OPINION

Positioning cholangioscopy in bile duct stone management: mind the technology gap

Vincent Zimmer,^{1,2} Frank Lammert²

¹Department of Medicine, Marienhausklinik St. Josef Kohlhof, Neunkirchen, Germany

²Department of Medicine II, Saarland University Medical Center, Saarland University, Homburg, Germany

Correspondence to

Dr Vincent Zimmer, Department of Medicine, Marienhausklinik St. Josef Kohlhof, Neunkirchen 66539, Germany; vincent.zimmer@gmx.de

Received 24 January 2018

Accepted 24 February 2018

Published Online First

9 March 2018

INTRODUCTION

Management of common bile duct stones (CBDS) affecting up to 20% of individuals with symptomatic gallstone disease is commonplace in day-to-day endoscopic retrograde cholangiography (ERCP) business as mainstay modality and platform technology in complex cases. The role of cholangioscopy in CBDS is poorly defined; however, it has been strengthened in the recently '*Updated guideline on the management of common bile duct stones (CBDS)*' published by Williams and colleagues.¹ Regarding the renewed interest in cholangioscopy in complex bile duct stone disease practice, the expert guideline strongly, although with low-level evidence, recommends cholangioscopy-directed (catheter-based) electrohydraulic or laser lithotripsy as potential best practice rescue techniques for conventional endoscopic failure, specifically including mechanical lithotripsy and/or endoscopic papillary (large) balloon dilation (EP(L)BD) after standard incision sphincterotomy. Per-oral or direct cholangioscopy (DC) versus single operator cholangioscopy and their high success rates in dedicated clinical studies derived from highly specialised centres are justifiably discussed in more detail. However, that said, the major downside of these highly appealing techniques lies in their restricted dissemination, thus complicating patients' access to these rescue options. Overall, the current discussion on the appropriate positioning of cholangioscopy in complex bile duct stone management centres around the application of (widely available) ultraslim upper endoscopes, the utilisation of specifically dedicated anchoring balloons (associated with increased procedure-related costs and complexity), the application of CO₂

insufflation (however, relative to air insufflation similarly associated with risk of gas embolism) and (not widely available) catheter-based lithotripsy technology fraught with high investment and maintenance costs.^{2–5}

DILATION-ASSISTED CHOLANGIOSCOPIC STONE EXTRACTION

By contrast, the novel concept of '*dilation-assisted cholangioscopic stone extraction*' (DACSE) after freehand intubation takes resort to standard size upper endoscopes with reasonable working channel calibres capable of accepting standard ERCP and other accessories such as polyp graspers, snares and/or Roth nets.^{6,7} A variation of dilation-assisted stone extraction based on EPLBD, relying on ubiquitously available endoscopy technology, this approach might thus have a significant role in endoscopy practice in the future with wider diffusion into dedicated endoscopy services, at least so under the premise of a grossly dilated biliary system as is often encountered in complex CBDS disease.

BASIC STEPS AND TECHNICAL ASPECTS OF DACSE

As illustrated in [figure 1](#), the four basic steps of the DACSE procedure include: (1) conventional EPLBD taking into account stone and common bile duct diameter; (2) freehand intubation of the EPLBD site for DC; (3) intraductal stone fragmentation with duodenal extraction (calling for repeated reintubations); and (4) cholangioscopic documentation of stone clearance as procedural completeness. While freehand intubation has traditionally been discredited in the expert opinion due to initially

To cite: Zimmer V, Lammert F. *Frontline Gastroenterology* 2018;**9**:315–316.

Figure 1 (A) High distal stone burden with barrel-shaped stones up to 18 mm in a grossly dilated and angulated common bile duct (CBD). The four different steps of the dilation-assisted cholangioscopic stone extraction (DACSE) procedure: (B) Step 1: endoscopic papillary large balloon dilation (EPLBD) with a maximum diameter of 18 mm (CRE Balloon Dilator, Boston Scientific, Ratingen, Germany) after proximal stone advancement. (C) Step 2: freehand intubation of the EPLBD site for direct cholangioscopy (DC) access using a standard size endoscope (Fujinon EG590WR, Fujifilm, Düsseldorf, Germany—outer diameter 9.6 mm, working channel 2.8 mm) providing direct endoscopic vision of CBD stones. (D) Step 3: intraductal fragmentation and extraction by standard accessories including, for example, a snare. (E) Step 4: lack of remaining stones as evidenced by visualisation of the liver hilum as a marker for procedural completeness. Note that neither saline irrigation nor air/CO₂ insufflation with potentially higher risks of cholangitis and/or gas embolism was needed in consideration of the marked CBD dilation.

disappointing performance results in a prototype multibending cholangioscope pilot study (0/7 successful DC access),^{8,9} reasonable technical feasibility with conventional upper endoscopes including utilisation of standard size endoscopes (which may potentially attenuate gastric loop formation often complicating ultraslim DC) has been reported in small studies and individual reports, optionally applying ad hoc available ancillary techniques, such as routine biopsy forceps anchoring.^{10–12} Of note, recent data on a dedicated next-generation double-bending cholangioscope have revived interest in ancillary-free papillary intubation with successful freehand access in 51/72 procedures.¹³

CONCLUSIONS

Notwithstanding the rather perceived than real high technical demands related to freehand intubation of the EPLBD site and the lack of rigorous systematic studies, DACSE may streamline and provide new horizons in endoscopic stone interventions in the future,

and may therefore help bridge the technology gap in complex bile duct stone management under direct endoscopic vision.

Contributors VZ: drafting and finalisation. FL: discussion and finalisation with significant intellectual contribution.

Funding This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Provenance and peer review Not commissioned; internally peer reviewed.

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