ORIGINAL ARTICLE

Troubleshooting impaction of a pancreatoscopy-guided retrieval basket during pancreatic duct stone removal

Anna Cecilia Amaral, MD,[1] Waleed K. Hussain, BS,[1] Raj J. Shah, MD,[2] Samuel Han, MD, MS[3]

Pancreatic duct (PD) stones are a common adverse event of chronic pancreatitis that can cause pain via ductal obstruction. Symptomatic patients are eligible for endoscopic or surgical treatment, with first-line treatment strategies including ERCP with stone extraction and/or extracorporeal shockwave lithotripsy.[1] Peroral pancreatoscopy-guided lithotripsy, including laser lithotripsy or electrohydraulic lithotripsy (EHL), enables treatment under direct visualization, with a high rate of technical and clinical success (88.1% and 87.1%, respectively) while maintaining a low adverse event rate (12.1%).[2,3] However, limited data exist regarding the use of a cholangiopancreatoscopy-specific retrieval basket for the removal of PD stones.

In this video, we report the case of a 68-year-old man who presented with an acute exacerbation of established chronic pancreatitis, and a recent EUS that showed multiple PD stones (Video 1, available online at www.videogie.org). An ERCP was performed with the initial pancreatogram demonstrating a dilated PD (9 mm) and multiple large intraductal stones. Following sphincterotomy and balloon dilation, an impacted stone was found in the head of the pancreas, blocking the advancement of any device past the stone (Video 1). The decision was therefore made to perform pancreatoscopy. Using the pancreatoscope (SpyScope DS II, Boston Scientific, Marlborough, Mass, USA), we successfully identified several stones and performed EHL (Autolith Touch, Northgate Technologies Inc, Elgin, Ill, USA) under medium-high power (3 probes, ~15,000 shocks over 45 minutes) with fragmentation of most of the stones in the head and the genu of the pancreas. One large stone (Fig. 1) refractory to EHL remained, however, and an attempt was made to remove it with the cholangiopancreatoscopy-guided retrieval basket (SpyBasket, Boston Scientific), but once the basket captured the stone, the basket became impacted within the duct (Fig. 2). Upon forceful attempts to remove the basket, the wires of the basket broke off the catheter with the basket still holding firmly to the stone. Several unsuccessful attempts were made to remove the basket, including using biopsy forceps, a grasping device, and sweeping with an extraction balloon. Pancreatoscopy was repeated with EHL performed as a salvage maneuver on the impacted stone through the basket (Fig. 3, Video 1). Successful fragmentation (1 probe, medium power, 2000 shocks over 10 minutes) allowed for complete removal of the basket (Fig. 4) with a grasping device, and the remaining stone debris were swept with an extraction balloon. The procedure ended with placement of a 7F plastic stent, and the patient was discharged home uneventfully.

The cholangiopancreatoscopy-guided retrieval basket is a device inserted through the cholangiopancreatoscope to allow for capture and removal of stones under direct visualization. With a 15-mm diameter, the basket contains a parachute design that accommodates stones up to 10 mm in diameter. This can be particularly useful in extracting larger

Abbreviations: EHL, electrohydraulic lithotripsy; PD, pancreatic duct.

2468-4481
https://doi.org/10.1016/j.vgie.2023.05.001

Division of Gastroenterology, Hepatology and Nutrition, Ohio State University Wexner Medical Center, Columbus, Ohio (1), Division of Gastroenterology and Hepatology, University of Colorado Anschutz Medical Campus, Aurora, Colorado (2), Division of Gastroenterology, Hepatology and Nutrition, Ohio State University Wexner Medical Center, Columbus, Ohio (3).

