NEW METHODS

Endoscopic Doppler optical coherence tomography in the human GI tract: initial experience
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Optical coherence tomography (OCT) is an emerging endoscopic imaging technique that can visualize mucosal and submucosal microstructure at the micrometer scale. Analogous to pulse-echo sonography, OCT performs cross-sectional imaging by sending near-infrared light into tissue and by detecting reflected light from tissue structures at different depths. A low-coherence light source and an optical interferometer permit high-resolution (~10 μm) depth discrimination. By using optical fibers, endoscopic OCT systems perform imaging via a catheter through the accessory channel of endoscopes, similar to miniprobe EUS. Currently, the axial resolution (~10 μm) of endoscopic OCT is approximately 10-fold better than high-frequency (12 MHz) EUS. Initial clinical studies of OCT in the GI tract have been promising; for example, OCT has been shown to be highly sensitive and specific for the detection of specialized intestinal metaplasia. Functional OCT imaging was developed with the addition of Doppler measurements and has been demonstrated in human retina and skin in vivo. Doppler OCT can serve as an important diagnostic adjunct, enabling the detection and the monitoring of changes in microvasculature after therapeutic intervention and may be useful for assessment of vascular disease progression.

The aim of the present study was to evaluate the clinical feasibility of in vivo imaging of mucosal and submucosal blood flow by using the endoscopic Doppler OCT (EDOCT) system in both normal and diseased conditions of the GI tract. Here we present our first clinical experience with this new technology, used during 22 endoscopic procedures.