

Case Blog

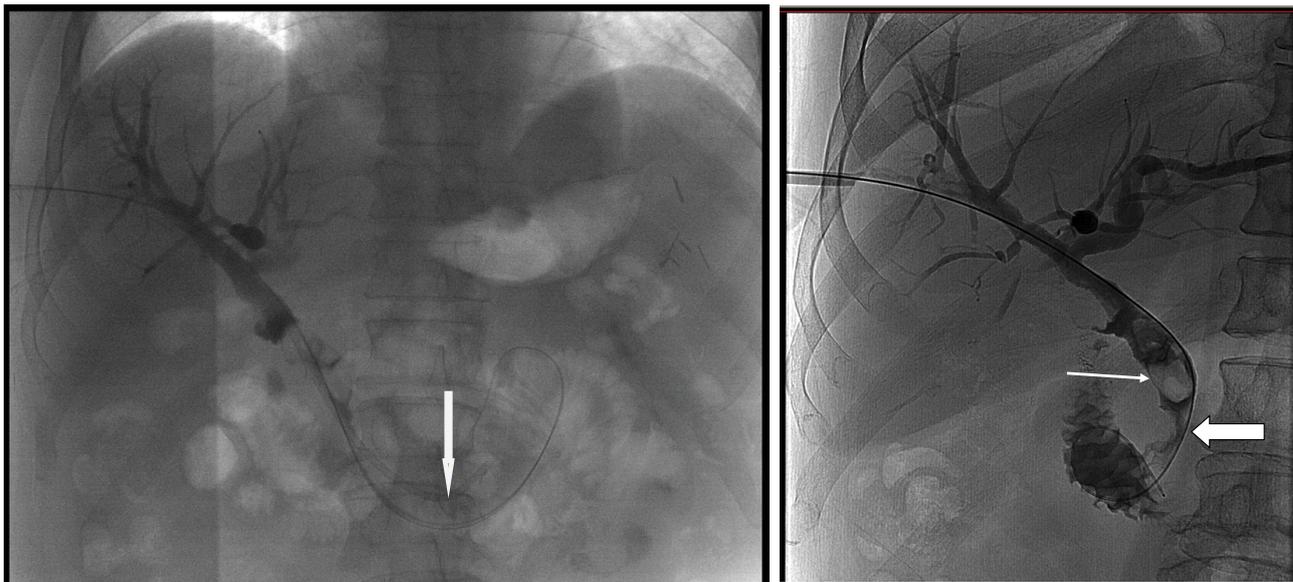
## Lithotripsy of Biliary Calculi in a Complex Biliary Tract Using Endourologic Equipment

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**Figure 1:** Cholangiogram through percutaneous approach. Contrast is seen in the intrahepatic bilateral bile ducts and the proximal extra hepatic duct. The rest of the common bile duct is occluded by a fibrotic tissue. ERCP placed plastic stent (thick arrow) embedded within the fibrotic tissue and also occluded. The proximal part of the stent is seen well within the jejunum.

**Figure 2:** Cholangiogram through percutaneous approach. Contrast was injected through a vascular sheath. Contrast is seen in the intrahepatic and extra hepatic bile ducts with passage to the jejunum. A large stone (thin arrow) causing partial occlusion within the extrahepatic bile duct. There is a narrowing and irregularity (thick arrow) of the distal extrahepatic bile duct.

### Abstract

Patients with choledocholithiasis are usually managed with endoscopic retrograde cholangiopancreatography (ERCP). However, some selected patients pose a challenge due to large impacted stones, anatomical variants or surgical procedures involving the stomach such as a Roux-en-Y anastomosis. We present an interesting case of a 60-year-old caucasian male who had a Roux-en-Y gastro-enterostomy and a complex biliary tract who kept presenting to our department with ascending cholangitis due to a large common bile duct stone. The patient failed several standard endoscopic and percutaneous attempts of stone extraction and was eventually managed by endoscopic lithotripsy using endourologic equipment.

### Introduction

Patients with choledocholithiasis usually have their stones removed by endoscopic retrograde cholangiopancreatography (ERCP). Complicated cases of choledocholithiasis cannot always be managed by typical surgical, radiological or endoscopic means. This is due to large or impacted stones that preclude safe endoscopic removal, poor surgical candidates that cannot undergo general anesthesia or variability in anatomy due to duodenal diverticuli or previous procedures of the upper gastrointestinal tract such as a Roux-en-Y anastomosis. All of these cases that are usually referred for treatment after failing at least one procedure, have encouraged in recent years the cooperation of general surgeons and endo-urologists in an attempt to render these patients

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stone-free via a percutaneous trans-hepatic approach [1,2]. We present such a case of a patient who previously underwent a Roux-en-Y anastomosis with a retained large common bile duct (CBD) stone in a complex system who failed repeated retrieval attempts and was eventually managed by percutaneous lithotripsy by holmium:YAG laser.

