



# THE CONVERGENCE OF ADVANCE IMAGING AND THERAPEUTIC ENDOSCOPY IN ESOPHAGEAL DISEASE MANAGEMENT

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## TECHNOLOGY REVIEW

Probe-based Confocal Laser Endomicroscopy (pCLE) is a new method, which provides en face, diagnostic, 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*.

## CASE REPORT

A 67 year old male Barrett's esophagus patient, with high-grade dysplasia (HGD), was initially treated with the BARRX Halo 360 Ablation System [1]. Three months later a follow-up EGD was performed and residual intestinal metaplasia was found (Figure 1). During the EGD, both high-definition white light endoscopy (HD-WLE) and narrow band imaging (NBI) were used to assess the location and the boundaries of the residual Barrett's mucosa without success.

pCLE was then performed on the residual Barrett's mucosa. After intravenous injection of 2.5 ml of 10% fluorescein, the pCLE probe was passed through the scope to examine the area of the distal esophagus. Irregular formed glands, vascular leakage of fluorescein into the interstitium and multiple areas of cellular disorganization were noted. These changes were thought to be consistent with dysplasia (Figure 2), which was later confirmed with biopsy.

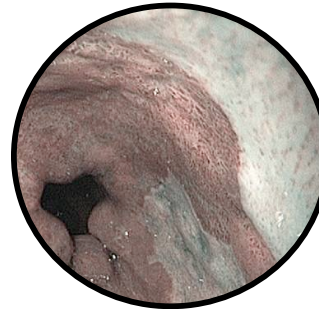
The BARRX Halo 90 Ablation System [1] was used to ablate the area of residual intestinal metaplasia and dysplasia, then per protocol, scraped and ablated a second time. The area was cleaned of debris and the pCLE was utilized to assess the efficacy of the ablation therapy (Figure 3). pCLE images showed villous appearing structures, consistent with residual intestinal metaplasia, remained in one area (Figure 4). Further ablation was performed. pCLE was used to image the ablation margins and to confirm the absence of intestinal metaplasia or dysplasia. The pCLE demonstrated, in real-time, that the margins were free of intestinal metaplasia and dysplasia (Figure 5).

## SUMMARY

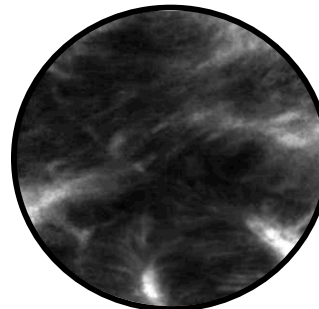
In our patient, endoscopic examination with HD-WLE and NBI failed to identify residual dysplasia in Barrett's esophagus. With pCLE, we were able to identify and target the residual dysplastic areas for therapeutic treatment. Post-ablation pCLE was used to confirm that the ablated areas and margins were free of residual intestinal metaplasia or dysplasia. The benefit of pCLE in this case was to accurately guide and assess therapy in real-time.

## REFERENCES

1. BARRX Halo 90 and 360 Ablation Systems are owned by BARRX Medical Inc.



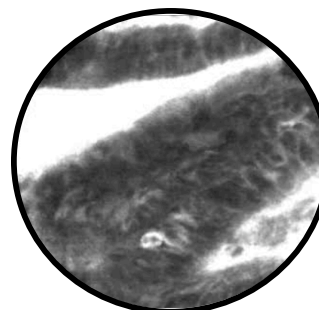
**FIGURE 1**  
Endoscopic image prior to ablation.



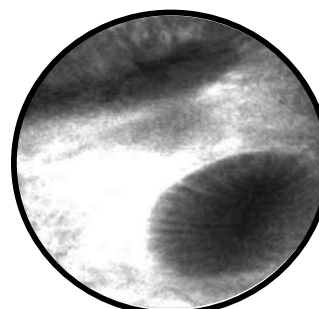
**FIGURE 2**  
pCLE image of Barrett's esophagus with HGD identified prior to performing ablation. Imaging demonstrates the presence of irregular glandular formation and the presence of abnormally dark cells.



**FIGURE 3**  
Endoscopic view of pCLE probe being used in conjunction with Halo 90 to assess ablated areas.



**FIGURE 4**  
pCLE image of an ablated area demonstrating incomplete ablation with evidence of residual Barrett's metaplasia.



**FIGURE 5**  
pCLE image demonstrating gastric cardia mucosa at the margin of the ablated region confirming an adequate ablation margin.