

Percutaneous Transhepatic Treatment for Obstructing Retained Surgical Biliary Stents After Pediatric Liver Transplantation Without Placement of Biliary Drain

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INTRODUCTION

Pediatric liver transplantation has evolved significantly over the last few decades with improved surgical technique and long-term survival (1). Despite higher success rates, the operation remains intricate and technically difficult (2). Biliary complications are a common cause of morbidity in pediatric liver transplantation and may occur due to a ring of fibrotic tissue at the bilioenteric anastomosis or a retained surgical biliary stent (3). The standard of care for managing biliary obstruction includes minimally invasive treatment with interventional radiology placement of internal–external biliary drain and cholangioplasty or surgical revision of the bilioenteric anastomosis. Typically, during percutaneous biliary stent retrieval, a transhepatic sheath is placed followed by an internal–external biliary drain to aid with treatment of the biliary obstruction over several weeks to months (4). We present a case detailing a novel technique of biliary stent removal without requiring subsequent biliary drain placement.

CASE REPORT

A 16-month-old 8.7 kg female with syndromic biliary atresia was referred to the interventional radiology service with persistently elevated alkaline phosphatase and moderate biliary dilatation on ultrasound (Fig. 1). She was afebrile and nontoxic on exam. At 8 months of age, the patient had undergone left lateral segment liver transplantation with 2 duct anastomosis over stents created from 2 shortened 3.5 French (Fr) feeding tubes. One stent displaced into the bowel and was excreted normally. One stent was retained, which was confirmed radiographically and via ultrasound. The decision was made to proceed with percutaneous transhepatic treatment of the biliary obstruction and retained stent.

Following the induction of general anesthesia and administration of prophylactic antibiotic, a dilated peripheral biliary duct was accessed under real-time ultrasound guidance using a

22-gauge needle (Inrad, Kentwood, MI), 0.018" Nitrex wire (ev3, Plymouth, MN), and a 5 Fr sheath (Terumo, Elkton, MD). Initial cholangiogram demonstrated biliary obstruction at the level of the retained stent (Fig. 2A). Next, through the sheath, a 10-mm 4 Fr gooseneck snare loop (ev3, Plymouth, MN) was passed over the Nitrex wire with the 4 Fr snare catheter alongside the Nitrex wire. The over-the-wire snare was used to secure the retained stent at its distal end and advance it into the roux component alongside the wire (Fig. 2B). Cholangioplasty was not needed, and the completion cholangiogram following stent advancement into the bowel showed patent ducts with the stent in the roux component (Fig. 3). A biliary drain was not placed at this time. Finally, a Gel foam pledget tract embolization was performed with ultrasound guidance during sheath removal for hemostasis. The procedure took 61 minutes to complete, with fluoroscopy time of 6.3 minutes and dose of 28.8 mGy. The patient was admitted overnight for observation and follow-up ultrasound the next day showed resolution of biliary dilation.

DISCUSSION

A variety of biliary surgical techniques are utilized in pediatric liver transplantation including choledochcholedochostomy, choledochojejunostomy, and hepaticojejunostomy (2). During a hepaticojejunostomy and choledochojejunostomy, one or more internal plastic stents are frequently placed at the biliary anastomosis to aid in suturing of small bile ducts and maintaining patency (5). Typically, the plastic stents pass into the small bowel from the biliary tree and are excreted (1). If they do not advance normally, sludge may encrust these retained stents leading to biliary obstruction, necessitating their removal (4).

Crowley et al (4) detailed 3 cases in which pediatric liver transplant recipients presented with retained biliary stents causing obstruction. All 3 of these patients underwent stent retrieval in which the snare technique was used to remove the stent through a 7 Fr sheath and all patients required internal–external biliary drain placement (4).

