EDITORIAL

''Cross-wired'' biliary metal stents for malignant hilar strictures: a new window of opportunity?

The majority of malignant hilar lesions are diagnosed at an advanced stage, with surgical resection possible in only 20% of patients.[1,2] Palliation is therefore the focus of most interventions.[3] Because surgical decompression carries a significant morbidity,[4,5] less-invasive interventions, including endoscopic[6,7] or percutaneous stenting,[8,9] are frequently offered. In many tertiary centers, endoscopic biliary drainage has become the preferred approach for palliation in patients with inoperable malignant biliary obstruction.[10-12] All attempts to prove the superiority of a percutaneous approach over an endoscopic decompression have remained inconclusive,[13-15] and the recent addition of EUS-guided biliary drainage[16,17] will relegate the percutaneous approach to a backup option or to a combined approach in case of a rendezvous requirement.[18] Uncovered self-expanding metallic stents (SEMSs) are preferred for palliation of malignant hilar strictures when compared to plastic stents due to their prolonged patency rates, the decrease in endoscopic sessions, and length of hospitalization.[12,19] However, placement of plastic stents at the hilum is still recommended if the patient might be a surgical candidate, is receiving photodynamic therapy,[20-22] brachytherapy,[23] or if the cancer diagnosis is not confirmed. The major limitations associated with SEMS use are their occlusion by tumor progression through the uncovered meshes, and the feasibility of placing multiple SEMSs in order to provide adequate biliary decompression.[7]

The concept of placing multiple SEMSs has been supported by many studies demonstrating improved clinical symptoms and survival,[12,24] and although this was recently challenged,[10,25] many endoscopists still offer multiple SEMS placement, especially when all intrahepatic segments have been opacified or if a second-line chemotherapy is contemplated.[7,26] Different options have been described to achieve this kind of ''maximal'' drainage and have included selective placement of guidewires on both sides of the intrahepatic biliary tree,[27] temporary placement of a plastic stent to prevent the first SEMS from fully expanding,[28] deployment of a second SEMS through the first SEMS after disrupting its interstice,[6] and, finally, the use of an ''open mesh'' SEMS with an 8-mm interstices central section realizing a T-shaped[29] or Y-shaped configuration[30] (however, stent obstruction has been reported to occur in 18% to 25% of cases due to tumor overgrowth or ingrowth, pointing toward a weakness at the level of open interstices[29,30]).

In this issue of *Gastrointestinal Endoscopy,* Park et al[31] report a multicenter experience in which they used a newly designed metal stent (BONASTENT M-Hilar; Standard Sci Tech Inc, Seoul, South Korea) with a narrower stent mesh (cavity size 1.6 mm × 1.6 mm) in 35 patients. The first SEMS placed had 2 spiral markings on its 25-mm–long central portion, and 4 spot markings on both ends. The 2 central spiral markings created a cross-wired structure to facilitate cross-placement of a contralateral stent. The overall success rate of bilateral placement was 94% (33/35), leaving only 2 patients receiving unilateral drainage. The success rate of the stent-in-stent procedure in a single session was 82% (27/33), with an intention-to-treat result of 77% (27/35). Median survival and stent patency were 180 and 150 days, respectively. Interestingly, there was no percutaneous insertion of the contralateral stent in this series. Two patients (6%) experienced cholangitis with sludge formation requiring SEMS revision. This occlusion rate compares favorably with previously reported data on SEMSs with wider interstices in their central section, but it needs to be validated in larger randomized studies. In the meantime, how should we manage malignant hilar strictures?

In malignant hilar strictures, before even considering the type of stents to be placed (plastic versus metal), adequate diagnosis and staging are required, with judicious use of cross-sectional imaging (ie, MRI-MRCP) and tissue sampling techniques (EUS-FNA, brushing, or targeted intraductal biopsy with choledochoscopy).

