

Brief Report

Choledocholithotripsy using peroral direct cholangioscopy through a standard gastroscope for a giant common bile duct stone: a case report

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Introduction

Cholangioscopy has become a prevalent method for treating common bile duct (CBD) stones. Two primary types of cholangioscopes are commonly used: through-the-scope cholangioscopy and peroral direct cholangioscopy (PDCS). In the literature, three kinds of endoscopes are documented for PDCS: ultra-slim endoscopes, double-bending cholangioscopes and standard endoscopes [1]. Among these options, standard endoscopes offer superior advantages, including better image quality, larger working channels and more available accessories [2]. Particularly in cases where patients exhibit significant CBD dilation, typically with a diameter exceeding 12 mm, a standard endoscope proves to be an effective choice for PDCS. Consequently, we presented a successful case where a giant CBD stone was effectively treated using PDCS through a standard gastroscope.

Case presentation

An 83-year-old woman, who had undergone a cholecystectomy 28 years ago, was presented at the local hospital with symptoms of abdominal pain, fever and jaundice. Her abdominal ultrasonography and computed tomography scan showed CBD stones. The patient's body temperature returned to normal following the administration of antibiotics. However, her pain and jaundice did not improve. Subsequently, the patient was transferred to our hospital. Her magnetic resonance cholangiopancreatography revealed multiple stones within the significantly dilated CBD (Figure 1A). The patient was diagnosed with acute obstructive cholangitis and had undergone endoscopic retrograde cholangiopancreatography (ERCP).

At the view of duodenoscopy, a periampullary diverticulum and an orifice of biliary fistula within it were observed (Figure 1B). After endoscopic sphincterotomy, the mucosa between the fistula and papilla was cut and formed a large CBD outlet about 15 mm in diameter, but no bleeding or perforation was observed. Multiple stones were removed using a balloon and basket; however, repeated attempts to remove the largest stone failed. Eventually, we placed two plastic stents passing over the stone in CBD with the

consideration of the patient's poor general condition. The patient was discharged shortly in stable condition with great improvement of her pain and jaundice. The patient was informed to return at a later date to remove the remained giant stone.

Since her symptoms resolved, the patient did not return until 10 months later. Due to significantly dilated CBD and large outlet of the CBD of this patient, we decided to perform PDCS for lithotripsy through a standard gastroscope.

The whole procedure was described step by step in the video (Video 1). First, the plastic stents were removed through a duodenoscope, and then the cholangiography showed a 30 mm × 50 mm filling defect within dilated CBD.

Subsequently, we switched to a standard gastroscope (GIF-Q260J; outer diameter, 9.9 mm; working channel, 3.2 mm). We first inserted the gastroscope to the distal duodenum (passed the major papilla), then reversed the gastroscope and put it back slightly and finally adjusted the angle and direction of the gastroscope to make it enter the outlet of the CBD ("J" method; Figure 1E).

A giant stone was clearly seen in the CBD (Figure 1F). Using the U100 plus laser lithotripsy (Figure 1G), we created multiple pore channels on the surface and the inside of the stone, but it was obvious that the lithotripsy was not efficient enough. Then we used the tip of a snare to break the stone in the automatic cut mode of 70 W (Figure 1H) and found that it was more effective. We used laser and snare lithotripsy alternately; meanwhile, the foreign body forceps were used to break the stone. Finally, a snare, basket and balloon were alternately used to remove all stone fragments. Eventually, a naso-choledochal drainage tube was placed, through which the biliary duct would be flushed three times per day (Figure 1I). Five days later, her cholangiography showed a smooth biliary wall without any residual stone fragments. The patient was discharged without any complications. There was no recurrence during 1-year follow-up.

Discussion

ERCP is widely used as a minimally invasive modality for the treatment of CBD stones [3]. However, it is often difficult to

