

# EUS-guided gallbladder drainage and gallbladder interventions in China

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Laparoscopic cholecystectomy is the gold standard for the treatment of symptomatic gallstones. However, before clinical implementation, instruments still need modification because a more convenient treatment approach is still needed.

Chinese experts have made substantial efforts on gallbladder-preserving approaches. Laparoscopic and choledochoscopic gallbladder-preserving cholecystolithotomy has recently gained popularity in China. There are many studies comparing laparoscopic cholecystolithotomy with cholecystectomy. The stone recurrence rate of cholecystolithotomy is only 1%–7% in the long-term follow-up.<sup>[1]</sup> For this reason, gallbladder-preserving cholecystolithotomy is feasible.

However, EUS-guided gallbladder drainage (EUS-GBD) and gallbladder intervention have not gained traction in China. EUS-GBD could be a more minimally invasive choice for patients, provided that it achieves the same therapeutic effect as a laparoscopic procedure for gallbladder-preserving cholecystolithotomy.

Adrian evaluated the safety and feasibility of this approach, terming it EUS-notes.<sup>[2]</sup> In our endoscopy center, we performed another similar study in a swine model, where pigs underwent EUS-guided

cholecystogastrostomy with the placement of a novel fully covered metal stent. Four weeks later, the stents were removed and an endoscope was advanced into the gallbladder through the fistula, after which cholecystolithotomy was performed. After we performed the interventional procedure in gallbladder, and removed the stent, the stomach healed in a very short time. The gastric and gallbladder walls were attached to each other by a short band of connective tissue. After a long period of time, the adhesive tissue became less prominent.

This approach can be used in elderly patients with a high surgical risk, with cholesterol stones or secondary common bile duct stones. Ursofalk and Taurolite can prevent recurrence. The patency of the cystic duct must be ensured; cystic duct stricture is a contraindication.

There remain some challenges. Collapse of the gallbladder is a difficult complication; when this occurs, the gallbladder becomes like a closed organ without a space. It is extremely difficult to deploy a large flange into it, so a hot technique must be used. We have patented a modification, combining the introducer and cytome or introducer with retriever tip, in order to reduce the risk of stent migration and bile leakage. Although the AXIOS™ is a good choice for EUS-GBD, it is not available in China. Microtech designed another

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hot implanter; the shorter the tip, the better the effect. The diameter of the stent is 12 mm, through which a regular gastroscope with a 3.2-mm channel can pass. The diameter of the flange is 25 mm. With the hot delivery system, the ulcer is smaller and tissue adhesions are less.

In our preliminary analysis, endoscopic cholecystolithotomy was performed in 26 patients and polypectomy in two patients, with a technical success rate of 96.15% and adverse event rate of 11.5%. The recurrence rate of stones was 12% after a 6-month to 5-year follow-up period.

To summarize, this procedure may be a useful alternative to percutaneous cholecystostomy and facilitate the entry

of the endoscope inside the gallbladder to perform endoscopic lithotomy and polypectomy. It is a promising technique, but requires further research.

### *Conflict of interests*

Prof. Siyu Sun is a consultant of Mircotech Company. Prof. Jintao Guo declares no conflict of interests for this article.

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