Outcomes and limitations in EUS-guided gallbladder drainage

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ABSTRACT

EUS-guided gallbladder drainage (EUS-GBD) is gaining popularity as an option for drainage of the gallbladder in patients suffering from acute cholecystitis but at high risk for cholecystectomy. It allows internal drainage of the gallbladder and avoidance of the external tube as used in percutaneous cholecystostomy (PT-GBD). It may also provide additional benefits, including reduced re-admissions and re-interventions. In this chapter, we review the indications and outcomes of EUS-GBD. Furthermore, the follow-up management of patients that received EUS-GBD would be outlined.

Key words: Acute cholecystitis, EUS-guided gallbladder drainage, malignant biliary obstruction, percutaneous cholecystostomy

INTRODUCTION

Acute cholecystitis is increasing in frequency with an aging population.¹ Laparoscopic cholecystectomy is the gold standard in the treatment of the condition.² However, with an elderly population, frequently, they are also suffering from multiple comorbidities that render them at high-risk for cholecystectomy. Then, percutaneous cholecystostomy gallbladder drainage (PT-GBD) may be needed for drainage of the gallbladder. However, the presence of an external tube is frequently cumbersome for care as they are prone to leak, obstruction, and dislodgement.³⁻⁵ The advent of endoscopic gallbladder provides an alternative to external drainage of the gallbladder and avoidance of an external drainage tube. Endoscopic GBD can be performed with either transpapillary GBD or EUS-guided transmural GBD. When compared, EUS-GBD is associated with higher technical and clinical success and lower risk of adverse events (AE). Hence, the procedure is increasing in popularity as the procedure of choice for the treatment of acute cholecystitis in high-risk patients. In the paper, an in-depth review of EUS-GBD would be provided.

Indications for EUS-guided gallbladder drainage

The most common indication of EUS-GBD is in patients suffering from acute cholecystitis but are at high risk for cholecystectomy.¹ EUS-GBD should be avoided in patients with suspected gallbladder perforation or necrosis. In case of doubt, a computed tomography should be performed to assess the vascularity of the gallbladder.

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gallbladder and to rule out peroration. The second indication of EUS-GBD is to convert the long-term percutaneous cholecystostomy to internal drainage. Care should be taken when performing EUS-GBD in this group of patients. First, the gallbladder is frequently contracted and difficult to distend. This results in a small-sized target for drainage. The presence of a cholecystostomy can allow injection of saline or contrast to help with distension of the gallbladder. Second, the gallbladder wall may be thickened and more difficult to puncture. Finally, the presence of a large gallstone may make EUS-GBD more difficult as there is limited space for stent deployment. The third indication for EUS-GBD is to achieve drainage of malignant biliary obstruction in patients with failed ERCP and EUS-guided biliary drainage. The principle of this procedure is similar to the principle of a surgical cholecystojejunostomy, and successful drainage depends on a patent cystic duct. In a retrospective study assessing the incidence of patent cystic ducts on cholangiograms performed by ERCP in patients with MBO, only 50% of the patients had a patent hepatocystic junction. In addition, results from multiple surgical series on cholecystojejunostomy demonstrated that the overall rate of recurrent biliary obstruction of 8%–48%. Thus, in patients with failed ERCP, EUS-guided biliary drainage should still be the first option, and in cases where EUS-guided biliary drainage (EUS-BD) is not possible, then EUS-GBD can be considered.

Outcomes of EUS-guided gallbladder drainage

EUS-gallbladder drainage for acute cholecystitis

EUS-GBD is associated with high technical and clinical success rates ranging from 90% to 98.7% and 89% to 98.4%, respectively. AEs are infrequent and range from 4.8% to 22%. These include bleeding, recurrent cholecystitis, stent migration, and occlusion. Five studies have compared EUS-GBD to PT-GBD in patients with acute cholecystitis. Three studies used lumen apposing stents (LAMS), one study used fully covered self-expandable biliary metal stents (FCSEMS) and the other studies used a naso-gallbladder drain as a method of drainage prior to cholecystectomy.

Comparing EUS-GBD and PT-GBD, all studies reported comparable technical (95.2%–100% vs. 96.6%–100%) and clinical success rates (86.7%–96.7% vs. 85.8%–97.7%), respectively. Jang et al. compared EUS-GBD with a naso-gallbladder drain and PT-GBD as temporary drainage prior to cholecystectomy. They reported similar AE rate (6.7% vs. 3.4%, respectively) but significantly lower median postprocedure pain score after EUS-GBD (1 vs. 5; \(P < .001\)).

