

# Endoscopic biliary drainage for biliary obstruction

Ping-Hong Zhou, Li-Qing Yao, Yi-Qun Zhang, Wei-Dong Gao, Guo-Jie He, Mei-Dong Xu, Ping Wang and Xin-Yu Qin

Shanghai, China

**OBJECTIVE:** To improve the successful rate of endoscopic biliary drainage.

**METHODS:** Three hundred and fifty-two patients with biliary obstruction were given biliary drainage via duodenoscope from January 1998 to December 2002. 258 patients received endoscopic naso-biliary drainage (ENBD), 51 endoscopic retrograde biliary drainage (ERBD), and 43 endoscopic metal biliary endoprosthesis (EMBE).

**RESULTS:** Of the 352 patients with biliary obstruction, 337 succeeded in drainage by endoscopy and 15 failed. Ten ENBD failed patients were handled successfully by readjustment of the site of the naso-biliary tube. In 3 ERBD failed patients, 2 were given plastic stents with appropriate length and got a fluent drainage. Percutaneous transhepatic biliary drainage (PTBD) was performed in one patient after failure of endoscopic management. In 2 patients with failed EMBE, one stent could not exceed the site of tumor stricture and one was obstructed by tumor implantation only one month after EMBE. Placement of another metallic stent and a plastic stent through the previous prosthesis for each patient ensured a successful drainage.

**CONCLUSIONS:** The effect of endoscopic biliary drainage for biliary obstruction is definite. Drainage failure can be avoided or remedied as early as possible by taking some active measures.

(*HBDP Int* 2003; 2: 598–601)

**Key words:** biliary obstruction; endoscopy; endoscopic retrograde cholangiopancreatography

## Introduction

In the past, surgical biliary drainage was often performed for biliary obstruction.<sup>[1]</sup> With the advancement of endoscopic instrumentation and accumulation of experience of endoscopists, the successful rate in treating biliary diseases by endoscopy has been increasing markedly. Endoscopic therapy without general anaesthesia and laparotomy

has the advantages of less wound, less pain, rapid recovery, short hospital stay and affirmative curative effect.<sup>[2,3]</sup> Many patients need not receive further surgical treatment. This study summarises the experience with biliary drainage by duodenoscope for biliary obstruction at our hospital from January 1998 to December 2002.

## Methods

### Patients

Endoscopic biliary drainage was performed in 352 patients with biliary obstruction, of whom 165 were men and 187 women, aged from 17 to 89 years (mean 68.7 years). 153 patients (43.5%) were over 70 years. All patients had symptoms of abdominal pain, jaundice or fever. Among them, 140

*From the Department of General Surgery, Zhongshan Hospital, Fudan University, Shanghai 200032, China (Zhou PH, Yao LQ, Zhang YQ, Gao WD, He GJ, Xu MD, Wang P and Qin XY)*

*Correspondence: Ping-Hong Zhou, MD, Department of General Surgery, Zhongshan Hospital, Fudan University, Shanghai 200032, China (Tel: 86-21-64041990 ext 2537; Fax: 86-21-64222100; Email: chow@zshospital.net)*

patients had acute obstructive suppurative cholangitis, 111 choledocholithiasis, 53 benign biliary stricture, and 46 malignant biliary tumor. Biliary operation was performed more than 2 times in 57 patients. Forty-three patients presented with concomitant severe diseases such as arrhythmia, chronic obstructive pulmonary diseases, cerebrovascular suddenness or chronic renal dysfunction.

### Methods

Electronic duodenoscope (Olympus, TJF-200, 240, Tokyo, Japan) was used. Endoscopic retrograde cholangiopancreatography (ERCP) was performed, followed by endoscopic sphincterotomy (EST) if intubation was difficult. When the cause of biliary obstruction was confirmed, the way of biliary drainage could be determined. Endoscopic naso-biliary drainage (ENBD) was performed for patients with acute cholangitis, and EST or endoscopic papillary balloon dilatation (EPBD) for those with choledocholithiasis. Stones were extracted via different approaches such as basket, balloon and basket lithotripsy. For benign biliary stricture, endoscopic retrograde biliary drainage (ERBD) with plastic stent or ENBD was indicated after stricture dilation with balloon. On the other hand, endoscopic metal biliary endoprosthesis (EMBE) with metallic stent or ERBD was used for malignant biliary stricture.

