

Peer Review File

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Reviewer A:

Comment 1: line 22, start the number alphabetical at the beginning of the sentence.

Reply 1: Thank you for your comments. We revised them to “Three-dimensional reconstruction was performed for all cases.”

Changes in the text: We have modified our text as advised (see Page 3, line 42).

Comment 2: line 32, better to replace doctors by surgeons or thoracic surgeons. This applies to the rest of the article.

Reply 2: Thank you for your comments. We revised them according to your request.

Changes in the text: We have modified our text as advised (see Page 4, line 53).

Comment 3: Keywords, better to add chest wall. precise resection has no value if we consider the type of resection R0.

Reply 3: Thank you for your comments. We added “chest wall” and deleted “precise resection” in the keyword.

Changes in the text: We have modified our text as advised (see Page 4, line 57).

Comment 4: line 45, advise using the word intra-operative and post-operative.

Reply 4: Thank you for your comments. We revised them to “Thus, surgical treatment is difficult, and there are many intra-operative and post-operative complications”.

Changes in the text: We have modified our text as advised (see Page 4, line 67).

Comment 5: line 51, better to add the reference for the use in neurology.

Reply 5: Thank you for your comments. We added this reference “Using 3D-Printed Mesh-Like Brain Cortex with Deep Structures for Planning Intracranial EEG Electrode Placement” in this part.

Changes in the text: We have modified our text as advised (see Page 5, line 76).

Comment 6: line 67, better to use any thoracic tumor.

Reply 6: Thank you for your comments. We added the word “any”

Changes in the text: We have modified our text as advised (see Page 5, line 89).

Comment 7: line 68, types of biopsy are incisional excisional or true cut. To clarify it.

Reply 7: Thank you for your comments. We used puncture biopsy before operation and this biopsy belong to true cut, because we insert the biopsy needle into the tumor.

Changes in the text: We have modified our text as advised (see Page 5, line 90).

Comment 8: How was metastasis ruled out? by PET scan?

Reply 8: The metastasis was ruled out by PET scan or general examination including Head MRI, Abdominal ultrasound, Chest CT, and Whole-body bone scan.

Changes in the text: We have modified our text as advised (see Page 5, line 91).

Comment 9: line 143, better to use the length of stay instead of hospitalization time.

Reply 9: Thank you for your comments. We revised it to “Postoperative indicators included the length of the stay, and the incidence of postoperative complications (such as wound bleeding, respiratory failure, relapsing pulmonary edema, arrhythmia, lung infections).”

Changes in the text: We have modified our text as advised (see Page 9, line 169).

Comment 10: In regards to scoring, would you consider the type of tumor based on the biopsy as a factor since some of the tumors are highly vascular and some invade aggressively than others?

Reply 10: We added the pathological information of each patient, graded and scored the degree of pathological malignancy, and then compared them. The results showed that among the resectable patients, there was no difference in pathological malignancy between the 3D research group and the control group. However, compared with the resectable group and the non-resectable group, the pathological malignancy of the non-resectable group is significantly higher than that of the resectable group.

Changes in the text: We have modified our text as advised (see Page 10, line 185; Page 11, line 219; Page 25, line 395)

Comment 11: line 194, other methods of treatment as solo or in combination have been considered as an effective treatment for chest wall tumors in special cases. embolization, radiotherapy, etc..

Reply 11: Thank you for your comments. We revised this sentence to “Surgical resection plays an irreplaceable role in the treatment of thoracic tumors including embolization, radiotherapy, chemotherapy, etc.”

Changes in the text: We have modified our text as advised (see Page 11, line 224)

Comment 12: table 2, better to summarize the first case's organ relation.

Reply 12: Thank you for your comments. In relationship with adjacent organs column, we deleted some descriptions about tumor relationship with adjacent vessel, and only left tumor relationship with adjacent organs in this column.

Changes in the text: We have modified our text as advised (see Page 21, line 391)

Reviewer B:

Comment 13: Patient assignment criteria are ambiguous (which patients had 3D CT and which patients did not). It does not describe what the specific inclusion or

exclusion criteria are for the 3D CT group. It may also be a limitation of a retrospective study, but the exact criteria for patient assignment should be presented to rule out the possibility that the 3D group may have easy patients for surgery.

Reply 13: Thank you for your comments. In order to prevent that the 3D group may have easy patients for surgery, these 34 patients were divided into the 3D research group and the control group randomly. It was our mistake to forget to mention it before, and we added this point to the text.

Changes in the text: We have modified our text as advised (see Page 6, line 105)

Comment 14: Analysis of many factors that determine the surgical outcome is missing. For example, how many doctors were included (there are few cases, so if too many doctors are included in the study, it is difficult to ensure the consistency of the operation), and how was the reconstruction method (reconstruction maybe sometimes more difficult than resection for the surgery of giant tumors, it is missing of reconstruction principles and detailed methods) and the pathological findings of the tumor (there is no information on whether the pathological findings are benign, thymoma or other tumors). Finally, treatment other than surgery was also missed.

