

Cutting the sphincter in the presence of a normal cholangiogram

Perhaps there is nothing more satisfying in the world of GI endoscopy than performing an ERCP with sphincterotomy and stone extraction. The patient presents with pain and fever and is visibly jaundiced, a filling defect is seen on cholangiogram, a large sphincterotomy is made, and then a stone and possibly even some pus is pulled from the bile duct. The patient immediately feels better and the endoscopist can emphatically state, "Yes, I have accomplished something today."

However, biliary endoscopy, like life, is not always so straightforward. Sometimes the patient looks and smells just like a common duct stone but no filling defect or stone is seen in the biliary tree on cholangiogram. What to do in this situation? Cut the sphincter and sweep and explore the duct or trust your cholangiogram and not cut the sphincter?

This is the topic that Lee et al¹ addressed in a study that examined whether endoscopic sphincterotomy (ES) reduces subsequent biliary symptoms, particularly future episodes of cholangitis, in patients who have a high pretest probability and a clinical suspicion of choledocholithiasis before the ERCP is performed but when no actual stones are seen on fluoroscopy at the time of the endoscopic retrograde cholangiogram (ERC).

Lee et al¹ retrospectively examined 117 patients who had cholangitis, defined as fever, abdominal pain, and jaundice, and a high probability of a common duct stone defined as 2 or more of the following: (1) bilirubin greater than or equal to 2 mg/dL or alkaline phosphatase greater than or equal to twice the normal value, (2) a common bile duct (CBD) dilated to 8 mm or larger, (3) the presence of high-density material in the duct on other imaging but no stone seen on cholangiogram at the time of ERCP. They then followed the patients to see if they had further bouts of cholangitis and examined whether the variables of age, sex, dilated CBD; the presence of a perampullary diverticulum; the presence of a gallbladder; the presence of gallbladder stones; or the performance of a sphincterotomy predicted future recurrent episodes of cholangitis.

On univariate analysis, a dilated duct > 12 mm, the presence of gallbladder stones, and whether a sphincterotomy was performed all were predictors of recurring cholangitis. On multivariate analysis, only the performance of a sphinc-

terotomy was shown to affect recurring cholangitis, with lower rates of cholangitis found in the sphincterotomy group at 1 and 3 years, and a cholangitis recurrence rate of 9.2% if a sphincterotomy was performed versus 52.1% if a sphincterotomy was not performed after 5 years of follow-up. The investigators thus concluded that ES reduced cholangitis in patients, with 1 documented attack of cholangitis and a high risk of stones even when no stones were seen on cholangiogram. This leads to the suggestion that, even in the absence of a stone, a sphincterotomy should be performed in select patients.

Performing an empiric sphincterotomy just because you feel the patient probably has or had a stone, though commonly practiced, still does not have much or even any clinical data to back it up.

Empiric sphincterotomy when a stone is suspected but not seen in the duct is already likely highly practiced in the real world. But should we be ignoring our cholangiograms and relying just on clinical suspicion when making the decision to cut a sphincterotomy in patients with possible stone disease? Are there data to support performing sphincterotomy with normal cholangiograms? Does the present study by Lee et al¹ support this practice?

The main reason to perform a sphincterotomy for a suspected stone but with a normal cholangiogram is the fact that you do not trust your cholangiogram and believe that a small stone or even sludge is present in the duct despite imaging. We consider a cholangiography the criterion standard, but a cholangiogram at the time of ERC is not a perfect study, and every practitioner has dragged a stone out of the duct that was not seen on a cholangiography. The best evidence suggests that ERC for choledocholithiasis is not perfect and has sensitivities that range from 90% to 100%.² In comparison, a choledochoscopy, which allows direct visualization inside the ducts, has shown that stones can be missed on a cholangiography.³ Another example of how frequently cholangiograms might miss common duct stones is evident through the use of intraductal US, which may find as many as 38% of patients who have small stones (< 5 mm) or

sludge that was not seen on cholangiography.⁴ EUS has also been shown to be able to detect tiny stones that could be masked by contrast medium during the time of ERCP.⁵ When knowing that stones can be missed on ERC, perhaps the investigators are correct and a sphincterotomy with exploration of the duct with a basket or a balloon should be performed, even with a normal cholangiogram when there is a suspicion of a stone.

However, before it can be recommended to cut the sphincter of every patient with a suspected stone, the downside or negative aspects of performing empiric and sometimes unnecessary sphincterotomies need to be considered. ES, although a safe procedure in experienced hands, is not without complications. Bleeding from a sphincterotomy may range from 0.7% to 2.0% of cases, with mortality related to bleeding in the range of 0.08% to 0.1%.⁶⁻⁸ The majority of bleeding related to sphincterotomy is mild and can be managed conservatively, with or without additional endoscopic therapy. Perforation related to sphincterotomy in earlier studies^{9,10} occurred in 0.8% of cases but was found to be less common and closer to 0.35% in more recent studies.¹¹ Again, although the majority of sphincterotomy-related perforations can be managed with conservative measures, it is very rare that a perforation secondary to cutting the biliary sphincter will lead to disastrous consequences, including death. Controversy continues to exist on how much the thermal injury of a sphincterotomy leads to pancreatitis. Most recent data suggest that a biliary sphincterotomy does not lead directly to pancreatitis.^{6,12,13} The presence of a common duct stone, in fact, does appear to be protective in preventing pancreatitis. The greatest risks of post-ERCP pancreatitis are patient related, with patients who have suspected sphincter of Oddi dysfunction or the indication for the ERCP being abdominal pain, which carries the highest risk for pancreatitis. ERCP and empiric sphincterotomy in patients who do not have stones on cholangiogram nor are they at high risk for stones are thus likely at greater risk of pancreatitis. Thus, overall, sphincterotomy is relatively safe, but complications do occur, and, if a complication occurs in a patient with a normal (no stone seen) duct, then the complications are harder to defend.

