Percutaneous Placement of Biliary Metallic Stents in Patients with Malignant Hilar Obstruction

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Malignancies of the biliary hilum have an extremely poor prognosis, with less than 10% of patients surviving 5 years after the diagnosis. Malignant hilar obstruction is most often caused by hilar cholangiocarcinoma (Klatskin’s tumor), gallbladder cancer growing into the liver or hepatoduodenal ligament, advanced gastric cancer, lymphadenopathy in the hepatoduodenal ligament or liver metastases compressing hilar structures. Although surgery offers the only chance of cure, the majority of these tumors have been managed with nonsurgical treatment for palliation because of their poor prognosis and advanced stage at the time of diagnosis. The primary aim of palliative treatment of malignant hilar strictures is to improve quality of life by providing biliary drainage with long-term relief of jaundice, pruritus, pain, and cholangitis. However, patients with malignant bile duct obstruction at or above the hepatic hilus are much more difficult to treat than those with low bile duct obstruction. Isolation of the right and left hepatic ducts often occurs when the obstruction lies above the hilum, and this isolation may extend involvement to the secondary ducts as well.

Bile duct obstructions at the level of the liver hilum, particularly in cases of Klatskin’s tumor, are usually graded according to the Bismuth classification (Grade I: obstruction of the common hepatic duct, communication between left and right and left hepatic duct intact. Grade II: obstruction at the level of the bifurcation, no involvement of the segmental ducts. Grade III: hilar obstruction with involvement of the segmental ducts of left or right lobe. Grade IV: hilar obstruction with involvement of segmental ducts in both the right and left lobe). This grading system is not only useful for determining tumor resectability but also for planning a drainage procedure. The level of obstruction is most easily determined by thin section CT or magnetic resonance cholangiopancreatography. Three-dimensional reconstructions make it easier to appreciate the level of bile duct obstruction and the normal variants of bile duct anatomy that are present in 20-25% of patients. The level of obstruction as determined by diagnostic imaging must be well understood to plan biliary drainage and to predict its efficacy.

The relatively low level of biliary obstruction in patients with Klatskin’s tumor of Bismuth type I or II, can be easily managed by endoscopic stenting. However, the percutaneous approach is more appropriate for patients with a higher level of obstruction; i.e., Bismuth type III or IV, because the endoscopic approach can cause cholangitis, and selective endoscopic stenting into the appropriate bile duct is technically difficult.

Percutaneous palliation of biliary obstruction resulting from hilar malignancy can be accomplished in a variety of ways. Various self-expanding metallic stents with differing constructions have been available for the treatment of malignant biliary strictures. Adequate drainage and stenting of one complete liver lobe is usually sufficient to relief the obstructive jaundice, but draining only several segments of one lobe is usually not enough. The concerns regarding unilateral drainage include the inability to relieve jaundice and the potential for bacterial contamination of an undrained segment, with the possibility for subsequent biliary sepsis and death. When one lobe is severely atrophied as a result of longstanding occlusion of the ipsilateral portal vein, it is usually not useful to stent the atrophied lobe.

There has been debate on whether bilateral drainage is better than unilateral drainage in unresectable hilar malignancy. One study showed that drainage of 25% of the liver volume can achieve adequate palliation with improvement in biochemical parameters, biliary decompression, and relief of symptoms with improved quality of life. Others have shown that more than one endoprosthesis would not appear to be justified as a routine procedure in patients with malignant hilar biliary obstruction. However, another study showed that for the cumulative patency rate, bilateral drainage was superior to unilateral drainage in Bismuth type IV obstruction. The best survival has been reported for patients with bilateral drainage and the worst survival for patients with cholangiographic opacification of both lobes after drainage of only one lobe. In complicated hilar disease, contrast medium may be injected into one or more segments, which are subsequently left undrained. This increases the risk for cholangitis.
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Biliary stent should be long enough to cover the proximal and distal segments of the stricture, under the assumption that the malignant stricture will continue to progress. Ideally tailored stenting [i.e., single-duct stenting; Y, T, or chi-configuration (X shape) of dual- or triple-duct stenting], which can result in drainage of the entire duct system without a major missing duct, should be undertaken in accordance with the anatomic types of strictures as described by the Bismuth classification.

Bilateral drainage is most commonly accomplished through separate transhepatic punctures. The straight stents are deployed in parallel, so that the shafts of the two stents are side by side in the common duct. However, the parallel arrangement of two stents may prevent full expansion at and below the hepatic confluence. Several techniques to drain the right and left hepatic ducts via a single percutaneous tract have been developed to eliminate the additional morbidity and discomfort associated with a second PTBD procedure. Decompression of isolated ducts through a single transhepatic access is preferable to the dual-access approach because it has less associated morbidity and is better tolerated by patients. Various interventional techniques have been developed to perform bilateral internal drainage of the right and left ductal systems via a single percutaneous approach. T-configured dual stent for the treatment of malignant hilar obstruction allows bilateral internal drainage of the right and left ductal systems via a single percutaneous approach and offers a large luminal diameter throughout the system.

Some investigators have studied more complete drainage for far advanced malignant hilar obstructions. In patients with hilar tumors extending beyond the segmental ducts, T- and Y-configured stent placement cannot effectively drain another right-sector duct and leave a large portion undrained. In these situations, if two metallic stents are placed crossing each other in a criss-cross configuration, three intrahepatic limbs of the stents can drain two right-sector ducts and the LHD for “trisectoral” drainage.

Percutaneous biliary stenting for palliation of malignant hilar obstruction has evolved to a safe and effective technique. Metal self-expandable stents have proved superior to plastic stents and should therefore be used. Technical success is >90% and clinical success is >75% in all major series. The vast majority of complications can be treated conservatively and the procedure-related mortality is <2% in most series. In conclusion, percutaneous multiple stents placement can be a useful palliative method in advanced hilar malignancies which are not suitable for surgery.

REFERENCES