

Endoscopic ultrasound guided confocal microscopy: Atlas of cystic pancreatic lesions

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INTRODUCTION

Confocal endomicroscopy is an emergent technique and allows real optical biopsies in the gastrointestinal (GI) tract. The aim of this study was to evaluate a new intra-tumoral confocal mini-probe under endoscopic ultrasound (EUS) guidance in patients with cystic pancreatic tumors. The primary goal of this study was to develop descriptive image interpretation criteria and a classification of EUS-confocal microscopy (CM) findings in pancreatic cystic lesions (PCL) through a review of prospectively obtained EUS-CM videos from proven malignant and benign cases, and to propose diagnostic criteria to differentiate serous than mucinous lesions. Informed consent was obtained for all patients included in this study.

TECHNIQUE

The material used was a 19G EUS-needle (Cook-endoscopy) in which the stylet was replaced by the confocal mini-probe (Cellvizio Technology, Mauna-Kea Company-France). The mini-probe preloaded in the EUS-needle was guided endosonographically in the target then the mini-probe was pushed under EUS guidance into the cystic lesion. The intra-tumoral CM examination started after injection of 2.5 mL of fluorescein intravenously.

RESULTS AND DESCRIPTIONS OF THE ENDOSCOPIC ULTRASOUND-CONFOCAL MICROSCOPY IMAGES

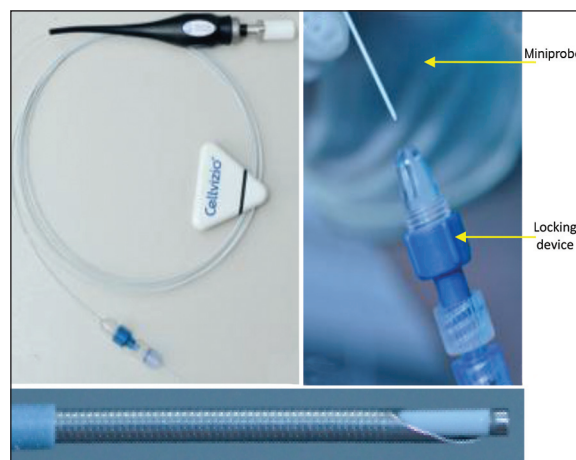
Normal pancreatic tissue

Normal pancreatic tissue appears like “coffee bean” which are the normal acini as round and black area surrounding by normal vessels. Multiple nuclei could be seen at the periphery of the cell. More rarely CM showed in normal pancreatic tissue a very large black cell which corresponds at the islet cell. The periphery of the pancreatic capsula is composed by vessels and adipocytes.

Serous cystadenoma

Endoscopic ultrasound-CM showed ultra-thin straight bright grey bands in the serous cystadenoma and more specific is the vascular network of branch vessels, which was present in around 70% of serous cystadenoma. This sign is highly specific of a serous cystadenoma.

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	DOI: 10.4103/2303-9027.129481

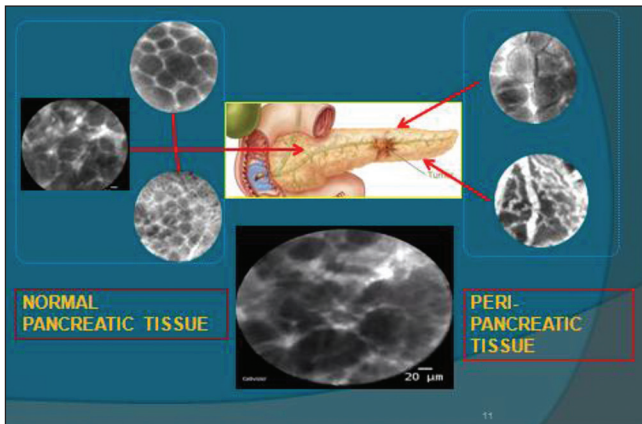


Probe of endoscopic ultrasound-confocal microscopy: AQ-FLEX

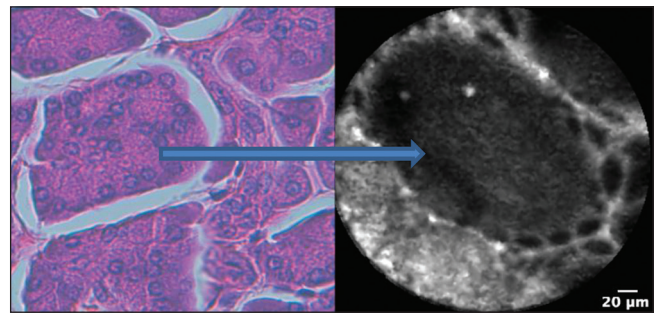
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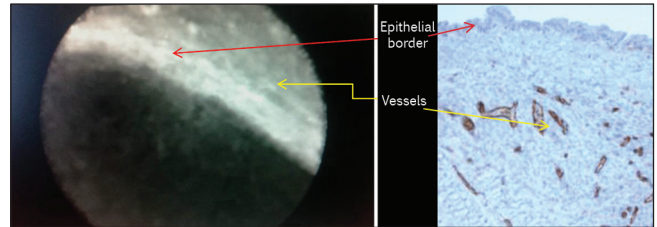
Received: 2014-03-13; Accepted: 2013-03-17