Before even considering the type of stents to be placed (plastic vs metal), adequate diagnosis and staging are required, with judicious use of cross-sectional imaging (ie, MRI-MRCP)[32] and tissue-sampling techniques (EUS-FNA, brushing or targeted intraductal biopsy with choledochoscopy). During endoscopic retrograde cholangiography, avoidance of biliary opacification of undrained segments is key to prevent cholangitis.[6] Based on the local expertise,

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inaccessible dilated radicals after repeat conventional endoscopic retrograde cholangiography can then be accessed during a rendezvous or an EUS-guided transhepatic procedure. The choice of the number or type of SEMSs to be placed should not be based on operator preference but on the configuration of the biliary tree, the potential for surgical resection, the presence of an eventual atrophic lobe, and the need to obtain maximal decompression in order to eventually offer chemoradiation.[7] For biliary endoscopists dealing with challenging hilar lesions, the availability of new uncovered metal stents of different design and configuration might increase the potential for providing efficacious biliary decompression. Whether the ''cross-wired'' biliary SEMS can be added to our arsenal as a competitive device remains to be proven in a long-term multicenter randomized trial.

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Michel Kahaleh, MD
Digestive Health Center of Excellence
University of Virginia Health System
Charlottesville, Virginia

Abbreviation: *SEMS, uncovered self-expanding metal stent.*

REFERENCES

1. Bismuth H, Nakache R, Diamond T. Management strategies in resection for hilar cholangiocarcinoma. Ann Surg 1992;215:31-8.
2. Blom D, Schwartz SI. Surgical treatment and outcomes in carcinoma of the extrahepatic bile ducts: the University of Rochester experience. Arch Surg 2001;136:209-15.
3. Luman W, Cull A, Palmer KR. Quality of life in patients stented for malignant biliary obstructions. Eur J Gastroenterol Hepatol 1997;9:481-4.
4. Chaudhary A, Dhar P, Tomey S, et al. Segment III cholangiojejunostomy for carcinoma of the gallbladder. World J Surg 1997;21:866-70.
5. Smith AC, Dowsett JF, Russell RC, et al. Randomised trial of endoscopic stenting versus surgical bypass in malignant low bileduct obstruction. Lancet 1994;344:1655-60.
6. Cheng JL, Bruno MJ, Bergman JJ, et al. Endoscopic palliation of patients with biliary obstruction caused by nonresectable hilar cholangiocarcinoma: efficacy of self-expandable metallic Wallstents. Gastrointest Endosc 2002;56:33-9.
7. Van Laethem JL, De Broux S, Eisendrath P, et al. Clinical impact of biliary drainage and jaundice resolution in patients with obstructive metastases at the hilum. Am J Gastroenterol 2003;98:1271-7.
8. Ferrucci J, Mueller P, Harbin W. Percutaneous transhepatic biliary drainage: technique, results, and applications. Radiology 1980;135:1-13.
9. Inal M, Akgul E, Aksungur E, et al. Percutaneous placement of biliary metallic stents in patients with malignant hilar obstruction: unilobar versus bilobar drainage. J Vasc Interv Radiol 2003;14:1409-16.
10. Freeman ML, Overby C. Selective MRCP and CT-targeted drainage of malignant hilar biliary obstruction with self-expanding metallic stents. Gastrointest Endosc 2003;58:41-9.
11. Perdue DG, Freeman ML, DiSario JA, et al. Plastic versus self-expanding metallic stents for malignant hilar biliary obstruction: a prospective multicenter observational cohort study. J Clin Gastroenterol 2008;42:1040-6.
12. Arvanitakis M, Van Laethem JL, Pouzere S, et al. Predictive factors for survival in patients with inoperable Klatskin tumors. Hepatogastroenterology 2006;53:21-7.
