Autofluorescence Endoscope Detects Endometriosis

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LAS VEGAS — An endoscopic device that has been used to detect lesions in the bladder and lung was able to detect unusual and inconspicuous endometrial lesions during laparoscopy that cannot be seen under white light. Dr. Steven F. Palter said in his award-winning presentation at the annual meeting of the American Association of Gynecologic Laparoscopists.

Dr. Palter and his colleagues conducted a pilot study using the D-Light system to detect lesions in patients suspected of having endometriosis because of pelvic pain or infertility. All suspected lesions were biopsied and excised for pathologic confirmation. Eight of 10 women were diagnosed with endometriosis, and 34 biopsies were reviewed.

Overall, 79% of the lesions diagnosed with autofluorescence were confirmed to be endometriosis. And the new technique revealed additional lesions in 11% of the patients who had endometriosis. As a result, 10 additional biopsies were taken, and 90% of these new lesions were confirmed.

“Therefore, 5 of 6 patients with suspected additional disease were confirmed,” Dr. Palter said. In other words, the autofluorescent technology identified additional disease in 62.5% of the patients studied.

“Our pilot study demonstrated the ability to visualize the endometriosis, and further studies are ongoing on clinical outcomes,” noted Dr. Palter, medical and scientific director of Gold Coast IVF, Sydney, N.Y. He disclosed that he serves as a consultant to Karl Storz Endoscopy-America, which makes the D-Light system.

“This was the first complete use of the system in the pelvis without drug dyes for the diagnosis of endometriosis in the United States,” said Dr. Palter. “Further studies are obviously required to determine the clinical outcome” of pain-free survival in patients who undergo a more complete excision of diseased tissue as a result of the imaging system.

The D-Light system has not been approved for pelvic use by the Food and Drug Administration, but it received IRB approval for the study. It’s not yet known whether autofluorescence endoscopy will provide enough information on the depth of the lesion to know whether ablative or surgical excision will be the most appropriate treatment, he said.

In contrast to the classical dark, black, hemosiderin-like endometrial lesions that can be seen with normal white light, there are subtle and atypical clear, red, and white endometrial lesions with high metabolic activity that are now recognized as earlier forms of the disease. These atypical forms are found in most patients. The new autofluorescence endoscope system could improve the ability to see these lesions and render their detection less dependent on the ability and experience of the user, he said.

The standard method for the diagnosis of endometriosis is by direct, white-light illumination of lesions during laparoscopy with confirmation by biopsy.

Under normal white light illumination, most light is reflected back from the tissue at the same wavelength. A small percentage of photons are absorbed by the tissue and released at another wavelength in the process of autofluorescence. In regular endoscopy, the autofluorescence endoscope is present but cannot be seen, since it is overpowered by the large amount of white light. Dr. Palter said.

An autofluorescence endoscope differs from a regular endoscope by the use of two additional colored filters. The first one filters the light illuminating the tissue from the wavelength range in a normal white light mode into a narrower, blue-light range, which intensifies the amount of fluorescent light that is released from the tissue at a higher wavelength. Another filter blocks reflected light with a wavelength shorter than 450 nm. This second filter blocks more than 99.5% of the reflected blue light, enhancing the small amount of fluorescent light emitted from the tissue so that it can be visualized.

Endometrial lesions may appear dark blue if they block the green background fluorescence or they may be hyperfluorescent with an increased level of fluorescence, compared with the background.

Further details of the studies, including photos and videos of the system, are available on Dr. Palter’s Web site and blog about future technology and medicine at http://docinthemachine.com/afendo.