To evaluate the usefulness of percutaneous transluminal forceps biopsy in patients with suspicious malignant biliary obstruction.

Eight consecutive patients (7 men and 1 female; mean age, 69 years old) with obstructive jaundice underwent transluminal forceps biopsy after percutaneous transhepatic biliary drainage. The lesion involved the common bile duct (n = 5) and hepatic hilum (n = 3). For each patient, six specimens were taken from the lesion with 5.2-Fr biopsy forceps. The final diagnosis for each patient was confirmed with pathological findings at surgery, biochemistry, or additional histocytological data.

All biopsies resulted in correct diagnoses of malignant or benign lesion. There are no false negative or false positive result. The accuracy of the transluminal forceps biopsy is 100%. There was no major complication related to the biopsy procedures.

Percutaneous transluminal forceps biopsy is a safe procedure that is easy to perform through a transhepatic biliary drainage tract. It provides a high accuracy in the diagnosis of suspect malignant biliary obstruction.

**Key words:** Bile ducts; Biopsy; Jaundice

Pre-operative tissue sampling is essential for the treatment planning for suspect malignant biliary stricture. Poor results often obtained from direct fine-needle aspiration (FNA) and endoscopic brush biopsy techniques. Image guided FNA has a reported sensitivity of 40-71% [1-3]. The sensitivity of endoscopic biopsy has comparative result of 44-72% [4-7]. For this reason, other biopsy methods have been proposed for improving the diagnostic rate of malignant biliary tumors. Percutaneous use of biopsy forceps in the bile duct was first reported in 1980 by Elyaderani et al [8]. Various studies suggest this technique is highly sensitive, especially for cholangiocarcinoma, with a reported sensitivity of 30-100% [9-13]. Our report evaluates the sensitivity of percutaneous transhepatic endoluminal forceps biopsy of suspected malignant biliary obstruction performed in eight patients.

**PATIENTS AND METHODS**

From Mar. 2002 to Feb. 2003, eight intraluminal forceps biopsies were performed in eight patients with obstructive jaundice including 7 men and 1 female, age from 53 to 85 years old, (mean 69 years old). The clinical data of the patients were listed in Table 1. The sonography and computed tomography (CT) scan of the abdomen revealed biliary dilatation. Intrahepatic lesion was demonstrated in one patient. Ultrasound-guided percutaneous transhepatic cholangiography and drainage (PTCD) was performed for each case as previously described [14] and showed strictures involving the left intrahepatic duct in three patients and common hepatic duct in five patients. An 8-Fr polyethylene drainage catheter was initially placed for few days to alleviate cholangitis. Administration of broad-spectrum antibiotics before and after the procedure was routinely done.

All biopsies were delayed for few days after control of cholangitis and performed as previously discussed [11-13]. Cannulation of the stricture was
done using a pre-shaped 6-F H1 catheter (Cook, Bloomington, Ind) and a 150-cm, 0.035-inch plastic coated guidewire (Terumo, Tokyo, Japan) through the lesion to the common hepatic duct down to the duodenum. The biliary catheter is then replaced over the guidewire by a 25-cm, 8-F sheath (Terumo, Tokyo, Japan) with its tip at the stricture area (Fig. 1). The sheath dilator was removed and replaced with a 60-cm, 5.2-F flexible biopsy forceps (Cook, Bloomington, Ind). This biopsy forceps (Fig. 2) was originally designed for endomyocardial biopsies and consisted of three parts: a handle with control button, cutting jaws, and polyethylene coated shaft. Biopsy is done at different regions of the stricture focused on the center of the stricture whenever possible through fluoroscopic guidance (Fig. 3). Two intraductal biopsies were performed at three different sites (distal, middle and proximal) of the intraluminal filling defect or focused on the papillary filling defect in each patient and the specimens were fixed with formalin for pathological examination. After each biopsy, the external or internal-external catheter was replaced in all patients (Fig. 4).

RESULTS

All biopsy procedures were technically successful. Biopsies were performed with a right-side approach in two patients and with a left-side approach in six patients.

All cases of hemobilia were transient and resolved within 24 hours. There were no complication requiring emergent surgery or blood transfusion.

The final diagnosis was malignant disease in 7 patients. The disease included cholangiocarcinoma (n=3), pancreatic carcinoma (n=2), hepatocellular carcinoma (n=1), metastatic carcinoma (n=1). The diagnosis of malignant disease was confirmed with pathological findings at surgery (n=1) as chronic inflammation. The histological results included adenocarcinoma (n=6), hepatocellular carcinoma (n=1), and chronic inflammation (n=1).

Table 1. Clinical Data of Patients Receiving Percutaneous Transluminal Forceps Biopsy

