Endoscopic treatment for distal malignant biliary obstruction

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Abstract: Distal malignant biliary obstruction (MBO) leads to obstructive jaundice as a result of when the bile excretion from the liver is disturbed and induces hepatic failure and sepsis, which when complicated with cholangitis, it becomes necessary to perform drainage for the MBO. For biliary drainage, we can perform a surgical bypass operation, percutaneous transhepatic biliary drainage (PTBD), endoscopic biliary drainage (EBD) via duodenal papilla, or endoscopic ultrasound (EUS)-guided biliary drainage (EUS-BD), which is a transgastrointestinal biliary drainage. Although currently we usually perform EBD for distal MBO to begin with, the choice is different for biliary drainage in patients in whom EBD has failed in a preoperative case or an unresectable case. In other words, we choose PTBD for preoperative cases, and PTBD or EUS-BD according to the ability of the institution for their procedures when EBD has failed. It is desirable not to choose a plastic stent (PS) but a self-expandable metallic stent (SEMS), in particular for the unresectable cases of pancreatic cancer it is desirable not to choose an uncovered SEMS but a covered SEMS in EBD. Nevertheless, further examinations are expected to decide which, a covered or uncovered SEMS, we should choose in unresectable biliary tract cancer (BTC) and whether we should select PS, SEMS or ENBD in preoperative cases.

Keywords: Malignant biliary obstruction (MBO); endoscopic biliary drainage (EBD); EUS-guided biliary drainage (EUS-BD), plastic stent (PS); self-expandable metallic stent (SEMS)

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Introduction

Distal malignant biliary obstruction (MBO) results from different types of tumors including pancreatic cancer, biliary tract cancer (BTC), gallbladder cancer, and lymph node metastasis, which can lead to obstructive jaundice as a result of the bile excretion from the liver being disturbed. Because the MBO induces hepatic failure and sepsis when complicated with cholangitis, it is necessary to perform drainage for the MBO immediately (1). Endoscopic biliary drainage (EBD) is firstly reported by Soehendra *et al.* (2) who arranged endoscopic retrograde cholangiopancreatography (ERCP) (3). EBD is preferred over operative bypass and percutaneous transhepatic biliary drainage (PTBD) for management of a distal MBO, because operation and PTBD are more invasive and impose considerable patient discomfort (4-6).

More importantly, PTBD is frequently susceptible to catheter tract recurrence after surgery (7). Self-expandable metallic stents (SEMS) were introduced at the end of the 1980s to overcome the disadvantages of plastic stents (PS) (8-10).

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guidelines for distal MBO recommend either a SEMS or a PS. For patients with a short life expectancy and distant metastasis, a PS is usually used. Despite this, while it has been shown that PS are cheaper than metal stents, metal stents have better drainage and longer patency (11), and recent data shows that they are cost-effective (12,13).

Also we can perform EBD for intact papilla in patients with an altered anatomy by using balloon-enteroscopy-assisted ERCP (BEA-ERCP) (14-17).

Recently, the utility of endoscopic ultrasound (EUS)-guided biliary drainage (EUS-BD) is a developed alternative to PTBD for patients in whom ERCP has failed (18). However, it is not clear which we should choose: EBS, PTBD or EUS-BD for a preoperative or an unresectable case. In this review, we mainly describe the endoscopic treatment for distal MBO with normal anatomy of EBS and EUS-BD for preoperative or unresectable cases.

Preoperable cases

In preoperative cases, either EBD or PTBD is chosen, but there are not any reports about the utility of EUS-BD. The current meta-analysis suggests that endoscopic nasobiliary drainage (ENBD) is better than EBS for MBO in terms of the preoperative cholangitis rate, the postoperative pancreatic fistula rate, the incidence of stent dysfunction, and morbidity (19).

Generally, it is approximately three months into the patency of the PS during which the malignant distal biliary obstruction occurs, but we often experienced PS occlusion in the preoperative PS placement after less than one month. In our retrospective analysis for preoperative cases with distal MBO, which includes pancreatic cancers and BTCs, we did not require re-drainage in the SEMS custody group. On the other hand, the re-drainage rate is 81.8% and 31.3% in 7Fr and 8.5Fr or more in the PS custody group, respectively. Similarly, all of the studies about the comparison of PS and SEMS in the case of preoperative biliary tract drainage were retrospective examinations (20-25).

Also, there is a prospective study about the safety of MS in preoperative biliary tract drainage (26), but a randomized controlled trial with PS has not been conducted.

In the future, it is necessary to examine prospective randomized trials for prognosis, cholangitis, stent patency, cost effectiveness, and postoperative complications of each procedure including PS, ENBD, and SEMS.

