



Response to comment on: ‘Hybrid operating room: the leading edge of thoracic surgery’

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Response to: Ujjie H, Gregor A, Yasufuku K. Hybrid operating room: the leading edge of thoracic surgery. *Video-assist Thorac Surg* 2019;4:7.

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We sincerely appreciate the interest and comments for our article entitled “*Preoperative Dye Localization for Thoracoscopic Lung Surgery: Hybrid Versus Computed Tomography Room*” (1). The authors have comprehensively analyzed and discussed several of the important issues described in our manuscript.

First, we appreciate the comment on an important issue: radiation dose. As mentioned in the article, the balance between image quality and lower radiation dose is still controversial (2). Although a higher cone beam computed tomography (CT) radiation dose is needed to achieve soft tissue image quality to equivalent to that available on conventional CT, we agreed that “excellent” image quality may be not necessary for preoperative nodule localization. Although the learning curve is a possible factor influencing the result, modifying the procedure for every individual patient may be a more important key factor for improvement (3). We believe it is an important issue to focus on in future practice, by applying preoperative planning and low-dose screening sequences for the initial evaluation in the localization procedure. To reduce the radiation dose in the hybrid room group, a new flowchart should be designed for cooperation between the radiologist and thoracic surgeon as per the authors’ suggestion.

Moreover, the comment showed the concern regarding the time difference of the epidural procedure. Currently, thoracic epidural analgesia is considered as the intraoperative and postoperative gold standard mainly for thoracotomy. However, it still poses a high risk of hypotension due to the reduced cardiac output. Therefore, the intercostal nerve blockade, rather than epidural

analgesia, was the routine procedure in the postoperative pain control in our institute (4). The matter in Figure 1B in the paper should be corrected as a steel wire, which placed a surface localization guide (1). Mostly, the intercostal nerve block would be performed after wound incision. Therefore, the procedure time for the intercostal nerve block would be included in the surgery time for both groups. We suggest that the waiting time in the general ward and the transport time between the ward, CT room, and operating room may be the key factors for the large gap in global time between the hybrid room group and CT room group.

The authors also indicate the difference in the malignancy rate. During our matching, propensity score matching was performed to compare the hybrid and CT room group considering the operation method and lesion number, depth, and size. As a result, the malignancy rate was not the factor we set for the matching and showed the difference between both groups. However, the pathology of the nodule does not influence the difficulty of the localization or the operation. According to our previous experience of CT guide localization, the malignancy rate is near 85%, similar to the mean of the two groups.

Retrospectively collected data limited the verity of our study (1). Although use of the hybrid room in thoracic surgery has been shown to be a novel procedure with potential benefits, further studies and experiences from additional medical centers are necessary to produce more robust evidences in the future. For this reason, we believe a prospective study is necessary to clarify this dilemma in the future.

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