

# De novo EUS-guided biliary drainage

Kazuo Hara<sup>1</sup>, Nozomi Okuno<sup>1</sup>, Kenji Yamao<sup>1</sup>

<sup>1</sup>Department of Gastroenterology, Aichi Cancer Center, Nagoya, Japan

## INTRODUCTION

EUS-guided biliary drainage (EUS-BD) was developed as a rescue method of ERCP.

Recently, the usefulness of EUS-BD for the papilla tumors, duodenal stenosis by tumors, or altered anatomy patients were reported in many papers. EUS-BD is a good indication for difficult ERCP cases. In addition, “*de novo* EUS-BD” for malignant lower biliary obstructions is focused by experienced endosonographers now. The most different points in these two procedures are kinds of complications. Post-ERCP pancreatitis is a big problem in ERCP until now. All physicians made efforts to decrease post-ERCP pancreatitis for very long time, but still unresolved. EUS-BD is very low risk of pancreatitis, nearly zero. However, bile peritonitis is a common complication of EUS-BD. Which is the better procedure for malignant lower biliary obstructions?

Hence, in this review, we will focus on *de novo* EUS-BD, not a rescue of the standard transpapillary drainage for lower biliary obstructions. We will not mention about *de novo* EUS-BD for hilar obstructions which is still controversial because of not enough evidence.

## RESULTS IN PUBLISHED PAPERS

The possibility of *de novo* EUS-BD was reported from the early stages of the development. First report of the primary EUS-BD was EUS-guided choledochoduodenostomy (EUS-CDS) cases enrolled in the prospective study by Hara *et al.*, in 2011.<sup>[1]</sup> First prospective study of focusing *de novo* EUS-BD was also reported in 2013 by Hara *et al.*<sup>[2]</sup> Results of these two papers showed clinical usefulness in *de novo* EUS-BD. Okuno *et al.* reported usefulness of primary EUS-guided hepaticogastrostomy (EUS-HGS) for estimated difficult ERCP cases.<sup>[3]</sup> They also reported the safety of 6 mm bore fully covered metal stents. Kawakubo *et al.*<sup>[4]</sup> and Nakai *et al.*<sup>[5]</sup> published papers of comparative studies in EUS-CDS and ERCP. They reported EUS-CDS is the acceptable procedure compared with ERCP. Three randomized controlled trial papers<sup>[6-8]</sup> referred to EUS-BD *vs.* ERCP were already published in 2018. Bang *et al.*<sup>[8]</sup> and Park *et al.*<sup>[6]</sup> reported ERCP *vs.* EUS-CD. Paik *et al.*<sup>[7]</sup> reported ERCP *vs.* EUS-BD (both EUS-HGS and EUS-CDS). Park *et al.*<sup>[6]</sup> reported EUS-BD had similar safety to ERCP. They also reported EUS-BD was not superior to ERCP in terms of relief of malignant biliary obstruction. EUS-BD may have fewer cases of tumor ingrowth but may also have more cases of food impaction or stent migration. Bang *et al.*<sup>[8]</sup> reported the similar rates of adverse events and treatment outcomes in the randomized trial. They also mentioned

Access this article online	
<b>Quick Response Code:</b> 	<b>Website:</b> <a href="http://www.eusjournal.com">www.eusjournal.com</a>
	<b>DOI:</b> 10.4103/eus.eus_48_19

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**How to cite this article:** Hara K, Okuno N, Yamao K. *De novo* EUS-guided biliary drainage. *Endosc Ultrasound* 2019;8:S14-6.

### Address for correspondence

Dr. Kazuo Hara, Department of Gastroenterology, Aichi Cancer Center, Nagoya, Japan. E-mail: khara@aichi-cc.jp

**Received:** 2019-06-11; **Accepted:** 2019-07-08; **Published online:** 2019-11-28

EUS-BD was a practical alternative to ERCP for primary biliary decompression in pancreatic cancer. Paik *et al.*<sup>[7]</sup> reported comparable technical and clinical success rates between EUS-BD and ERCP in relief malignant distal biliary obstruction. Substantially, longer duration of patency coupled with lower rates of adverse events and reintervention, and more preserved quality of life (QOL) were observed with EUS-BD.

Total early adverse events rate in published papers is 12% (23/199) in the present paper. Technical and clinical success rate are both 95% in the present paper [Table 1].

## DISCUSSION

From the published papers, *de novo* EUS-BD has a comparable technical success rate, clinical success rates, and safety. Stent patency of EUS-BD may be longer than ERCP. EUS-BD may have the benefits in reintervention and patient's QOL also. The most different and beneficial point in *de novo* EUS-BD is zero pancreatitis. Zero pancreatitis is so happy for both patients and physicians. Until now, we cannot prevent post-ERCP pancreatitis, so EUS-BD is the ideal procedure at this point. Bile peritonitis is a common complication in EUS-BD; this is the unresolved problem also. Can we decrease these two complications in future? If dedicated devices are developed, EUS-BD

can decrease severe complications, especially bile leakage. One step devices such as Hot AXIOS<sup>[9]</sup> may prevent bile leakage and other complications also. We can minimize complications of EUS-BD by ourselves. However, ERCP is not in the same condition. Even if ERCP devices are so developed in the near future, we cannot easily prevent pancreatitis. A long history of ERCP can show this fact. Only one way of the prevention pancreatitis is “no touch the papilla.”