In addition to immediate complications, there has been a concern about the long-term effect of the ablation of the sphincter after a sphincterotomy. Whereas, the investigators suggest that sphincterotomy can reduce future episodes of cholangitis, other studies that examined the long-term impact of sphincterotomy, particularly in young people, noted that sphincterotomy can lead to recurrent biliary symptoms and, in particular, recurrent choledocholithiasis, in as many as 10% of patients.^{14,15} Although 10% is an acceptably low number in patients who have had documented common duct stones that needed to be removed, it may be considered a relatively high long-term complication rate for a sphincterotomy that was performed without a stone even seen in the duct on cholangiogram and for

a sphincterotomy that may have had little clinical benefit for the patient.

Three previous studies examined the issue of an ES with an inconclusive cholangiogram before the present study by Lee et al¹ and found mixed results. Johnston et al¹⁶ found that, in 20 patients, sphincterotomy performed for a suspected stone but no stone seen on cholangiogram did not reduce future biliary problems but instead increased procedure-related patient morbidity. Siddique et al¹⁷ studied 78 patients who had a sphincterotomy despite a normal cholangiogram and found 25% to have small stones not seen on cholangiogram. However, even though more stones were seen and removed by performing the sphincterotomy, biliary symptoms were not decreased compared with a control group, and the sphincterotomy group had more procedure-related complications, which suggests that removing the small stones not seen on cholangiography might not make a clinical difference except for increasing the complication risk to the patient. Finally, in the one existing study that supported an empiric sphincterotomy, Brand et al¹⁸ found biliary-related pain to be reduced after a sphincterotomy in patients with a normal cholangiogram but suspected stones but did not address the impact of sphincterotomy on subsequent development of cholangitis in these patients.

The present article by Lee et al¹ further supports the idea that an ES may be beneficial in certain situations, even with a normal cholangiogram. However, the practice should still be recommended with caution and only in a select group of patients. One issue with the data presented by Lee et al¹ in their article is whether it is applicable to a Western population. In Western populations, approximately 95% of patients with common duct stones have stones in the gallbladder as well.¹⁹⁻²¹ Only 20% of patients in the study by Lee et al¹ had a cholecystectomy after an ES, and only 25% had gallbladder stones at the time that there was a suspicion of a common duct stone. Thus, choledocholithiasis in the West, where the majority of common duct stones migrate from the gallbladder, is likely not the same thing as choledocholithiasis in Asia, where most common duct stones are primarily intraductal. With significantly less de novo common duct stones forming in Western populations, it may be that an empiric sphincterotomy for suspected stones but a normal cholangiogram may be of less benefit, particularly if there is the concomitant presence of cholelithiasis and the gallbladder is subsequently removed.

Of more importance in judging the clinical relevancy of the study by Lee et al¹ is to closely examine the patient selection in the study. Patients included were not patients at moderate clinical risk for having a stone or even just a high-risk group for choledocholithiasis^{22,23} but rather could be classified as extremely high-risk patients for having common duct stones. All the patients had clinical cholangitis and elevated bilirubin or alkaline phosphatase, CBD dilatation, or a possible stone seen on another imaging study. The patients who had a sphincterotomy had a mean

bilirubin of 4.0 mg/dL (reference range 0.0-1.4 mg/dL), a mean alkaline phosphatase of 250 U/L (35-130 U/L), and a mean ductal dilatation of almost 12 mm. These patients are not the patients with mildly elevated transaminases, intermittent abdominal pain, and stones seen in the gallbladder that, in the United States, comprise a large number of patients who may be referred for consideration of an ERCP before cholecystectomy. The patients in the study by Lee et al¹ are the patients you are almost sure have a stone before doing an ERCP. They had a very high pretest probability of having choledocholithiasis and presented with cholangitis, clinically making the cutting of a sphincterotomy without cholangiography evidence of a stone perhaps more justifiable.

Does the present article by Lee et al¹ then alter practice and make it permissible or at least defensible to perform an ES in stone cases solely based on clinical suspicion, despite negative ERC imaging? What the study by Lee et al¹ does do is give the first clinical evidence that performing a sphincterotomy without stones seen on cholangiogram can provide a clinical benefit in a very select group of patients. What the study does not do is justify cutting a sphincterotomy when the clinical suspicion for a stone is only low or moderate. Performing an empiric sphincterotomy just because you feel the patient probably has or had a stone, though commonly practiced, still does not have much or even any clinical data to back it up. Continue to use and trust your cholangiogram as the primary guide in the decision to cut a sphincterotomy, because this remains a highly accurate test for choledocholithiasis, with sensitivities well over 90% and approaching 100%. ERCP should not automatically equal a sphincterotomy in all suspected stone cases. A sphincterotomy should obviously be performed when a filling defect is seen, and now there is some evidence it may be acceptable when a patient presents with cholangitis and, in addition, when, by biochemical measures, ductal dilatation, and noninvasive imaging, there is a very high chance of having a common duct stone even when a stone is not detected by ERCP.

DISCLOSURE

The author reports that there are no disclosures relevant to this publication.

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Abbreviations: CBD, common bile duct; ERC, endoscopic retrograde cholangiogram; ES, endoscopic sphincterotomy.

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