—Note for Clinical Doctors—

One-step Insertion of an Expandable Metallic Stent for Unresectable Common Bile Duct Carcinoma

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Abstract

Background: This report describes a one-step insertion of an expandable metallic stent to treat obstructive jaundice due to unresectable common bile duct carcinoma.

Methods: A percutaneous transhepatic cholangiogram is obtained, and the bile duct obstruction is negotiated with a guide wire. After advancing the catheter into the duodenum, contrast material is injected to measure the length of the stenosis. After an expandable metallic stent is positioned, an external biliary drainage catheter is left in place to provide temporary drainage. The catheter is removed after stent patency is confirmed after 3 days.

Conclusions: One-step insertion of an expandable metallic stent for biliary obstruction is a useful method that shortens hospitalization. Once it has been decided to use stent palliation, the stent should be inserted without undue delay to maximize symptomatic relief and cost benefits. (J Nippon Med Sch 2003; 70: 179–182)

Key words: expandable metallic stent, common bile duct carcinoma, obstructive jaundice

Introduction

The incidence of biliary pancreatic malignancies is increasing, and the resection rate also has increased as operative procedures and diagnostic techniques have improved. However, some cases are still inoperable, and prognosis remains poor, in part because the incidence of obstructive jaundice is so high. Biliary stent insertion is now the preferred treatment for jaundice caused by malignant biliary pancreatic obstruction. When first introduced, stenting was performed using polyethylene endoprostheses, but an expanding metal stent has also been available for a number of years[1,2]. Expandable metallic stents have advantages over plastic stents because they can be introduced on a smaller delivery catheter, have a larger inner diameter, and remain fixed in position after release[3–6].

This report describes a one-step method of insertion of an expandable metallic stent for obstructive jaundice due to unresectable common bile duct carcinoma.

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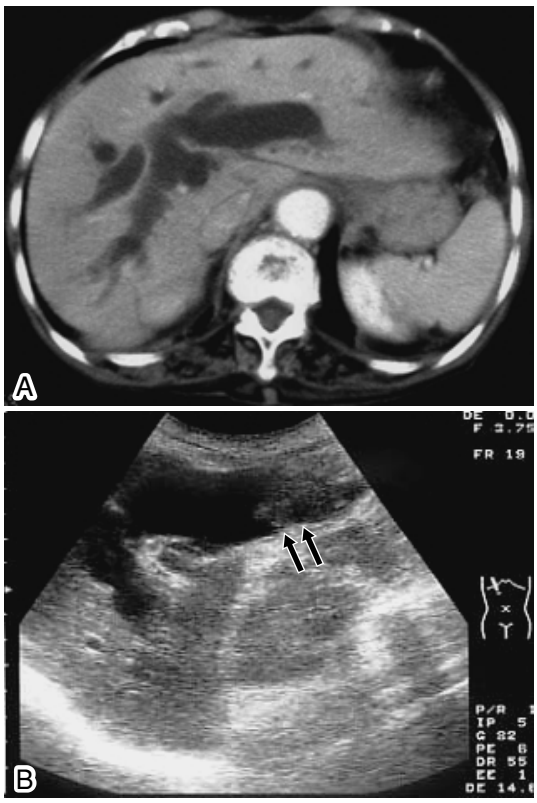

Fig. 1 On admission, computed tomography (A) and ultrasonography (B) demonstrate dilatation of the intrahepatic bile duct and common bile duct mass (black arrow).

Case Report

A 90-year-old woman presented with jaundice and pyrexia on June 17, 2002. On admission, computed tomography and ultrasonography demonstrated dilatation of the intrahepatic bile duct and a mass in the common bile duct (**Fig. 1**). The serum concentration of CA 19-9 was 70.2 u/mL (normal, < 37 u/mL), CEA was 1.2 u/mL (normal, <2.5 u/mL), and total serum bilirubin was 5.9 mg/dL (normal, < 1.0 mg/dL). The serum concentration of CRP was 10.5 mg/dL (normal, <0.5 mg/dL), ALP was 2,096 IU/L (normal, 98～279 IU/L), GOT was 125 IU/L (normal, <31 IU/L), GPT was 80 IU/L (normal, < 31 IU/L), r-GTP was 316 IU/L (normal, 8～45 IU/L), and WBC was 9,300/uL (normal, 5,000～8,500/uL). We diagnosed obstructive jaundice and cholangitis due to common bile duct carcinoma. She refused operation, so insertion of an expandable metallic stent was performed.

Methods

The patient was given a local anesthetic and intravenous analgesic. The appropriate intrahepatic bile duct was punctured with an 18 gauge sheath needle under ultrasonographic guidance. Percutaneous transhepatic cholangiography was performed (**Fig. 2A**), and bile duct obstruction was negotiated with a guide wire (0.035 inch). After advancing a 9-French catheter into the duodenum, contrast material was injected to determine the overall length of stenosis. A 10-mm diameter×80-mm long and a 10-mm diameter×60-mm long S.M.A. R.T. stent (Cordis Endovascular, Warren, NJ) was put in place (**Fig. 2B**). A 9-French external biliary drainage catheter was left in place to provide temporary drainage and removed after stent patency was confirmed 3 days postprocedure.

The procedure lasted 32 minutes. The patient received antibiotics after stent placement. After successful insertion of the stent, the patient's cholestasis and cholangitis rapidly resolved.

