A novel method of endoscopic removal of an impacted ampullary stone using a snare (case report with video)

Yang-Lin Pan^{1,2}, Catherine Ngo¹, Danny Yen¹, Joseph Leung¹

¹Section of Gastroenterology, Sacramento Veterans Affairs Medical Center, Mather, CA and UC Davis Medical Center, Sacramento, CA, USA; ²Department of Gastroenterology, Xijing Hospital, Xi'an, China

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Abbreviations: ERCP, endoscopic retrograde cholangiopancreatography

Introduction

Impacted stone at the ampulla is a common cause of acute suppurative cholangitis or acute biliary pancreatitis. Suppurative cholangitis is associated with a significantly high morbidity and mortality and warrants urgent ERCP for biliary decompression and removal of the impacted stone.¹⁻⁴ However, stone impaction often leads to swelling and deformity of the papilla and the impacted stone makes deep cannulation and standard papillotomy technically difficult. Needle-knife precut papillotomy has been described for the removal of an impacted ampullary stone but this is risky especially when performed by inexperienced or trainee endoscopists.^{5,6} We describe a novel method of removal of an impacted ampullary stone using a polypectomy snare.

Case report

A 75-year-old woman was admitted with septic shock from suspected acute cholangitis. She presented with right upper quadrant abdominal pain for 2 days which radiated to her back and right shoulder, with associated nausea and vomiting. She was noted to be jaundiced in the ER and had a fever of 101.5°F. Blood tests showed a serum bilirubin of 3.6 mg/dL (direct 2.2mg/dL), AST of 135 IU/L, ALT of 100 IU/L, ALP 360 IU/L (upper limit normal was 115), with a normal serum lipase level. WBC count was $19.2 \times 10^9/L$ with an INR of 1.39 (normal <1.18). Despite IV fluids, her heart rate was persistently >100 beats per min with a mean arterial pressure of <90 mmHg. Her urine output was decreased. Abdominal ultrasound revealed a distended gallbladder with a few stones. The intrahepatic ducts were dilated and the CBD measured 13mm (**Fig. 1**). The distal CBD could not be visualized because of overlying bowel gas. The patient was suspected to have a distal CBD obstruction and acute cholangitis. Because of her unstable clinical condition, an urgent ERCP was arranged under general anesthesia for biliary decompression. At the time of ERCP,

an impacted stone was seen at the major papilla which appeared swollen (**Fig. 2**). Attempted cannulation with a wire guided papillotome (Cook Endoscopy, Winston-Salem, NC) failed because of the impacted stone. The stone could not be pushed back or dislodged with the tip of the papillotome. Because of the prolonged INR and risk of bleeding, needle knife papillotomy was not attempted. Instead, we used a mini snare (Cook Endoscopy, Winston Salem, NC) to loop around the swollen papilla proximal to the impacted stone. The papilla was grasped loosely with the snare and gentle tugging was applied to the snare to dislodge the impacted stone. A brown stone (measuring approximately 8 mm x 6 mm) was basically squeezed out of the ampulla by traction on the snare (**Video 1**). Dark purulent bile was seen draining from the papilla. A partial cholangiogram did not reveal any further filling defects in the CBD. Because of the unstable condition of the patient, a 10 Fr x 7 cm Cotton Leung stent (Cook Endoscopy, Winston Salem, NC) was inserted for biliary drainage. The patient was treated with intravenous antibiotic initially with Piperazillin-Tazobactam and then switched to ampicillin plus cefepime when subsequent bile culture showed *Klebsiella Pneumonia* and *Enterococcus Faecalis*.

The patient's clinical condition improved after the ERCP. Her fever defervesced and her liver function tests eventually normalized. A laparoscopic cholecystectomy was performed 5 days after ERCP. The patient made an uneventful recovery and the biliary stent was removed later.

Discussion

It is not uncommon to see an impacted ampullary stone in patients presenting with acute cholangitis. According to reports of Leung et al¹ and Moreira et al,³ impacted ampullary stone was seen in 4.1% (21/510) and 4.9% (10/204) of patients with CBD stone during ERCP with failed conventional papillotomy.

Endoscopic papillotomy, using standard papillotome or needle knife, has been shown to be effective in removal of impacted ampullary stones. Most if not all of the impacted stones could be extracted using either method.^{1,2} However, in some cases, selectively deep cannulation with a papillotome failed because of the swollen and distorted papilla caused by stone impaction.

*Correspondence to: Joseph Leung; Email: jwleung@ucdavis.edu
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Figure 1. Dilated common bile duct on abdominal ultrasound

Figure 2. Impacted stone at the major papilla

Creation of a choledochoduodenostomy above the impacted stone may help to drain the biliary system.⁴ The risk of post papillotomy bleeding and perforation is increased with the use of needle knife papillotomy; therefore, it is recommended that this be performed by an experienced endoscopist. Needle knife precut papillotomy provides access into the biliary system and facilitate subsequent deep cannulation and completion of the papillotomy using a standard papillotome. Occasionally, a big impacted stone could pass spontaneously after an adequate precut papillotomy. Subsequent stone extraction using balloon or stone retrieval basket helps to clear the biliary system. In sick patients with suppurative cholangitis, it is recommended to insert a stent to insure biliary drainage.

We described a novel method of removal of an impacted ampullary stone using a polypectomy snare as a way to avoid the increased risk of post papillotomy bleeding associated with the use of needle knife precutting. A potential advantage is that the biliary sphincter function is preserved after removal of the impacted stone by a snare without papillotomy. In conclusion, a small or medium stone impacted in the ampulla could be extracted by an endoscopic snare. This method may provide a good alternative for

removal of impacted ampullary stones without the risks associated with precut papillotomy.

Disclosure

Authors have no conflicts of interest financial or otherwise.

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