Reply 14: We added the pathological information of each patient, graded and scored the degree of pathological malignancy, and then compared them. The results showed that among the resectable patients, there was no difference in pathological malignancy between the 3D research group and the control group. However, compared with the resectable group and the non-resectable group, the pathological malignancy of the non-resectable group is significantly higher than that of the resectable group. (see Page 7, line 182; Page 8, line 216; Page 19, line 396) All operations were performed by two thoracic surgeons. In the 3D reconstruction method, we describe it in the materials and methods part in the text. The CT images were segmented and reconstructed three-dimensionally using the Amira software for thoracic tumors, pericardium, lungs, vertebrae, aorta, pulmonary artery, subclavian artery, brachiocephalic vein and superior vena cava. The 3D model was smoothed and simplified by Amira software and 4D Cinema software. (see Page 6, line 158) About the treatments besides the surgery, we did not mention them in this manuscript, because in this manuscript, our main point is 3D printing and thoracic surgery, so we cannot gather all the point in one manuscript.

Changes in the text: We have modified our text as advised. (see Page 8, line 162; Page 10, line 185; Page 11, line 219; Page 26, line 400)

Comment 15: The classification of tumor types on CT is arbitrary. It may not be easy, but I think it would be better to use an official classification that can guarantee objectivity.

Reply 15: In this paper, we mainly study the complex chest tumor except esophageal cancer and lung cancer, which include chest wall tumor, intrathoracic tumor and mediastinal tumor. At present, there is no mature method for the classification of this kind of tumor in clinic. Generally speaking, tumor location, size, relationship with adjacent organs and blood vessels may be the main factors that affect the resectability

of this kind of tumor. Based on the characteristics of 3D reconstruction imaging, we grade these factors and try to find out the main factors that affect the resectability of this kind of tumor.

Changes in the text: We have provided the Statement of Ethics Approval. (see Page 9, line 162; Page 16, line 317-319)

Comment 16: As a minor part, there is a problem that the font size of the text is different (252 lines), or the appearance of the paper is uneven due to the misalignment of the manuscripts, and the sentence is not concise. In addition, there are problems such as the use of informal abbreviations (line 98) or lack of commentary on terms used in 3D printing.

Reply 16: Thank you for your comments. We revised them according to your request. In line 252, we adjusted the font size. We added the full name of ECT in the text.

Changes in the text: We have modified our text as advised (see Page 7, line 121)

Reviewer C:

Comment 17: Only 34 patients with complex thoracic tumors were included in this study. The small sample size will adversely affect the study results.

Reply 17: Thank you for your comments. Complex thoracic tumors are relatively rare in clinical practice, and even fewer of them can receive surgical treatment. It's true that the small sample size will adversely affect the study results, and we will continue to collect such cases.

Changes in the text:

Comment 18: All the patients were followed up for 6 months, the patient's follow-up time is too short, and tumor metastasis is difficult to detect in a short time. In addition, the long-term prognosis of both groups should be considered.

Reply 18: All the patients in the two groups underwent radical resection according to the principle of surgery. In this paper, we focused on the effect of 3D reconstruction on surgery and perioperative period, so we made a six months short-term follow-up. At the same time, we are also doing a long-term follow-up.

Changes in the text:

Reviewer D:

Comment 19: How does the 3D printed model match up with the intraoperative images? What can be predicted by the model and what cannot?

Reply 19: Thank you for your comments. The 3D printed model can directly show the detailed 3D information of tumor and its adjacent structures, which can be observed in the hand. We can discuss the detailed operation plan through 3D printed model, while it is pity that we cannot touch and operate the anatomical structures inside the 3D printed model.

Changes in the text:

Comment 20: The manuscript would benefit from English Language editing to make it easier to read.

Reply 20: Thank you for your comments. We reedited the English Language according to your request.

Changes in the text:

Comment 21: The comparison between resectable and unresectable cases indicated that some relevant factors are the markers for determining whether the resectable cases are resectable or not. However, it is not associated with the preoperative 3D printing, so how to use the printing materials to better serve the operation? Whether a set of preoperative criteria can be developed?

Reply 21: Thank you for your comments. We used photosensitive resin to 3D print the tumor and its adjacent structures' model and this can let the superficial structures semi-transparent and let the surgeons observe the deep structures clearly. We also added this point in the text. (see Page 6, line 146)

Changes in the text: We have modified our text as advised (see Page 8, line 148)

Comment 22: I would like to know how much the 3D printing model cost and how long does it take to make. There is always a cost-efficient consideration of each novel technique before they are generally put into practice.

Reply 22: Thank you for your comments. The 3D printing materials is photosensitive resin and one printed model's price is around 1400-2000 dollar. We paid this model by our research fund instead of patients' expense. We also added this point in the text. (see Page 8, line 150-152)

Changes in the text: We have modified our text as advised (see Page 8, line 150-152)

Comment 23: Last but not least, the 3D printing model is a good reference when the patients revisit their doctors. Is the model able to be reused after its related case has been closed? How do the authors deal with these used models?

Reply 23: Thank you for your comments. When the case is closed, we will store these 3D printed models in our office and may reuse it when we discuss this study or we use it in clinical propaganda and education.