13. Mansfield SD, Barakat O, Charnley RM, et al. Management of hilar cholangiocarcinoma in the North of England: pathology, treatment, and outcome. World J Gastroenterol 2005;11:7625-30.
14. Lee SH, Park JK, Yoon WJ, et al. Optimal biliary drainage for inoperable Klatskin's tumor based on Bismuth type. World J Gastroenterol 2007;13:3948-55.
15. Paik WH, Park YS, Hwang JH, et al. Palliative treatment with self-expandable metallic stents in patients with advanced type III or IV hilar cholangiocarcinoma: a percutaneous versus endoscopic approach. Gastrointest Endosc 2009;69:55-62.
16. Giovannini M, Dotti M, Bories E, et al. Hepaticogastrostomy by echoenodscopy as a palliative treatment in a patient with metastatic biliary obstruction. Endoscopy 2003;35:1076-8.
17. Kahaleh M, Wang P, Shami V, et al. EUS-guided transhepatic cholangiography: report of 6 cases. Gastrointestinal Endoscopy 2005;61:307-13.
18. Martin D. Combined percutaneous and endoscopc procedures for bile duct obstruction. Gut 1994;35:1011-2.
19. Wagner HJ, Knyrim K, Vakil N, et al. Plastic endoprostheses versus metal stents in the palliative treatment of malignant hilar biliary obstruction: a prospective and randomized trial. Endoscopy 1993;25:213-8.
20. Ortner ME, Caca K, Berr F, et al. Successful photodynamic therapy for nonresectable cholangiocarcinoma: a randomized prospective study. Gastroenterology 2003;125:1355-63.
21. Kahaleh M, Mishra R, Shami VM, et al. Unresectable cholangiocarcinoma: comparison of survival in biliary stenting alone versus stenting with photodynamic therapy. Clin Gastroenterol Hepatol 2008;6:290-7.
22. Harewood GC, Baron TH, Rumalla A, et al. Pilot study to assess patient outcomes following endoscopic application of photodynamic therapy for advanced cholangiocarcinoma. J Gastroenterol Hepatol 2005;20:415-20.
23. Simmons DT, Baron TH, Petersen BT, et al. A novel endoscopic approach to brachytherapy in the management of Hilar cholangiocarcinoma. Am J Gastroenterol 2006;101:1792-6.
24. Deviere J, Baize M, de Toeuf J, et al. Long-term follow-up of patients with hilar malignant stricture treated by endoscopic internal biliary drainage. Gastrointest Endosc 1988;34:95-101.
25. De Palma GD, Pezzullo A, Rega M, et al. Unilateral placement of metallic stents for malignant hilar obstruction: a prospective study. Gastrointest Endosc 2003;58:50-3.
26. Demols A, Marechal R, Deviere J, et al. The multidisciplinary management of gastrointestinal cancer. Biliary tract cancers: from pathogenesis to endoscopic treatment. Best Pract Res Clin Gastroenterol 2007;21:1015-29.
27. Dumas R, Demuth N, Buckley M, et al. Endoscopic bilateral metal stent placement for malignant hilar stenoses: identification of optimal technique. Gastrointest Endosc 2000;51:334-8.
28. Hookey LC, Le Moine O, Deviere J. Use of a temporary plastic stent to facilitate the placement of multiple self-expanding metal stents in malignant biliary hilar strictures. Gastrointest Endosc 2005;62:605-9.
29. Kim CW, Park AW, Won JW, et al. T-configured dual stent placement in malignant biliary hilar duct obstructions with a newly designed stent. J Vasc Interv Radiol 2004;15:713-7.
30. Lee JH, Kang DH, Kim JY, et al. Endoscopic bilateral metal stent placement for advanced hilar cholangiocarcinoma: a pilot study of a newly designed Y stent. Gastrointest Endosc 2007;66:364-9.
31. Park DH, Lee SS, Moon JH, et al. Newly designed stent for endoscopic bilateral stent-in-stent placement of metallic stents in patients with malignant hilar biliary strictures: multicenter prospective feasibility study (with videos). Gastrointest Endosc 2009;69:1357-60.
32. Matos C, Winant C, Delhaye M, et al. Functional MRCP in pancreatic and periampullary disease. Int J Gastrointest Cancer 2001;30:5-18.