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The Use of an Optical Biopsy System in Barrett's Esophagus

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Past optical biopsy has been laboratory based and lacked clinical applicability. We utilized the first commercial system to assess its ability to detect high grade dysplasia (HGD) within Barrett's esophagus (BE). Aim: To determine the sensitivity and specificity of an Optical Biopsy System in BE Methods: An Optical Biopsy System (SpectraScience) based on laser induced fluorescence was used in two academic centers to determine its utility in BE. The system is coupled to a novel probe that combines an optical fiber within a standard biopsy forcep. The mucosa can be interrogated by the optical fiber and removed by the biopsy forcep. A nitrogen laser produces light of 337 nm wavelength to excite endogenous fluorophores within the mucosa. The autofluorescent spectra is then captured by optical fibers and delivered to a spectrophotometer which separates the light into its components. This is detected by a CCD and analyzed using a proprietary algorithm. The result is displayed within 1-2 seconds on a LCD panel. The system is self-calibrating. Patients who were undergoing surveillance endoscopy for BE were enrolled in this trial. Results: A total of 87 patients with BE were enrolled into the trial with 326 optical biopsies taken. These biopsies revealed 266 (82%) specimens of BE without dysplasia, 46 (13%) with low grade dysplasia (LGD), and 14 (4%) with HGD. Using these data as a training set an algorithm was developed. The results of our preliminary evaluation showed that we were able to obtain a sensitivity of 95% and a specificity of 80% in determining HGD versus LGD or non-dysplastic BE. Conclusions: A commercial optical biopsy system appears to be able to distinguish HGD with high sensitivity and specificity. This system may be of use in surveillance of patients with BE.

