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Novel use of a balloon dilatation catheter to enable mechanical lithotripsy of difficult common bile duct stones after initial failed attempt: A case report

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ABSTRACT

INTRODUCTION: Difficult and large common bile duct stones can be crushed and removed using a mechanical lithotripter. Very often the lack of working space within the common bile duct causing the failure of mechanical lithotripsy would inevitably mean repeat or further invasive procedures.

PRESENTATION OF CASE: A patient with large and multiple common bile duct stones underwent ERCP, and initial deployment of a mechanical lithotripter failed due to the lack of working space within the common bile duct. A through-the-scope (TTS) dilator was utilized to increase the working space before successful deployment of the mechanical lithotripter, and subsequent clearance of all stones within the same setting.

DISCUSSION: We herein describe a novel and ingenious technique of utilizing a through-the-scope (TTS) dilator in helping to expand the space within the common bile duct to allow for full deployment of a mechanical lithotripter and successful clearance of common bile duct stones. This method can be easily applied by advanced endoscopists and is expected to lead to increased success rates of difficult common bile duct stones clearance in a single setting.

CONCLUSION: Use of TTS dilators to increase working space within the common bile duct can be useful in increasing the success rates of mechanical lithotripsy in the setting of large and multiple common bile duct stones.

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1. Introduction

Cholelithiasis or common bile duct (CBD) stones are a common occurrence, seen in about 10% of patients undergoing cholecystectomy. Their size (1–2 mm to >3 cm) and number can vary greatly with varying degrees of complexity in endoscopic management [1]. Endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy (ES), with or without endoscopic papillary large-balloon dilation (EPLBD), coupled with basket and balloon extraction can successfully remove up to 85% of CBD stones [2]. Factors associated with failure of extraction include older patient age, altered anatomy (e.g. Billroth Type II anatomy, Roux-en-Y gastrojejunostomy, periampullary diverticulum), large number of stones (>10), large size of stones (>15 mm), unusual shape and location of stones, distal CBD stricture and angulation [3,4]. Mechanical lithotripsy (ML), electrohydraulic lithotripsy

(EHL), laser lithotripsy (LL), extracorporeal shockwave lithotripsy (ESWL), per-oral cholangioscopy are dedicated techniques which can be utilized based on operator preference and ability to aid in difficult stone extractions [5]. These capabilities are not often available in most institutions. If these methods fail, then operative management with CBD exploration is required, or frequent biliary stent changes if the patient is not a fit surgical candidate, thus increasing their morbidity and healthcare costs.

This case, which was carried out in a private hospital, is unique due to the novel use of a balloon dilatation catheter to dilate the CBD after an initial failed deployment due to lack of working space, thereby not subjecting the patient to a potentially more morbid and costly procedure. This technique should be included in the armamentarium of advanced endoscopists to increase their rate of difficult CBD stone clearance.

This work has been reported in line with the SCARE criteria [6].

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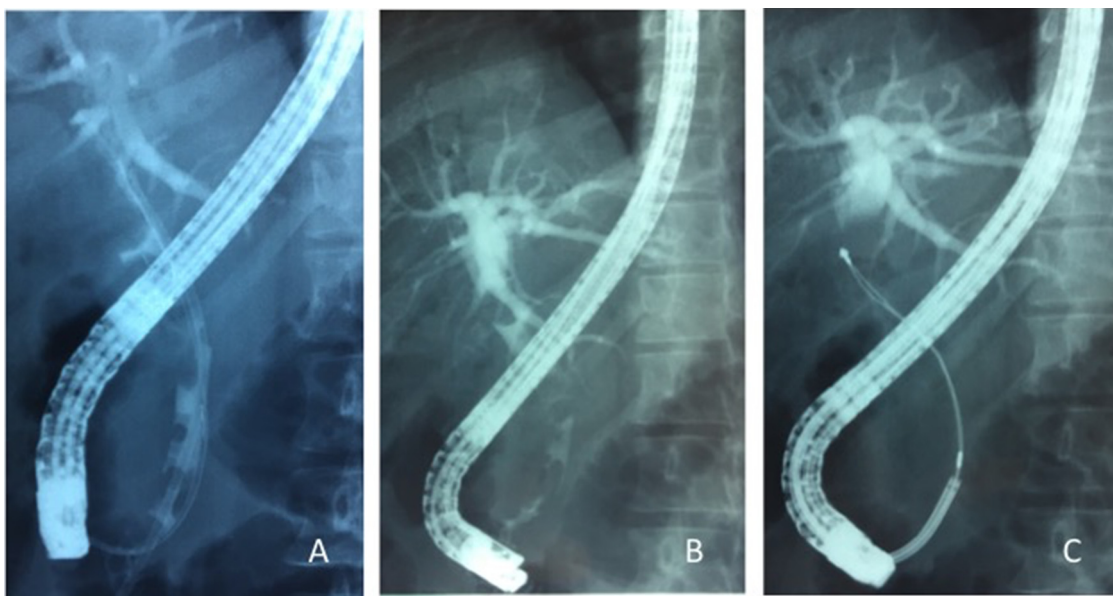


Fig. 1. A: Presence of multiple CBD stones with previous stent in-situ. B: Dilated CBD with multiple stones. C: Failure of deployment of mechanical lithotripter demonstrated, due to space constraints within CBD.

