Cholangiopancreatoscopy for Targeted Biopsies of the Bile and Pancreatic Ducts

Shahzad Iqbal, MD[a], Peter D. Stevens, MD[a,b,*]

KEYWORDS

• Cholangioscopy • Pancreatoscopy • ERCP
• Biliary stricture • Pancreatic stricture • Intraductal endoscopy
• Directed biopsy • Image-guided biopsy

With the advances in intra-abdominal imaging, there has been a shift from diagnostic to therapeutic endoscopic retrograde cholangiopancreatography (ERCP). The use of ERCP as a pure diagnostic test has significantly diminished. Nonetheless, ERCP maintains the advantage over intra-abdominal imaging in that it offers access to the pancreatobiliary system for tissue diagnosis. Standard ERCP-sampling techniques reliant on fluoroscopic imaging, however, have low-to-moderate sensitivity for pancreatobiliary cancer detection.[1,2] Intraductal endoscopic visualization of the biopsy target during peroral cholangioscopy (POC) or peroral pancreatoscopy (POP) might enhance the diagnostic value of ERCP by improving target selection and tissue acquisition.

In this article, the authors describe POC- and POP-sampling techniques and their contribution to the diagnosis of pancreatobiliary diseases. A Pubmed search was conducted to identify all relevant publications on image-guided biopsy technique. The key words used were: peroral cholangioscopy, peroral choledochoscopy, peroral pancreatoscopy, intraductal endoscopy, SpyGlass, directed biopsy, image-guided biopsy, and SpyBite-forceps biopsy. The yield of standard non-image–guided ERCP-sampling techniques is reviewed first, followed by detailed description of image-guided sampling techniques.

NON-IMAGE–GUIDED TISSUE-SAMPLING TECHNIQUES

Standard techniques were analyzed for malignant biliary stricture in two review articles by de Bellis and colleagues.[1,2] These consist of either intraductal fluid aspiration

[a] Division of Digestive and Liver Diseases, Department of Medicine, Columbia University College of Physicians and Surgeons, P&S 10-508, 630 West 168th Street, NY 10032, USA
[b] Columbia University Medical Center, New York Presbyterian Hospital, Irving Pavilion, 8th Floor, 161 Fort Washington Avenue, NY 10032, USA
* Corresponding author. Columbia University Medical Center, New York Presbyterian Hospital, Irving Pavilion, 8th Floor, 161 Fort Washington Avenue, NY 10032, USA.
E-mail address: Pds5@columbia.edu (P.D. Stevens).

Gastrointest Endoscopy Clin N Am 19 (2009) 567–577
doi:10.1016/j.giec.2009.06.005 giendo.theclinics.com
1052-5157/09/$ – see front matter

cytology, cytologic-histologic analysis of retrieved plastic stents, fine-needle–aspiration (FNA) cytology, brush cytology, endobiliary forceps biopsy (**Table 1**), or combination of above.

Although the specificity was almost 100% with the above techniques, the sensitivity was low-to-moderate. The most effective method for obtaining tissue diagnosis was combining two or more techniques. Combining one cytologic method with forceps biopsy was more often diagnostic.[3] The cancer detection rate varied from 55% to 73% with the combination of biopsy and brushings; and 62% to 82% with the combination of biopsy, brushings, and fine-needle aspiration.[2] The authors, however, concluded that multimodal sampling was more time-consuming and technically difficult when compared with the use of a single technique.

The yield is even lower for pancreatic malignancy, as shown in **Table 2**. The single best technique was the use of forceps biopsy for ampullary cancer, with a detection rate of 77% to 88%.[3] These findings are logical as ampullary malignancy can be visualized endoscopically and sampled directly.

IMAGE-GUIDED TISSUE-SAMPLING TECHNIQUES

Biliary Malignancy

In the setting of biliary malignancy, cholangioscopy can be used for the visual diagnosis of malignancy by assessing for the typical features including "tumor vessels" (ie, irregularly dilated and tortuous vessels), intraductal nodules or masses, infiltrative or ulcerated strictures, and papillary or villous mucosal projections.[4,5] The sensitivity of cholangioscopy is further improved by directed biopsies. In a study by Kim and colleagues,[6] the presence of tumor vessels had a sensitivity of 61% but, when combined with percutaneous biopsy, diagnosed 96% of cancers. In **Table 3**, all studies on image-guided sampling for biliary malignancy have been mentioned in chronologic order.

In a study by Langer and colleagues,[7] 64 cholangiopancreatoscopic procedures were performed in 52 consecutive patients by using Olympus BP30, Olympus video CHFB160, and Pentax FCP9P scopes. Cholangioscopic biopsy was obtained in 26 patients using a prototype Olympus biopsy forceps. Fourteen patients had confirmed malignancies: seven by cholangiopancreatography (CP) with cholangioscopic forceps biopsy (CFB), five visualized by CP, and two intraoperatively. The sensitivity for cancer detection was 85.7%. The authors concluded that CFB improved the ability of CP to confirm malignancy.

Fukuda and colleagues[8] studied the utility of POC for distinguishing malignant from benign biliary disease. A total of 97 consecutive patients (76 strictures and 21 filling defects), were included in the study. Standard-type Olympus peroral cholangioscopes (CHF-B20, 4.5 mm diameter; CHF-BP30, 3.4 mm diameter; CHF-B260, 3.1 mm diameter; Olympus) were used. Brushing cytology or endobiliary forceps biopsy also was performed. ERCP-tissue sampling correctly identified 22 of 38 malignant strictures and all 35 benign lesions except in three patients with inadequate samples (accuracy, 78.0%; sensitivity, 57.9%; specificity, 100%; positive predictive value [PPV] 100%; negative predictive value [NPV] 68.6%). The addition of POC correctly identified all 38 malignant strictures and 33 of 38 benign lesions (accuracy, 93.4%; sensitivity, 100%; specificity, 86.8%; PPV 88.45; NPV 100%). For the 21 filling defects observed by ERCP, POC correctly diagnosed all 8 malignant diseases and 13 benign lesions (accuracy 94.8%; sensitivity 100%; specificity 90.2%; PPV 90.2%; NPV 100%). The authors concluded that the addition of POC to tissue sampling improves the diagnostic ability and covers for insufficient sensitivity. POC was especially useful for diagnosing a filling defect.