See Article page 301.

Commentary: A novel approach for localization of small lung nodules

Whitney S. Brandt, MD,[a] and
Justin D. Blasberg, MD, MPH[b]

Whitney S. Brandt, MD, and Justin D. Blasberg, MD, MPH

CENTRAL MESSAGE

The radiofrequency identification (RFID) marker system is a novel way to help localize central or non-palpable nodules.

The implementation of lung cancer screening guidelines has led to the identification of a wave of small, suspicious lung nodules in high-risk patients.[1] A modest percentage of these patients have small central nodules not easily biopsied by simple visualization in the operating room, percutaneous computed tomography (CT)-guided biopsy, or by endobronchial localization. Although current localization techniques include the injection of methylene blue, fluorescence dye, or coils, they are inherently limited with respect to accuracy and a surgeon's inability to define the deep margin of a nodule during resection.[2] Sato and colleagues[3] have embraced these limitations, and in their manuscript entitled "First Clinical Application of Radiofrequency Identification (RFID) Marking System," they have described a novel localization technique to improve the clinical effectiveness of surgical resection for challenging lung nodules.

In their manuscript, Sato and colleagues describe their technique for preoperative localization of non-palpable or non-solid nodules using CT guidance or navigational bronchoscopy with a novel radiofrequency identification (RFID) marking system to more effectively resect those targets. The authors did an outstanding job describing how to incorporate this technique into clinical practice, and their manuscript serves as a guide for any clinician interested in localization. Unlike existing localization techniques, RFID marking provides a surgeon with spatial feedback and improves the ability to achieve negative margins during sublobar resection. This precision has the theoretical benefit of preserving lung parenchyma while effectively resecting a non-palpable nodule with adequate margins. In addition, tag migration, which has the potential to significantly impact the accuracy of resection, seems to be infrequent with RFID markers, which makes it more attractive than other techniques, including dye or coils, which may be subject to diffusion or displacement.

Despite the obvious benefits of this technology, there are clearly some limitations that should be considered. For a clinician without navigation equipment, the cost and implementation of any delivery technology can be significant. The success of this technique is likely user dependent, and the reproducibility of these results has not been evaluated. However, the authors plan on replicating these findings in a larger cohort, which will be helpful for readers. The aforementioned limitations are not unique to RFID technology; the implementation of any preoperative localization system is associated with capital investment, a learning curve, and some level of inaccuracy. However, if RFID adoption is successful, it has the potential to become a more effective tool for clinical use, particularly given its precision advantages with respect to deep margins.

Improvements in localization technology are needed as the performance of screening CT scans of the chest and the identification of non-palpable lung nodules similarly increase. RFID technology is a novel, intriguing way to manage central or non-palpable lung nodules, and the authors should be applauded on their ingenuity and timeliness in publishing a clinically useful tool for thoracic surgeons.

References

1. National Lung Screening Trial Research Team, Aberle DR, Adams AM, Berg CD, Black WC, Clapp JD, et al. Reduced lung-cancer mortality with low-dose computed tomographic screening. *N Engl J Med*. 2011;365:395-409.

From the Departments of [a]Surgery and [b]Thoracic Surgery, Yale New Haven Hospital, New Haven, Conn.

Disclosures: The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication Oct 3, 2020; revisions received Oct 3, 2020; accepted for publication Oct 20, 2020; available ahead of print Oct 22, 2020.

Address for reprints: Whitney S. Brandt, MD, Department of Surgery, Yale New Haven Hospital, 333 Cedar St, New Haven, CT 06510 (E-mail: Whitney.Brandt@yale.edu).

JTCVS Techniques 2020;4:305-6
2666-2507

https://doi.org/10.1016/j.xjtc.2020.10.034

2. Velasquez R, Martin A, Hishmeh MA, DeLorenzo L, Dhillon SS, Harris K. Placement of markers to assist minimally invasive resection of peripheral lung lesions. *Ann Transl Med*. 2019;7:360.

3. Sato T, Yutaka Y, Nakamura T. First clinical application of radiofrequency identification (RFID) marking system—precise localization of a small lung nodule. *J Thorac Cardiovasc Surg Tech*. 2020;4:301-4.