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Commentary: Demarcating the intersegmental fissure: Please cut along the dotted line

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CENTRAL MESSAGE

The authors demonstrate that a constant-rate infusion of indocyanine green leads to more consistent, longer lasting, and higher maximum fluorescence intensity when demarcating an intersegmental fissure compared with bolus administration.

Anatomic segmental resection is a well-accepted therapy for clinical stage I lung cancers in patients with low pulmonary reserve or predominantly ground-glass tumors and has become increasingly popular with the refinement of minimally invasive techniques and adjunctive technologies. In terms of oncologic outcomes, some suggest equivalence to lobectomy for stage IA non–small cell lung cancers, although prospective data are still pending.[1] In my own experience, the number of segmentectomies (as opposed to wedge resections or lobectomies) that I perform has easily doubled during the past year since transitioning to robotics, and the use of indocyanine green (ICG) has proven extremely easy and useful with the built-in infrared technology of the da Vinci Xi platform (Intuitive, Sunnyvale, Calif).

As Misaki and colleagues[2] point out, a common method to identify the intersegmental fissure involves temporary reinflation of the lung after the segmental bronchus is clamped or divided, but we have all experienced the limitations and irritations of this maneuver. Emphysematous lungs may not inflate and subsequently deflate appropriately on command. As a result, the intersegmental fissure may remain ambiguous and worse yet, both operative domain and visualization are compromised. Resentment toward the anesthesiologist inevitably ensues, as what feels like an eternity passes while waiting for the lung to collapse again. And of course, stapling across a partially inflated lung will almost certainly result in postoperative air leak.

Misaki and colleagues[2] were among the first to describe the use of intravenous injection of ICG and an infrared camera to identify the intersegmental fissure according to perfusion once the segmental pulmonary artery is divided. The authors published this pilot study of 8 patients using rapid injection of a 3.0 mg/kg ICG bolus with reasonable safety and efficacy in 2010.[2] Subsequent studies have confirmed the utility and generalizability, as well as the possible optimization of oncologic margin, with this methodology.[3,4] However, this approach is not perfect, and the authors aptly note that there are cases in which the demarcation line appears mottled or the ICG washes out too quickly. Ideally, the intersegmental demarcation is visible for enough time to allow marking a dotted line with electrocautery.

In their current article, Misaki and colleagues[5] expand on their previous work to compare bolus (similar dosing as above) versus constant-rate infusion of ICG to identify the intersegmental fissure during thoracoscopic segmentectomy.[5] Their findings demonstrate more consistent, longer lasting, and higher maximum fluorescence intensity with a constant rate infusion at 300 mL/h of 2.5 mg/mL ICG solution. Accordingly, the intersegmental fissure was well demarcated in 9 out of 10 thoracoscopic segmentectomies in the constant-rate infusion group, compared with only 3 out of 10 in the bolus group. The sample size is small and only 3 out of 10 in the bolus group seems low, but, overall,

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this is a very straightforward study that offers a simple solution to a technical problem. It is exactly these types of pilot studies and clinical trials that are much needed in our specialty to help us enhance intraoperative decision making, streamline procedures, and overcome challenges, no matter how seemingly trivial.

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