Peroral cholangioscopy–guided probe-based confocal laser endomicroscopy for preoperative diagnosis of pancreatic cancer in a patient with surgically altered anatomy

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A 79-year-old man was referred to our hospital because of jaundice. He had previously undergone Billroth-II gastrectomy for gastric cancer. Contrast CT showed a mass lesion in the pancreatic head with contrast effects and invasion of the distal bile ducts (Fig. 1). Additionally, ERCP was performed to obtain more detail.

Because of the patient’s prior gastrectomy, ERCP was performed with a short-type single-balloon enteroscope, SIF-H290S (Olympus Medical Systems, Tokyo, Japan) with a working length of 152 cm and channel diameter of 3.2 mm. Cholangiography showed a defect in the distal bile duct (Fig. 2). The procedure was then completed with fluoroscopy-guided biopsy of the bile duct. However, the size of the biopsy sample was insufficient to enable a conclusive diagnosis.

ERCP was performed again 2 weeks later (Video 1, available online at www.VideoGIE.org). With the aim of improving diagnostic ability, a CF-H260AI colonoscope (Olympus Medical Systems Corporation, Tokyo, Japan) with a working length of 133 cm and channel diameter of 3.7 mm was used to perform peroral cholangioscopy (POCS) guided by SpyGlass DS (Boston Scientific Corp, Marlborough, Mass, USA) fluorescein-dripping probe-based confocal laser endomicroscopy (pCLE)1,2 (CholangioFlex, Cellvizio; Mauna Kea Technologies, Inc, Paris, France) and POCS-guided biopsy.

When the papilla was reached, it was possible to insert the cholangioscope inside the bile duct. Both findings suggested cancer, with POCS showing an irregular, hemorrhagic, papillary protrusion lesion, and pCLE showing a dark ductal structure with irregular margins (Fig. 3A-C). POCS confirmed that the bile ducts at nonlesion sites had normal mucosa, and pCLE showed a reticular network of thin, dark, branching bands,3,4 considered to be normal (Fig. 4A-C). POCS-guided biopsies were performed at both lesion and nonlesion sites.

In contrast to the initial fluoroscopy-guided biopsy performed with ERCP (Fig. 5A, B), a sample of sufficient size was collected by the POCS-guided biopsy. The biopsy samples contained atypical cells with hyperchromatic nuclei and eosinophilic cytoplasm. Similarly to the pCLE findings, these formed a ductal structure with irregular margins.

Figure 1. Contrast CT of the abdomen showing a mass with contrast effects in the distal bile duct (pink arrow).

Figure 2. Cholangiographic view of the lesion showing a defect in the distal bile duct (pink arrow).
The nuclei showed marked variations in size, irregular morphology, and irregular arrangement, indicating adenocarcinoma (Fig. 5C, D).

Biopsy specimens from normal bile ducts showed no malignancy. Therefore, a preoperative diagnosis of pancreatic cancer was made, and pancreatoduodenectomy was performed. The histopathologic findings from the surgical samples were similar to those from the POCS biopsy tissue samples, and irregular, invasive proliferation by atypical bile ducts with eosinophilic cytoplasm was found, confirming pancreatic cancer (Fig. 6A, B).

In patients with Billroth-II gastrectomy, it is common to use a forward-viewing endoscope like the single-balloon enteroscope we used initially in this case. The absence of an elevator makes adjusting angles on devices difficult, and in the present case, this restriction resulted in an insufficient biopsy sample size. However, POCS enabled angle adjustment of the cholangioscope itself inside the bile duct, which was highly effective for pCLE and biopsy. In fact, exact pCLE findings were possible with this method, and we were able to obtain a sufficiently large biopsy sample by POCS-guided biopsy.

Sensitivity and specificity for malignancy based on visual findings of cholangioscopy were 90% and 95.8%, respectively, although accuracy for the combination of ERCP and pCLE was significantly higher in comparison with ERCP and tissue acquisition (90% vs 73%; P = .001). Furthermore, a prospective multicenter international study showed that pCLE provided a more accurate and sensitive diagnosis of cholangiocarcinoma than did tissue sampling alone. Although the neoplastic changes were seen on cholangioscopy alone in this case, pCLE is more reliable because real-time microscopic images of the bile duct tissue are seen and can be expected to increase the accuracy.
Our experience with using POCS-guided pCLE to diagnose cancer in a patient with surgically altered anatomy may improve the efficacy of diagnosis in such patients with surgically altered anatomy.

**DISCLOSURE**

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