Metallic Stents for Benign Extrahepatic Biliary Stricture: In Praise of Self-Expansion?

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Benign biliary strictures are often safely and successfully treated with removable indwelling biliary stents with stricture resolution in 75–90 % of all cases. There is no consensus on the optimal time to remove the stent, and this typically varies from 3 to 12 months [1, 2], depending upon the pathology of the stricture and the clinical setting. For example, shorter dwell times are recommended for post-orthotopic liver transplant (OLT) strictures in the setting of immunosuppression. Resolution of the stricture must be balanced against the complications of stent migration and of cholangitis.

In this issue of *Digestive Diseases and Sciences*, Saxena et al. [3] collected retrospective data from the endoscopic databases of five US tertiary referral centers, identifying patients with benign biliary strictures treated with covered self-expandable metal stents. Stricture etiologies included biliary calculi, chronic pancreatitis, post-OLT, primary sclerosing cholangitis, and other benign indications. The authors evaluated pre- and post-procedural characteristics to identify predictive factors associated with stricture resolution and adverse events. On analysis of 123 patients, the stricture resolution rate was 81 % after a mean stent dwell time of 6.1 months with a corresponding cholangitis rate of 4.1 %. Stricture resolution was associated with longer stent dwell times (24.4 vs 13 weeks, $P = 0.02$), but stricture etiology, prior plastic stenting, duration of stricture prior to stenting, stricture length, stricture dilatation, and brand of stent (Wallflex[®] vs Viabil[®]) did not predict

stricture resolution [3]. The data may have been biased by its retrospective design and the use of mean rather than the preferred nonparametric median to describe dwell time. Nevertheless, a stent dwell time of ~6 months appeared to be near optimal, allowing adequate time to ensure scar remodeling with a relatively low complication rate, including cholangitis. Liver function testing was advocated at 3-month intervals to provide an early indication of stent obstruction and migration. A previously published prospective multicenter study by Devière et al. [1] reported a stricture resolution rate of 75 % and cholangitis rate of 13.9 % after a median stent dwell time of 11.3 months. Saxena's study adds to the data from prior case series, supporting the assumption that temporary stenting is safe and effective for treating benign strictures of various aetiologies (Table 1), even though one death occurred from cholangitis. Other stenting-related complications in this and other case series include post-sphincterotomy hemorrhage, pain, and stent migration [3, 4].

Potential flaws of the study include its retrospective nature with variable lengths of follow-up, heterogeneity of stricture etiology, and the tertiary hospital case mix, all factors that may reduce generalizability. The strength of the study is that it suggests that a 6-month stent dwell time may be optimal.

Self-expanding metal stents have been increasingly used in preference to plastic stents. In a systematic review of the treatment of chronic pancreatitis-related biliary strictures, the use of covered self-expanding metal stents achieved higher success rates than plastic stents as well as lower complication rates [5]. On the other hand, another systematic review identified a higher complication rate associated with the use of self-expanding metal stents (40 %) compared to either single (36 %) or multiple plastic stents (20 %) [6]. Another relatively recent prospective multicenter study of

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Table 1 Examples of the etiologies benign biliary strictures amenable to temporary biliary stenting

Autoimmune pancreatitis
Calculi
Chronic pancreatitis
Gallstone-related stricture
Post-OLT anastomotic stricture
Primary sclerosing cholangitis
Ampullary stenosis
Postoperative

133 patients reported that stent duration of >90 days increased stricture resolution rate by 4.3-fold [7]. The benefit of self-expanding metal stents, however, has not been reported for all aetiologies of benign strictures; hence, further research is needed in this expanding field.

Stent migration, another cause for failure to achieve the scheduled dwell time, occurs in up to 37 % of procedures [8]. Efforts to decrease migration include the incorporation of anti-migration features to the stent such as flared ends, anchoring flaps, and a novel unfixed cell structure design [8]. In comparison with stenting of malignant strictures, self-expanding covered metal stents are more cost-effective with palliative etiologies since stent replacement is rarely indicated. Any future prospective randomized studies should stratify for stricture etiology, stent type, and health economic benefits need to be determined.

In conclusion, endoscopic stent placement is increasingly recognized as the standard of care in the treatment of benign biliary strictures. Treatment efficacy is high, especially if the indwelling stent time is not interrupted by early occlusion or migration. A scheduled stent removal time of 6 months seems reasonable as an appropriate compromise

between improving the stricture resolution rate and limiting the risk of cholangitis.

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