### Results

#### Endoscopic biliary drainage

ENBD, ERBD and EMBE were performed in 258, 51 and 43 patients, respectively. Of the 352 patients, 337 were successfully drained. The symptoms of the 140 patients with acute suppurative cholangitis relieved 24 hours after ENBD. Among these patients, 107 received endoscopic treatment again after the cause of the disease was determined, but 33 patients accepted operation. Sixty-eight of the 111 patients with choledocholithiasis showed the clearance of stones in the common bile duct, whereas 43 patients with residual stones received endoscopic extraction again. Of the 53 patients with benign biliary obstruction who were followed up for 4 months after ERBD, 28 had plastic stents removed because of stricture relief, 21 had stent replacement, 4 underwent operation following percutaneous transhepatic biliary drainage (PTBD) after failure of ERBD. The 46 patients with malignant biliary stricture were subjected to EMBE showing reduced serum bilirubin and improved quality of life. The mean duration of drainage in all the patients was 43.3 days with a range of 1 to 193 days, including 8.1 days for ENBD, 132.5 days for ERBD, and 156.7 days for EMBE.

#### Drainage failure and countermeasures

Endoscopic biliary drainage failed in 15 patients, including ENBD (10 patients), ERBD (3) and EMBE (2). In the 10 patients, the naso-biliary tube was folded in the oral pharynx, gastric

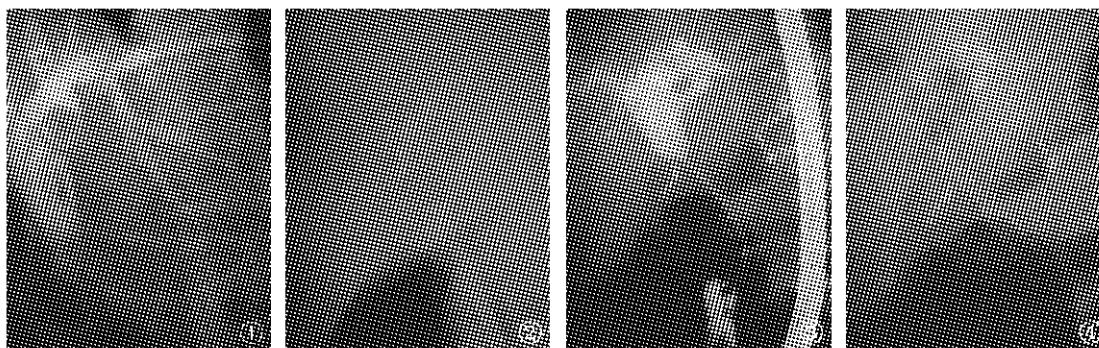


Fig. 1. The naso-biliary tube folds in the gastric lumen.

Fig. 2. The plastic stent could not reach and exceed the biliary stricture.

Fig. 3. The metallic stent could not exceed the tumor stricture site.

Fig. 4. Another metallic stent is replaced through a previous prosthesis.

lumen or bile duct (4 patients) (Fig. 1), slid from the bile duct when withdrawal of the endoscope (3), dropped because of intense cough and vomiting (2), and pulled up incautiously. Successful drainage, however, was performed by modulating the site of the tube or reinserting another tube.

In the 3 patients who failed in ERBD (Fig. 2), 2 were successfully drained using stents with an appropriate length. In another patient, the wide caliber of stent and great resistance of placement made insertion unsuccessful, percutaneous transhepatic biliary drainage (PTBD) was performed because of failure of re-insertion.

In the 2 patients who failed in EMBE, one patient undergoing radical gastrectomy had a widespread metastasis in the abdominal cavity, causing compression of the bile duct. The metallic stent could not exceed the site of tumor stricture and the drainage failed (Fig. 3). Another patient presented with symptoms of biliary obstruction again for tumor implantation confirmed by ERCP only 1 month after EMBE. Either a metallic or plastic stent was replaced through previous prosthesis to restore fluent drainage (Fig. 4).

## Discussion

### Value and indications of endoscopic biliary drainage

For biliary obstruction, traditional surgical treatment is generally applied. But the risk of operation is great for the elder patients with such diseases as diabetes mellitus, hypertension, cardiorespiratory dysfunction, and so on. Some patients have had several biliary operations and widespread adhesion formed in the abdominal cavity, making the subsequent operation more difficult. The rates of complication and death during and after surgery are thus increased. Recent development of endoscopic techniques enables many patients with biliary obstruction to have a fluent drainage via endoscope instead of surgical procedure.

Patients with biliary obstruction caused by benign or malignant diseases are indicated for endoscopic procedure. Bile leakage is also indicated for

endoscopic treatment,<sup>[4]</sup> but the treatment is not advisable if the symptoms of the disease can not be relieved or satisfactory results can not be achieved, in such conditions as multiple intrahepatic cholangiocarcinoma, widespread intrahepatic metastatic carcinoma, and severe blood coagulation. To prevent massive bleeding, endoscopic biliary drainage should be performed cautiously for patients with portal hypertension and severe esophageal varices. Since the metallic stent can not be taken out once it has been implanted and scar-restenosis is likely to occur because of repeated ulceration caused by friction between the end of the stent and the bile duct wall, researchers suggest benign bile duct diseases a contraindication of EMBE.<sup>[5]</sup>

### Cautions for ENBD

During ENBD, withdrawal of an endoscope should be synchronous with insertion of the tube under a fluoroscope after the naso-biliary tube is located. The pushing tube must be connected to the drainage tube if necessary until the tip of a duodenoscope is retreated from the mouth. The assistant should fix the tube tightly to prevent it from being brought out. Attention is given to prevent pulling out of the tube too fast in case that it folds and slides from the bile duct, space and the drainage tube must be fixed firmly in vitro.