The second beneficial point in *de novo* EUS-BD is the new drainage route. EUS-BD creates the new drainage route outside the tumor. On the other hand, ERCP put the stent into the tumor. In the clinical course, tumors will involve ERCP stent and duodenum. Reintervention of ERCP may be difficult in this situation. On the other hand, EUS-BD stent is located above the tumor, so stent dysfunction by the tumor progression is not so common.<sup>[7]</sup> Reintervention of EUS-BD is much easier than ERCP.<sup>[3]</sup> Ascites are commonly seen in advanced malignant patients. After pooling ascites, EUS-BD is not a safe procedure due to the possibility of infectious peritonitis. Hence, finally, we recommend the early stage EUS-BD, especially *de novo* EUS-BD before pooling ascites and duodenal obstruction.

However, some physicians do not agree the *de novo* EUS-BD.<sup>[10]</sup> Because EUS-BD is a still not matured procedure. There are no good teaching system and few

**Table 1. Published papers (*de novo* EUS-biliary drainage)**

Author	n	Year	Study design	Method	Technical success	Clinical success	Early AE	Grade of AE
Hara <i>et al.</i>	16	2011	Prospective single arm	EUS-CDS using PS	100% (16/16)	100% (16/16)	19% (3/16)	3 mild (2 bile peritonitis, 1 bleeding)
Hara <i>et al.</i>	18	2013	Prospective single arm	EUS-CDS using MS	94% (17/18)	100% (17/17)	11% (2/18)	2 mild (2 bile peritonitis)
Kawakubo <i>et al.</i>	26	2016	Retrospective comparative	EUS-CDS using MS	Not analyzed	96%(24/26)	Overall 27% (7/26)	Not mentioned
Okuno <i>et al.</i>	20	2018	Prospective single arm	EUS-HGS using MS	100% (20/20)	95% (19/20)	15% (3/20)	2 moderate (2 focal cholangitis), 1 mild (1 fever)
Nakai <i>et al.</i>	34	2018	Prospective single arm	EUS-CDS using MS	97% (33/34)	100% (33/33)	12% (4/34)	2 moderate (2 cholecystitis), 2 mild (2 abdominal pain)
Paik <i>et al.</i>	64	2018	RCT, EUS-BD versus ERCP	EUS-CDS and HGS using MS	94% (60/64)	90% (54/60)	6% (4/64)	Not mentioned (2 pneumoperitoneum, 1 bile peritonitis, 1 cholangitis)
Park <i>et al.</i>	14	2018	RCT, EUS-BD versus ERCP	EUS-CDS using MS	100% (14/14)	93% (13/14)	0% (0/14)	No AE
Bang <i>et al.</i>	33	2018	RCT, EUS-BD versus ERCP	EUS-CDS using MS	91% (30/33)	97% (29/30)	21% (7/33)	2 moderate (1 bile peritonitis, 1 cholecystitis), 5 mild (5 abdominal pain)
Present paper	225	2019	Primary EUS-BD	CDS173: HGS52	95% (190/199)	95% (205/216)	12% (23/199)	No severe adverse events, moderate 4% (6/135), mild 10%(13/135)

HGS: Hepaticogastrostomy, RCT: Randomizes controlled trial, BD: Biliary drainage, CDS: Choledochoduodenostomy, PS: Plastic stent, MS: Metal stent

good trainers in these fields. Hence, the clinical benefits of *de novo* EUS-BD are still controversial.

### Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Hara K, Yamao K, Niwa Y, et al. Prospective clinical study of EUS-guided choledochoduodenostomy for malignant lower biliary tract obstruction. *Am J Gastroenterol* 2011;106:1239-45.
2. Hara K, Yamao K, Hijioka S, et al. Prospective clinical study of endoscopic ultrasound-guided choledochoduodenostomy with direct metallic stent placement using a forward-viewing echoendoscope. *Endoscopy* 2013;45:392-6.
3. Okuno N, Hara K, Mizuno N, et al. Efficacy of the 6-mm fully covered self-expandable metal stent during endoscopic ultrasound-guided hepaticogastrostomy as a primary biliary drainage for the cases estimated difficult endoscopic retrograde cholangiopancreatography: A prospective clinical study. *J Gastroenterol Hepatol* 2018;33:1413-21.
4. Kawakubo K, Kawakami H, Kuwatani M, et al. Endoscopic ultrasound-guided choledochoduodenostomy vs. transpapillary stenting for distal biliary obstruction. *Endoscopy* 2016;48:164-9.
5. Nakai Y, Isayama H, Kawakami H, et al. Prospective multicenter study of primary EUS-guided choledochoduodenostomy using a covered metal stent. *Endosc Ultrasound* 2019;8:111-7.
6. Park JK, Woo YS, Noh DH, et al. Efficacy of EUS-guided and ERCP-guided biliary drainage for malignant biliary obstruction: Prospective randomized controlled study. *Gastrointest Endosc* 2018;88:277-82.
7. Paik WH, Lee TH, Park DH, et al. EUS-guided biliary drainage versus ERCP for the primary palliation of malignant biliary obstruction: A multicenter randomized clinical trial. *Am J Gastroenterol* 2018;113:987-97.
8. Bang JY, Navaneethan U, Hasan M, et al. Stent placement by EUS or ERCP for primary biliary decompression in pancreatic cancer: A randomized trial (with videos). *Gastrointest Endosc* 2018;88:9-17.
9. Tsuchiya T, Teoh AY, Itoi T, et al. Long-term outcomes of EUS-guided choledochoduodenostomy using a lumen-apposing metal stent for malignant distal biliary obstruction: A prospective multicenter study. *Gastrointest Endosc* 2018;87:1138-46.
10. Nabi Z, Talukdar R, Reddy DN. Primary EUS-guided drainage for malignant distal biliary obstruction: Not yet prime time! *Gastrointest Endosc* 2018;88:18-20.