EUS-guided rendezvous for difficult biliary cannulation using a standardized algorithm: a multicenter prospective pilot study (with videos)

Takuji Iwashita, MD, PhD,[1] Ichiro Yasuda, MD, PhD,[4] Tsuyoshi Mukai, MD, PhD,[2] Keisuke Iwata, MD, PhD,[3] Nobuhiro Ando, MD, PhD,[3] Shinpei Doi, MD, PhD,[4] Masanori Nakashima, MD, PhD,[2] Shinya Uemura, MD, PhD,[1] Masatoshi Mabuchi, MD, PhD,[4] Masahito Shimizu, MD, PhD[1]

Gifu, Kanagawa, Japan

Background and Aims: Biliary cannulation is necessary in therapeutic ERCP for biliary disorders. EUS-guided rendezvous (EUS-RV) can salvage failed cannulation. Our aim was to determine the safety and efficacy of EUS-RV by using a standardized algorithm with regard to the endoscope position in a prospective study.

Methods: EUS-RV was attempted after failed cannulation in 20 patients. In a standardized approach, extrahepatic bile duct (EHBD) cannulation was preferentially attempted from the second portion of the duodenum (D2) followed by additional approaches to the EHBD from the duodenal bulb (D1) or to the intrahepatic bile duct from the stomach, if necessary. A guidewire was placed in an antegrade fashion into the duodenum. After the guidewire was placed, the endoscope was exchanged for a duodenoscope to complete the cannulation.

Results: The bile duct was accessed from the D2 in 10 patients, but from the D1 in 5 patients and the stomach in 4 patients because of no dilation or tumor invasion at the distal EHBD. In the remaining patient, biliary puncture was not attempted due to the presence of collateral vessels. The guidewire was successfully manipulated in 80% of patients: 100% (10/10) with the D2 approach and 66.7% (6/9) with other approaches. The overall success rate was 80% (16/20). Failed EUS-RV was salvaged with a percutaneous approach in 2 patients, repeat ERCP in 1 patient, and conservative management in 1 patient. Minor adverse events occurred in 15% of patients (3/20).

Conclusions: EUS-RV is a safe and effective salvage method. Using EUS-RV to approach the EHBD from the D2 may improve success rates. (Gastrointest Endosc 2016;83:394-400.)

BACKGROUND

Therapeutic ERCP for the management of biliary disorders has been widely used in current medical practice as a reliable and less-invasive procedure. In therapeutic ERCP, achievement of biliary deep cannulation is an inevitable step. Although the reported success rates for achieving biliary cannulation are high, there are some cases in which cannulation cannot be achieved, even with the use of advanced cannulation techniques, such as a double guidewire or precut papillotomy techniques. This is especially true for patients with tumor infiltration around the papilla or with periampullary diverticula.[1,2] Alternatives for difficult biliary cannulation include

Abbreviations: CI, confidence interval; D1, duodenal bulb; D2, second portion of the duodenum; EHBD, extrahepatic bile duct; EUS-RV, EUSguided rendezvous; IHBD, intrahepatic bile duct; PTB, percutaneous transhepatic biliary; PTBD, percutaneous transhepatic biliary drainage.

DISCLOSURE: *All authors disclosed no financial relationships relevant to this article.*

This video can be viewed directly from the GIE website or by using the QR code and your mobile device. Download a free QR code scanner by searching "QR Scanner" in your mobile device's app store.

0016-5107/$36.00
http://dx.doi.org/10.1016/j.gie.2015.04.043

Received January 21, 2015. Accepted April 26, 2015.

Current affiliations: First Department of Internal Medicine, Gifu University Hospital, Gifu (1), Department of Gastroenterology, Gifu Municipal Hospital, Gifu (2), Department of Gastroenterology, Gifu Prefectural General Hospital, Gifu (3), Department of Gastroenterology, Teikyo University Mizonokuchi Hospital, Kanagawa (4), Japan.

Reprint requests: Takuji Iwashita, MD, PhD, First Department of Internal Medicine, Gifu University Hospital, 1-1 Yanagido, Gifu 501-1194, Japan.

If you would like to chat with an author of this article, you may contact Dr Iwashita at takuji@w7.dion.ne.jp.

percutaneous transhepatic biliary (PTB) and surgical approaches, which are associated with considerable morbidity and occasional mortality.[3-5] Recently, the EUS-guided rendezvous (EUS-RV) has been reported as an effective salvage technique after failed biliary cannulation.[6-18]

In EUS-RV, the biliary duct is punctured by using an FNA needle from the upper GI tract under EUS guidance followed by guidewire placement into the duodenum through the needle. Subsequently, biliary cannulation is reattempted by using the EUS-placed guidewire after exchanging the endoscope with the ERCP duodenoscope. In our previous study,[14] the 2 most challenging steps, biliary puncture and guidewire manipulation, were noted in EUS-RV. We found the importance of the EUS scope position to overcome these challenging points because the EUS scope position substantially affects the site of punctured biliary duct, the needle direction, and the distance between the access point and the ampulla. Therefore, we conducted this study in a prospective cohort to evaluate the efficacy and safety of EUS-RV by using a standardized algorithm with regard to the EUS scope position.