## Case Study

A 60 year old Caucasian male underwent a distal gastrectomy and cholecystectomy with a Roux-en-Y gastro-enterostomy due to a large suspicious gastric ulcer that turned out to be a benign peptic ulcer. A few months prior to the operation the patient underwent an ERCP with a papillotomy due to choledocholithiasis. A stent was inserted into the CBD and remained in situ thereafter. Three years later the patient presented to our surgical department several times with episodes of ascending cholangitis. Access to the stone and stent could not be gained via ERCP due to the difficult anatomy. The patient was then referred to the interventional radiology service and a cholangiography was performed through a right trans-hepatic approach. The cholangiography demonstrated an occluded distal extrahepatic duct and the ERCP placed plastic stent encased within fibrotic tissue (Figure 1).

The occlusion was passed and a percutaneous trans-hepatic drain (PTD-Cook biliary 10 F) was placed. Two weeks later, after decompression of the biliary system, the stent was eventually withdrawn in a retrograde fashion through a 14F sheath in the trans-hepatic tract. A month and a half later, on routine exchange, a cholangiography demonstrated an impacted large biliary stone at the distal CBD (Figure 2). Attempts to push the stone forward after careful dilation of the papilla with a 10 mm balloon or snare failed due to the large size of the stone. A 14F PTD drain was left within the biliary system. Thereafter, a multidisciplinary meeting was convened including a general surgeon, a gastroenterologist, an endourologist and an invasive radiologist. Due to the failures of the traditional methods at that point, and repeated episodes of cholangitis, it was decided to engage the stone under general anesthesia in the operating suite through the PTD route by lithotripsy of the stone using the urologic holmium:YAG laser.

## Procedure

The patient was admitted for several days of intravenous antibiotics for an Extended-Spectrum Beta-Lactamase Producing klebsiella pneumoniae that was cultivated from his PTD. The procedure was done in a dedicated operating room for laser guided procedures and under general anesthesia. After disinfection of the entrance site, drain and draping of the skin, a hydrophilic glide wire was passed through the PTD to the jejunum and the PTD was removed. A 14F 13 cm access sheath was inserted on top of a 14F AMPLATZ dilator through the left hepatic duct. A flexible ureteroscope (FLEX-X™ STORZ) was inserted and a 1 cm stone was recognized in the CBD 1-2 cm above the intestinal anastomosis. We used the holmium:yttrium-aluminum-garnet (Ho:YAG) laser with a 200 μm laser fiber. The stone was fragmented close to the anastomosis by using a setting of 0.3 J pulse and 40 Hz and reduced to 2-3 mm fragments that were flushed into the intestine. We used normal saline as an irrigant. At the end of the procedure a cholangiogram demonstrated free passage of contrast material through the CBD. Drainage was ensured by placement a 14F PTD open for internal and external drainage.

The patient remained hemodynamically stable and without fever during the remainder of the admission. One month later, a cholangiogram was performed using the PTD and normal passage of contrast material through the CBD was demonstrated. The drain was then successfully removed. At two months follow-up, the patient feels well with no pain, nor clinical or laboratory signs of obstruction.

## Discussion

More and more patients cannot have their biliary stones treated endoscopically or surgically. The biliary drainage they require is a burden for the patients and their health system, necessitating repeated exchanges and may be complicated by episodes of obstruction and sepsis. Thus, alternative solutions must be sought.

A few studies on small cohorts have been published in recent years seeking solutions in the form of flexible endoscopes performing electorohydraulic lithotripsy, ultrasound, laser lithotripsy and balloon dilatation or even shock wave lithotripsy. The success of the latter is reasonable but may require multiple treatments [3], while the success rate of laser lithotripsy reaches 90% and biliary clearance is achieved using a single endoscopic session [4]. The complications described are minor biliary leaks managed by stenting [5] or cholangitis and no de-novo strictures are described on follow-up [6].

In this case we were faced with a complex biliary tract both by anatomy and fibrosis of a long standing stent, with a stone resistant to standard manipulations. The patient was rendered stone-free after one session of laser lithotripsy with no sequela.

## Conclusion

Standard endourologic methods can achieve high stone-free rates safely for complex biliary tracts and should be considered a viable option for resistant stones.

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