

Endoscopic ultrasound-guided confocal endomicroscopy requires high-quality imaging and interpretation for diagnostic evaluation of pancreatic cystic lesions



The needle-based confocal endomicroscopy (nCLE) probe was first approved by the Food and Drug Administration (FDA) in 2013. In a “white paper” published by the American Gastroenterology Association, competency-based training of novel endoscopic imaging techniques was emphasized compared to the traditional volume-based model of procedures [1]. We define competency as the ability to recognize diagnostic image patterns in nCLE. Only with familiarity of these patterns, can the endoscopist acquire them during the procedure. While competency needs to be achieved before physicians start enrolling patients in a prospective study, image acquisition quality also needs to be continually monitored during the study process to evaluate the learning curve and detect any potential deficiencies.

In the study by Keane et al., a prospective trial of CONfocal endomicroscopy in CYSTic lesions of the pancreas (CONCYST), there is concern regarding the images demonstrated in their **Fig. 1** [2]. The interpretation of study results and less than superior diagnostic accuracies in the evaluation of pancreatic cystic lesions are hence questioned. The representative images of intraductal papillary mucinous neoplasm (IPMN), serous cystadenoma (SCA), and pseudocyst do not appear to be accurate. High-quality imaging during EUS-guided needle-based confocal endomicroscopy (EUS-nCLE) is critical before realizing the diagnostic accuracies of these novel investigative modalities. Moreover, accurate interpretation of nCLE images is also equally important.

The nCLE images are broadly classified into epithelial and vascular patterns [3,4]. The following are the four major studies evaluating EUS-nCLE.

(i) The INSPECT study [5] (2013). This was the first multicenter study that included 66 patients from eight centers in

the US and Europe. This trial focused on the characterization of IPMNs. EUS-nCLE revealed papillary structures that were IPMNs (sensitivity of 59%, specificity of 100%, and accuracy of 71%). The overall complication rate was 9%.

(ii) The DETECT study [6] (2015). This single center US study showed improved diagnostic parameters. EUS-nCLE had a sensitivity of 80%, specificity of 100%, and accuracy of 89% for the diagnosis of IPMNs.

While the INSPECT and DETECT studies had lower sensitivity, the next two trials revealed higher sensitivity mostly due to discovery of image patterns in SCAs, and mucinous cystic neoplasms (MCNs).

(iii) The CONTACT study [4,7] (2018). This multicenter European study defined novel diagnostic patterns for SCAs, MCNs, and cystic neuroendocrine tumors; hence, the diagnostic parameters were much improved for detecting premalignant pancreatic cystic lesions (PCLs) (sensitivity 91%, specificity 95%, accuracy 94%).

(iv) The INDEX study [3,8,9] (2019). This single center US study compared in vivo and ex vivo CLE to surgical histopathology. For diagnosing premalignant mucinous PCLs, the sensitivity, specificity, and accuracy were 98%, 94%, and 97%, respectively. This study, thus far, had the highest number of patients with definitive surgical histopathology (n = 65) [9].

While earlier EUS-nCLE studies revealed lower sensitivity, the more recent trials have demonstrated improving diagnostic accuracies with the discovery of additional image patterns. Future clinical trials evaluating EUS-nCLE should emphasize the acquisition of high-quality images by implementing physician training and have periodic assessments on competency.

Competing interests

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