Inoperable cases

Davids *et al.* first reported that SEMS have a longer patency than PS and offer adequate palliation in patients with unresectable distal MBO (27).

In a meta-analysis, the use of SEMS results in longer stent patency, lower complication rates, and fewer re-interventions than that of PS in the palliation of patients with MBO (28).

Although there are no significant differences in stent dysfunctions, stent patency, patient survival, and complications between covered SEMS (CMS) and uncovered SEMS (UMS) in meta-analysis, we think that BTC and pancreatic cancer are mixed in the subjects (29-31).

Kitano *et al.* reported that by preventing tumor ingrowth and migration, covered SEMSs with an anti-migration system had a longer duration of patency than uncovered SEMSs, recommending their use in the palliative treatment of patients with MBO due to pancreatic carcinomas (32). Krokidis *et al.* reported that use of CMS seems to offer better results with fewer re-interventions and a better quality of patient life for those with pancreatic cancer (33). Krokidis also reported that CMS proved to be significantly superior to UMS for the palliation of distal MBO due to extrahepatic cholangiocarcinoma, with comparable cost and complication rates (34). However, it might be necessary to consider that this study only tested for the use of CMS and UMS with the use of PTBD. We think that a randomized controlled trial between CMS and UMS in the utility for EBS in BTC patients with distal MBO is expected in the future.

It is unknown whether we should employ a PS, a SEMS replacement, an additional SEMS placement, or perform a cleaning against the re-intervention for SEMS obstruction and whether EBD or ENBD is better. We cleaned clogs with a balloon to re-canalize the initial SEMS. The placement of an ENBD tube was the treatment of choice, because, with this we can check the status of the drainage, the amount of bile juice, detect the causative bacteria with culture, and wash the tube if it is occluded. The indication of ENBD placement remains unestablished, but in patients with severe acute cholangitis, we recommend this procedure. Some articles recommend the replacement of the CMS, after an initial CMS occlusion by sludge, but keeping the initial stent could be more cost effective and reduce the number of procedures. Another candidate was a PS placement inside the initial CMS (35,36).

Recently, the 12 mm large-diameter SEMS (37) and the anti-reflux SEMS (38) have been developed. Further investigations are warranted on the routine use of them as a means of a first or second -line for biliary drainage for distal MBO.

As for EUS-BD, Giovannini *et al.* first reported about EUS-guided choledocoduodenostomy (EUS-CDS) (39), which arranged EUS-guided cholangiopancreatography (40). Then, Burmester *et al.* reported about EUS-guided hepaticogastrostomy (EUS-HGS) and EUS-guided hepaticojejunostomy (EUS-HJS) by using a PS (41). Kahaleh *et al.* underwent EUS-gall bladder drainage (EUS-GBD) with PS (42) and EUS-CDS by using metal stents (43). Nguyen-Tang *et al.* reported EUS-guided antegrade treatments (EUS-AG) by metal stent for the first time (44).

Recently, there have been several reports about EUS-BD in a single center. As for the procedure success rate and the adverse event rate; they reported the rate of success and adverse event in EUS-HGS 64.7–100% and 14.3–30.5%, and in EUS-CDS 73.1–96.8% and 3.4–19.2% (45-47), respectively. The most serious adverse event is stent migration in EUS-HGS (48). There are some reports that the risk of complications in EUS-BD falls after the experience of 10–20 or more cases (45,49). Then, only endoscopists skilled in both ERCP and EUS should be permitted to perform EUS-BD. The indication of EUS-BD is a difficulty in EBS, both with normal anatomy and altered anatomy. It is entrusted to the hope of the patients and the ability of the institution whether one can choose PTBD or EUS-BD. A superior point of EUS PTBD over PTBD is making a permanent fistula in a single step, but the procedure success rate and the complication rate are inferior to PTBD. It is possible that if a device for EUS-BD is developed, that is capable of increasing the success rate and decreasing the complications rate, that EUS-BD may replace ERCP as the initial treatment for distal MBO in high-volume centers.

Conclusions

We gave an outline mainly on endoscopic drainage having to do with the management of distal MBO. We should first perform EBD for distal MBO and choose PTBD for preoperative cases, and PTBD or EUS-BD according to the procedural ability of the institution when EBD fails. It is desirable to not choose PS but SEMS, in particular in the case of pancreatic cancer and to not choose UMS but CMS in EBD for unresectable cases. Further examinations are expected about which we should choose, CMS or UMS, in unresectable BTC and which we should choose, PS, SEMS or ENBD, in preoperative cases.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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