### Cautions for ERBD

To make the placement of plastic stent successful, the bile duct should always be dilated transitorily. Prior to the insertion of the stent, contrast media in the bile duct which can not be drained should be sucked out as far as possible to avoid cholangitis or pyohemia. Selection of suitable plastic stent is dependent on the stricture of the bile duct. The diameter of the stent for those patients with severe biliary constriction is appropriate to 10 Fr or below because the effect of stents with a diameter of 12 Fr and 14 Fr is not better than that of the stent with a diameter of 10 Fr. Two stents should be placed simultaneously to drain respectively the left and right hepatic ducts because of tumor oppression of the porta hepatis. The stents should be deployed with their distal ends above the

ampulla of Vater in patients with strictures that do not extend to the lower end of the common bile duct to minimize the occurrence of bacterial colonization and to reduce the risk of the stent clogged by food stuff.

The main cause affecting the long-term effect of ERBD is the occlusion of stent.<sup>[6]</sup> In general, occlusion due to bile encrustation is less frequent in plastic stents with a large internal diameter. If the occlusion causes drainage failure, the stent should be removed and replaced endoscopically. Another cause is the migration of stent, but the incidence of migration is lower than that of occlusion of stent. To avoid the migration, some migration-resistant designs such as double-mushroom stents and spirals are recommended.

### Cautions for EMBE

EMBE has become an effective therapy in treating malignant biliary tumor.<sup>[7]</sup> Metallic stent should be selected according to obstructive position and length, the characteristics of stent and so on. The stent should exceed the tumor 2 cm in length in order to prevent overgrowing from obstruction. The proximal end of the stent should be placed in the peripheral intrahepatic duct, ensuring a stable position and minimizing the risk of overgrowth in patients with hilar strictures. The distal end of the stent should be left in the duodenum to allow endoscopic recanalization if necessary. The optimal position of the distal end of the stent is 1 to 2 cm inferior to the ampulla of Vater. In patients whose left and right hepatic ducts are obstructed, it is necessary to insert bilateral stents. For porta hepatitis tumor, metallic stent must be placed cautiously because widespread biliary obstruction may result in worse drainage or severe cholangitis. Other transitional procedures such as ENBD and ERBD should be used first. When the effect of ENBD or ERBD is satisfactory and inflammation is controlled, alteration of metallic stent is much safer.

The main cause affecting the long-term effect of EMBE is also the occlusion of stent, including

tumor overgrowing into the stent, bile encrustation and tumor necrosis tissues blocking the stent. It is still effective to relieve obstruction, however, if metallic or plastic stent is reinserted into the blocked stent. It has been reported that the metallic stent covered with a layer of polyurethane can be effective to prevent the invasion of tumor tissue and prolong the patency of the stent.<sup>[8]</sup>

### Competing interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

### References

- 1 Zhou PH, Liu FL, Yao LQ, et al. Endoscopic diagnosis and treatment of post-cholecystectomy syndrome. *HBPD Int* 2003;2:117-120.
- 2 Lai EC. Current status of therapeutic endoscopy in hepatobiliary and pancreatic surgery. *Chin Med J (Engl)* 1997;110:438-443.
- 3 Zhou PH, Yao LQ, Gao WD, et al. Endoscopic diagnosis and treatment of post-cholecystectomy syndrome. *Chin J Dig Endosc* 2001;18:335-338.
- 4 Rajman I, Catalano MF, Hirsch GS, et al. Endoscopic treatment of biliary leakage after laparoscopic cholecystectomy. *Endoscopy* 1994;26:741-744.
- 5 Sung JY, Chung SCS. Endoscopic stenting for palliation of malignant biliary obstruction: a review of progress in the last 15 years. *Dig Dis Sci* 1995;40:1167-1168.
- 6 Shim CS, Kim JH, Cho SW. Clinical study of endoscopic retrograde biliary drainage (ERBD) in malignant obstructive jaundice. *Korean Int Med* 1988;35:644-651.
- 7 Cotton PB. Endoscopic methods for relief of malignant obstructive jaundice. *World J Surg* 1989;8:854-861.
- 8 Shim CS, Lee YH, Cho YD, et al. Preliminary results of a new covered biliary metal stent for malignant biliary obstruction. *Endoscopy* 1998;30:345-350.

Received May 26, 2003

Accepted after revision August 6, 2003