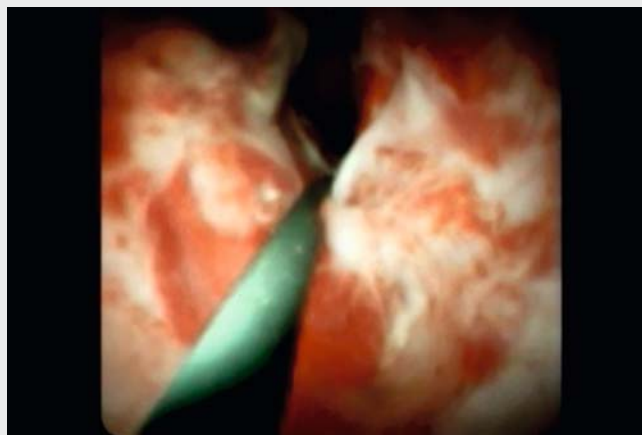


Intraoperative SpyGlass to determine extension of pancreatic resection in main duct intraductal papillary mucinous neoplasm associated with pancreas divisum

The International Association of Pancreatology recommends that main duct intraductal papillary mucinous neoplasm (IPMN) be treated with partial pancreatectomy [1] if surgical margins are negative for high-grade dysplasia (HGD) and invasive carcinoma, avoiding total pancreatectomy [2]. However, it is difficult to determine the exact margins of resection during duodenopancreatectomy for main duct IPMN. The latest guidelines recommend SpyGlass to obtain precise measures of margin extension before surgery [1].

The patient was an asymptomatic 63-year-old man. Routine ultrasound showed main duct dilatation (6 mm), and magnetic resonance imaging (MRI) showed pancreas divisum with signs of chronic pancreatitis. The patient's main duct dilatation evolved from 6 mm to 32 mm at 2 years of follow-up (► Fig. 1). Imaging exams confirmed the diagnosis of IPMN, and duodenopancreatectomy was proposed. The MRI left doubt about the resection margin, and SpyGlass was indicated. A bulging papilla with mucoid secretion was observed (► Fig. 2), and pancreatic sphincterotomy was performed to improve SpyGlass access (► Fig. 3). Tissue fragments were obtained and revealed HGD at the pancreatic tail (► Fig. 4). Total pancreatectomy was uneventful and the patient was discharged after 7 days with blood glucose levels stabilized by insulin (► Video 1).

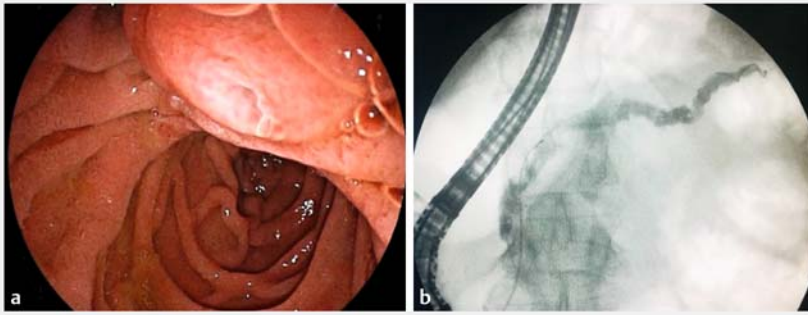
The biopsies revealed the presence of HGD, and it was not necessary to perform the section of the margins to be frozen during surgery. However, one limitation of SpyGlass is the diameter of the main duct, which needs to be dilated (>5 mm) once the diameter of the Spy-scope is 3.46 mm [2]. In this case, be-



