Author's response to reviews

Title: Treatment of Periprosthetic Femoral Fractures after Femoral Revision Using a Long Stem

Authors:

Youngwoo Kim (woochan76@hotmail.co.jp)
Chiaki Tanaka (c.tanaka@kyoto.zaq.jp)
Hiroshi Tada (tadah4416@gmail.com)
Hiroshi Kanoe (kanoehiroshi@gmail.com)
Takaaki Shirai (takaakis@kuhp.kyoto-u.ac.jp)

Version: 4  Date: 17 February 2015

Author's response to reviews: see over
Author`s response to reviews

Title: Treatment of Periprosthetic Femoral Fractures after Femoral Revision Using a Long Stem

Authors:

Youngwoo Kim (woochan76@hotmail.co.jp)
Chiaki Tanaka (c.tanaka@kyoto.zaq.jp)
Hiroshi Tada (tadah4416@gmail.com)
Hiroshi Kanoe (kanoehiroshi@gmail.com)
Takaaki Shirai (takaakis@kuhp.kyoto-u.ac.jp)

Version:

Author`s response to reviews: see over
Thank you for consideration of our manuscript for publication in your journal.
We have reviewed the above manuscript according to your reviewer’s comments.

Reviewer's report:

MAJOR COMPULSORY REVISIONS

This is a retrospective study that looked at 11 patients with periprosthetic femoral fractures following femoral revision with a long stem. 9 patients were treated with ORIF and 2 had revision with a long stem. 1 patient from the ORIF group failed to united, the plate broke and revision to a long stem was performed. Average time of union was 5 months. The authors concluded that in this situation most cases of B1 fractures can be treated with ORIF and advocated for femoral component revision in patients with a transverse fracture and a poor bone quality.

The following clarifications need to be made before this paper gets accepted for publication.

Abstract page 2, line 3: I cannot see the relevant of mentioning specific bipolar hemiarthroplasty. Periprosthetic femoral fractures (PFFs) happen also following standard monopolar hemiarthroplasty

The reviewer is correct and we have changed the sentence “bipolar
hemiarthroplasty” to “hemiarthroplasty” in our manuscript as the reviewer indicates.

Abstract page 2, line 8: please rephrase the sentence. The mean numbers of previous…… Most likely take out the word “times”.

We have changed this sentence to as the reviewer indicates. :
The mean numbers of previous surgeries were 3.1 (2 to 5).

Background, page 4 line 4: again PFFs happen also after monopolar hemis.

The reviewer is correct and we have changed the sentence “bipolar hemiarthroplasty” to “hemiarthroplasty” in our manuscript as the reviewer indicates.

Background, page 5 line 7: correct spelling is Orthopaedic
Change made as indicated by the reviewer.

Methods, page 6: line 6. Please rephrase and exclude times
We have changed this sentence to as the reviewer indicates. :
The mean numbers of previous surgeries were 3.1 (2 to 5).

Methods general question: How many surgeons?
We have included this sentence in the last line of the methods section as the reviewer indicates; All operations were performed by two experienced senior surgeons (CT and YK).

Results, page 8, line 8: Why two different treatments with ORIF, why some got locking plates and 2 dall miles?
We have used the Dall-miles system for treatment of periprosthetic fracture between 1998 and 2004. Locking plates were not available in our hospital during this period. Recently, many reports suggest that the locking plates provides improved fixation for treatment of periprosthetic fracture. Therefore, we have been using the locking plates after 2004.

Results, page 8, line 9: what was the criteria for adding bone graftin?
As shown in the table we did not use the bone grafting in 3 cases. These fractures were oblique fractures without comminution and the absolute reduction of these fractures were possible. We have added bone grafting according to the following criterias: 1) transverse fracture, and 2) short oblique fracture with comminution.
We have added this sentence to the Methods(page7, line2):

We have added bone grafting in cases of transverse fracture or short oblique fracture with comminution.

Results, page 8, line 11. On the second case of long stem revision you have to give more info here at the results. I appreciate you mention more details in the abstract and in the discussion but the authors who reads that here does not understand why the second case had long stem revision and why it was reinforced with a locking plate.

The reviewer is correct and we have added this sentence to the Results(page8, line11):

This patient was a 73-year-old female who had undergone revision surgery using impaction bone grafting because of aseptic loosening of the long stem after hemiarthroplasty. Six months after revision, this patient sustained a periprosthetic femoral fracture and had required revision arthroplasty using long stem because of very poor bone quality (cortical index; 13.8%) and had required reinforcement with a locking compression plate fixation because the length of the long stem available seemed to be insufficient and the reduction was not ideal (in valgus alignment).

Results, page 9, line 1: Union did not occur in all patients, as you mentioned 1 patient had failure of metalwork and in your abstract I guess this is the same patient you describe as not united.

The reviewer is correct and we have changed this sentence:

Union occurred in all patients except one without malunion or infection. This failed case with breakage of the plate had a bone defect at the fracture site, and revision surgery using a cementless long stem and allografts was successful.

Results, page 9, line 3: One implant had to be revised, it was the broken plate.

The reviewer is correct and we have changed this sentence:

None of the implants were radiographically loose at final follow-up.

Results, page 9, line 4: you have to elaborate slightly more and explain things in relation to the JOA hip score. Also how has this developed / improved from post op to the final follow up? Or was it done only at the final follow up?

JOA hip score was evaluated only at the final follow up. These patients were elderly and were not able to walk immediately after operation. However, all patients were
able to walk with walking aid at the final follow up. JOA hip score 67.2 means that all patients were able to walk and return to the preoperative activity of daily living at the final follow up.