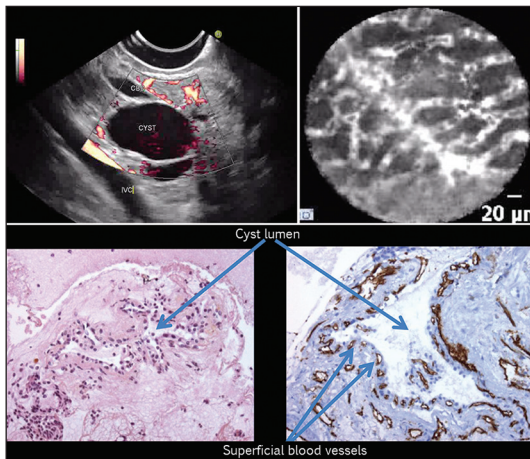
Normal pancreatic and peri-pancreatic structures



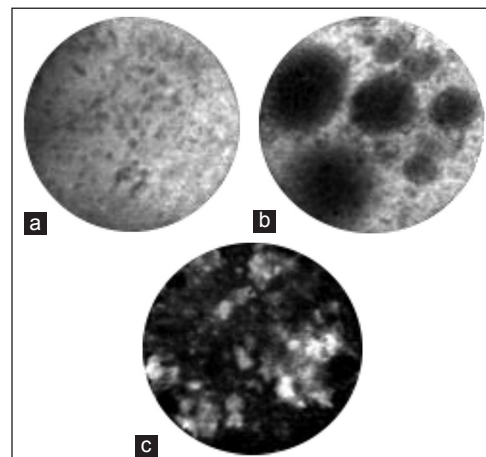
Normal acini: "Coffee bean aspect"



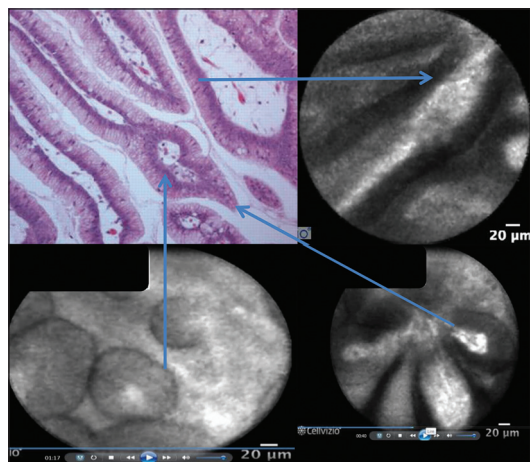
Mucinous cystadenoma: "Large white band with rare vessels"



Serous cystadenoma: Vascular network of branch vessels



Pancreatic pseudo-cyst: (a) Small black floating particles; (b) Large dark round homogeneous floating structures; (c) Heterogeneous-sized bright particles (which are Macrophages)



Intraductal papillary mucinous neoplasms intestinal type: "Finger like projections" intestinal papillae

Mucinous cystadenoma

Mucinous cystadenoma is represented in CM by a large white band with very rare vessels. Vessels are deeper in the ovarian like stroma than the vessels of the serous cystadenoma which are much closed to the cystic lumen.

Intraductal papillary mucinous neoplasms (IPMN)

Benign IPMN was characterized by the aspect of finger like projections, which correspond to the villous changes of intestinal IPMN type. Benign IPMN was also characterized by the presence of regular vessels and an aspect of dark clumps with a neovascularization and large vessels (>20 μ of diameter) in the malignant IPMN.

Pseudo-cyst

Confocal microscopy in pseudocyst showed three types of structures:

1. Small black floating particles
2. Large dark round homogeneous floating structures and

3. Heterogeneous-sized bright particles (which are macrophages).

DISCUSSION

Endoscopic ultrasound with fine-needle aspiration of PCL is flawed by inadequate diagnostic yield. Needle-based confocal laser endomicroscopy (nCLE) utilizes a sub-millimeter probe that is compatible with an EUS-needle and enables real-time imaging with microscopic detail of PCL. A recent paper showed in a total of 66 patients who underwent nCLE imaging that images were available for 65, 8% of cases. The presence of epithelial villous structures based on nCLE was associated with pancreatic cystic neoplasms (PCN) ($P = 0.004$) and provided a sensitivity of 59%, specificity of 100%, positive predictive value of 100%, and negative predictive value of 50%. The overall complication rate was 9% and included pancreatitis (one mild case, one moderate case), transient abdominal pain ($n = 1$), and intracystic bleeding not requiring

any further measures ($n = 3$). Eight referral centers performed nCLE in patients with PCL. Stage 1 defined descriptive terms for structures visualized by an offline, unblinded consensus review. Cases were reviewed with a GI pathologist to identify correlations between histology and nCLE. Stage 2 assessed whether the specific criteria defined in Stage 1 could identify PCN including IPMN, mucinous cystic adenoma, or adenocarcinoma in an offline blinded consensus review. These preliminary data suggested that nCLE has a high specificity in the detection of PCN.

CONCLUSION

Endoscopic ultrasound-CM can distinguish mucinous than serous cystadenoma, this small atlas will help the endosonographers which started this new technique.

How to cite this article: Giovannini M, Caillol F, Lemaistre A, Monges G, Napoleon B, Pujol B. Endoscopic ultrasound guided confocal microscopy: Atlas of cystic pancreatic lesions. *Endosc Ultrasound* 2014;3:S19-S21.

Source of Support: Nil. **Conflict of Interest:** None declared.