Outcomes of meta-analysis

Several pooled analyses of case series and meta-analysis on EUS-GBD have been reported recently. Three
of these studies were pooled analysis on EUS-GBD using LAMS only and the other included the use of plastic stents, self-expandable metallic stent (SEMS), and LAMS. One meta-analysis compared the outcomes of EUS-GBD to PT-GBD. Klava reported the outcomes of EUS-GBD with LAMS in 233 patients. The pooled proportion of technical success was 93.86% (95% confidence interval [CI] = 90.56–96.49) and clinical success was 92.48% (95% CI = 88.9–95.42). Overall complication rate was 18.31% (95% CI = 13.49–23.68) and stent-related complication rate was 8.16% (95% CI = 4.03–14.96). The pooled proportion for perforation was 6.71% (95% CI 3.65–10.6), and recurrent cholangitis/cholecystitis was noted in 4.05% (95% CI = 1.64–7.48). Anderloni reported the outcomes of EUS-GBD using plastic stents, SEMS, and LAMS in 166 patients. The technical success rate was 100% using plastic stents, 98.6% using SEMS, and 91.5% using LAMS. The clinical success rate was 100%, 94.4%, and 90.1% for plastic stents, SEMS, and LAMS, respectively. The frequency of AE was 18.2% using plastic stents, 12.3% using SEMS, and 9.9% using LAMS. Both studies concluded that EUS-GBD was feasible, safe, and effective.

In a meta-analysis comparing EUS-GBD with PT-GBD, five studies comprising 495 patients were selected for analysis. There were no differences in technical or clinical success rates between the two groups on pooled meta-analysis. EUS-GBD had significantly lower postprocedural pain scores (mean difference - 3.0, 95% CI - 2.3–3.6, P < 0.001, on a 10-point pain scale). There were no statistically significant differences in procedure complications between groups. Re-intervention rates were significantly higher in the PT-GBD group (odds ratio 4.3, 95% CI 2.0–9.3, P < 0.001).

Thus, the above studies suggest that EUS-GBD is associated with high technical and clinical success rates with low AE. When compared to PT-GBD, EUS-GBD may reduce AE and re-interventions. The results of a completed randomized study (NCT02212717) performed by the authors comparing EUS-GBD vs. PT-GBD are eagerly awaited to confirm the benefits of EUS-GBD over PT-GBD.

The management of patients after EUS-guided gallbladder drainage

There are two options for management in patients that have received EUS-GBD for acute cholecystitis. In those frail and old patients who do not want a second endoscopy, permanent stenting could be a potential option. Choi et al. reported the long-term outcomes with EUS-GBD. Late AE occurred in four patients (7.1%) including asymptomatic distal stent migration (two patients), and acute cholecystitis due to stent occlusion (two patients). Two patients with an occluded stent were successfully treated endoscopically. A total of 54 patients (96.4%) had no recurrence of acute cholecystitis during the follow-up. The median stent patency time was 458 days for the 28 patients who were alive at the study end. The cumulative stent patency rate was 86% at 3 years.

In our institution, we prefer to perform a peroral cholecystoscopy at 4 weeks after EUS-GBD. The aim is for complete stone clearance and to replace the LAMS with a 7Fr double pigtail plastic stent. The presence of a large diameter stent also allows endoscopic access and interventions to the gallbladder. We reported the outcomes of 29 cholecystoscopies that were performed in 25 patients. The success rate was 93.1%. Magnifying endoscopy was performed in 10 patients, confocal endomicroscopy and EUS in 1 patient, and endocytoscopy in another patient. Fourteen patients (56%) had spontaneous stone passage. Eleven patients (44%) had residual gallstones on cholecystoscopy, and removed in 8. Overall stone clearance rate was 88% after a mean (standard deviation) number of 1.25 (0.46) sessions of cholecystoscopy.

CONCLUSION

EUS-GBD is a safe and effective procedure for the treatment of acute cholecystitis in patients that are at high-risk for cholecystectomy. It also opens up new windows for endoscopic intervention to the gallbladder that was previously impossible. Data from large scale randomized studies are eagerly awaited to confirm the efficacy of the procedure.

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Conflicts of interest
There are no conflicts of interest.

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