Peer Review File

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Review Comments

In this manuscript, the authors conclude that using an augmented reality navigation system for percutaneous CT-guided biopsy in GGOs contributes to a lower complication rate and a higher diagnostic yield than conventional procedure, which is an interesting finding. Although the results are important for diagnosing GGOs with non-surgical biopsy, It is hard to understand the advantages of augmented reality navigation system from the manuscript. I cannot recommend the publication of the manuscript in the journal in its current version. Thus, several points as indicated below need to be addressed by authors to improve the quality of the article.

Major comments

1. In this manuscript, the definitions of "technical success" and "diagnostic success" remain unclear. For example, from line 194, it is estimated that the number of patients in each group for whom CT-guided biopsy failed to yield a diagnosis was 4 in the trial group and 16 in the control group. However, different numbers are given from line 197 onwards. Each definition is needed to be clearly described in the Methods section.

We added the definitions of "technical success" and "diagnostic success" in methods (page 7; lines 174-176) and we also rewrote the lines in results about this topic (page 9; lines 209-215).

2. Although the augmented reality navigation system was used for CT-guided lung biopsy, the details of the procedure were unclear and difficult to understand. The explanation in Fig. 1 alone is insufficient, and the specific model numbers of the instruments used need to be included in the text for clarity.

We added the details of the procedure in methos (page 6; lines 135-141) and also modified the caption of figure 1.

3. The results of histological diagnosis of GGO in this study are barely described in detail. In cases where CT-guided lung biopsy did not yield specific results and no-

repeat examination or surgical biopsy was performed, the extent to which the patient was followed up should be described.

We added this in results (page 9; lines 209-215).

4. Complications are significant in CT-guided biopsy. The exact number and variety or content of complications in this study and the treatment details for the complications need to be specified.

We added some details about complication rate in both groups (pages 9 and 10; lines 226-231).

5. There are several reports that GGO is a risk factor for increased bleeding in CT-guided lung biopsy. If the bleeding was less in the trial group in this study than in previous studies, that needs to be clearly explained.

In our study, no patients had a massive bleeding. We reported only self-limited hemoptysis in both trial and control groups.

6, When considering the tumor invasiveness of GGNs, it is essential whether they are pure GGNs or part-solid GGNs. Similarly, the consolidation-tumor ratio or solid component size is also an important factor in estimating tumor invasiveness. I suggest that these variables be presented in the manuscript as patient characteristics.

We only considered pure GGNs.

7. Authors conclude that using an augmented reality navigation system increases the diagnostical success rate for lesion < 1.5 cm. I suggest adding the reason why the cutoff value was set to 1.5 cm. Moreover, regarding complications, was there a difference between the trial and control groups, according to a cutoff of 1.5cm?

Our sample is composed by lesions not very big in size. So, we chose this cutoff value because it allows us to better divide the groups of lesions we analyzed.

We did not report a significant difference in complications rate between the trial and control groups, according to a cutoff of 1.5cm.

8. CT imaging was performed at low-dose, which improves radiation exposure, but was there any risk of missing GGNs associated with this?

We performed low-dose chest CT during biopsy but there is the possibility to modify images on SIRIO visualization system to evaluate GGNs better. However, GGNs were previously identified with standard CT (without using low-dose protocol).

Minor comments

1. Table 2 is difficult to understand; please rewrite it more clearly by adding explanations of abbreviations. Also, the order of the variables in Figure 4 and Table 2 is different and should be corrected.

Done.

2. I think the unit of "cm" in Figure 4 is wrong.

We modified it in "mm".

3. Coaxial technique is used in this study. However, it is difficult for non-specialists to understand, so it would be better to provide a brief explanation and describe the differences from other techniques.

We added some data about coaxial technique as advised (pages 6 and 7; lines 150-157).

4. I think "Yamagam" in line 245 is a mistake for "Yamagami."

Ok, done.