The Prevalence of Bile Duct Sludge in Patients With Suspected Bile Duct Stones

Rutger Quispel,[1] Lydi M.J.W. van Driel,[2] Marco J. Bruno,[2] Sarto C. Paquin,[3] and Anand V. Sahai[3]

[1]Department of Gastroenterology and Hepatology, Reinier de Graaf Gasthuis, Delft, The Netherlands; [2]Department of Gastroenterology and Hepatology, Erasmus Medical Center, Rotterdam, The Netherlands; and [3]Department of Medicine, Division of Gastroenterology, Centre Hospitalier de l'Université de Montréal, Canada

Keywords: Biliary tract and liver; Endoscopic ultrasonography; bile duct sludge.

Introduction

Endoscopic Ultrasonography (EUS) in patients with suspected bile duct stones rules out the presence of stones in up to 65% of patients, thus preventing unnecessary Endoscopic Retrograde Cholangiography with Endoscopic Sphincterotomy (ERC with ES) and its complications in the majority of cases.[1] Increased use of EUS for ruling out bile duct stones has led to more cases in which bile duct sludge is detected. Sludge is an ultrasound diagnosis usually described as layered, mobile, low-amplitude echoes without shadowing, representing bile precipitate out of solution.[2,3] In presumed idiopathic pancreatitis the finding of bile duct sludge is considered an indication to perform a cholecystectomy.[4] The clinical relevance and significance of detecting bile duct sludge in patients with suspected bile duct stones is currently unclear. Based on two retrospective studies including a total of 215 EUS procedures with positive findings (sludge or stones), bile duct sludge is estimated to account for 20-25% of the abnormalities detected in the CBD in patients with suspected bile duct lithiasis.[5,6]

Methods

Aiming for a better estimate of the prevalence of bile duct sludge at EUS in patients with suspected bile duct lithiasis, we analyzed all consecutive EUS procedures in patients with suspected bile duct stones from a large prospectively maintained EUS database from a tertiary referral center in Montreal, Canada. Cases were stratified based on serum bilirubin and findings at transabdominal ultrasound according to the 2010 ASGE criteria into low, intermediate, and high probability of bile duct stones.[7] Pancreatitis and suspected cholangitis cases were excluded. Linear array EUS was performed by either one of two experienced endosonographers (SP and AS).

Results

Between October 2000 and June 2020, 41259 upper gastrointestinal EUS procedures were performed in patients >18 years of age, of which 2991 cases were performed for suspected bile duct lithiasis. Overall, bile duct stones were detected in 403 (13.5%) out of 2991 cases and sludge was detected in 65 (2.2%) cases. EUS detected bile duct sludge or stones (positive findings) in 468 cases. Sludge was detected in 13.8% (65 out of 468) of these cases. A total of 1511 (51%) patients had low probability, 1265 (42%) patients had intermediate probability, and 215 (7%) patients had high probability of bile duct stones according to 2010 ASGE criteria. In patients with intermediate or high probability of bile duct stones EUS detected stones in 349 of 1480 (24%) and sludge in 54 of 1480 (3.6%) of cases (Figure). The prevalence of both bile duct stones and sludge increases with the estimated probability.

Discussion

Based on this retrospective analysis of a large, prospectively maintained EUS database, we estimate the prevalence of bile duct sludge in patients with intermediate or high probability of bile duct stones to be 3.6%.

Previous estimates of the prevalence of bile duct sludge ranged from 20%-25% and were calculated using the number of positive findings at EUS (sludge or stones) as the denominator in studies with limited numbers of cases (116 and 99 cases respectively).[5,6] In the current study, sludge was detected in 65 (13.8%) out of 468 cases with positive findings at EUS.

