

Science Editor, Company Editor-in-Chief,
World Journal of Clinical Cases

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Dear Dr. Lian-Sheng Ma:

Please find attached a revised version of our document “**Innovative Chest Wall Reconstruction with Locking Plate and Cement Spacer After Radical Resection of Chondrosarcoma in the sternum: A Case Report**”. We would like to resubmit for publication as a case report in World Journal of Clinical Cases.

Your comments and those of the reviewers were highly insightful and enabled us to improve the quality of our document. In the following pages are our responses to each comment from the reviewer(s).

We hope that our revisions to the document combined with our accompanying responses will be sufficient to render our document suitable for publication in World Journal of Clinical Cases.

We look forward to hearing from you soon.

Yours sincerely,

Yi-Chin Fong, MD

Responses to the comments of Reviewer #1

In the case report entitled, “Innovative Chest Wall Reconstruction with Locking Plate and Cement Spacer After Radical Resection of Chondrosarcoma: A Case Report” the authors demonstrate the innovative chest wall reconstruction method after Chondrosarcoma resection. The manuscript has an excellent summary and claims publishing.

Response: *Thank you for the carefully reviewing. I'm truly honored that you like the article.*

Responses to the comments of Reviewer #2

1. Title. The authors may provide specific information regarding the tumor site in the title, such as “Innovative Chest Wall Reconstruction with Locking Plate and Cement Spacer After Radical Resection of Chondrosarcoma in the sternum: A Case Report”

Response: *Thank you for the kindly advice. I totally agree with your comment. The title was modified as” Innovative Chest Wall Reconstruction with Locking Plate and Cement Spacer After Radical Resection of Chondrosarcoma in the sternum: A Case Report” as suggested.*

2. Background. The authors have concisely described the epidemiology and characteristics of chest wall chondrosarcoma, mainstay reconstructive methods for the defect after tumor resection are also described. However, more comments are necessary to explain the difficulty about reconstruction for tumor defect in the chest wall, major limitations of the reconstruction options in the literature, and the significance of this study.

Response: *Thank you for the carefully reviewing. I totally agree with your comment. The difficulty about reconstruction for tumor defect in the chest wall, including the limitation of reconstruction options in the literature and the reason and significance of our technique were illustrated in the manuscript.*

The following are the revised part:

- *The reconstruction is considered challenging regarding the proximity of major vital organs and difficulties in finding suitable materials. (Introduction section, page 4)*
- *Previous studies with variable tumors located on the sternum reported various methods of sternal reconstruction, including those performed using a methyl methacrylate Marlex mesh sandwich plate, titanium mesh, titanium plate and stainless steel plate, allograft transplantation, and three-dimensional custom-made prosthesis. Ideally, the materials used for these purposes must be readily available, durable and cost-effective. The lack of flexibility of metal prosthesis could lead to unexpected breakage or potential dislocation if malpositioned. Other issues include inaccurate sizing or restriction of movement after surgery. Allograft transplantation takes the major advantage in the ability to incorporate into native tissue and revascularization. However, bone allograft comes in limited source and bears the risk of disease transmission. Three-dimensional custom-made prosthesis achieves a perfect shape in chest wall reconstruction process but is deemed time-consuming and costly. (Introduction section, page 4-5)*
- *The advantages of using cement spacer for chest wall reconstruction include low cost, durable, readily available, and most importantly moldable based on individual*

body size. (Introduction section, page 5)

3-1. Methods: Preoperative biopsy was omitted in the study, could the authors explain the reason? Because some types of primary malignant bone tumors may require neoadjuvant chemotherapy, so I doubt whether it's appropriate to skip preoperative biopsy.

Response: Thank you for the carefully reviewing. I totally agree with your comment. Sincerely, we would like to apologize for missing the biopsy report in the original manuscript. The patient did receive biopsy before surgery with the report showing as follows, "Section through the tumor at sternum showed hypercellularity and contains groups of neoplastic chondrocytes with extensive chondroid matrix component. The tumor cells had enlarged, hyperchromatic nuclei and occasional binucleation. Some bony fragments were also present. The immunostains of the tumor cell revealed S100 positive and IDH-1 focal positive. It was consistent with grade II chondrosarcoma." (Case presentation section- preoperative biopsy, page 6)

3-2. Methods: According to figure 6, the remodeled PMMA spacer was also fixed to the J-shape plate, please add this to the explanation of the surgical procedures.

