ISSN 1948-9366 (online)

World Journal of

Gastrointestinal Surgery

World J Gastrointest Surg 2024 November 27; 16(11): 3381-3642

Published by Baishideng Publishing Group Inc

World Journal of Gastrointestinal Surgery

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The *WJGS* is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Current Contents/Clinical Medicine, Journal Citation Reports/Science Edition, PubMed, PubMed Central, Reference Citation Analysis, China Science and Technology Journal Database, and Superstar Journals Database. The 2024 Edition of Journal Citation Reports® cites the 2023 journal impact factor (JIF) for *WJGS* as 1.8; JIF without journal self cites: 1.7; 5-year JIF: 1.9; JIF Rank: 123/290 in surgery; JIF Quartile: Q2; and 5-year JIF Quartile: Q3.

RESPONSIBLE EDITORS FOR THIS ISSUE

NAME OF JOURNAL
World Journal of Gastrointestinal Surgery

ISSN
ISSN 1948-9366 (online)

LAUNCH DATE
November 30, 2009

FREQUENCY
Monthly

EDITORS-IN-CHIEF
Peter Schemmer

EDITORIAL BOARD MEMBERS
https://www.wjgnet.com/1948-9366/editorialboard.htm

PUBLICATION DATE
November 27, 2024

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World J Gastrointest Surg 2024 November 27; 16(11): 3614-3617

DOI: 10.4240/wjgs.v16.i11.3614

ISSN 1948-9366 (online)

LETTER TO THE EDITOR

Endoscopic ultrasound-guided biliary drainage *vs* percutaneous transhepatic biliary drainage for malignant biliary obstruction after endoscopic retrograde cholangiopancreatography failure

He Zhao, Xiao-Wu Zhang, Peng Song, Xiao Li

Specialty type: Gastroenterology and hepatology

Provenance and peer review: Invited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's classification

Scientific Quality: Grade B

Novelty: Grade A

Creativity or Innovation: Grade A

Scientific Significance: Grade A

P-Reviewer: Kong XH

Received: March 16, 2024

Revised: September 14, 2024

Accepted: September 27, 2024

Published online: November 27, 2024

Processing time: 227 Days and 20.8 Hours

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Abstract

In a recent issue of the *World Journal of Gastrointestinal Surgery*, a meta-analysis investigated the safety and efficacy of electrocautery-enhanced lumen-apposing metal stent (ECE-LAMS) implantation for managing malignant biliary obstruction following failed endoscopic retrograde cholangiopancreatography. This manuscript endeavors to offer a comprehensive look at the progression of endoscopic ultrasound-guided biliary drainage (EUS-BD) technologies, weighing their merits and drawbacks against traditional percutaneous methods. Several meta-analyses and randomized controlled trials have compared the performance of EUS-BD and percutaneous transhepatic cholangiodrainage (PTCD). These studies revealed that the technical success rate, clinical success rate, and adverse events were similar between EUS-BD and PTCD. Nevertheless, given that most of these studies predate 2015, the safety and effectiveness of novel EUS-BD techniques, including ECE-LAMS, compared with those of percutaneous biliary drainage remain elusive. Further investigation is imperative to ascertain whether these novel EUS-BD techniques can safely and efficaciously replace conventional percutaneous therapeutic approaches.

Key Words: Malignant biliary obstruction; Biliary drainage; Endoscopic ultrasound; Percutaneous transhepatic biliary drainage; Endoscopic retrograde cholangiopancreato-

graphy

Core Tip: In recent years, several meta-analyses and randomized controlled trials have evaluated the efficacy of endoscopic ultrasound-guided biliary drainage (EUS-BD) *vs* percutaneous transhepatic cholangiodrainage (PTCD) in managing malignant biliary obstruction after failed endoscopic retrograde cholangiopancreatography. Nevertheless, given that most of these studies preceded 2015, the potential of recent EUS-BD advancements, such as electrocautery-enhanced technique, remains largely unexplored. Consequently, there is a pressing need for additional research to conclusively determine whether these novel EUS-BD techniques can effectively supplant established treatments such as PTCD.

Citation: Zhao H, Zhang XW, Song P, Li X. Endoscopic ultrasound-guided biliary drainage *vs* percutaneous transhepatic biliary drainage for malignant biliary obstruction after endoscopic retrograde cholangiopancreatography failure. *World J Gastrointest Surg* 2024; 16(11): 3614-3617

URL: https://www.wjgnet.com/1948-9366/full/v16/i11/3614.htm

DOI: https://dx.doi.org/10.4240/wjgs.v16.i11.3614

TO THE EDITOR

Obstructive jaundice resulting from malignancies including pancreatic adenocarcinoma, cholangiocarcinoma, periampullary cancer, or other malignances, can typically be relieved through endoscopic retrograde cholangiopancreatography (ERCP)-guided biliary drainage (BD)[1]. Nevertheless, ERCP-guided BD can fail in 5% to 10% of cases because of anatomical difficulties or inaccessible papilla[2]. Conventionally, percutaneous transhepatic cholangiodrainage (PTCD) or biliary stent placement is the primary treatment for such patients, as it can rapidly alleviate symptoms and improve the liver function[3]. However, owning to its discomfort and invasiveness, new endoscopic BD techniques continue to emerge.

