

Endoscopic ultrasound-guided methylene blue injection to achieve bile duct cannulation after failed ERCP

Endoscopic ultrasound (EUS)-guided biliary drainage is an increasingly popular technique for cases of previously unsuccessful endoscopic retrograde cholangiopancreatography (ERCP). It has good results in expert hands, but is a challenging procedure with a significant rate of adverse events [1].

EUS-guided methylene blue cholangiopancreatography is a wireless alternative to the rendezvous technique in benign pancreaticobiliary disease. This interventional EUS-guided technique has been reported anecdotally to facilitate pancreatic duct and common bile duct access [2–4]. Recently, our interventional endoscopy unit published a case series with good results [5]. The purpose of the present report is to elaborate on some important technical details and to clarify some doubts.

The standard procedure includes EUS and ERCP steps, respectively. The EUS part is as follows. i) Advance of a linear array echoendoscope and identification of the duct. Both long and short scope positions are allowed. ii) Checking for interposing vessels using Doppler. iii) EUS-guided duct puncture from the gastrointestinal (GI) tract with a 22-gauge needle, which has been prepared without the stylet and purged with saline serum. iv) Aspiration of fluid (bile, pancreatic) before injection. v) Obtaining ductography: slow, careful injection of dilute contrast (with physiological saline solution [SSF]; 1:1). vi) EUS-guided colorant injection: slow, meticulous injection of dilute colorant (methylene blue plus SSF; 1:9); a total amount of 5–15 mL should be enough, depending on the duct diameter. After this last step, if the ductogram is less visible, due to the dilution effect, an additional amount of contrast (3–5 mL) can be injected, to ensure a well-marked “road map.”



▶ Video 1 An 86-year-old woman presented with cholangitis, and magnetic resonance imaging showed choledocholithiasis. Endoscopic retrograde cholangiopancreatography (ERCP) was attempted but the papillary orifice could not be identified. Subsequently, endoscopic ultrasound-guided cholangiography was performed. A transduodenal puncture of the bile duct was made using a 22 gauge needle. First, a cholangiogram was obtained. Then, 5 mL of diluted methylene blue was injected. The papillary orifice was identified by methylene blue flow, and bile duct access was then achieved via ERCP.

The ERCP part is as follows. A duodenoscope immediately replaces the echoendoscope. Under endoscopic view, the papillary orifice is identified by methylene blue flow and bulge effect (▶ **Fig. 1**; ▶ **Video 1**). Finally, duct cannulation is attempted using sphinctertome wire-guided cannulation, preferably small-diameter ERCP catheters (i. e. 3.9 Fr), or using pre-cut techniques (i. e. needle-knife). This part is challenging; expertise in challenging ERCP procedures is mandatory.

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Competing interests

None

The Authors

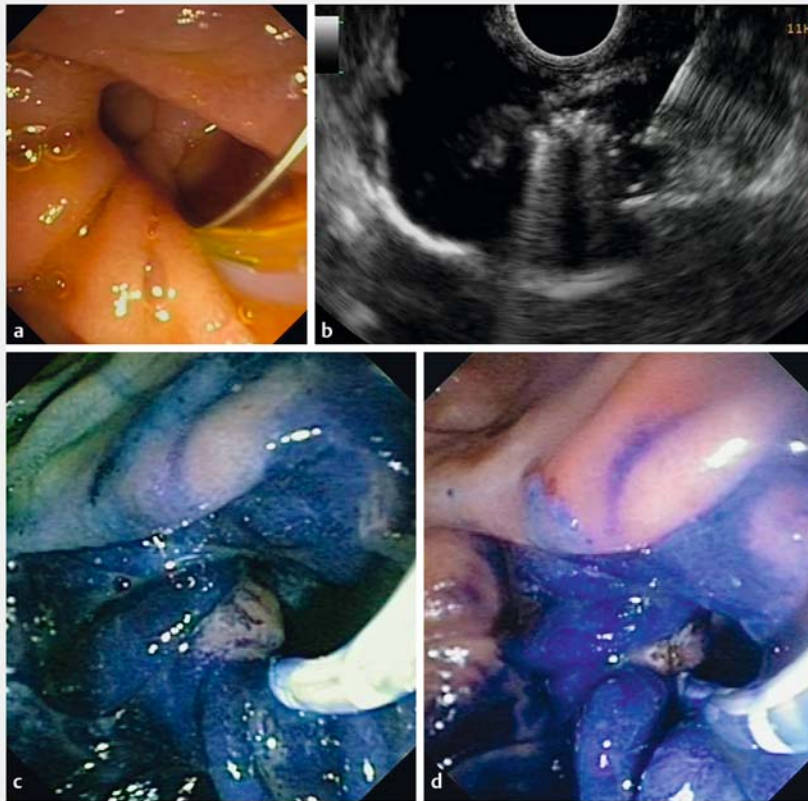
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► **Fig. 1** Endoscopic ultrasound-guided methylene blue cholangiopancreatography. **a** Duodenal diverticulum with unidentifiable papilla. **b** Endoscopic ultrasound-guided methylene blue injection. **c, d** After methylene blue and saline solution injection, an image of bulge and colorant flow facilitates location and cannulation of the papilla.

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