Time for randomization

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As a result of high-definition, computed tomography (CT) imaging and lung cancer screening,¹ thoracic surgeons are often challenged with removing small pulmonary nodules or nodules deep in the lung. Although digital palpation is useful for nodule detection during open operations, it is less reliable during minimally invasive procedures. The ability to detect small lung nodules is correlated with their size and distance from the pleural surface, and more than half of nodules ≤ 10 mm in diameter and >5 mm below the pleural surface cannot be localized by video-assisted thoracoscopic surgery.^{2,3} There are many techniques that aim to improve localization of small nodules before minimally invasive resection, including hook-wire localization⁴; microcoil placement behind the nodule⁵; and methylene blue injection, either percutaneously or into the nodule or the pleural surface using electromagnetic navigational bronchoscopy (ENB) guidance.^{6,7} The use of indocyanine green (ICG) and near-infrared fluorescence is a new technique for locating small or deep pulmonary nodules. Like methylene blue, ICG can be injected percutaneously⁸ or with ENB guidance.⁹

Ujiie and colleagues¹⁰ present their feasibility study on percutaneous ICG injection into small lung nodules and thoracoscopic resection using a near-infrared thoracoscope. Using CT guidance, the authors placed a microcoil behind each nodule and injected ICG into the nodule after coil placement. Coil placement, ICG injection, and the surgical procedure were performed in a specialized operating room with dual CT scanners. After using a near-infrared thoracoscope to detect the ICG-injected nodule and noting the potential resection margins, the authors used fluoroscopy to detect the coil and ensure proper margins before video-assisted thoracoscopic surgery wedge resection. There were no major complications from the procedure, and ICG successfully localized 18 of 20 nodules.

This study adds to the body of literature on the use of markers and dyes to localize lung nodules. As Figure 1 in the article attests and the authors acknowledge, very few surgeons have a similar operating suite at their disposal. Although operating rooms with CT scanners are becoming more common, they are often not accessible to thoracic

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Central Message

There are several methods of marking pulmonary nodules for thoracoscopic resection, including indocyanine green detected by near-infrared fluorescence. A randomized trial is needed.

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surgeons. In the absence of such facilities, CT-guided nodule localization, by coil or ICG, must be performed in the radiology suite before transport of a patient to the operating room. This increases patient discomfort and potentially increases the risk of complications. For thoracic surgeons who do not have an operating room equipped with a CT scanner and who do not want their patients marked in radiology and then transferred for operation, ENB-guided nodule marking with methylene blue or ICG injection is a very good alternative to coil localization. At the University of Tennessee Health Science Center, we successfully localized 97% of small nodules using ENB-guided, methylene blue injection.⁷ Abbas and colleagues⁹ localized 98% of small nodules using ENB-guided marking with methylene blue or ICG injection. With an increasing number of techniques available to localize small pulmonary nodules, the time has come for a randomized trial examining the efficacy and cost of each technique. Without a randomized trial, it is impossible to credit any technique as superior to another in localizing small lung nodules before minimally invasive resection.

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