Author’s response to reviews

Title: A three-dimensional printed porous implant combined with bone grafting following curettage of a subchondral giant cell tumour of the proximal tibia: A case report

Authors:

Minxun Lu (minhun@126.com)
Jie Wang (wangjie_bonetumor@126.com)
Fan Tang (tangfan_bonetumor@126.com)
Li Min (minli_bonetumor@126.com)
Yong Zhou (zhouyong_bonetumor@126.com)
Wenli Zhang (wenli_bonetumor@126.com)
Chongqi Tu (tuchongqi@yeah.net)

Version: 2 Date: 13 Feb 2019

Author’s response to reviews:

February 12th, 2019

Dr Yingqi Hua
Editor-in-Chief
BMC Surgery

Dear Editor,

We appreciate the thoughtful comments and suggestions from you and the reviewers regarding our manuscript, “A three-dimensional printed porous implant combined with bone grafting following curettage of a subchondral giant cell tumour of the proximal tibia: A case report” (BSUR-D-18-00546R1). We have addressed each of the editor’s and reviewers’ concerns, with additional clarifications. Specific responses to the editor’s and reviewers’ comments are outlined below. All changes in the revised manuscript are indicated in red text.

Reviewer #1

Reviewer reports:
I wish to thank the authors for their manuscript which proposes that an three-dimensional printed porous implant combined with bone grafting can be an alternative treatment option for a subchondral giant cell tumor of the proximal tibia. This case report mainly focused on the subchondral bone protection in the treatment of Campanacci Grade II GCT, which was crucial to reduce the risk of postoperative knee joint collapse. The case is thoroughly described, comprehensively analyzed and followed for more than 2 years. The background was well organized with presenting other strategies including cement packing, bone grafting, and a combination of cement packing and bone grafting. Furthermore, the benefits of porous implant combined with bone grafting to fill the tumorous cavity was also well presented in the background and discussion sections. The design of porous implant with strut and bearing plate was creative and acceptable. We believe this design of implant could effectively promote bone ingrowth and support the tibial plateau to prevent degenerative changes of knee. Thus, this alternative reconstruction approach with 3D-printed porous implant could be an acceptable option for the treatment GCT of proximal tibia with subchondral area affection. However, considering short follow-up period and insufficient case presentation, the long-term efficacy should be verified in the next further studies. The limitations are well recognized especially for the short period of follow-up. However, some language issues should be checked and solved.

Specific comments:

1. Abstract (Line 31): „with a three-dimensional (3D)-printed porous implant combined…” please add the missing „with”

Response: We have corrected this error. (Lines 31)

2. The authors use two different descriptions for bone grafting, „bone graft” (e.g. lines 28, 31, 43, 67, 75) and „bone grafting”. For the reviewers' best knowledge, only the bone grafting is usual. Please clarify and correct.

Response: We clarify the „bone grafting” is the correct description and eliminate any description errors. (Lines 28, 31, 43, 67, 75)

3. Conclusion (Line 253): change GCTs into GCT

Response: We have corrected this error. (Lines 253)

4.) In the list of references, the authors are inconsistent with respect to paper titles, upper case versus lower case.

Response: We have corrected this formatting issue.
Reviewer #2

Reviewer reports:

Please include all comments for the authors in this box rather than uploading your report as an attachment. Please only upload as attachments annotated versions of manuscripts, graphs, supporting materials or other aspects of your report which cannot be included in a text format.

Please overwrite this text when adding your comments to the authors.

Thank you for inviting me to review this very interesting case report. Currently, for grade I or II GCTs of bone, the treatment after the curettage is still controversial, especially remaining subchondral bone is very less. In this case, the authors might provide a very promising choice for the patients with grade I or II GCTs of bone.

These are my comments:

1. "history": line 82. biopsy should be performed after the imaging assessment, why this description?

Response: Thank you for raising this issue. We apologized for our incorrect description. The biopsy was certainly performed after the radiographical evaluation in this case. We correct the order of imaging assessment and biopsy to eliminate the misunderstanding. (Lines 82-84)

2. "Implant design and fabrication": one question, to increase the mechanical strength, can the strut be solid and have a surrounding 3D-printed structure similar with trabecular bone? Which may be good for bone ingrowth. Rather than simulating the cortex.

