Stents in medicine

Stents in the biliary tree

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Summary

Biliary stenting has become established as a valuable method of palliation in malignant biliary strictures. The development of percutaneous and endoscopic techniques is described and illustrative cases are shown. The role of percutaneous *vs* endoscopic procedures is examined.

Keywords: biliary tree, stents

Figure 1 Left duct puncture showing dilatation of the left ducts. No drainage is seen via the previously inserted endoscopic stent, whose tip lies in the right biliary system

Figure 2 1 cm diameter nitinol stent was inserted from the left ducts through the stricture into the common bile duct. Free drainage of contrast into the duodenum

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Percutaneous cholangiography was developed originally around 1952 and made safer and more successful by the development of the skinny (Chiba) needle in the early 1970s.¹ These techniques were developed further into percutaneous tube biliary drainage in the mid 1970s. There is little evidence, however, that preoperative biliary drainage in malignant strictures produced any clinical benefit.²

Internal–external biliary drainage

Internal–external biliary drainage for palliation of jaundice was subsequently developed. This technique uses a multiple side-hole drainage catheter passed through the stricture to allow drainage into the small bowel. Problems persisted, mainly due to difficulty in management of the percutaneous entry site. Finally, plastic percutaneous stents were produced which allowed a short internal drainage catheter to be left across a stricture, with subsequent removal of the external component. Complication rates in the use of these devices are high, due mainly to the size of the transhepatic track, usually around 12F.

Endoscopic drainage procedure

Technical and clinical improvements in endoscopy have subsequently made endoscopy the first choice in the investigation and management of biliary disease. Complication rates for endoscopic insertion of endoprostheses are considerably lower than for percutaneous access.³

Percutaneous biliary stents

Around 10–15% of patients are not suitable for endoscopic treatment (see box). These patients are then managed by a percutaneous approach. The combined procedure was developed for these cases. In this technique the stricture is crossed percutaneously through a 6F track. A guide wire is then passed through into the duodenum and picked up using an endoscope. It is then possible to proceed endoscopically. The success rate of the technique is close to 100%⁴ and the complication rate lies somewhere between percutaneous and endoscopic methods.

The most important recent development is the manufacture of expandable metal stents. These devices can be introduced via a 7F track and expand up to 1 cm diameter. They may also be placed endoscopically. The time to occlusion of these stents is a little longer than plastic stents.⁵ The cost remains the major disadvantage, with average price around £600–700. It may well be that percutaneous insertion of metal stents will supplant the combined procedure.⁶

Case 1

A 40-year-old female with a previous history of resection of colonic carcinoma presented with jaundice and itching. Imaging showed dilatation of left and right intrahepatic ducts. A 10 French plastic endoprosthesis was placed endoscopically from the common bile duct into the right-sided bile ducts; there was, however, no clinical response. A further percutaneous cholangiogram was performed via a left duct puncture. This demonstrated persistent obstruction of the left-sided ducts (figure 1). A 1 cm diameter nitinol stent (Angiomed, Germany) was placed percutaneously from the left ducts into the common duct (figure 2). Satisfactory drainage and resolution of the jaundice and itching ensued.

Figure 3 Percutaneous cholangiogram. This shows intrahepatic biliary dilatation above a stricture in the common bile duct. No contrast seen below the stricture

Figure 4 1 cm diameter stainless steel wall-stent inserted across the stricture into small bowel. Free flow of contrast through stent

Case 2

A 70-year-old female with previous gastric bypass surgery for stomach cancer presented with jaundice and itching. Imaging showed dilatation of the biliary tree. Endoscopic stent placement was not possible due to the surgery; therefore a percutaneous approach was used. Figure 3 demonstrates the initial percutaneous cholangiogram with dilatation of the intrahepatic biliary tree above a stricture of the common bile duct. The stricture was crossed with a guide wire and a 1 cm diameter Wallstent (Schneider) was placed through the stricture into the small bowel (figure 4). There was rapid resolution of the patient's symptoms.

1 Okuda K, Tanikawa K, Emura T, *et al*. Nonsurgical, percutaneous transhepatic cholangiography: diagnostic significance in medical problems of the liver. *Am J Digest Dis* 1974; 1: 19–21.

2 Hatfield ARW, Terblanche J, Fataar S, *et al*. Preoperative external biliary drainage in obstructive jaundice. *Lancet* 1982; 2: 896.

3 Polydorou AA, Dowsett JF, Cairns SR, *et al*. Palliation of proximal malignant biliary obstruction by endoscopic endoprosthesis insertion. *Gastroenterology* 1989; 96: A203.

4 Dowsett JF, Vaira D, Hatfield ARW, *et al*. Endoscopic biliary therapy using the combined percutaneous and endoscopic technique. *Gastroenterology* 1989; 96: 1180–6.

5 Davids PHP, Groen AK, Rauws EAJ, Tytgat GNJ, Huibregtse K. Randomised trials of self-expanding metal stents versus polyethylene stents for distal malignant biliary obstruction. *Lancet* 1992; ii: 1488–92.

6 Martin DF. Combined percutaneous and endoscopic procedures for bile duct obstruction. *Gut* 1994; 35: 1011–2.

Percutaneous biliary stenting: indications
<ul style="list-style-type: none">• failed ERCP• previous gastric surgery• previous roux-en-Y or hepaticojejunostomy• periampullary diverticulum• periampullary tumour• left and right duct drainage required