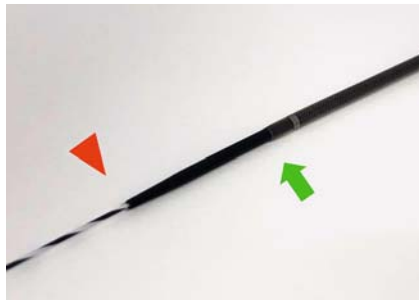


Novel sheath device for pancreatic biopsies in intraductal papillary mucinous carcinoma with parenchymal invasion

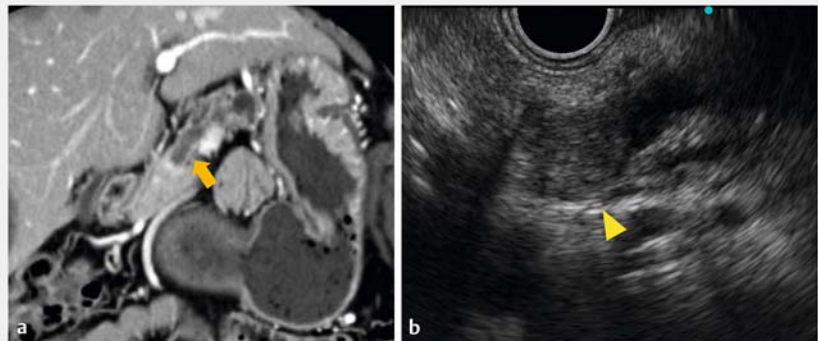


► **Fig. 1** This device has an inner catheter with a tapered tip (red arrowhead) and an outer sheath (green arrow).

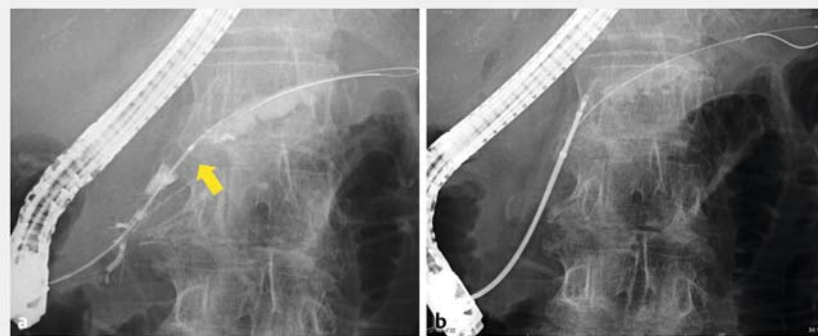
Preoperative evaluation of intraductal papillary mucinous carcinoma is challenging because “high-risk stigmata” in international guidelines are not always malignant [1]. Surgery is strongly recommended if pancreatic parenchymal invasion can be confirmed histologically [2]. Transpapillary biopsy for intraductal papillary mucinous neoplasms improves diagnostic yields [3]; nonetheless, it is difficult to diagnose parenchymal invasion on small biopsy specimens and the pancreatitis risk due to the repeated insertion of biopsy forceps into the main pancreatic duct cannot be ignored.

The novel sheath device (Endosheather; Piolax, Kanagawa, Japan) consists of a tapered inner sheath, and an outer sheath (► **Fig. 1**). Biopsy forceps can be advanced through the outer sheath, and specimens can be repeatedly obtained without papillary injury from repeated forceps insertions.

A 78-year-old woman was referred for main pancreatic duct dilation detected using computed tomography (► **Fig. 2a**). Endoscopic ultrasonography revealed a hypoechoic papillary tumor (16mm) in the main pancreatic duct of the pancreatic head (► **Fig. 2b**). Endoscopic retrograde cholangiopancreatography was performed to biopsy the tumor. Following the insertion of a guidewire into the main pancreatic duct, an intraductal pan-



► **Fig. 2 a** Computed tomography revealed an enhanced intraductal papillary tumor with main pancreatic duct dilation from the pancreatic body to the tail (arrow). **b** A hypoechoic papillary tumor in the main pancreatic duct was detected through endoscopic ultrasound (arrowhead).