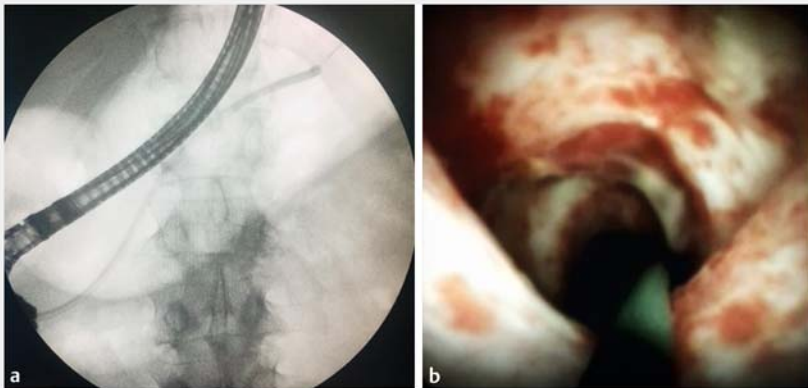
► **Video 1** SpyGlass was used intraoperatively to determine extension of pancreatic resection in main duct intraductal papillary mucinous neoplasm associated with pancreas divisum. Total pancreatectomy was ultimately performed and patient course was uneventful.



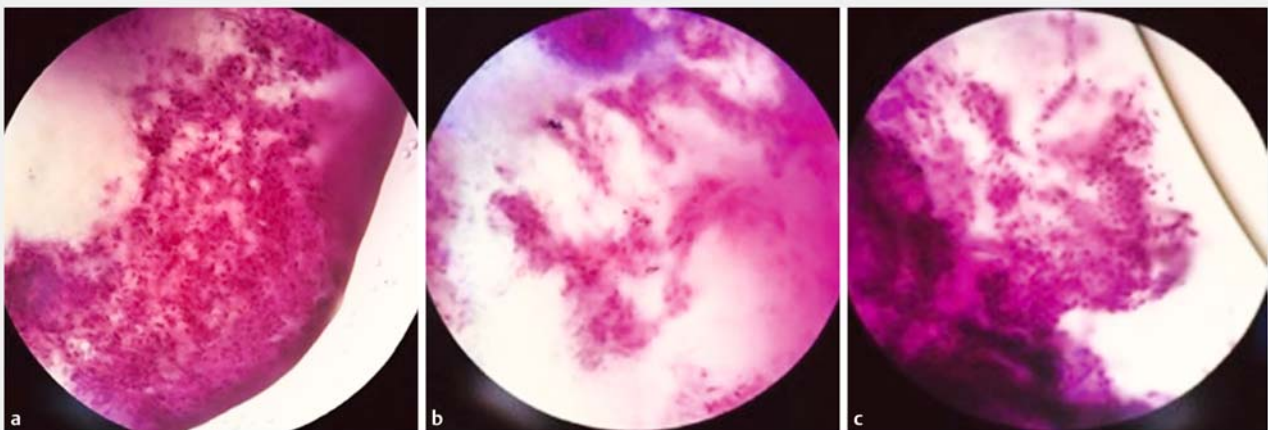
► **Fig. 1** Serial images of magnetic resonance cholangiopancreatography (MRCP). Note the diffuse enlargement of the main pancreatic duct, particularly enhanced at the pancreatic head. Dorsal main pancreatic duct drains to the minor duodenal papilla. **a, b, c** MRCP revealed chronic pancreatitis associated with pancreas divisum. **d** The image suggested a main duct intraductal papillary mucinous neoplasm located at the pancreatic head.



► **Fig. 2** **a** Endoscopic image of the duodenal papilla with eruption of mucoid secretion. **b** Pancreatography revealing defective filling of the pancreatic head and main pancreatic duct tortuosity with guidewire positioned on the pancreatic tail.



► **Fig. 3** **a** Fluoroscopy image of SpyGlass positioned on the pancreatic tail. **b** Internal view of main pancreatic duct obtained by SpyGlass with altered vascularization and diminutive mucous membrane projections.



► **Fig. 4** Hematoxylin and eosin stain images of fragments obtained with SpyGlass, seen as pancreatic head (**a**), body (**b**) and tail (**c**) Spybites. All revealed presence of high-grade dysplasia (HGD).

cause the main duct measured 5 mm, a direct view of the pancreatic tail was possible while biopsies were performed. Recent studies have shown SpyGlass to be a useful diagnostic and therapeutic tool in biliary diseases [3], but to the best of our knowledge, it is the first time it has been used in main duct IPMN with full pancreas examination to obtain direct visual images, perform biopsies, and safely change from a duodenopancreatectomy to a total pancreatectomy.

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Competing interests

The authors declare that they have no conflict of interest.

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