Overtube-guided electrohydraulic lithotripsy through digital cholangioscopy for difficult biliary stones in a postoperative patient: challenging points with salvage techniques

Hassan Atalla, MSc,1,2 Arata Sakai, MD, PhD,2 Hideyuki Shiomi, MD, PhD,2 Shohei Abe, MD,2 Yuzo Kodama, MD, PhD2

Enteroscopy-assisted ERCP (E-ERCP) in patients with surgically altered anatomy usually represents a challenge even within the hands of skilled operators, with a success rate ranging from 70% to 90%.1 Management of difficult hepatolithiasis in such patients, using overtube-assisted digital cholangioscopy (DC) with laser lithotripsy, was previously reported.2 We describe here the use of electrohydraulic lithotripsy (EHL) in a similar fashion; however, this case video focuses mostly on challenges we have faced during this demanding procedure. These challenges are mainly related to the reconstructed anatomy and the procedure technique and therefore may occur in similar patients. In our case, these challenges included the sharply kinked course of the overtube after enteroscope withdrawal with challenging DC passage. In addition, the DC (which lacks the ability to insufflate air) depends on a guidewire to pass through the overtube to access the bilioenteric anastomosis; this guidewire was dislodged from the anastomosis just after passage out of the overtube. Here, we describe simple technical tips and tools that facilitated overcoming these challenges, which may be helpful in future cases.

A 60-year-old man with a history of Roux-en-Y hepatico-jejunostomy for pancreaticobiliary maljunction presented with acute cholangitis in the form of jaundice and fever.

Abdominal CT (Fig. 1) revealed dilated intrahepatic bile ducts with a large impacted stone. After balloon dilatation of the bilioenteric anastomosis, we attempted...
balloon sweeping and mechanical lithotripsy through E-ERCP (EC-L600MP7; 9.4 mm diameter, 3.2 mm working channel; Fuji film, Tokyo, Japan); both were unsuccessful. Hence, EHL through DC (SpyScope DS II; Boston Scientific, Tokyo, Japan), assisted by the enteroscopy overtube, was chosen.

After E-ERCP successfully reached the anastomosis site, cannulation with a standard ERCP cannula was achieved with selective intrahepatic insertion of a guidewire, followed by biliary cholangiogram, which revealed large impacted stones. Afterward, the enteroscope was wisely withdrawn from the overtube, leaving the guidewire behind. DC was then introduced over the guidewire through the overtube, which had a sharply kinked course (related to postsurgical reconstruction) with challenging DC passage. In contrast to the ultrathin videoscope, DC with its increased flexibility and decreased friction resistance succeeded in passage without overtube dislocation, assisted by a prolonged process (more than 7 minutes) of tube negotiation and external abdominal compression to adjust tube position (Figs. 2 and 3).

Thereafter, while attempting to admit the DC through the biloenteric anastomosis, the guidewire accidentally slipped out of the biliary tract, leaving the DC within the collapsed jejunum. The DC’s way was lost through the collapsed lumen because the DC was not designed primarily to insufflate air. To salvage this troublesome situation, we tried to enhance the DC’s ability to directly insufflate CO2, besides its known ability to irrigate saline solution, to regain jejunal lumen patency. A short plastic tube, simply obtained by cutting the distal 3 cm of the conducting tube of an oxygen nasal cannula, was used to directly connect the CO2 pump to the DC working channel (Figs. 4 and 5), through which CO2 was maintained under high pressure. This technique succeeded in maintaining lumen patency and allowed the DC to view the anastomosis site.

DC direct cannulation through the anastomosis site into the bile ducts was then achieved, followed by EHL for the difficult stones (EHL AUTOLITH TOUCH; Northgate Technologies Inc, Elgin, Ill) (Figs. 6 and 7) with further fragmentation. On the next E-ERCP 1 week later (intended for mechanical lithotripsy of residual stone fragments), the cholangiogram (Fig. 8) revealed no fragments, demonstrating spontaneous passage after the previous EHL session.
With support of such simple techniques, the challenging overtube-assisted DC and related therapeutic procedures in a patient with surgically altered anatomy were safely and effectively achieved (Video 1, available online at www.VideoGIE.org).

**DISCLOSURE**

All authors disclosed no financial relationships.

**ACKNOWLEDGMENT**

This work was supported by JSPS KAKENHI grant numbers JP19K07938 (AS).

**REFERENCES**

1. Krutsri C, Kida M, Yamauchi H, et al. Current status of endoscopic retrograde cholangiopancreatography in patients with surgically altered anatomy. World J Gastroenterol 2019;25:3313-33.
2. Cho J, Buxbaum J, Sahakian AB. Balloon overtube-assisted cholangioscopy and laser lithotripsy of large bile duct stones. VideoGIE 2018;3:217-9.

Hepatology and Gastroenterology Unit, Department of Internal Medicine, Mansoura Faculty of Medicine, Mansoura University, Mansoura, Egypt (1), Division of Gastroenterology, Department of Internal Medicine, Kobe University Graduate School of Medicine, Kobe, Japan (2).

Copyright © 2020 American Society for Gastrointestinal Endoscopy. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

https://doi.org/10.1016/j.vgie.2020.08.007