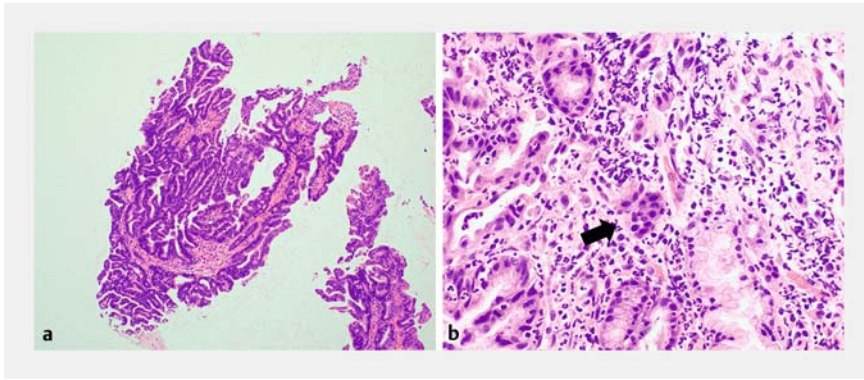


► **Fig. 3 a** An intraductal pancreatic tumor was detected via pancreatography (arrow). **b** Forceps were advanced into the main pancreatic duct through the novel sheath device to obtain tumor tissues.

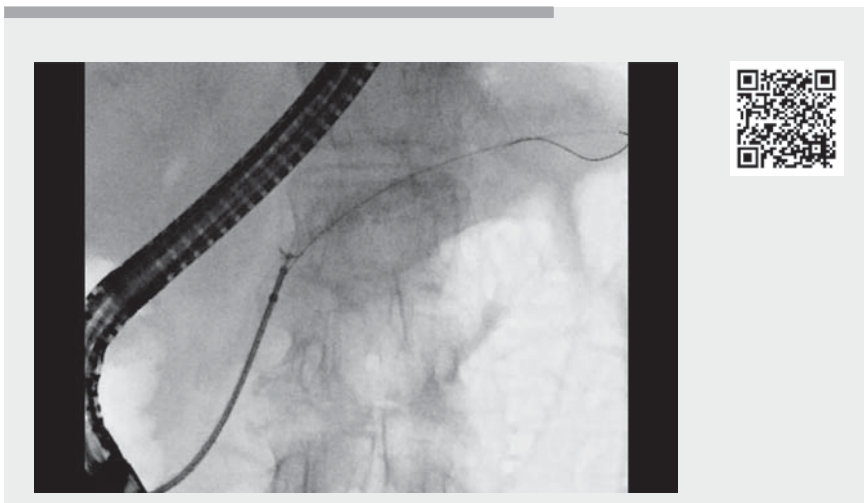
creatic tumor was detected through pancreatography (► **Fig. 3a**). A novel sheath device was inserted over the guidewire, and forceps (Radial Jaw 4 Pediatric Biopsy Forceps; Boston Scientific, Marlborough, Massachusetts, USA) were inserted into the main pancreatic duct through the sheath device to obtain the tumor specimen (► **Fig. 3b**). Finally, we obtained substantial tissue samples by performing three biopsies and placed a 6-Fr endoscopic nasopancreatic drainage tube (► **Video 1**). No adverse events were re-

ported. Histologically, the specimen was diagnosed as intraductal papillary mucinous carcinoma with invasion of the pancreatic parenchyma (► **Fig. 4**), and a pancreaticoduodenectomy was scheduled. This novel sheath device is useful for obtaining substantial intraductal tissue samples without causing papillary edema due to the frequent insertion of biopsy forceps (► **Video 1**).

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► **Fig. 4** **a** Histopathological examination showed atypical glands with irregular papillary and villoglandular structures lined with columnar epithelium. **b** Tumor cells spread into the stroma of the pancreas (arrow).




► **Video 1** We successfully obtained considerable tissue samples of intraductal papillary mucinous carcinoma with pancreatic parenchyma invasion using the novel sheath device.

Competing interests

The authors declare that they have no conflict of interest.

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