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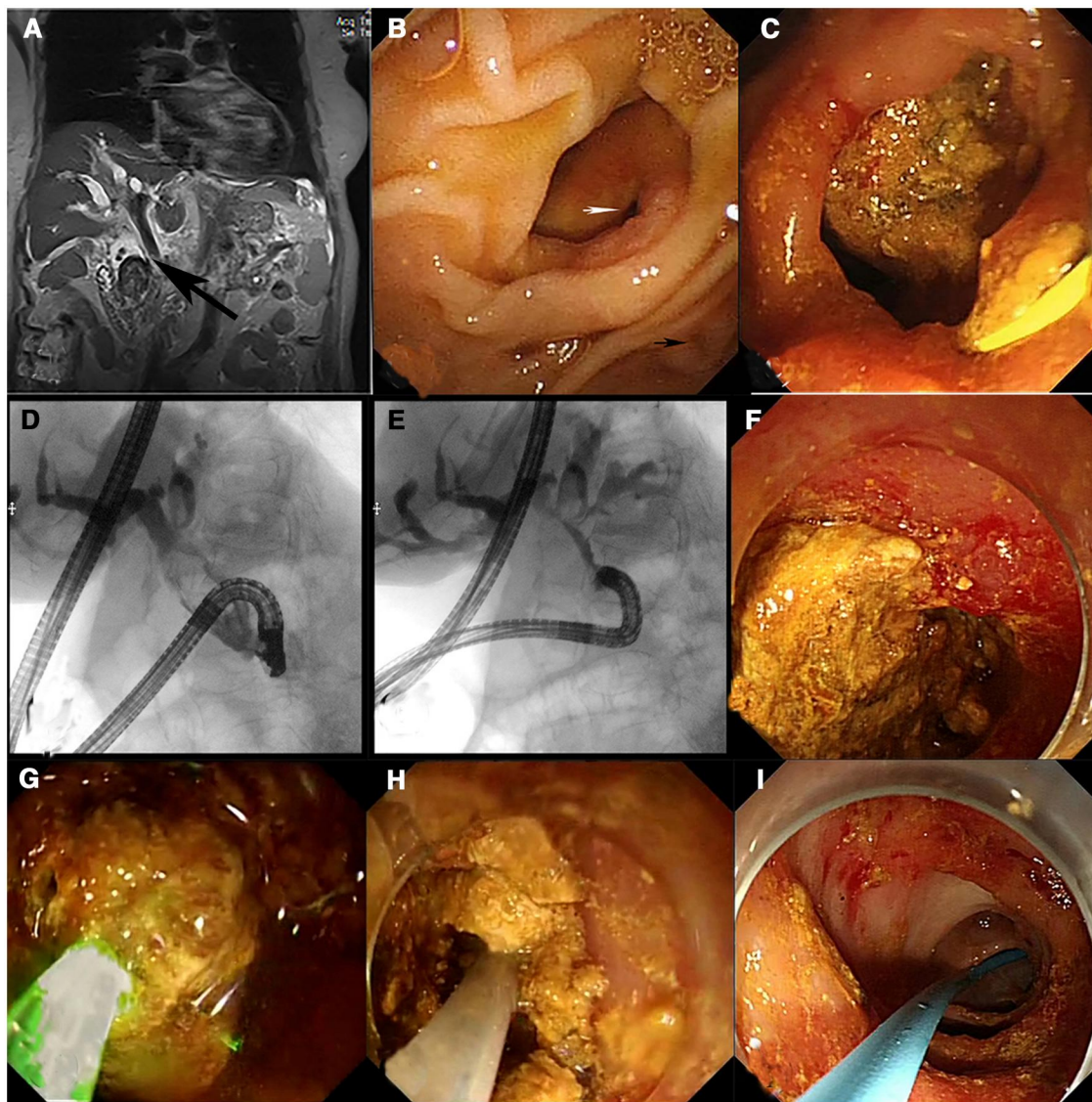


Figure 1. PDCS through a standard gastroscop for the removal of CBD stones. (A) MRCP reveals dilation of intra-hepatic biliary ducts and CBD with stones inside (black arrow). (B) A PAD above the major papilla (black arrow) was observed, and there was a fistula (white arrow) in it. (C) CBD stones were removed by the outlet formed by the incision of the mucosa between the fistula and papilla. (D) A 50 mm × 30 mm filling defect was noted in the dilated CBD on cholangiogram. (E) Fluoroscopic view of intubation of the biliary tree through a gastroscop. (F) PDCS through a standard gastroscop showed clearly a giant CBD stone. (G) U100 plus laser was used for lithotripsy. (H) A snare was used to break stone with Autocut mode at 70 W. (I) Repeated PDCS was done to confirm complete CBD clearance and a nasobiliary drainage tube was placed. CBD, common bile duct; MRCP, magnetic resonance cholangiopancreatography; PDCS, peroral direct cholangioscopy; PAD, perianal diverticulum.

remove a giant CBD stone (larger than 15 mm in diameter) by using a routine ERCP. The PDCS-guided lithotripsy improves the success rate of giant stones clearance [4, 5]. However, at present, PDCS technology has not been widely used in clinical practice. First, new equipment, such as double-bending cholangioscope, is not yet widely available [6]. Second, PDCS treatment with standard endoscope depends on the large outlet of the CBD (theoretically it should be greater than 10 mm) and dilated CBD. Third, excellent endoscopic control ability of endoscopist was required for performing PDCS.

In clinical practice, patients with giant CBD stones tend to have dilated CBD greater than 12 mm. The duodenal papilla can be dilated to 10–18 mm in many patients by endoscopic sphincterotomy and/or endoscopic balloon dilation [7]. In these patients, applying a standard gastroscop (less than 10 mm in diameter) for completing a PDCS is fully feasible.

For a successful insertion of standard gastroscop, it undoubtedly requires several tips and tricks. Brauer et al. [2] proposed the “J” insertion method and confirmed its safety and efficacy. Based on our experience, by reversing and slightly withdrawing the gastroscop in the distal the duodenum, the tip of gastroscop can enter the outlet of the CBD, and then gently controlling the angle knob of the gastroscop, the tip of gastroscop will enter the distal CBD.

The clear vision and powerful flushing and suction function of standard gastroscop are important for the treatment of giant CBD stones. Additionally, the standard gastroscop has a large enough working channel to provide more choices of ERCP equipment. In the experience of this case, we found that the laser lithotripsy can only make small holes on the giant stone. In contrast, a high-powered (70 W) electric snare is more effective to break stone. The combination of these two techniques has significantly

improved the working efficiency. To the best of our knowledge, this is the first reported case of choledolithiasis treated with an electric snare.

In conclusion, for patients with giant CBD stones and dilated CBD, as long as a large EST or endoscopic balloon dilation using greater than 10 mm balloon can be done, PDCS through standard gastroscope can be attempted.

Supplementary Data

Supplementary data are available at *Gastroenterology Report* online.

Authors' Contributions

Q.Y.T., D.L.L. and B.R.L. conceived and designed the project. Q.Y.T. collected the data. Q.Y.T. and B.R.L. drafted the manuscript. D.L.L., D.L. and B.R.L. performed the procedure for this patient. Q.Y.T. and Q.F.Z. followed the patient. D.L. and B.R.L. revised the manuscript. All authors read and approved the final manuscript.

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Conflicts of Interest

All authors have no conflicts of interest to disclose.

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