



# With so many different techniques for lung nodule localization, the time has come for randomization

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I read with interest the review manuscript by Yoshida and Nakajima on the preoperative localization of lung nodules for minimally invasive resection. Many methods have been described for localization and those can be divided into two broad categories: (I) localization by computed tomography; (II) localization by endobronchial means. Different agents are used by with each technique. Computed tomography localization often involves wire hook localization, microcoil localization, injection of dye markers (methylene blue or indocyanine green); while endobronchial localization often involves injection of either methylene blue or indocyanine green at the lesion and/or the pleural surface. Each technique and marker offers several advantages and disadvantages. Broadly speaking, computed tomography localization involves significant extra usage of resources and is usually done in the radiology suite. Few thoracic surgeons have access to an operating room with CT scanners to perform the localization immediately prior to the surgical procedure and hence patients have to be transported from the radiology suite to the operating room with patient discomfort, and the risk of a symptomatic pneumothorax. This risk is somewhat offset by superior results of CT localization, in particular when using microcoils (1). Endobronchial localization is often performed with the use of an electromagnetic navigation bronchoscope. This is a relatively simple and quick procedure that can be done in the operating room immediately prior to resection. It does involve the use of an electromagnetic bronchoscopy system which has a significant initial cost and learning curve. At the University of Tennessee Health Science Center, we have used navigational bronchoscopy with methylene blue marking and we were able to localize 97% of nodules (2). In

cases of lung cancer or suspected lung cancer we have been slowly switching to mark the nodule and pleural surface with indocyanine green and we use the Da Vinci robot firefly illumination system (3).

With the multiplicity of techniques and the unknown cost implications of each technique, it appears that the time has come for a proper randomized trial of nodule localization, preferentially comparing CT localization with navigational bronchoscopy dye localization. Only a randomized trial would be appropriate to define the cost and the benefit of each competing technique (4).

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