RAPID DEVELOPMENT OF ENDOSCOPIC ULTRASOUND-GUIDED BD TECHNIQUES

Endoscopic BD depends on guidance from ERCP or endoscopic ultrasound (EUS)[4]. In recent years, for patients experiencing ERCP failure, endoscopic ultrasound-guided BD (EUS-BD) methods have undergone rapid advancements. These methods, tailored to the unique route of access and specific location of BD, include the EUS-guided rendezvous technique, antegrade biliary stenting, choledochoduodenostomy, cholangiogastrostomy, and hepaticogastrostomy[5,6]. The basic steps of EUS-BD include observing the dilated extrahepatic bile duct, intrahepatic bile duct, or gallbladder *via* EUS through the duodenum, stomach, or pertinent regions of the digestive tract; puncturing the dilated bile duct or gallbladder under the guidance of EUS; and then introducing a guidewire into the bile duct through the puncture needle [7,8].

If the guidewire successfully passes the obstruction site and emerges from the duodenal papilla, a new guidewire can be introduced through the working channel to enter the deep biliary tract from the papilla[9]. Subsequently, either a drainage tube or metal stent can be introduced through the papilla. This technique is referred to as the EUS-guided rendezvous technique, which represents a refinement of ERCP[10].

If the guidewire cannot pass through the obstruction, a drainage tube or lumen-apposing metal stent (LAMS) is implanted *via* the dilated puncture tract for drainage between the bile duct and the digestive tract. This technique is usually called EUS-guided choledochoduodenostomy, cholangiogastrostomy, or hepaticogastrostomy depending on the puncture site[11,12]. The anastomosis directly connects the biliary and digestive tracts, providing a dependable passage for the accumulated bile. Theoretically, its clinical efficacy could mirror that of PTCD and avoid the long-term hanging of drainage devices in PTCD. However, this technique requires multiple instrument exchanges and long operation times, which increase the risk of adverse events[13].

Therefore, to improve EUS-guided biliary anastomosis technology, the electrocautery-enhanced (ECE) technique was developed for the rapid release of LAMS by electrocautery dilation of the puncture channel while advancing the delivery catheter, which greatly simplifies the operation, shortens the operation time, and improves the efficiency of EUS-BD. However, given its status as an emerging technology, there remains ongoing debate regarding its safety and efficacy in the real-world population. To evaluate the safety and efficacy of electrocautery-enhanced lumen-apposing metal stent (ECE-LAMS) for the treatment of malignant biliary obstruction after ERCP failure, Peng *et al*[14] conducted a meta-analysis, that included 14 eligible studies involving 620 participants, and reported that ECE-LAMS has high technical and clinical success rates. This study provides reliable evidence-based data for doctors to evaluate the clinical efficacy of the ECE-LAMS.

EVIDENCE-BASED COMPARISON BETWEEN EUS-BD AND PTCD

The development of alternative techniques is beneficial for patients, but it also leads to a selection dilemma. Therefore, it is necessary to clarify the clinical and technical differences between EUS-BD and traditional treatments (such as PTCD and percutaneous transhepatic biliary stent placement) for patients and doctors. Recently, Giri *et al*[15] conducted a meta-analysis comparing the clinical efficacy of EUS-BD and PTCD after ERCP failure on the data of 1376 subjects from 23 studies. Their findings revealed that the technical success rate [96.9% *vs* 97.1%; odds ratio (OR) = 1.12; 95%CI: 0.67−1.88] and incidence of major adverse events (1.3% *vs* 1.0%; OR = 0.66; 95%CI: 0.31−1.42) were comparable for EUS-BD and PTCD. However, the clinical success rate of EUS-BD seemed to be significantly greater than that of PTCD (90.6% *vs* 78.4%; OR = 2.55; 95%CI: 1.63−4.56). Interestingly, when restricted to the three randomized controlled studies in the meta-analysis, the clinical success rates were not significantly different between EUS-BD and PTCD (87.1% *vs* 84.4%; OR = 1.45; 95%CI: 0.51−4.09)[16-18]. Given that three randomized controlled trials preceded 2015, it is still unknown whether the application of new technologies (*e.g.*, ECE) significantly improved the efficacy of EUS-BD and conferred substantial advantages over PTCD[19].

Several recent randomized controlled trials have also attempted to answer these questions (*e.g.*, NCT01686425, NCT03546049, and NCT03172832)[20], but many have not been completed due to slow accrual or other impediments. In the future, it is necessary to conduct multicenter randomized controlled studies among patients with malignant obstructive jaundice who have experienced ERCP failure, to compare the safety and efficacy of these new EUS-BD techniques (*e.g.*, ECE-LAMS) with those of PTCD. For the study design, the stratification factors should include the cancer type, and parameters such as technical success, clinical success, adverse events, operation time, cost, and quality of life should be evaluated.

CONCLUSION

The development of EUS-BD technologies has opened new avenues for patients with malignant obstructive jaundice. We believe that EUS-BD techniques will play a pivotal role for patients with malignant obstructive jaundice, with promising advancements anticipated in the years to come.

FOOTNOTES

Author contributions: Zhao H and Li X contributed to the overall concept and outline of the manuscript; Zhang XW contributed to the writing and editing the manuscript; Song P review of literature; Zhao H took primary responsibility for communication with the journal during the manuscript submission, peer review, and publication processes; all of the authors read and approved the final version of the manuscript to be published.

Supported by the National Natural Science Foundation of China, No. 82001937 and No. 82330061; and the CAMS Initiative for Innovative Medicine, China, No. 2021-I2M-1-015.

Conflict-of-interest statement: All the authors report having no relevant conflicts of interest for this article.

Country of origin: China

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S-Editor: Luo ML
L-Editor: A
P-Editor: Wang WB

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