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age(y)</th>
<th>Sex</th>
<th>Chief Complaint</th>
<th>Lesion Location</th>
<th>Bilirubin Level</th>
<th>Specimen size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>67</td>
<td>M</td>
<td>abdominal pain</td>
<td>hilar</td>
<td>2.5</td>
<td>0.4 × 0.2 × 0.1 cm³</td>
</tr>
<tr>
<td>2</td>
<td>85</td>
<td>M</td>
<td>abdominal pain</td>
<td>CBD</td>
<td>3.9</td>
<td>0.6 × 0.2 × 0.1 cm³</td>
</tr>
<tr>
<td>3</td>
<td>64</td>
<td>M</td>
<td>jaundice</td>
<td>CBD</td>
<td>11.2</td>
<td>0.3 × 0.1 × 0.1 cm³</td>
</tr>
<tr>
<td>4</td>
<td>60</td>
<td>M</td>
<td>abdominal pain</td>
<td>CBD</td>
<td>19.8</td>
<td>0.1 × 0.1 × 0.1 cm³</td>
</tr>
<tr>
<td>5</td>
<td>84</td>
<td>M</td>
<td>dizziness</td>
<td>CBD</td>
<td>12.4</td>
<td>0.1 × 0.1 × 0.1 cm³</td>
</tr>
<tr>
<td>6</td>
<td>64</td>
<td>M</td>
<td>jaundice</td>
<td>CBD</td>
<td>25.7</td>
<td>0.4 × 0.2 × 0.2 cm³</td>
</tr>
<tr>
<td>7</td>
<td>71</td>
<td>F</td>
<td>jaundice</td>
<td>hilar</td>
<td>10.1</td>
<td>0.6 × 0.3 × 0.3 cm³</td>
</tr>
<tr>
<td>8</td>
<td>53</td>
<td>M</td>
<td>jaundice</td>
<td>hilar</td>
<td>18.1</td>
<td>0.5 × 0.2 × 0.2 cm³</td>
</tr>
</tbody>
</table>

Figure 1. Fluroscopy shows a 150-cm, 0.035-inch plastic coated guidewire (arrow) at the left hepatic duct bypassed the stricture into the duodenum and a 25-cm, 8-F sheath (arrow heads) with its tip at the stricture area.

Figure 2. Biopsy forceps has a handle with control button, cutting jaws, and polyethylene coated shaft.
DISCUSSION

In patients with obstructive jaundice, an accurate diagnosis of the causes of biliary obstruction is necessary in appropriate treatment planning. Imaging studies are not always able to distinguish benign from malignant biliary obstruction [15]. From therapeutic and prognostic views, correct histological diagnosis is very important. Therefore, we evaluated the effectiveness of biliary forceps biopsy through percutaneously placed biliary tract.

Ultrasound or CT guided FNA is frequently unsuccessful in diagnosis of biliary tumors with a sensitivity of only 42-67% [1,16,17]. Bile cytology by bile collection during biliary drainage is a simple technique but is rarely used due to its poor results [18, 19]. Brush cytology performed during PTCD or during endoscopic retrograde cholangiography has proven to be a safe and popular technique but seems to be of limited diagnostic value because of its superficial sampling and low reported sensitivity of 44-67% [20-22]. When the biliary obstruction is caused by a small tumor, it is advocated that intraductal biopsy is a preferable method. It is ideal if PTCD can be used for relief of obstructive jaundice and for biopsy at the same time.

In 1978, Palayew and Stein initially reported intraductal biopsy via a formed postoperative T-tube tract [23]. Nishimura et al. used a transhepatic access to introduce a 20-French choledochoscope and visually direct biopsy with a 7-French bioptome [24]. But the drawback of this method is that the tract must be dilated into 16-French in order to accommodate the cholangiofibroscope. This increases the potential risk of bleeding and prolongs the waiting for treatment planning. Terasaki et al. used a 3-French or 5-French bioptome, originally designed for transjugular endomyocardial biopsies, for percutaneous transluminal biopsy of biliary strictures. In all 6 patients of their study, the histological diagnosis was positive for malignancy and correlated with the patient’s known primary tumor [9]. Tsai et al. performed percutaneous transhepatic transluminal biopsy for patients with obstructive jaundice by using a 9-French sheath with radiopaque band to accommodate a guide wire and forceps, resulted in a sensitivity of 71% [12]. Jung et al. recently reported a large series of 130 patients show similar sensitivity of 78.4% for malignant biliary obstruction. The overall accuracy of forceps biopsy can reach as high as 79.2% [25].

The high positive rate of our biopsy could be attributed to sampling of the specimen from an intraluminal polypoid lesion rather than from a stenotic lesion. Moreover, a total of 6 biopsies were routinely taken from 3 different locations of the intraluminal filling defect in our series. A similar result with sensitivity of 100% in 15 patients was obtained by taking 3 biopsies via percutaneous transhepatic cholangioscopy [26].

No significant hemorrhage or bile leakage was found after biopsy in this study in spite of transient hemobilia early in the procedure in all patients. Contact bleeding was easy to occur when passing the guide wire across the intraluminal filling defect and
advancing the introducer sheath against the tumor fragment. The transient hemobilia completely regressed within 24 hours in all patients.

In conclusion, our experience from this limited number of cases shows that intraductal forceps biopsy after PTCD is a safe and effective method for tissue diagnosis in patients with suspicious malignant biliary obstruction. It also provides a high accuracy in the diagnosis of suspect malignant biliary obstruction.

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疑似惡性膽道阻塞之經皮穿肝膽道內取樣術

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評估經皮穿肝膽道內取樣術應用於診斷疑似惡性膽道阻塞之方法及效果。
八位疑似惡性膽道阻塞之病患接受經皮穿肝膽道引流術，病患於一至二週後接受經皮穿肝
膽道內取樣術。
所有的取樣皆得到足夠組織及正確病理診斷，取樣後所有病患皆有暫時性出血性黃疸，少
部份病患癲痢及疼痛之輕微併發症，無任一病患有嚴重之併發症。
經皮穿肝膽道內取樣術用於診斷疑似惡性膽道阻塞為一安全及有效之法。

關鍵詞：膽道，生檢，黃疸