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## Endoscopic ultrasonography-guided common bile duct stone removal

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### INTRODUCTION

Over the past few years, there has been a steady increase in reports of therapeutic interventions using endoscopic ultrasonography (EUS) for a wide variety of indications including alcohol ablation of pancreatic cysts, celiac plexus neurolysis and several others<sup>[1]</sup>. We have previously reported the feasibility of performing therapeutic interventions in the bile duct under EUS guidance alone, such as cannulation and gallstone removal without fluoroscopy and contrast medium injection<sup>[2]</sup>. Other investigators have previously reported removal of gallstones using an echoendoscope, albeit under fluoroscopic guidance. We hypothesized that common bile duct (CBD) stone removal could be safely performed under EUS guidance alone, thus obviating fluoroscopy use. If feasible, such a strategy could be an alternative to Endoscopic retrograde cholangiopancreatography (ERCP), which entails injection of contrast medium and exposure to radiation. Furthermore, CBD stone removal could be carried out in the same setting as diagnostic EUS, eliminating the need for a follow-up ERCP procedure. We therefore prospectively investigated clinical outcomes following EUS-guided CBD cannulation and stone extraction versus ERCP-directed intervention.

### TECHNIQUE

A therapeutic duodenoscope (TJF-140, Olympus), 4.4F sphincterotome, 0.035-inch guidewire, dormia basket (Boston Scientific) were used for cannulation and CBD

### Abstract

Endoscopic ultrasonography has become an important diagnostic and therapeutic tool in endoscopy units. It has a great impact on biliary and pancreatic disease management and its application to retrograde cholangiopancreatography is appealing, although very challenging with current devices. In this article we describe our initial experience with this technique.

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**Key words:** Endosonography; Endoscopic retrograde cholangiopancreatography; Choledocholithiasis; Therapeutics; Biliary tract diseases

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stone extraction in ERCP utilizing the “wire-guided” cannulation technique as described earlier<sup>[3]</sup>. Following wire-guided cannulation of the CBD, endoscopic sphincterotomy and stone extraction was carried out in the usual fashion. Fifty-two patients with uncomplicated CBD stones were prospectively randomized to CBD cannulation and stone removal under EUS or ERCP guidance.

A single endosonographer with proficiency in both EUS and ERCP performed all the procedures. EUS and ERCP were both performed with patients in the left lateral or semiprone position with the left hand over the head. This allowed adequate endoscopic and US views of the bile duct. Needle-knife sphincterotomy was necessary in 3 patients, 1 in the EUS group and 2 in the ERCP group. The time required for the procedures was less than 27 minutes from the start of CBD cannulation to completion for both EUS and ERCP. Doppler US was used as needed to confirm structures and avoid adjoining vessels. Additionally, Doppler US was also used to identify the CBD and avoid accidental pancreatic duct cannulation.

## DISCUSSION

Cannulation in the current study was hampered in cases of ampullary diverticulum, which increases the complexity and decreases the likelihood of CBD access. Even so, rates of successful cannulation of the bile duct in our study were comparable to reported ERCP cannulation rates of 90% or greater when performed by expert endoscopists using advanced techniques such as precut sphincterotomy. Standard ERCP cannulation techniques can be easily adopted when using an oblique side-viewing echoendoscope. In our experience, cannulation with an EUS endoscope is not more challenging than cannulation during ERCP. After cannulation, therapeutic interventions on the CBD by using standard accessories are also feasible

with the echoendoscope, albeit under fluoroscopic guidance, as reported earlier<sup>[4]</sup>. On the other hand, EUS-related adverse events were similar to those following ERCP.

We have demonstrated for the first time that it is feasible to perform therapeutic interventions of the CBD under EUS guidance alone. At the same time, EUS is becoming widely available and its range of indications is expanding. For example, EUS is being used for therapeutic interventions in the pancreaticobiliary system. We expect that this strategy will be adopted by some endosonographers, albeit somewhat selectively. This is because, despite the feasibility of therapeutic intervention with an echoendoscope, pragmatic considerations such as reimbursement and “wear and tear” to the endoscope may limit its widespread usage for therapeutic indications. Furthermore, not all endosonographers perform conventional ERCP, which may limit their enthusiasm for performing “an ERCP-like procedure” with an echoendoscope. Larger studies are also required to further ascertain the utility and safety of this technique.

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