Author’s response to reviews

Title: Revision surgery for instrumentation failure after total en bloc spondylectomy: a retrospective case series

Authors:

Kazuya Shinmura (kazuyashinmura@yahoo.co.jp)
Satoshi Kato (skato323@gmail.com)
Satoru Demura (msdemura@gmail.com)
Noriaki Yokogawa (chakkun1981chakkun@yahoo.co.jp)
Noritaka Yonezawa (nori_greenbeetle3322@yahoo.co.jp)
Takaki Shimizu (takaki.shimizu0928@gmail.com)
Norihiro Oku (norihiron09_0820@yahoo.co.jp)
Ryo Kitagawa (ryo415k@gmail.com)
Makoto Handa (makotohana1020@gmail.com)
Ryohei Annen (r_annen@mac.com)
Hideki Murakami (hmuraka@med.nagoya-cu.ac.jp)
Hiroyuki Tsuchiya (seikei@med.kanazawa-u.ac.jp)

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Author’s response to reviews:

August 12th, 2020

Haku Iizuka, MD
Editor
BMC Musculoskeletal Disorders

Dear Dr Iizuka:

We would like to thank you and the reviewers for all the time and effort devoted to the review of our manuscript mentioned above. The reviewers’ comments were indeed incredibly insightful
and greatly appreciated. We believe that the reviewers’ comments have helped improve the quality of our manuscript.

We have addressed the feedback of the editors and reviewers in the revised manuscript, and appropriate changes have been made following the reviewers’ comments. I have attached a detailed list of point-by-point responses to the specific comments of the reviewers following this letter. We have attached a version of the revised manuscript with track changes.

All author details on the revised manuscript are correct. All authors have agreed to authorship and order of authorship for this manuscript, and all authors have the appropriate permissions and rights to the reported data.

We appreciate your re-consideration of our manuscript. We hope that the revised manuscript is now suitable for publication in BMC Musculoskeletal Disorders. I look forward to hearing from you.

Sincerely,

Satoru Demura
Department of Orthopedic Surgery
Graduate School of Medical Sciences
Kanazawa University
13-1 Takara-machi
Kanazawa 920-0961, Japan
Tel.: +81-762-265-2374
Fax: +81-762-234-4261
E-mail: msdemura@gmail.com

Point-by-point response

Reviewer 1:

Comment #1: The authors did not evaluate the risk factors of implant failure in this present study for example; Type of tumor, radiotherapy, level of the TES, the extensive of the resection, cage diameter, construction stiffness, etc. This information may suggest readers to select the proper reconstruction in TES procedure.

Response: Thank you for your advice. As you pointed out, the risk factors of implant failure are very useful information for the reader. We have added type of tumor and the presence of preoperative radiotherapy to the Results section (lines 114-120, page 7) and Table 1. However, this study focuses on the surgical techniques and outcomes of revision surgery for implant failure after TES. According to your advice, we will surely conduct a further study to identify factors associated with implant failure.
This study is a case series of TES using liquid nitrogen–treated bone. The instrumentation failure rate in the present study was higher than previous reports using the same reconstruction method. This could be due to the fact that previous studies used fresh autologous bone for bone grafting. We believe that the use of liquid nitrogen–treated bone itself may be a risk factor, and in consideration of risk factors for this series alone, would result in a bias. We also have the data of TES without the usage of liquid nitrogen–treated bone before 2010. We plan to examine the risk factors of implant failure including this data. Following your suggestion, we will examine and report on the risk factors, including the type of tumor, radiotherapy, level of the TES, the extensiveness of the resection, cage diameter, and construction stiffness in another report.

Comment #2: How did the authors design the reconstruction method in revision surgery?
   a. The authors did not extend the instrumentation in every revision case. What was the reason behind?
   b. When the author used 3 or 4 rods?
   c. What was the reason why the titanium rod was still used in some cases?

Response: Thank you for the comments. They have improved our paper.
   a. In cases without screw loosening, instrumentation was not extended. All of the six cases with extended fixation had screw loosening. We have added this information to the Results section (lines 134-136, pages 8).
   b. c. As you pointed, this retrospective study included various reconstruction methods differed depending on the time of surgery. This is a limitation of the study, and we have added it to the Discussion section (lines 226-227, page 13).
   We also have added the recommended revision procedure based on our findings to the Discussion section (lines 221-222, page 13).

Comment #3: The author stated that one of the major factors that increased the rate of failure after TES was recycling frozen graft. If the authors still use this method (recycling frozen graft), how could the authors prevent instrumentation failure based on the success after revision strategies? Is it possible to Increase the number of rods in the first TES surgery? Lay the autograft around the cage? etc.

Response: Thank you for raising this point. To prevent instrumentation failure after TES, we used a more robust cage and cobalt chrome rods to create a stiffer construct of the operated spine during first TES. We already described this in lines 192-194, page 11. Additionally, we have recently had additional bone graft around the cage in order to facilitate bone fusion. We have added this information to the Discussion section (line 194, page 11)

Reviewer 2:

Comment #1: Could you show intraoperative findings such as location of obvious pseudoarthrosis, presence of metallosis in the results section or tables? The information might be helpful for performing appropriate reconstructive procedures.
Response: Intraoperative findings via a posterior approach did not reveal any obvious pseudoarthroses in the patients because the scar tissue covered the anterior column where the pseudoarthroses existed, but mild metallosis at the rod fracture site was observed in nine patients. We have added this information to the Results section (lines 139-142, page 8).

Comment #2: I think the authors should show body mass index or body weight, because of important factors on breakage and tolerance periods of implants.

Response: Thank you for your advice. We added the data of body mass index to the Results section (lines 113-114, page 7) and Table 1.

Comment #3: After revision surgeries there were bone fusions in 72% patients, this rate was good results, considering in the patients with once instrumentation failures. I would like the authors to discuss why the rate of bone fusion was high and whether it was associated the rate with more rigid instrumentation in revision than in the initial surgeries. Then, please describe your recommend selection of instruments such as three or four rods, anterior struts from these findings in discussion.

Response: Thank you for your advice. We believe that robust restabilization of the posterior instrumentation increased the stability of the spine, which facilitated bone fusion within the cage. Furthermore, bone fusion at the posterior aspect of the spine, which could not be applied in the primary surgery without the scar tissue of the resected vertebral area, was achieved earlier than that within the cage in cases where posterior bone grafting was performed. We believe that attaining bone fusion at the posterior aspect further increased the stability of the spine and favored bone fusion within the cage. We have added this to the Discussion section (lines 213-219, page 12-13), and we also added our recommended revision procedure (line 221-222, page 13).