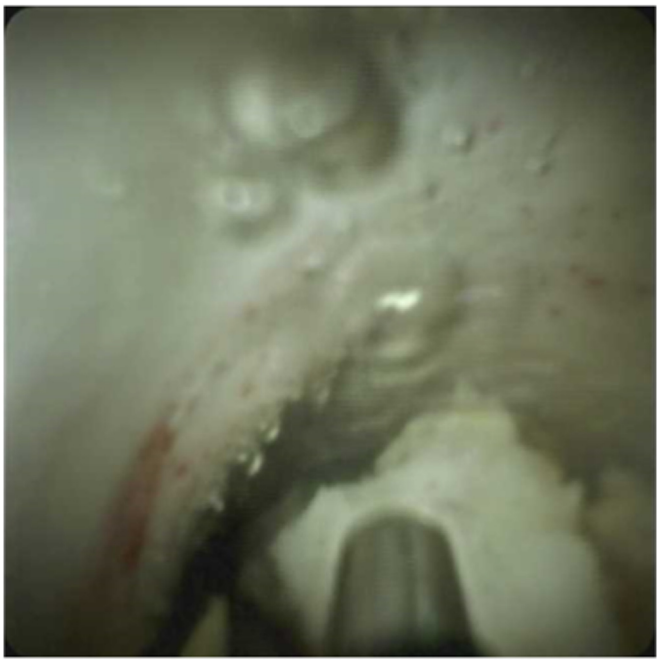

Figure 1. A large, impacted stone in the head of the pancreas.

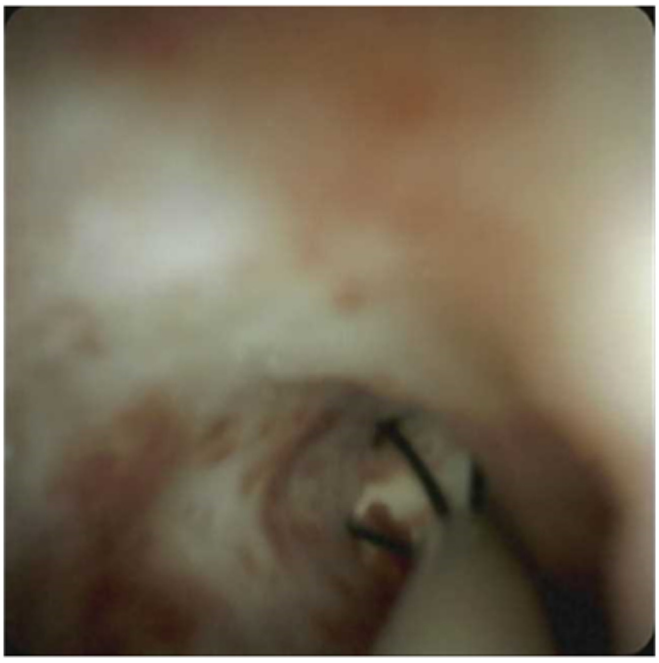

Figure 2. Impacted retrieval basket with a pancreatic duct stone.

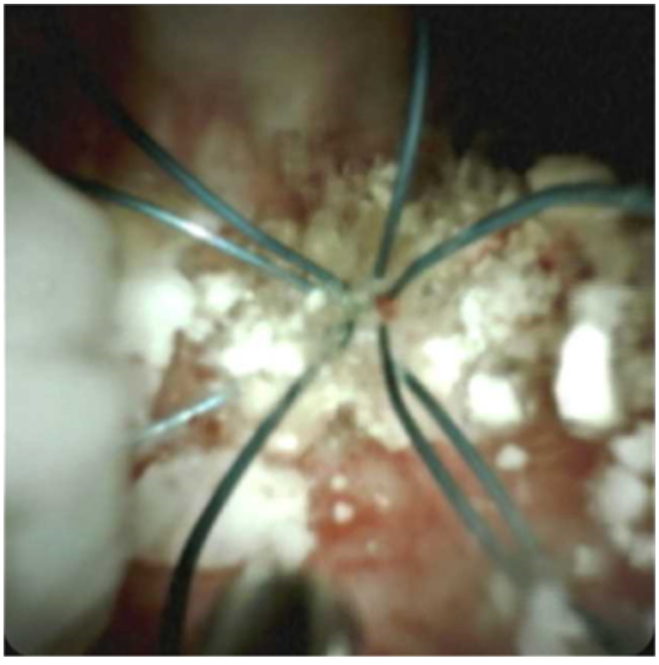

Figure 3. Electrohydraulic lithotripsy of the pancreatic duct stone through the retrieval basket.

or impacted stones refractory to conventional balloon or basket extraction under fluoroscopic guidance.[4] Unexpected impaction of a basket is a potential adverse event that can require surgical intervention, and EHL has been reported as a viable rescue option in these cases.[5,6] However,

