

Optical Biopsy by Probe-based Confocal Laser Endomicroscopy Drives Decision for Timely Endoscopic Submucosal Dissection

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1. Technology Review

Probe-based Confocal Laser Endomicroscopy (pCLE) is a new method that provides microscopic views of the mucosa. Images are obtained by scanning the mucosal surface with a low power laser light that is passed through a fiber optic bundle. This technology makes it possible to image individual cells and tissue architecture, allowing the endoscopist to make a diagnostic assessment of the histology real-time, *in vivo*. Endoscopic Submucosal Dissection (ESD) is a technique at early stages of adoption in the US developed for en block resection of large mucosal and submucosal tumors.

2. Case Report

A 62-year-old woman in good health who had a 3 cm duodenal adenoma was referred to Winthrop hospital for evaluation. On endoscopy, a central depressed area was noted. The endoscopic differential diagnosis included "scarring" caused by the prior endoscopic biopsies versus a more advanced histology such as carcinoma (Figure 1). High-frequency probe EUS (HFEUS) excluded a deeply invasive (T2, T3 carcinoma) or suspicious paratumoral lymph nodes (Figure 2). However, HFEUS has been shown to be inadequate for the detection of T1 carcinoma with subtle submucosal invasion. Therefore, pCLE was used to exclude T1 carcinoma and optical biopsies revealed images very suggestive of adenoma in the depressed area (Figure 3). Based on these findings, an endoscopic resection of the adenoma with curative intent was performed. After "lifting" of the lesion by saline injection, it was noted that the depressed area of the lesion was lifting poorly, confirming the presence of scarred tissue, as suggested by pCLE. First, a standard snare EMR technique was used to remove the polypoid parts of the lesion, but the depressed area was flat, poorly lifting, and not amenable to snare resection. Therefore, a novel ESD technique was used in order to remove en block the flat, depressed, central part of the lesion. Figure 4 demonstrates the resection crater confirming an excellent complete resection. The resection specimen of the depressed area was submitted for histology separately, which confirmed the pCLE findings of adenoma with no evidence of carcinoma *in situ*, intramucosal carcinoma, or more advanced lesion histology (Figure 5).

3. Conclusion

Probe-based confocal laser endomicroscopy allowed real-time, low-risk, successful treatment of the patient. Had pCLE detected carcinoma, biopsies of the depressed area of the lesion would have been obtained in order to confirm this diagnosis and then the patient probably would have been referred for surgical resection. In this healthy young patient, endoscopic resection is not generally considered adequate for duodenal lesions containing any degree of carcinoma and would have subjected the patient to unnecessary risks of duodenal perforation and delayed bleeding.



Figure 1: Endoscopic view of the duodenal polyp

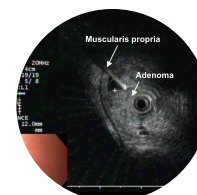


Figure 2: EUS visualization of the lesion

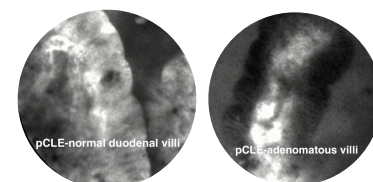


Figure 3: Findings of patches of thickened dark epithelium consistent with adenoma but no carcinoma findings

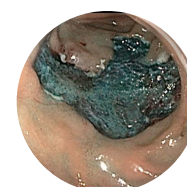


Figure 4: Endoscopic view of the EMR

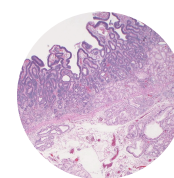


Figure 5: Histologic slide