Probe-based Confocal Laser Endomicroscopy and the **Decision to Perform 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.

Figure 1: Endoscopic view of the lesion



Figure 2: EUS visualization of the lesion





Figure 3: pCLE images of the lesion: a) non dysplastic BE b) BE with Low grade dysplasiac) BE with high grade dysplasia



Figure 4: En bloc resection



Based on pCLE images, this Barrett's patient was treated successfully and in real-time with the optimal technique for advanced mucosal lesions. Carcinoma cells within the epithelial layer revealed by pCLE, and later confirmed by physical biopsy, allowed, in real-time, selection of ESD as the more complete and appropriate treatment for this lesion.

2. Case Report

A 76-year-old woman with severe cardiac and pulmonary diseases and long-standing history of Barrett's esophagus had surveillance endoscopy with biopsy of a small, nodular area that revealed low grade dysplasia. The patient was referred to Winthrop University Hospital for further evaluation and management. On endoscopic evaluation assisted with chromoendoscopy and NBI, a nodular mucosal lesion of 2 x 1.5 cm in size was detected (Paris classification 0-1s) and presented some features suspicious for carcinoma (Figure 1).

High frequency probe EUS was performed and revealed two subcentimeter benign appearing para-lesional lymph nodes and the absence of gross submucosal invasion or muscularis propria invasion (Figure 2).

Optical biopsies by pCLE were then performed and revealed images highly suspicious for advanced histology such as high grade dysplasia or even intramucosal carcinoma (Figure 3). Based on these findings, it was decided to opt for an en bloc resection via ESD rather than piecemeal resection via EMR (Figure 4). En bloc resection allows very precise assessment of the deep margin of the lesion, a very important determinant for early carcinomas since lesions invading the submucosa for >300 micrometers have high risk of lymph node metastases. Precise assessment of the lateral margin is only possible with en bloc resection and is important as it confirms complete resection (RO resection) with no residual neoplasm.

Following the resection, histologic analysis of the resected specimen confirmed the pCLE diagnosis of high grade dysplasia and completeness of resection (negative lateral and deep margin) (Figure 5). Treatment was further completed by the RFA ablation of the remaining Barrett's.

3. Conclusion

Figure 5: Histologic slide