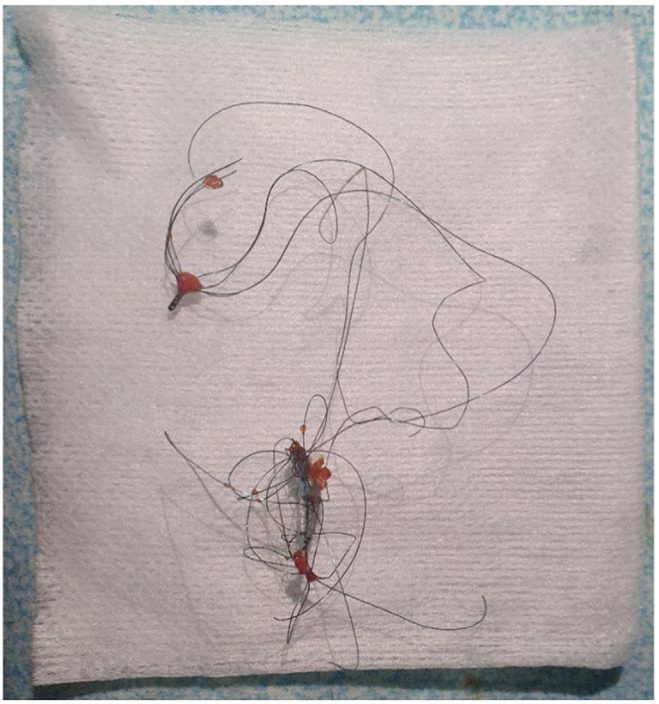

Figure 4. Cholangiopancreatoscopy-guided retrieval basket wires upon removal after impaction.

cases of impaction of cholangiopancreatoscopy-guided baskets are lacking in the literature. Interestingly, this case also demonstrates how EHL, which was initially unsuccessful, achieved successful fragmentation once the stone was enveloped by the basket. Although this may simply be a byproduct of the accumulation of a greater number of shocks, this may alternatively suggest that entrapment within the metal fibers of the basket allows for greater reflected tensile waves that reverberate within the stone once the initial shock wave passes through the stone.[6] In summary, this report illustrates the usefulness of intraductal lithotripsy in the event of a cholangiopancreatoscopy-guided basket impaction, which allowed for a successful nonsurgical intervention.

DISCLOSURE

Dr Shah is a consultant for and on an advisory board at Boston Scientific, and he is a consultant for Cook Medical. The other authors did not disclose any financial relationships.

ACKNOWLEDGMENTS

Dr Han was supported by the Path to K award from the Ohio State University College of Medicine Office of Research and the Center for Clinical and Translational Science through the Richard P. & Marie R. Bremer Medical Research

Fund and William H. Davis Endowment for Basic Medical Research.

REFERENCES

1. Dumonceau J-M, Delhaye M, Tringali A, et al. Endoscopic treatment of chronic pancreatitis: European Society of Gastrointestinal Endoscopy (ESGE) Guideline—updated August 2018. Endoscopy 2019;51:179-93.
2. Brewer Gutierrez OI, Raijman I, Shah RJ, et al. Safety and efficacy of digital single-operator pancreatoscopy for obstructing pancreatic ductal stones. Endosc Int Open 2019;7:E896-903.
3. Han S, Shah RJ, Brauer BC, et al. A comparison of endoscopic retrograde pancreatography with or without pancreatoscopy for removal of pancreatic duct stones. Pancreas 2019;48:690-7.
4. Han S, Shah RJ. Cholangioscopy-guided basket retrieval of impacted stones. VideoGIE 2020;5:387-8.
5. Terauchi T, Shinozaki S, Inoue M, Lefor AK, Shinozaki H. Nonsurgical rescue after basket-stone impaction by endoscopic cutting of a metallic lithotripter and laser lithotripsy. VideoGIE 2021;6:416-8.
6. Zhu S, Cocks FH, Preminger GM, Zhong P. The role of stress waves and cavitation in stone comminution in shock wave lithotripsy. Ultrasound Med Biol 2002;28:661-71.