



# Endoscopic ultrasound (EUS) or endoscopic retrograde cholangiopancreatography (ERCP): is that the question?

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Since 1968 (1), endoscopic retrograde cholangiopancreatography (ERCP) has been the leading technique for endoscopic minimal invasive treatment of pancreatobiliary diseases. However, in certain cases, due to congenital anatomical abnormalities or acquired anatomical changes, the success rate of cannulation limits its application. Endoscopic ultrasound (EUS) was developed in the 1980s to acquire better pancreatic images and perform puncture to obtain pathological diagnosis (2). Due to its superior ability to diagnose biliary and pancreatic diseases, EUS has become increasingly widely used, and many minimal invasive treatments have also been developed, such as endoscopic ultrasound cholangiopancreatography (ESCP), which can be used as an alternative for bile duct and pancreatic duct drainage when ERCP fails (3). As both ERCP and EUS have a strong complementary role in the diagnosis and treatment of pancreatobiliary diseases, endoscopists are required to master both ERCP and EUS techniques to carry out accurate minimal invasive diagnosis and treatment. Complex procedures require endoscopists to have more experience and the support of a multidisciplinary team.

Ideally, when the patient has undergone adequate preoperative evaluation and communication, the necessary EUS and ERCP should be performed in the same endoscopic procedure session to minimize the diagnosis and treatment period, reduce risks, and save medical resources. In terms of procedure sequence, EUS may play different roles according to different disease characteristics and should be arranged accordingly. For instance, in patients with suspected common bile duct stone or bile duct obstruction secondary to undiagnosed autoimmune

pancreatitis (AIP), EUS can determine whether there is an indication for ERCP, thereby avoiding unnecessary and risky procedures and reducing the incidence of complications. Thus, EUS should be prioritized. In the process of AIP being recognized by doctors, the prevailing view is that patients with obstructive jaundice should be treated with ERCP biliary drainage first (4), followed by steroid therapy. In recent years, some guidelines have suggested that patients with mild-to-moderate obstructive jaundice can be treated with steroids alone (5). Throughout more than 20 years of experience in the diagnosis and treatment of AIP, the Department of Gastroenterology, Peking Union Medical College Hospital, Peking Union Medical College and Chinese Academy of Medical Sciences has found that even in AIP patients complicated with severe obstructive jaundice, steroid therapy alone is safe and effective without the manifestation of clinical cholangitis. Therefore, our center usually uses EUS-guided fine needle aspiration (FNA) to exclude malignancy or to confirm the diagnosis in suspected AIP patients with bile duct obstruction, and directly performs steroid therapy to avoid unnecessary ERCP procedure. For patients with obstructive jaundice secondary to pancreatobiliary tumors, or pancreatic pseudocysts requiring drainage, EUS can complement ERCP in terms of diagnosis and treatment, which can simplify the procedures of ERCP and reduce the difficulty. This is another reason why EUS should be prioritized. In addition, for patients with surgical anatomical changes (such as gastric volume reduction surgery or Roux-en-Y surgery), which increase the difficulty of performing ERCP

directly, EUS can assist in establishing access through the stomach or small intestine to improve the success rate of ERCP. When ERCP fails, EUS drainage of the bile duct or pancreatic duct can be used as an alternative treatment option in technically competent centers, and can be performed in the same session after ERCP failure to conserve medical resources and accessories.

In the development process of the diagnosis and treatment technology integrating EUS and ERCP, the design of most accessories is based on the ERCP procedure, which increases the manipulation difficulty when applied to ERCP. In recent years, new instruments have gradually emerged to improve the success rate of the interventional EUS procedure, such as 3F-diameter catheters for guide wire manipulation (6), the lumen-apposing metal stent (LAMS) (7) to facilitate access establishment, and special plastic stents for EUS-guided pancreatic drainage (EUS-PD) (8). In the future, more technological advances may further simplify the process of the interventional EUS procedure or expand the boundaries of diagnosis and treatment indications. For instance, a plastic stent system integrating incision and expansion functions can improve the technical success rate of EUS-guided biliary drainage (EUS-BD) or EUS-PD. Accessories specially designed for anterograde stone removal with better performance can reduce the difficulty and risk of stone removal. The closure device that is convenient for closing gastrointestinal fistula, in cooperation with LAMS, can help endoscopists to enter another space through the gastrointestinal tract more safely for examination and treatment without worrying about secondary infection or bleeding of the remaining fistula. Someday, we may even be able to employ a new type of endoscope with both trans-papillary intubation and ultrasound-guided transmural puncture capabilities, enabling better integration of EUS and ERCP techniques.

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