surgical revision or re-transplantation. The rendezvous approach represents a valuable minimally invasive option for the management of complex biliary strictures following LT.

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