Preliminary study of single-operator cholangioscopy for diagnosing pancreatic cystic lesions

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Background and Aims: Advances in imaging technology have improved the annual detection rate of pancreatic cystic lesions (PCLs), but the preoperative diagnosis of PCLs remains unclear. Thus, the usefulness of single-operator cholangioscopy (SOC) as a diagnostic imaging tool for PCLs is worth investigating. We performed an intracystic visual examination of PCLs using SOC to determine the diagnostic value of SOC for PCLs.

Methods: In this retrospective observational study, PCLs were confirmed using a diagnostic imaging modality. Patients who underwent an EUS-guided through-the-needle fiberoptic pancreatic cystoscopy and SOC examination and those whose lesion type was definitively diagnosed were included (n = 43). If the cystic fluid was turbid, a physiologic saline solution was injected into the cyst, and a SOC fiberoptic probe was inserted through a 19-gauge needle to observe the wall of the intracystic cavity and its contents. The characteristics were recorded, and the cystic fluid and biopsy specimens were further assessed by performing liquid-based cytologic and histopathologic examinations. Particularly, histopathologic examinations were performed in patients who underwent surgery.

Results: Intracystic characteristics of the confirmed cases of PCLs (43 patients) were identified through intracystic visual examination with SOC. The clarity of cyst fluid is a prerequisite for imaging by SOC. The tree-like branching pattern of blood vessel distribution may be a serous cystic neoplasm–specific characteristic. Intracystic papilla-like structure is an important characteristic for diagnosing mucinous cystic neoplasms.

Conclusions: The identified imaging characteristics such as blood vessel distribution on the intracystic wall and the contents of different PCLs observed under the SOC probe can provide useful information for diagnosing PCLs. SOC could be an important ancillary imaging test of PCLs by EUS.

Pancreatic cystic lesions (PCLs) are cystic or solid pancreatic space-occupying lesions observed on imaging studies. The incidence rate of PCLs reportedly ranges from .7% to 24.3%,[1-3] and it increases with age.[2] Depending on the lesion characteristics, the clinical treatment options for PCLs mainly include follow-up observation, surgery, and cyst ablation.

Abbreviations: CEA, carcinoembryonic antigen; IPMN, intraductal papillary mucinous neoplasm; MCN, mucinous cystic neoplasm; MRI, magnetic resonance imaging; PCL, pancreatic cystic lesion; SCN, serous cystic neoplasm; SOC, single-operator cholangioscopy; TTNFPC, through-the-needle fiberoptic pancreatic cystoscopy.

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The different types of PCLs are benign, potentially malignant, and malignant, with mucinous cystic lesions having a greater probability of occurrence. Hence, establishing a comprehensive preoperative diagnostic and evaluation system would provide guidance regarding treatment decisions. However, presently, the preoperative diagnosis of PCL remains a clinical issue. In cases of cystic lesions with unclear characteristics, especially small cystic lesions, patients are often advised to undergo follow-up observation to avoid unnecessary treatments. However, a small possibility of malignancy may still engender a significant psychological burden for patients, in addition to the risk of treatment delay.

CT and magnetic resonance imaging (MRI) are currently the most commonly used diagnostic modalities for diagnosing PCLs. However, these modalities have lower diagnostic accuracies. As physicians differentiate the various types of lesions based on experience, the use of CT and MRI poses a greater limitation in distinguishing between mucinous and nonmucinous PCLs.[4,5]

Case reports have described the observation of pancreatic pseudocysts by using single-operator cholangioscopy (SOC; Spyglass; Boston Scientific, Boston, Mass).[6,7] However, studies on the use of SOC as a diagnostic tool for

