a negative surgical margin in patients who are having a wedge resection.

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MAIN OBJECTIVES OF PREOPERATIVE MARKING TECHNIQUE FOR HARDLY PALPABLE LUNG NODULES

Reply to the Editor:

Thank you for your letter to the Editor, “A new lung marking technique for robotic cases.”¹ During thoracoscopic surgery or robotic surgery, it is sometimes difficult to identify the exact location of small lung nodules. In such cases, preoperative marking may be required. In thoracoscopic surgery, we can palpate the target nodules using a finger through the port; thus, preoperative marking near the nodule is useful for localization. In robotic surgery, however, there is no sense of touch. Therefore, greater accuracy of preoperative marking for localization is required in robotic surgery than in thoracoscopic surgery.

The main objectives of the marking technique are accuracy, technical ease, and minimal invasiveness of the procedure. The authors’ technique exhibits acceptable accuracy because they used methylene blue paste under computed tomography (CT) fluoroscopy on the operation day. However, the described technique is limited in terms of technical ease and minimal invasiveness because the patients must be punctured with a 19-gauge trocar needle under local anesthesia, and moderate or large pneumothorax occurred in 3 of 18 patients (17%). In our report, 20 patients underwent noninvasive CT-guided marking. No complications were observed during the marking procedure.²

The authors pointed out that if the lesion is located beneath the scapula, the shortest distance to the lesion may not be a straight vertical line, but would require an extrapolated angle when marking the visceral pleura for noninvasive CT-guided marking. In such situations, we performed a 2-point noninvasive CT-guided marking method. Two marks were placed on the patient’s skin at the same axial line in the CT examination room 1 day before the operation. During the operation, 2 marking points were placed in the routine manner, and we palpated the tumor on the line extending to these 2 points.

Sato and colleagues³ reported a novel bronchoscopic multiple marking technique to assist with resection of hardly palpable lung nodules. They named this technique virtual assisted lung mapping. In their report, virtual bronchoscopy was used for marking and bronchoscopy was conducted with the patient under local anesthesia. Indigo carmine was injected into a catheter inserted into a selective bronchus. CT after virtual assisted lung mapping was used to visualize the location of the marking. Of the 95 marking attempts made for 37 tumors in 30 patients, 88 (92.6%) were identified and contributed to the thoracoscopic surgery with no complications. However, their method is expensive and complicated.

Preoperative marking techniques for peripheral pulmonary nodules require a balance among accuracy, technical ease, and minimal invasiveness. In this aspect, the authors’ marking technique is a useful option for cases where robotic surgery is indicated.

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