Value of indocyanine green and laparoscopic near-infrared technology in the surgical management of endometriosis: what is the evidence?

Sir,

Sieghenthaler et al published on the role of indocyanine green and near-infrared-vision (NIR-ICG) in the management of endometriosis, investigating not only the diagnostic value of NIR-ICG, but also the parameters that alter its detection-rate. The knowledge about the factors that negatively influence the detection-rate of NIR-ICG will certainly help future research.

Although NIR-ICG was found to be useful for identifying the extent lesions, allowing for the resection of nodules and the preservation of healthy tissue surrounding the diseased, the results were not satisfactory regarding the detection-rate. The diagnostic value of NIR-ICG was therefore described as "minimal", which is in contrast to the encouraging results previously published. In our opinion, this conclusion is misleading and of questionable validity because of several biases, some of which have been already discussed by the authors.

We would like to discuss the possibility of other biases in the context of their study, specifically:

- 44.4% of the study population (group1) was subjected to insufficient observation-time (2-5 minutes) whereas only 55.6% (groups 2-3) received an observation-time that was consistent with previous literature (> 5 min). While it is commendable that the authors reported the data divided
into three sub-categories, showing a trend of improvement in the detection rate in proportion to the observation-time, comparing the overall-results with those obtained by the Gre-Endo seems incorrect. Even including data from a “sub-treated/observed” population (group1) could be considered a bias. Indeed, if the authors wanted to compare data, they should have done so with homogeneous groups.

-49.2% of the population belonged to the rAFS III-IV stage, and some of these were subjected to inspection with NIR-ICG prior to having obtained a correct exposure of the surgical field utilizing visceral adhesiolysis to expose the pouch of Douglas and rectovaginal-septum. This led to the conspicuous loss of "anatomical surface" to be analyzed (e.g., the retro-cervical surface etc.). The incorrect exposure of a frozen pelvis could have resulted in surgeons missing some lesions.

- The use of increased doses of ICG compared with that employed in previous literature (0.30mg/Kg vs 0.25mg/Kg) demonstrating better outcomes, and the concomitant use of an additional intra-ureter dose in 3% of the population, could have contributed to excessive "background-noise" due to excessive surrounding basal peritoneal fluorescence leading to reduced identification of endometriotic lesions.

- The search for endometriosis in excised fluorescent tissue requires a "dedicated" pathologist in order to avoid an excessive false-negative rate, which could indirectly reduce the sensitivity and accuracy of the laparoscopic approaches (White-Light (WL) and NIR-ICG). In particular, from our experience, when faced with macroscopically negative tissue samples, the specimens should be embedded in paraffin in toto, and analyzed at multiple levels.

- The absence of random biopsies of apparently healthy tissue employing WL does not allow for the calculation of the negative predictive value using the standard method. A more detailed analysis highlighting the concordance between the two diagnostic tests (Cohen's K), would provide for a direct comparison with previous literature.

Future studies are needed for further answers.

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References