The larger sample size in comparison to previous studies and the use of number of cases with intermediate or high probability of bile duct stones as the denominator are the main strengths of the data presented, providing a more solid estimate of the prevalence of bile duct sludge

Most current article

2590-0307

https://doi.org/10.1016/j.tige.2021.04.001

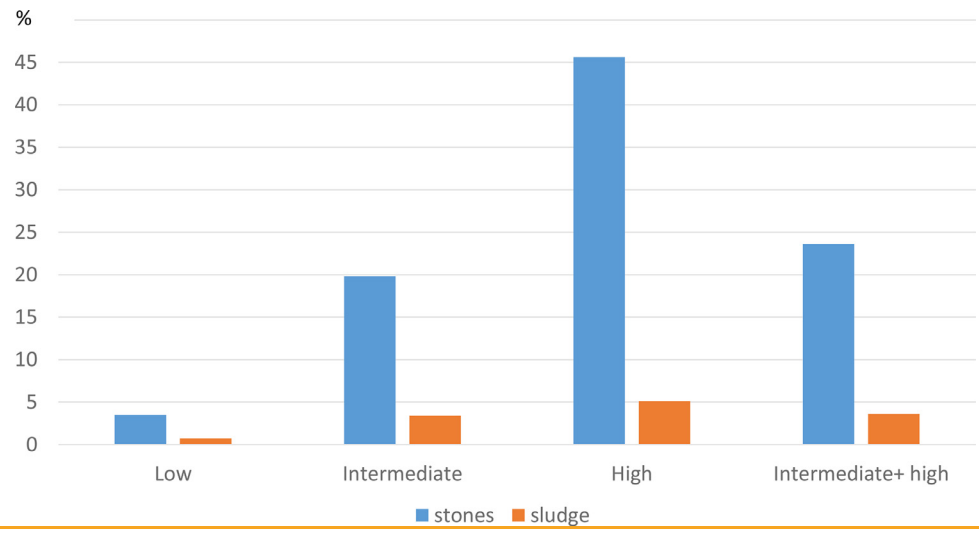

Figure. Probability of bile duct stones according to 2010 ASGE criteria and proportion (%) of cases with stones and sludge at EUS.

in patients with suspected bile duct lithiasis. Of critical note, EUS is known to be associated with interobserver variability.[8] In the current study, only two experienced endosonographers performed all EUS interventions.

Endosonography plays an important role in selecting patients with suspected bile duct lithiasis for ERC with ES. Performing EUS in patients with an intermediate or high probability of bile duct stones may yield bile duct sludge in 1 out of 25 cases, posing endosonographers the intriguing and unsolved question whether it is indicated to proceed to ERC and ES. Further research into the natural behavior of biliary sludge is needed to guide clinicians in making the right treatment decision in these patients.

Detecting hyperechoic, dependent, non-shadowing bile duct content at EUS in patients with suspected bile duct lithiasis, should prompt the endosonographers to confirm the diagnosis by repositioning the endoscope to rule out artifacts. In our practice, we only schedule ERC with ES in these patients after a thorough pro- and con discussion with the patient. An endoscopic intervention is scheduled 3-10 days after diagnosis. Prior to this ERC+ ES we schedule a second EUS in the same session to re-confirm the sludge diagnosis and rule out spontaneous passage.

REFERENCES

1. Tse F, et al. Gastrointest Endosc 2008;67:235–44.
2. Dahan P, et al. Gut 1996;38:277–81.
3. Lee SP, et al. Gastroenterology 1988;94:170–6.
4. Lee SP, et al. N Engl J Med 1992;326:589–93.
5. Fusaroli P, et al. Dig Liver Dis 2016;48:277–82.
6. Quispel R, et al. Eur J Gastroenterol Hepatol 2016;28:1473–6.
7. Committee ASoP. Gastrointest Endosc 2010;71:1–9.
8. Quispel R, et al. accepted for publication in EIO 2021.

Correspondence
Address correspondence to: Lydi MJW van Driel, MD, PhD, MSc, Department of Gastroenterology and Hepatology, Erasmus Medical Center, Rotterdam. e-mail: l.m.j.w.vandriel@erasmusmc.nl

Authors' Contributions
RQ: study concept and design/analysis and interpretation/ writing draft
LD: supported analysis and interpretation/ critical revision of the manuscript for important intellectual content
MB: critical revision of the manuscript for important intellectual content/ study supervision
SP: acquisition of data/ critical revision of the manuscript for important intellectual content
AS: acquisition of data/ critical revision of the manuscript for important intellectual content/ study supervision

Ethical Statement
The corresponding author, on behalf of all authors, jointly and severally, certifies that their institution has approved the protocol for any investigation involving humans or animals and that all experimentation was conducted in conformity with ethical and humane principles of research.

Conflicts of Interest
None of the authors have any conflicts of interest.

Disclosure of Funding
No Funding.