Patients with Biliary Filling Defect

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Introduction

Main diagnostic roles of endoscopic procedures for biliary lesions are precise and early diagnosis, differentiation of benign from malignant lesions, tissue sampling, and assessment of extent of disease. Recent advances in radiologic imaging including MRCP have challenged diagnostic indications for ERCP. However, technological advancements also have led to improve the roles of ERCP. ERCP is the gold standard to confirm a biliary lesion including filling defect. But, indirect radiological imaging of the biliary tree is a limitation of ERCP. Tissue sampling during ERCP is possible with brush cytology, and transpapillary biopsy. But, the problem is low sensitivity. A definite diagnosis can only be made by histopathology because of false positive and false negative results. So, we need to increase the accuracy of current ERCP and improve tissue sampling quality by directly visualizing the biliary tree. To overcome the diagnostic limitation of only cholangiogram, additional adjunctive endoscopic techniques have been developed. At present time, it is possible with intraductal ultrasonography (IDUS), and cholangioscopy. Cholangioscopy provides advantages over ERCP for the diagnosis of filling defects in the bile duct by direct visualization of the biliary tree and accordingly can detect abnormal surface features of the lesions and visualize the vascular pattern that characterize malignancy. Optical visual information discloses characteristics of filling defects, which enables us not only to differentiate between benign and malignant strictures, but also to apply to biopsy or treatment.

Intraductal ultrasonography (IDUS)

IDUS provides direct ultrasonographic visualization of the biliary tree and detailed images of the bile duct wall and surrounding area using an over-the-wire catheter ultrasonic probe. IDUS involves the insertion of an ultra-thin US probe with 2 mm in diameter directly into the biliary tree during ERCP. Development of wire guided IDUS markedly contributes to routine, prompt clinical application of IDUS during ERCP. IDUS has been an useful diagnostic tool with very low adverse events for the patients with equivocal findings on cholangiogram, the evaluation of biliary strictures and cholangiocarcinoma. IDUS has only diagnostic role, but, additional information from IDUS is useful to decision making in the further therapeutic strategies. Major advantage of IDUS is the evaluation of filling defects on a cholangiogram and diagnosing malignant biliary strictures. ERCP can easily missed microlithiasis and sludge. IDUS is the most accurate for the detection of small CBD stones in patients with biliary pancreatitis. Another advantage of IDUS is the evaluation of filling defects on cholangiogram.

Peroral cholangioscopy (POC)

POC provides direct endoscopic visualization of the biliary tree for many novel diagnostic and therapeutic procedures. The currently available techniques of POC include the “Mother-baby” scope system, single operator cholangioscopy
(SOC) by SpyGlass direct visualization system, and direct peroral cholangioscopy (DPOC) by use of a regular ultra-slim upper endoscope. Traditionally, POC can be performed using a mother-baby endoscopic system. But, the currently available “Mother-baby” scope system is not widely used due to several disadvantages. Recently, there are remarkable developments in this technology to regain interests in cholangioscopy. Direct peroral cholangioscopy (DPOC) using a regular ultra-slim upper endoscope can be changing this limitation as a valuable and economic solution for evaluating bile-duct lesions. The main diagnostic indications for DPOC are visual characterization and optically guided target biopsies for indeterminate bile duct lesions or filling defects. Enhanced endoscopy with narrow-band imaging (NBI) can be performed easily with DPOC with ultra-slim upper endoscope. NBI shows detailed images of the surface structure and of the mucosal microvessels of biliary lesions. However, blood or bile juice can interfere with NBI observation. Still, there is no slim endoscope having magnification function to exact NBI study. Computed virtual chromoendoscopy, such as i-scan, can be the good alternative for NBI, because these are less affected by the bile or blood. Tissue sampling using a large working channel and under direct visualization is a major advantage of DPOC.

1. Single operator cholangioscopy (SOC) by SpyGlass direct visualization system

With recent remarkable developments technology, single operator cholangioscopy system is available. SpyGlass POC system provides endoscopic visualization with tissue sampling, and facilitated stone fragmentation. The recent report from international, multicenter study shows highly clinical impact to managing biliary tract lesion with high success rates. Study for diagnostic accuracy of forceps biopsy on SOC for indeterminate biliary strictures give us an important message because tissue sampling under direct visualization can significantly improve the accuracy of forceps biopsy for biliary stricture. However, limitations like cost-effectiveness, and inferior image quality should be overcome. So, we are expecting next generation, SOC system with many functions.

2. Direct peroral cholangioscopy (POC)

Direct POC using an regular ultra-slim upper endoscope has been proposed as one of a single operator systems for the direct endoscopic examination of the biliary tree. The advantage of Direct POC using an ultra-slim endoscope is operated with conventional endoscopy equipment and set up by single endoscopist, and the superior image quality for biliary tree. Furthermore, a larger 2-mm working channel of an ultra-slim endoscope can facilitate the diagnostic procedures by a broader array of devices in patients with various biliary diseases and conditions. Tumor ablation therapy, such as photodynamic therapy, and argon plasma coagulation may be also performed using direct POC. Patients with a grossly dilated common bile duct (CBD) having adequate opened ampullary orifice are suitable for direct POC with these slim endoscope. Large loop formation within the gastric fundus or the deep portion of the duodenum hinders advancement of slim endoscope into the biliary tree. Therefore, specialized accessories are needed to advance ultra-slim endoscopes into the proximal biliary system and to improve the success rate of direct POC. Direct POC using intraductal 5 F balloon catheter, which can be anchored and fixed via ballooning within a branch of the IHD or proximal portion of strictured segment, reported as most useful to advance an endoscope into the biliary tree. Further development of a more appropriate accessory and dedicated slim endoscope for this purpose is required to improve the interventional performance of direct POC.

Conclusions

Instruments for intraluminal biliary endoscopy have evolved to single operator system and IDUS. Several recent developments including direct POC control using an ultra-slim upper endoscope are changing the limitations of current chol-
angioscopy system. Recent developments in endoscopy have provided new options for IDUS and POCS. We can use this system to detect early bile duct cancer precisely for the proper management. Further developments of the endoscope and specialized accessories or devices are expected to facilitate the role of endoscopic procedure for biliary lesions including filling defect.

References