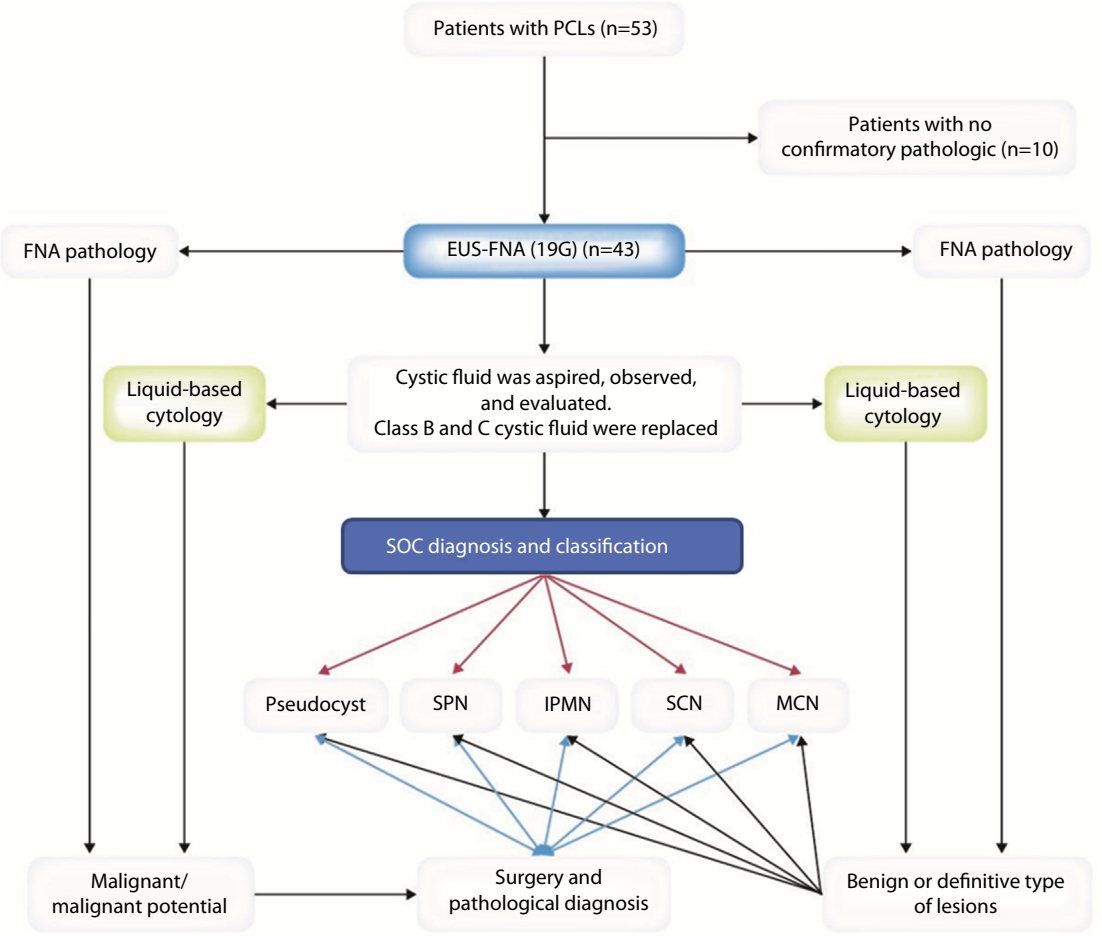

Figure 1. Study flow chart. *PCLs*, Pancreatic cystic lesions; *SOC*, single-operator cholangioscopy; *SPN*, solid pseudo-papillary neoplasm; *IPMN*, intraductal papillary mucinous neoplasm; *MCN*, mucinous cystic neoplasm; *SCN*, serous cystic neoplasm.

PCLs are relatively rare. The present study performed EUS-guided through-the-needle fiberoptic pancreatic cystoscopy (TTNFPC) on PCLs and visual examination by using a SOC fiberoptic probe, which was inserted in the pancreatic cyst through a puncture needle to identify the imaging characteristics of different PCLs, and to assess the diagnostic value of the SOC system in clinical applications.

METHODS

From April 2015 to May 2016, 53 patients were diagnosed as having PCLs (mucinous and nonmucinous cystic lesions) with cyst diameters >1 cm by using imaging modalities. Of these patients, 10 were excluded from the study because the pathologic diagnosis could not be confirmed. The remaining 43 patients who underwent EUS and TTNFPC were included in this study (Fig. 1, Table 1). The pathologic diagnosis was made based on the postoperative surgical pathology, FNA pathology, and cystic fluid cytology results. All patients provided written informed consent to participate in this study. The study protocol was approved by the Ethics Committee of Chinese PLA General Hospital.

EUS and TTNFPC procedures

Examinations were performed by using a US system (Prosound F75; Aloka, Tokyo, Japan) and an endoscopy system (CV-290 and CLV-290SL; Olympus, Tokyo, Japan). The cystic cavities of the PCLs were accessed, cystic wall or partitions were punctured to obtain tissue samples, and cystic fluid was aspirated with a 19-gauge needle (Boston Scientific) under EUS guidance (GF-UCT260; Olympus) to avoid blood vessels at the puncture site. The color and turbidity of the cystic fluid were observed, and a liquid-based cytologic study was performed. If the cystic fluid was turbid, a physiologic saline solution was used to replace the remaining cystic fluid until the intracystic liquid became clear. A SOC fiberoptic probe (SpyGlass 4603, SpyGlass Lightsource 4619, and SpyGlass Camera 4610; Boston Scientific) was inserted into the cystic cavity through the puncture needle to observe the intracystic wall and contents. The aspirated cystic fluid was examined for