Technical feasibility, diagnostic yield, and safety of microforceps biopsies during EUS evaluation of pancreatic cystic lesions (with video)

Chetan Mittal, MD,[1] Joshua C. Obuch, MD, MSc,[1] Hazem Hammad, MD,[1] Steven A. Edmundowicz, MD,[1] Sachin Wani, MD,[1] Raj J. Shah, MD,[1] Brian C. Brauer, MD,[1] Augustin R. Attwell, MD,[1] Jeffrey B. Kaplan, MD,[2] Mihir S. Wagh, MD[1]

Denver, Colorado, USA

Background and Aims: Through-the-needle microforceps are a recent addition to the EUS armamentarium for evaluation of pancreatic cystic lesions (PCLs). The main aim of this study was to assess the technical feasibility, diagnostic yield, and safety of EUS-guided microforceps biopsy for PCLs.

Methods: Our electronic endoscopy database was queried to identify patients who underwent EUS-guided FNA (EUS-FNA) of PCLs and microforceps biopsies during the same procedure. A biopsy was done on the wall of the cyst with the microforceps through the 19-gauge needle, and cyst fluid was collected for cytology and carcinoembryonic antigen (CEA) levels. Adverse events were recorded per published American Society for Gastrointestinal Endoscopy criteria.

Results: Twenty-seven patients underwent EUS-FNA and microforceps biopsy of PCLs from February 2016 to July 2017. Fourteen cysts were located in the pancreatic head and/or uncinate, and 13 were located in the body and/or tail region. Microforceps biopsies were technically successful in all cases and provided a pathology diagnosis in 24 of 27 cases (yield 88.9%). Microforceps biopsies diagnosed mucinous cyst in 9 patients (33.3%), serous cystadenoma in 4 (14.8%), neuroendocrine tumor in 1 (3.7%), and benign and/or inflammatory cyst in 10 (37.1%). In 7 patients (26%), microforceps biopsy results drastically changed the diagnosis, providing diagnoses otherwise not suggested by cytology or cyst fluid CEA levels. However, cytology provided a diagnosis of mucinous cyst in 4 cases (14.8%) not detected by microforceps biopsies. No adverse events were noted.

Conclusion: Microforceps biopsies were associated with high technical success, and an excellent safety profile and may be a useful adjunctive tool, complementing existing EUS-FNA sampling protocols for PCLs. (Gastrointest Endosc 2018;87:1263-9.)

(footnotes appear on last page of article)

The increased use of cross-sectional imaging over the last decade has resulted in increased detection of incidental pancreatic cysts.[1,2] Some of these incidentally found cysts may be associated with an overall increased risk of pancreatic adenocarcinoma and increased risk of mortality in patients younger than 65 years.[3] Different types of pancreatic cystic lesions (PCLs) are associated with varying degrees of malignant potential. The most common PCLs encountered in clinical practice are pseudocysts, serous cystadenomas (SCAs), mucinous cystic neoplasms, and intraductal papillary mucinous neoplasms.[4] Mucinous cystic neoplasms and intraductal papillary mucinous neoplasms have malignant potential, and are often referred to as mucinous cysts.

Not all pancreatic cysts seen on cross-sectional imaging need further evaluation or surgical resection. Concerning

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features like size >3 cm, the presence of a solid component, and dilated pancreatic duct increase the probability of malignancy.[5] International consensus guidelines recommend surgical resection for PCLs with high-risk stigmata including enhancing solid component and main pancreatic duct size ≥10 mm.[6] American Gastroenterology Association guidelines identify cyst size ≥3 cm, dilated pancreatic duct, and the presence of a mural nodule as high-risk features for malignancy.[7]

With varying degrees of malignant potential, accurate diagnosis of PCLs is pivotal for appropriate clinical management, by distinguishing PCLs with high-risk malignant potential that require surgery from those with low risk that can be managed conservatively with surveillance. Diagnostic evaluation of PCLs can be challenging, requiring a combination of radiologic imaging as well as EUS for morphologic characterization, cyst fluid cytology, and cyst fluid analysis.