PATIENTS AND METHODS

Patient eligibility

This was a prospective, multicenter pilot study and conducted at 3 tertiary care centers, Gifu Municipal Hospital, Gifu Prefectural General Medical Center, and Gifu University Hospital. Patients who underwent therapeutic ERCP for biliary disorders were eligible for this study. The inclusion criteria were no history of manipulation of the major duodenal papilla and no history of upper GI surgery. Patients were excluded if they met any of the following criteria: (1) younger than 20 years of age; (2) Eastern Cooperative Oncology Group performance status of 4; (3) life expectancy less than 4 weeks; (4) bleeding tendency ($\leq$50,000 platelets, prothrombin time international normalized ratio $\geq$1.5) or the use of antiplatelet agents; (5) cardiac, respiratory, or renal failure; and (6) possible or current pregnancy. All patients provided written informed consent; this study was approved by the institutional review board of each institution. This trial was registered at http://www.umin.ac.jp (UMIN000008612).

Study protocol

ERCP was performed with patients under moderate sedation with midazolam and pentazocine in a fluoroscopy suite that enabled endoscopy as well as EUS. EUS-RV was performed consecutively in cases where accomplishing biliary cannulation was difficult. Difficult biliary cannulation was defined as (1) biliary cannulation that could not be achieved in 30 minutes even with the use of advanced techniques such as double guidewire, needle-knife precut papillotomy, and pancreatic sphincter precut techniques or (2) accomplishing biliary cannulation was judged to be difficult by the operator because of the location or condition of the papilla.

A duodenoscope was exchanged for an oblique-viewing linear scanning video endoscope (GF-UC240P AL5 or GF-UCT260; Olympus Medical Systems, Tokyo, Japan). The biliary system was evaluated from 3 positions: the stomach, the duodenal bulb (D1), and the second portion of the duodenum (D2). An attempt was initially made to puncture the extrahepatic bile duct (EHBD) from the D2 in the stretched scope position (Video 1, available online at www.giejournal.org). By using this access, the EHBD was punctured from the proximal portion of the D2 by pulling the scope back with the stretched scope position. If biliary access from the D2 was technically impossible, a puncture of the EHBD from the D1 with a pushed scope position or a puncture of the intrahepatic bile duct (IHBD) from the stomach with a straight scope position was used according to the operator's decision based on patient's condition, such as location of the obstruction and degree of biliary dilation (Fig. 1, Video 2, available online at www.giejournal.org). A 19-gauge FNA needle (Echotip Ultra; Cook Medical Inc, Bloomington, Ind), which was primed with a contrast agent after removal of a stylet, was placed on the EUS scope. The bile duct was punctured under EUS guidance after confirming the absence of interposing vessels along the trajectory of the puncture by the using Doppler scanning mode. An accurate puncture of the bile duct was confirmed by aspiration of bile through the needle followed by cholangiography to visualize the configuration of the bile duct. A 0.025-inch angle-tip guidewire (VisiGlide; Olympus Medical Systems), which has nearly the same stiffness as the 0.035-inch regular guidewire, was placed in the biliary system. The guidewire was then manipulated in the duodenum through the biliary duct and duodenal papilla. After withdrawal of the needle, both the EUS scope and the needle were removed while maintaining the guidewire in place. The duodenoscope was reinserted next to the EUS-placed guidewire. In the duodenum, the guidewire was grasped with a snare and pulled out through the accessory channel of the duodenoscope. If failed, the guidewire was pulled out through the mouth with the duodenoscope. The duodenoscope was then backloaded over the guidewire and advanced again to the ampulla. Biliary cannulation was then accomplished with an ERCP cannula over the guidewire followed by the planned therapeutic intervention for the biliary disorder.

All patients underwent ERCP as an inpatient according to our standard ERCP protocol. Patients fasted on the day of the ERCP and were administered intravenous hydration and prophylactic antibiotics. Laboratory studies were obtained before and 2 hours after ERCP to monitor the patient's condition and to detect any potential adverse events of the ERCP. If the patient's condition allowed, oral intake was begun, and patients were discharged from the hospital the day after ERCP.