Response: Thank you for the carefully reviewing. I totally agree with your comment. The detailed description of how remodeled PMMA spacer fixed to surrounding musculature, bone and plate has been added into the manuscript and figure legend description.

The following is the revised part:

- After the defect size was carefully measured, the PMMA was remodeled to meet the shape of the manubrium during the working stage. Kirschner wires (K wires) were inserted into the cement spacer, creating holes for further suture anchoring (Fig. 7), following which 1–0 Ethibond sutures (Ethicon, Somerville, NJ, USA) were passed through the pectoralis major fascia, medial portion of the clavicle, the J-shaped locking plate and sternum body (Fig. 7). The polypropylene mesh (Marlex, Bard Cardiosurgery, Billerica, MA, USA) was first placed over the mediastinum for protection, and the cement spacer was then introduced into the desire location. The Ethibond sutures passing through the spacer were tightened, ensuring the stability of the thoracic cage. (Case presentation section-treatment, page 8)

3-3. Methods: Will it be better if the spacer was wrapped in a mesh to prevent direct contact with the surrounding musculature and superficial tissue?

Response: Thank you for the carefully reviewing. I totally agree with your comment.

Mesh was first placed over the mediastinum for protection, before the cement spacer was introduced to the desire location.

The following is the revised part:

- The polypropylene mesh (Marlex, Bard Cardiosurgery, Billerica, MA, USA) was first placed over the mediastinum for protection, and the cement spacer was then introduced into the desire location. The Ethibond sutures passing through the spacer were tightened, ensuring the stability of the thoracic cage. (Case presentation section-treatment, page 8)

4 Discussion: Page-8: “In the present case study, the patient was discharged 1 week after surgery.....” This paragraph may be removed from the discussion section. In this part, the authors should present the significance of the technique described in the study (e.g. Reliable? Cost-effective? Easy to accept by the patient?), and compare it with techniques reported in the literature. Meanwhile, what are the strengths and limitations of reconstruction techniques reported in the literature?

Response: *Thank you for the carefully reviewing. I really appreciate your comment. The paragraph about patient discharge was removed as suggested. We also illustrated the significance of our technique and compare the pros and cons with techniques reported in the literature.*

The following are the revised part:

- Several studies have demonstrated various chest wall reconstruction methods in the fields of cardiac and thoracic surgery. Gao et al. reported on the use of titanium sternal fixation systems for reconstruction, while Ma et al. performed sternal reconstruction with 3D custom-made prostheses. Metal prosthesis carries the advantage of establishing adequate chest wall stability, but there are some limitation regarding the use of metal prosthesis including prosthesis dislocation, infection, or inappropriate sizing. The 3D custom made prosthesis provides a reliable option for reconstruction with perfect shape matching but is time consuming, expensive and not readily available in every institution. Allograft transplantation is also discussed in the literature with better biological effect in reconstruction but the source is limited and the risk of disease transmission should also be taken into consideration. (Discussion section, page 10)

- The strengths of our reconstruction technique are as follows. It is reliable and provides adequate chest wall stability. In addition, the low cost is better tolerated by the patient. Furthermore, the procedure is not time-consuming and most orthopedic surgeons are familiar with. Finally, cement is readily-available and the moldability

also offers the advantage of better size-matching, providing personalized treatment. We believe the technique, which yielded promising results, may serve as an alternative in cases such as ours. (Discussion section, page 11)

- Our study has some limitations. First, the shape of handmade cement spacer may not be superior to 3D custom-made prostheses and this is not a biological reconstruction. Second, the maximal strength of PMMA bone cement against chest wall trauma requires further biomechanical study. Moreover, it is a case report with a 1-year follow-up period. Longer follow-up durations, for the monitoring of possible local recurrence or distal metastasis, are still required. Finally, there is a need for large series with control groups to ensure the reproducibility of our findings, and to confirm the radiological and functional outcomes associated with the technique we used as well. (Discussion section, page 11)

Responses to the comments of Reviewer #3

1. This report describes a well-conducted case of chondrosarcoma affecting the upper part of the sternum. Please add a simple CT scan of the largest part of the lesion so as to allow reader to check the inner part of the tumor and its anatomical relationship with mediastinum structures.

Response: Thank you for the carefully reviewing. I totally agree with your comment. The CT scan of the largest part of the lesion along with its description were added into our manuscript, which could be found as Figure 1.

The following are the revised part:

- Computed tomography (CT) with contrast showed focal osteoblastic mass in sternum manubrium region with bony exostosis and adjacent soft tissue calcification. (Case presentation section- Laboratory test and Imaging examination, page 6)