

Klein Infiltration Pump® for Irrigation During Percutaneous Cholangioscopy and Cholecystoscopy Using SpyGlass Discover® Digital Catheter

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Purpose

Direct visualization and management of complex biliary pathologies by percutaneous endoscopy is becoming more commonplace in the current interventional radiology practice due to its minimally invasive nature. However, intraprocedural visualization during cholecystoscopy is critically limited in part due to the current technique of manual irrigation during endoscopy.

Background

Recent studies have demonstrated the potential and efficacy of direct video visualization in the diagnosis and management of advanced pancreaticobiliary pathologies using single-use digital catheters. While direct visualization was initially described using reusable digital catheters, the introduction of disposable flexible digital catheters has revolutionized the field of percutaneous endoscopy, as they are smaller, cheaper, and decrease the risk of nosocomial infections. Disposable flexible digital catheters were originally developed for the purpose of accessing the upper genitourinary tract. Given their initial success, similar digital catheters were soon developed for navigating the biliary system. More recently, the use of these digital catheters for percutaneous cholecystoscopy in patients with symptomatic cholelithiasis has been reported with technical success rates of 95-100%. To facilitate appropriate visualization of the biliary architecture, reliable and controlled irrigation is critical to remove debris which otherwise makes visualization harder. Careful regulation of irrigation flow is essential in order to avoid pressurizing the biliary system and precipitating sepsis. All prior reports discussing percutaneous cholecystoscopy and cholangioscopy have described the use of a manual irrigation method via a 10 mL control syringe. The aim of this study was to evaluate the safety, feasibility and efficacy of a commercially available mechanical infiltration pump during percutaneous biliary endoscopy (cholecystoscopy, cholangioscopy, and choledochoscopy) to aid in visualization.

Methods

In this retrospective bi-institutional study (n=36), we examined the safety, feasibility, and efficacy of using an infiltration pump during percutaneous endoscopy using the SpyGlass Discover® digital catheter compared to the use of manual irrigation using the LithoVue single-use digital catheter from September 2017 to September 2020. Technical success was assessed by the attending interventionalist at the conclusion of the procedure and was defined as the ability to perform required maneuvers to access all predetermined areas in the gallbladder, cystic duct, common bile duct, or common hepatic duct during the procedure. Clinical success was defined as removal of all stones, successful biopsy of a lesion, and or evaluation of a stricture.

Results

The mean age of patients in the manual irrigation group (MIG) and pump irrigation group (PIG) was 77±14 and 72±11 years, respectively. The patients in both groups were predominantly male (76.47% for MIG vs. 73.68% for PIG). 29 (80.55%; 17 MIG, 15 PIG) patients were treated for cholelithiasis, 3 (8.33%; 2 MIG, 3 PIG) patients for choledocholithiasis, 1 (2.77%; 1 MIG) patient for cholangiolithiasis and 1 (2.77%; 1 PIG) patient for post-cholecystectomy dropped stones. The technical success was 100% in both groups. However, in the MIG, cholangioscopy had to be aborted in 4 (23.52%) cases due to haemobilia and limited visualization. In the PIG, none of the cases were terminated. The clinical success was 100% in the PIG but only 76.48% in the MIG due to the need for early procedural termination. The mean ± SD length of intraprocedural times for percutaneous endoscopy and cholelithotripsy was 128 ± 41 (MIG) versus 92 ± 37 minutes (PIG) (p < 0.001). The median number of cholecystoscopy, cholelithotripsy, and cholelithotomy sessions was 3 (range: 1-4) for the MIG and 2 (range: 1-3) for the PIG. There were no major or minor procedural complications in either group.



Conclusion

Using a pump for intermittent saline irrigation is effective, feasible, and safe with our study demonstrating increased clinical success, and procedural efficacy with a similar safety profile compared to the MIG.

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