The serum concentration of total bilirubin (1.1 mg/dL), CRP (1.5 mg/dL), ALP (830 IU/L), GOT (28 IU/L), GPT (20 IU/L), r-GTP (110 IU/L), and WBC (5,500/u*l*) were all lower 1 week after drainage than before. The patient was discharged from the hospital and is doing well.

Discussion

Long-term survival is poor in patients with malignant biliary pancreatic obstruction who are not candidates for surgical resection. The objective of palliation with a biliary stent is to relieve symptoms related to obstructive jaundice, prevent cholangitis, and possibly prolong survival. Stenting has also been shown to improve patient quality of life[7].

Since the development of suitable metallic stents, a debate has arisen regarding when to use a metallic stent in preference to a plastic one. Randomized studies comparing metallic and plastic endoprostheses have demonstrated that the metallic stent is associated with a lower incidence of complications, remains patent longer, and is more

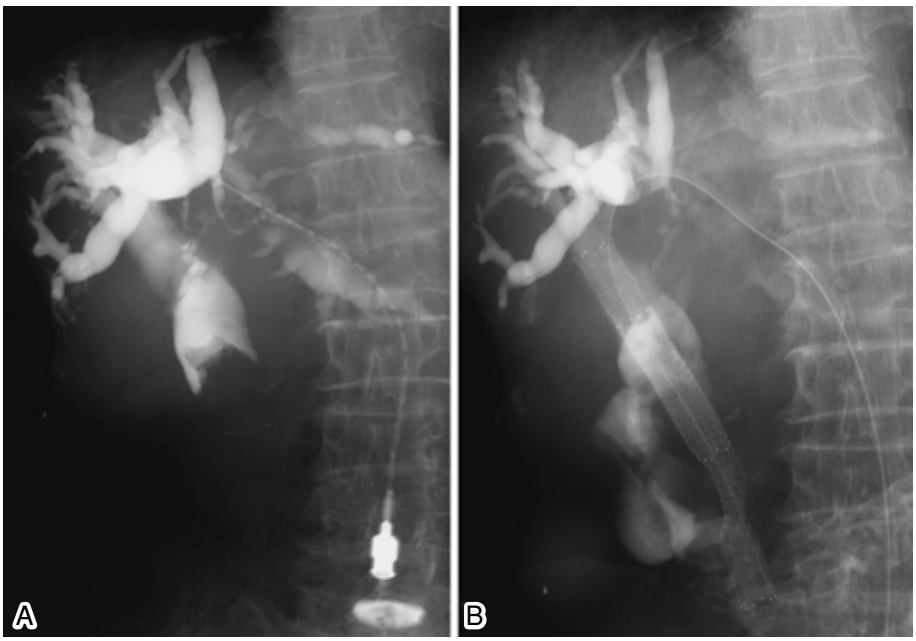

Fig. 2 Percutaneous transhepatic cholangiogram was obtained (A) and bile duct obstruction was negotiated with a guide wire. After advancing the catheter into the duodenum, the expandable metallic stents were put in place (B).

cost-effective despite being initially more expensive[3,4,8-10].

In previous series, serious complications, especially hemobilia, occurred in 2.3% to 20.8% of patients[11-13]. Stent-related complications are rare and include malpositioning of the stent, insufficient lumen, or the failure of the stent release[12]. Most complications are related to the percutaneous transhepatic approach and not to stent implantation[13].

There have been up to 100% success rates reported for stent insertion[12,14,15]. However, the clinical results of metallic stents have varied. There are reports of 7% to 42% early occlusion rates and reports of 12% and 38% late occlusion rates, with a mean time to stent failure of 6 to 9 months[3,4,9,10,16]. Hilar obstructions have lower patency rates than nonhilar obstructions, although one paper has reported opposite results[5,14,17]. One reason could be that it is difficult to achieve adequate dilation in the hilar area. The inner diameter of the occluded stents in this area was usually 5 mm to 7 mm; only one was 8 mm. Diagnosis does not seen to affect patency, and patency rates in patients with cholangiocarcinoma are comparable with those at other malignant lesions[5,6,14,18].

The S.M.A.R.T. self-expandable stent is composed of Nitinol, a nickel-titanium metallic alloy, and the unique, micromesh geometric design of the S.M.A.R.T. laser-cut stent affords superior radial force, excellent flexibility and minimal foreshortening.

Neuhaus et al[19]. reported on their preliminary experience with in vivo percutaneous placement of an expandable metallic stent in malignant and benign biliary obstruction. Percutaneous transhepatic biliary drainage was performed and the diameter of the drainage catheter was increased sequentially stepwise within 8 to 10 days.

One possible reason for the poor outcome is the delay from the time of diagnostic cholangiography until metallic stent insertion[20]. Macdougall et al.[20] reported that 25 (78%) patients had a plastic stent inserted prior to metallic stent insertion, causing a mean delay of 123 days, and 7 (22%) had more than one metallic stent inserted. It is clear that if a metallic stent had been inserted earlier in the disease process, patency would have been longer.

In conclusion, one-step insertion of an expandable metallic stent for biliary obstruction is a useful way to shorten hospitalization. Once it has been decided to perform metal stent palliation, the stent should be inserted without undue delay to maximize symptomatic relief and cost benefits.

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