Response: Although, solid strut with porous surfacing might have better mechanical strength than the strut we used, which was designed with the porosity and pore size of cortex, the supporting capacity of our strut design was strong enough to reconstruct Lacunar bone defect of proximal tibia. However, the reducing the weight is also the important purpose in our design process. Heavier implant would be an obstacle to the rehabilitation of postoperative joint function. We believe our design might have some advantages with lighter weight. Furthermore, we believe our strut combined with trabecular bone grafting could be more beneficial to the formation of solid and stable biological implant-bone interface than the solid strut with porous surfacing.

3. To exhibit the subchondral bone, articular surface and surrounding soft tissue, the authors should provide preoperative CT images.
Response: Unfortunately, the publication with preoperative CT images were not included in the written inform. We could not provide preoperative CT images without the permission of our patient. However, we already provided the thickness of subchondral bone, which was measured by Tomosynthesis-Shimadzu metal artefact reduction technology (T-SMART). The T-SMART images could be more clearly demonstrated the condition of subchondral bone and articular surface. However, we believe the surrounding soft tissue was less important to reconstruct the lacunar bone defect. Furthermore, surrounding soft tissue could not be clearly shown by the CT scan. Thus, we believe demonstration of subchondral bone, articular surface and surrounding soft tissue obtained by preoperative CT scan was unnecessary.

4. Line 142. They described "the full weight-bearing was gradually performed" how long?

Response: After four weeks of partial weight-bearing with crutches, we evaluated the risk of full weight-bearing and confirmed there is relatively low risk. Then, we encouraged the patients to walk without any crutches.

5. Line 149. the pain should be the rest pain? The patient had a OA history on the X-ray evaluation

Response: In this case report, the pain we needed to assess should be caused by GCT rather than the OA. Which was crucial to demonstrate postoperative oncology outcomes. However, our patient had a mild OA. Thus, we believe the rest pain was the best option to majorly represent cancer pain and to avoid OA pain.

6. Line 184. they should provide the more related references, no the experimental study. in the study, several grafts were compared, not included the cement. they should provide the difference between the cement and grafts.

Response: Although, we appreciate the recommendation of that comparison between the cement and grafts should be provided, considering that the main topic of our case report is the biological reconstruction of lacunar bone defects, we believe the detailed comparison between the our approach and cement packing combined bone grafting would be more attractive to the most of BMC Surgery readers, and be more suitable for the main topic of our case report. Furthermore, we believe our contents of discussion section was useful and comprehensive enough for a case report.

7. Compared with the bone grafts, the advantages using the cement packing? Mechanical strength? Better observed tumor recurrence?

Response: First of all, only a few of studies reported reconstruction of tumorous defect with bone grafting only. However, the supporting strength, restricted source, additional intraoperative damage were the major weakness of this approach. Compared with the cement packing
combined with bone grafting, the approach of cement packing only, as a traditional and old-fashioned reconstruction method, still has a few benefits in the treatment of GCTs, including facility of intraoperative procedures, the ability of anti-infection, and mechanical strength. But, the biological interface between bone and cement would never be achieved. Furthermore, the risk of the formation of sclerotic rim could be higher when cement packing only. Sclerotic rim might be confused with tumour recurrence. Thus, we believe the approach of cement packing only would not take advantages on the tumour recurrence observation.

8. Line 242. the description? In this study, only one case. Why they?

Response: Although, the proximal tibia was one of the most common affected site of GCTs, GCTs are relatively rare. Furthermore, the patients with subchondral bone affected by GCTs in the proximal tibia is extremely rare. Between Dec 2015 and Sep 2018, only two patients were met with our indications and both of them agreed with our treatment approach, which was reconstruction with a 3D-printed porous implant. However, only in one case, followed-up period was long enough to assess the early-term clinical outcomes. Considering presenting format of our study, demonstration one case’s clinical and radiographical outcomes was acceptable for case report. (Lines 242)

9. The copy of "Institutional Review Board approval" should be provided.

Response: After the confirmation of detailed informed consent and study type, which was case report, the ethics issue of our case report was approved by our Ethics Committee. And the copy of proof letter was provided.