



Figure 4. Captured stone delivered into duodenum.

procedure well. Preprocedure and postprocedure fetal heart tones were normal.

Challenges related to performing ERCP without radiographic assistance include cannulation of intended duct and confirmation of ductal clearance. We reported the largest series to date of nonradiation ERCP in 2003,² and for almost 20 years now we have performed all ERCPs on pregnant patients without the use of any fluoroscopy. We reported on the use of cholangioscopy during pregnancy to confirm ductal clearance in 2008.³ The utility of the SpyGlass retrieval basket to capture and retrieve stones under direct vision addresses one of the challenges associated with nonradiation ERCP during pregnancy.

As Drs Han and Shah discussed, the vast majority of bile duct stones can be treated by conventional techniques. Occasionally, with large stones and/or those in difficult locations or if impacted (eg, Mirizzi syndrome, hepatolithiasis), cholangioscopy with intraductal lithotripsy will be required. We suggest that cholangioscopy with mini-basket technology should also be considered as an option for confirmation and clearance of bile duct stones during pregnancy.

DISCLOSURE

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Response: Emerging uses of cholangioscopy for choledocholithiasis



We thank Tarnasky et al¹ for providing this insightful letter to the editor in response to our article regarding the use of cholangioscopy-guided basket retrieval of impacted stones.² The authors describe a case of using cholangioscopy-guided basket retrieval for the removal of a retained stone in the common bile duct that could not be removed during index ERCP. Before the patient's follow-up ERCP, however, the patient was found to be pregnant and was therefore referred for a repeat attempt at stone removal while in her second trimester. Cholangioscopy-guided basket retrieval of the stone was successful without the use of fluoroscopy.

We agree that the case illustrated by Tarnasky et al¹ highlights another helpful use of this novel technique. Therapeutic intent remains the primary indication for ERCP during pregnancy because conditions such as biliary pancreatitis and cholangitis can lead to fetal demise. Fetal radiation exposure remains a high-priority concern for both the patient and the fetus, and although shielding is often performed, the most effective way to reduce radiation exposure is to limit the use of fluoroscopy.³ In line with this, cholangioscopy may enable direct visualization of the bile duct lumen to identify stones with minimal or no use of fluoroscopy. Furthermore, the use of the SpyBasket (Boston Scientific, Marlborough, Mass, USA) allows for targeted removal of stones, as opposed to blindly performing balloon sweeps when performing ERCP without fluoroscopy. Finally, cholangioscopy also enables confirmation of stone clearance by directly examining the bile duct after stone removal and can even allow for examination of the cystic duct, where retained stones can be particularly challenging to remove with conventional ERCP.⁴ This can be of particular importance in pregnant patients by decreasing the need for additional procedures during pregnancy.

The use of cholangioscopy-guided techniques remains an area of significant interest in enabling targeted therapy while decreasing the need for fluoroscopy. An ongoing multicenter randomized controlled trial ([ClinicalTrials.gov](https://clinicaltrials.gov/NCT03421340) NCT03421340) is comparing fluoroscopy-less cholangioscopy with standard ERCP for the treatment of noncomplex choledocholithiasis. We agree with the authors that pregnancy represents a potential opportunity

for eliminating fluoroscopy during ERCP. Although studies are required to evaluate cholangioscopy alone for situations in which fluoroscopy is challenging (ie, emergent bedside ERCP without proper fluoroscopy or body habitus–limited fluoroscopy), cholangioscope-specific accessories and cholangioscopy-directed therapeutic maneuvers are an exciting prospect for endoscopic biliary therapy.

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