In this case report, we present a technique that allows for stent removal from the biliary tree by advancing the stent into the bowel through a small sheath without necessitating biliary drain placement. This technique can be utilized if the patient is not cholangitic and if the completion cholangiogram following stent advancement shows resolution of obstruction. Small sheaths can be used as the stents are simply being advanced into the bowel, not folded or pulled out into a larger sheath, which may minimize trauma to the biliary tree and avoid biliary drain placement out of concern for sludge or blood clots causing later obstruction within the biliary tree. We postulate that this minimally invasive technique could allow for nonemergent removal of retained biliary stents after a certain period of monitoring to prevent the development of cholangitis. By avoiding drain placement, we hope to eliminate

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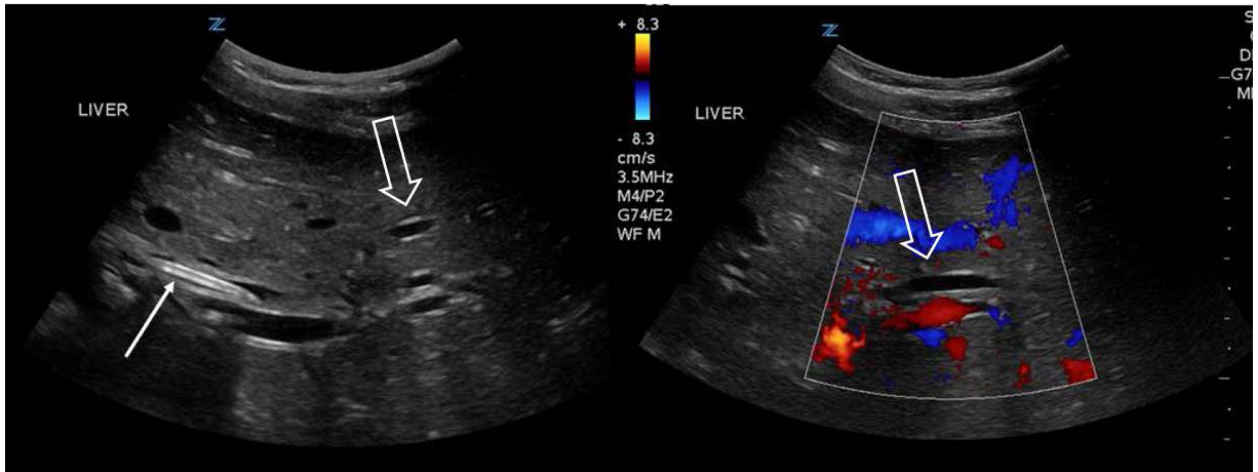


FIGURE 1. Gray scale and color Doppler ultrasound demonstrate retained obstructing biliary stent (arrow) and intrahepatic biliary dilation (open arrow).

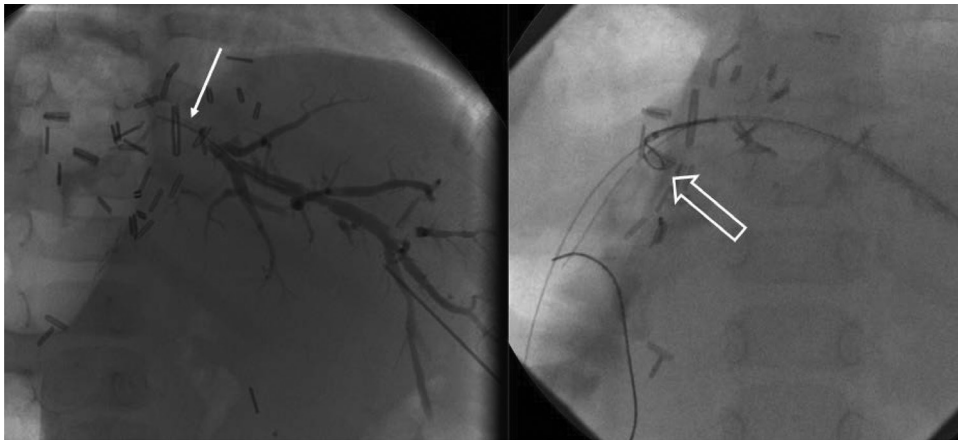


FIGURE 2. A dilated peripheral bile duct was accessed by ultrasound for subsequent cholangiography. A, Initial cholangiogram demonstrated biliary obstruction at the level of the retained stent (arrow). B, Stent was snared over the wire (open arrow) and advanced into the roux limb.



FIGURE 3. Post stent advancement cholangiogram demonstrating a patent bilioenteric anastomosis.

drain-related complications that may arise such as obstruction, infection, and dislodgement, as well as impaired quality of life related to patient discomfort and repeated catheter maintenance procedures.

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