Use of cyst fluid carcinoembryonic antigen (CEA), cytology, and amylase levels have had varying results in diagnosing PCLs. A CEA level of 192 ng/mL was found to be most optimal by using receiver operating characteristic curves, with a 75% sensitivity and 84% specificity for differentiating between mucinous and non-mucin producing cysts.[8] However, recent studies have found suboptimal accuracy of CEA in differentiating mucinous versus nonmucinous lesions with surgical pathology as the criterion standard,[9] suggesting a critical need for improved risk stratification of PCLs.

The overall sensitivity of EUS-guided FNA (EUS-FNA) for cytology is modest, although specificity is high. The combination of EUS morphology, cyst fluid analysis, and cytology increases sensitivity to 91% but with a reduced specificity than that of CEA level alone.[8] The lower diagnostic accuracy of these tests may be related to the difficulty of obtaining a histologic diagnosis without doing a surgical resection. Through-the-needle microforceps (Moray; US Endoscopy, Mentor, Ohio) are a recent addition to the EUS armamentarium. These microforceps are single-use miniature biopsy forceps, 230 cm long, with an outer diameter <1 mm, so the microforceps can be passed through a standard 19-gauge EUS needle. This allows histologic sampling of PCLs by obtaining biopsies of the cyst wall and/or mural nodules, which may improve diagnostic accuracy.

To date, scant data exist regarding the safety and diagnostic accuracy of microforceps biopsies for PCLs.[10,11] The main aim of our study was to assess the technical feasibility, diagnostic yield, and safety of microforceps biopsies for PCLs from a single-center experience.

METHODS

Patient selection

Our electronic endoscopy database was queried to identify patients who underwent EUS-FNA of PCLs and microforceps biopsies during the same procedure between December 2016 and June 2017. Cysts that were believed appropriate for FNA by the endoscopist, based on clinical presentation, size, radiologic imaging features, an associated solid mass or nodules and/or patient anxiety about the diagnosis underwent EUS-FNA and microforceps biopsy. Patients included in the study were not consecutive patients referred for EUS evaluation of PCLs, and the decision to perform a microforceps biopsy was based on endoscopist discretion. The study was approved by the University of Colorado Institutional Review Board. No financial support was received from the manufacturer of the microforceps, and none of the authors have any conflicts of interest with the company.

Data collection

Patient demographics, clinical history, radiologic imaging, endoscopy reports, cytology and pathology results, cyst fluid analysis, and pertinent clinical encounters were reviewed. Follow-up data were obtained from clinical encounters and/or telephone calls after the procedure to discuss pathology results. Also, all patients were given the on-call Interventional Gastroenterology Service contact information to call after their procedures in case they developed concerning symptoms. In addition, patients were contacted by telephone to confirm lack of adverse events. Adverse events were recorded per published American Society for Gastrointestinal Endoscopy criteria.[12] Continuous variables were reported as median and range. Categorical variables were summarized as frequency and percentage.

Aims

The aims of the study were to assess the technical feasibility, diagnostic yield, and safety of EUS-guided microforceps biopsies of PCLs.

Definitions

Technical feasibility was defined as the ability to puncture the cyst with the 19-gauge needle under EUS guidance, advance the microforceps into the cyst, and perform cyst biopsies.

Diagnostic yield was defined as the ability to obtain a pathology tissue diagnosis of the PCL with microforceps biopsies.

Safety was assessed by recording adverse events per published American Society for Gastrointestinal Endoscopy criteria.[12]

Procedure description

Five experienced endosonographers performed all EUS procedures. Prophylactic antibiotics (ampicillin-sulbactam 3 g or ciprofloxacin 500 mg intravenous) were administered to all patients before needle puncture of the cyst and for 3 to 5 days after the procedure (amoxicillin-clavulanate or ciprofloxacin orally).

A detailed endosonographic examination of the cyst was performed by using a curvilinear array echoendoscope