Endoscopic Biliary Drainage of Hilar Cholangiocarcinoma

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Cholangiocarcinoma is an uncommon malignancy which arises from biliary epithelial cells, anywhere along intra- and extrahepatic biliary tract and can be divided into three groups by involved anatomy: intrahepatic, perihilar, and distal extrahepatic cholangiocarcinoma. Cure can only be achieved by surgical resection. Because of initial diagnosis as advanced disease and recurrence despite surgery and resistance to chemotherapy or radiotherapy, overall prognosis is very poor.

Hilar cholangiocarcinoma (HC), also well known as Klatskin tumor, involves bile duct bifurcation area and/or both the right and left intrahepatic bile ducts, so it usually causes biliary obstruction at presentation. In the situations, biliary decompression is mandatory to relieve cholestatic symptoms, if the patients are not suitable for surgical resection because of advanced tumor stages or comorbidities. Here, it will be reviewed about endoscopic biliary drainage of HC.

Preoperative Endoscopic Biliary Drainage

It remains still unclear whether and how to perform preoperative biliary drainage (PBD) in patients with HC because of its possible complications, such as recurrent cholangitis, pancreatitis, hemorrhage, and longer hospitalization. Therefore, a routine PBD for every patient undergoing surgery is not recommended. However, some patients who have intractable pruritus or acute cholangitis need PBD.

Recently, major hepatectomies have increasing been performed in order to achieve negative resection margin. In those situations, portal vein embolization of the affected lobe can be required and a delay of at least 3 weeks in surgery is recommended. The patients who are subjected to portal vein embolization prior to surgery also need PBD.

Percutaneous biliary drainage (PTBD) has been widely performed as a technique of PBD in HC patients. As advances in endoscopic techniques and devices, endoscopic biliary drainage has been increasingly applied in the clinical settings. Some clinicians suggested endoscopic drainage should prefer to PTBD due to a relatively high (5.2%) tumor recurrence and serious complication such as vascular injury.

In a recent report, Kawakami compared three methods of PBD: endoscopic nasobiliary drainage (ENBD) vs. endoscopic biliary stent (EBS) vs. PTBD as an initial type of drainage for HC patients. Data showed that ENBD was the most appropriate method of PBD because of a high incidence of cholangitis in EBS, risk of cancer seeding or portal vein injury in PTBD. Considering above data, however, no consensus has been reached regarding the issue, EBS and PTBD might not be recommended in this group.

Plastic Stents Versus Self-Expendable Metallic Stents in Unresectable HC Patients

Almost all of the published data comparing plastic stents (PS) and self-expansible metallic stents (SEMS) have dealt with distal malignant biliary obstruction. Although SEMS have a more prolonged patency than that of PS and a better cost-effectiveness than that of PS in patients with distal malignant CBD obstruction who expect to live at least 3-6 months, the choice between PS and SEMS in HC patients is still doubtful. Recently, data from a prospective multicenter cohort study showed that fewer stent-related adverse outcome including re-interventions was observed in SEMS group when compared to those of PS in patients with HC. Raju et al. conducted retrospectively a study of comparison of the efficacy of PS and SEMS in HC patients. It showed patency of SEMS was superior to that of PS with similar complications rate. However, It has been recently published that there was no difference in the primary or secondary outcome whether PS or SEMS was placed in HC patients, even it has some limitations [retrospective study and SEMS in only 16 of 98 stents (20%)]. Patency of PS in HC seems little shorter than that of distal malignant biliary obstruction, in contrast to SEMS. It may be due to the characteristics of PS itself; rigidity, limited conformability, inability to drain side branches. Although the initial choice between PS and SEMS in HC is still unclear, SEMS have some theoretical advantages in patients with HC when compared with PS, such as larger diameter (it
represents longer patency), excellent conformability, ability to drain side branches, and then potential for prolonged survival.
If photodynamic therapy is planning, PS placement is usually recommended.

### Unilateral Versus Bilateral Stenting in Unresectable HC Patients

In the past, drainage of both lobes had been strongly recommended because unilateral drainage may not relieve sufficiently cholestasis and may cause acute cholangitis when contrast media is introduced into an undrained lobe. Although there is no doubt that both lobes drainage is technically more difficult than single lobe drainage, De Palmar et al, prospectively compared unilateral versus bilateral endoscopic drainage in HC patients and showed that unilateral drainage avoided contralateral side injection, had higher success rate and lower cholangitis rate than that of bilateral drainage group. Those results were supported by previous data that drainage of at least 25-30% of the liver volume had assumed to be the minimal requirement for jaundice relief. When unilateral drainage undergoes, efforts should be made to avoid retained contrast-dye in undrained segments because cholangitis can arise from undrained segments, especially contrast-dye injected segments without drainage. To drain more than 25-30% of the liver, one of the three sections (left lobe, right posterior section or right anterior section) should be drained. Recently, a retrospective study showed that draining more than 50% of liver volume (It frequently requires bilateral stenting.) was associated with effective drainage, less cholangitis rate and a prolonged survival in advanced Bismuth III HC. The study suggested that undrained intrahepatic ducts were associated with cholangitis and poor survival rate, so one or more stent placements into a dominant liver lobe is more effective biliary decompression than drainage of atrophied liver. In clinical practice, radiologic image provides not only preoperative staging but also volumetric measurement. And it identifies dilated bile ducts and avoids atrophic segment drainage as well. Therefore CT or particular MRCP-guided target drainage is mandatory for achievement of successful biliary decompression. Another way to minimize risk of procedure-related cholangitis may obtain air cholangiogram before injection. It has been recently published that normal bilirubin level after drainage can be a good indicator for longer survival in advanced HC. It may represent that the important thing would be not number of stenting, but complete resolution of cholestasis for prolonged survival.

Although this is still controversial issue, image (MRCP) guided targeted drainage of one or more stenting might be needed for achieving successful biliary decompression and reducing procedure-related cholangitis, then expecting prolonged survival in HC patients.

### Newly Designed SEMS

As mentioned above, whether unilateral or bilateral drainage should be performed for relief of cholestasis in HC patients is still controversial. Bilateral stenting using conventional SEMS is challenging and needs technical expertise because the second SEMS is not easily placed after the first SEMS insertion. Recently, various new-designed SEMSs have been developed for bilateral stenting; Niti-S Y-type, BONA M-hilar stent, Niti-S large cell D-type

The Niti-S Y-type SEMS has a wide mesh of the central portion which allows the second SEMS to be placed. Several studies showed that technical success rate was 85-90%, functional success rate was almost 100%. Although Y-type SEMS shows good outcome, it may be prone to tumor ingrowth due to wide mesh. To overcome central wide mesh portion of Y-stent which reduces radial force, M-hilar SEMS and Niti-S large cell D-type were developed. The feasibility and outcome of two-type SEMSs insertion was documented by pilot studies.

### REFERENCES

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