2. Case report

The patient in question is a 40 year old Chinese lady with no past medical history who presented at an overseas hospital with initial symptoms of fever and jaundice for one week, and signs of mild abdominal tenderness. Initial blood investigations showed an obstructive liver enzymatic profile and leukocytosis, and she was diagnosed with cholangitis. An ultrasonography showed a dilated CBD with multiple large stones ranging from 12 to 18 mm, and the patient underwent an ERCP and ES. However, due to the large nature of the stones, stone extraction (unclear if balloon trawling or Dormia basket was utilized) failed and a plastic biliary stent (10 Fr, 12.0 cm) was inserted for biliary drainage. Her sepsis was controlled with antibiotics and she was then transferred to our centre via ambulance for further management.

On arrival, she was afebrile, normotensive with a normal heart rate. She was moderately jaundiced with a bilirubin of 60 mg/dL,

and her white cell count was mildly elevated at $12.0 \times 10^9/\text{dL}$. Rest of her blood work up was largely unremarkable.

One week after her initial ERCP and ES, the patient underwent a repeat ERCP at our centre. Initial cholangiogram confirmed the presence of multiple large CBD stones (Fig. 1A). Her previous biliary stent was removed and a wider ES performed. Another cholangiogram after stent removal revealed more clearly the presence of upstream biliary dilation (Fig. 1B). Balloon trawling was attempted but failed as the CBD stones were stuck at the mid-CBD. A BML-V442QR-30 single-use mechanical lithotripter (Olympus, Shinjuku, Tokyo, Japan) was inserted into the CBD but could not be fully deployed due to the extremely limited space within the CBD from the multiple large stones (Fig. 1C).

At this point, the decision to attempt a novel technique of dilating the CBD to allow for full deployment of the mechanical lithotripter was made. A 7.5 Fr CRE™ Wireguided Esophageal/Pyloric Balloon Dilatation Catheter (Boston Scientific,

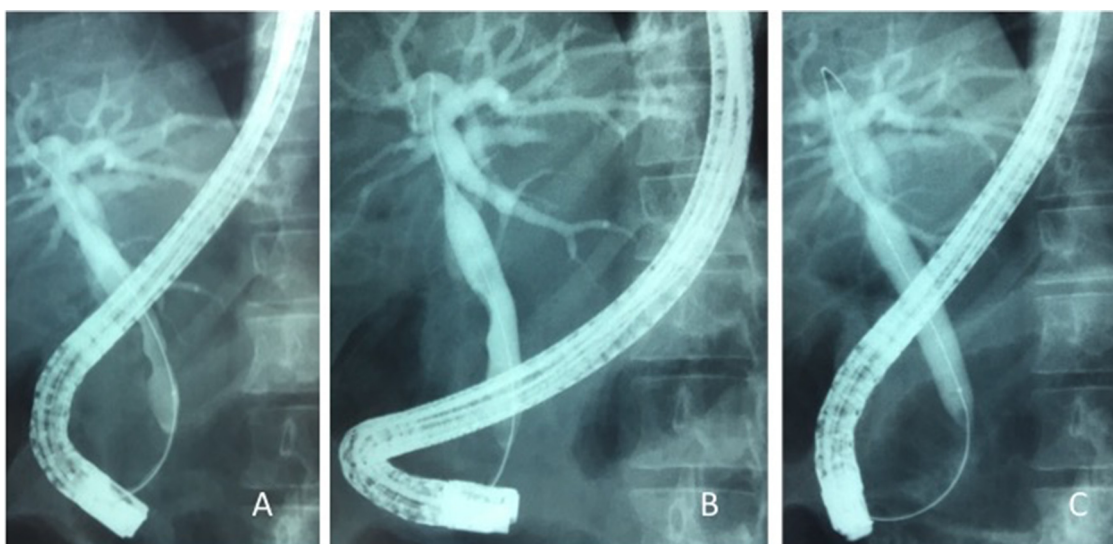


Fig. 2. A and B Sequential images demonstrating waisting of balloon dilator within CBD due to multiple stones. C: Resolution of balloon dilator waisting, indicating adequate space created from balloon dilation.

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