Discussion page 10. You write: we found several important features that might influence the outcome of the patients. But then you do not elaborate. On first instance you mention that all cases were Vancouver B1. How is this an important factor? Second you mention the transverse fractures, you have to elaborate slightly more. There is recent literature to suggest that transverse fractures in poor bone quality are unstable and should not be treated just with locking plates.

The reviewer is correct and we have added these sentences to the Discussion:

(page 10, line 1) In general, Vancouver type B1 fracture should be treated with open reduction and internal fixation. However, good fixation was less easily achieved in the presence of osteoporosis, which is common in this group of patients (Marsland & Mears, 2012).

(page 10, line 3) Recent study of short oblique or transverse Vancouver type B1 fracture reported less satisfactory results and concluded that locking plate alone are insufficient for the treatment of periprosthetic femoral fracture and should be supplemented with cortical strut grafts (Buttaro, Farfalli, Paredes Núñez, Comba, & Piccaluga, 2007).

Discussion Page 11, line 6: You have not defined as yet how you assess bone quality. Is it with the Dorrs index? With the canal thickness ratio?

We have assessed the bone quality using cortical index (Gruen, 1997) and added these sentences to the Methods (page 7, line 2) and Results (page 8, line 6):

(page 7, line 2) The bone quality of these fractures was assessed using cortical index (Gruen, 1997). Gruen have reported that the mean value of cortical index was 50.9% in patients with degenerative joint diseases and 43.9% in patients with femoral neck fractures.

(page 8, line 6) The mean cortical index was 20.5% (13.8 to 34.0%).

In the first revision case (Table 1, Case 4), cortical index is 15.3%. We have added these sentence to the Results (page 8, line 11):

In this case, cortical index was 15.3%.

In the second revision case (Table 1, Case 3), cortical index is 13.8%. We have added these sentence to the Results (page 8, line 11):

(cortical index; 13.8%)

We have added this sentence to the Discussions:
These patients had very poor bone quality because of osteoporosis and previous surgeries.

Discussion, page 12, lines 11-12. Please reference both these statements.

We have changed this sentence and some references were added:

(page12, line11) Stress concentration at the end of the stable stem seems to be much higher than that of the standard stem(Bobyn et al., 1992)(Engh & Bobyn, 1988).

Discussion, page 12, line 13: Can you please explain in more detail what was this matched group?

A control group involved 11 patients (11 hips, female n=11) undergoing primary THA at a mean age of 78.1 years (72-86). The mean cortical index of the control group was 53.7 (42.7-63.2). We have added these sentence to the Discussions (page12, line13):

(11hips, female n=11, mean age; 78.1, mean cortical index: 53.7)

Conclusions, page 13: you mention that a transverse fracture with poor bone stock needs femoral revision. But 4 out of the 9 patients you treated with ORIF had transverse bone fractures and some of them had bone graft which means that you thought the bone quality was not adequate. The question that rises is why you did not chose to revise the femoral component then.

We suggest that first choice of treatment for Vancouver type B1 periprosthetic femoral fracture after revision using the long stem is open reduction and internal fixation using the locking plate. In transverse fracture, bone grafting was necessary to improve fracture healing and increase bone stock. However, we recommended that transverse fracture with very poor bone quality (such as cortical index < 20) might be considered as a type B3 fracture, and femoral revision might be the treatment of choice.

We have added this sentence to the Discussion;

(page13, line1) A transverse fracture with very poor bone quality (cortical index<20%) or bone loss might be considered as a type B3 fracture, and femoral revision might be the treatment of choice.

Also the limitations paragraph should be before the conclusions.

The reviewer is correct and we have added these sentences to the Discussion:

(page13, line5) There are several limitations to this study. First, this study was retrospective design and the lack of a patient control group for comparison. Secondly, the series was too small and the follow up period was short. Thirdly, the strategies of treatment
for fractures were heterogeneous (e.g., Dall-miles system, locking plate, cementless long stem, and cemented long stem).

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests

Reviewer's report
Title: Treatment of Periprosthetic Femoral Fractures after Femoral Revision Using a Long Stem
Version: 3 Date: 20 January 2015
Reviewer: Mauro Spina

Reviewer's report:
Thank you for inviting me to revise this article on periprosthetic fractures of the hip.

It is an interesting work because there are few series in the literature of periprosthetic fractures in only revision prosthesis with this follow up.

This series is composed of 11 cases treated for femoral periprosthetic fracture after femoral revision using a long stem. For the classification was used Vancouver classification (METHODS page 7 line 1). All 11 periprosthetic fractures were classified as Vancouver B1 (RESULTS page 8 line 4-5, DISCUSSION page 10 line 1). Because is successively affirmed that the most of the patients had poor quality bone at the level of the fracture, due to osteoporosis and previous surgeries (DISCUSSION p. 10 line 6-7), then I would think that these fractures were not Vancouver B1 but Vancouver B3 fractures. So either there was an error of initial classification of fractures or should be clarified better these concepts.

The reviewer is correct and we also suggest that Vancouver type B1 fracture with very poor bone quality or bone loss such as fracture after revision using long stem might be considered as a type B3 fracture. However, our series were periprosthetic fracture with well-fixed stem. According to the Vancouver classification, these fractures were classified as type B1 fracture and recommended to be treated with open reduction and internal fixation.
We recommended that transverse type B1 fracture with very poor bone quality such as cortical index < 20% might be considered as a type B3 fracture, and femoral revision might be the treatment of choice.

Furthermore the clinical evaluation was based on the Japanese Orthopedic Association score (JOA) (METHODS p. 7 line 7-8). Would be added in a table with the criteria taken into consideration or a bibliographical reference of the JOA score.

Some references were added.

------------------------------------Always insert the references for each statement. For example in the BACKGROUND on the claim (page 4 line 6): are a major complication of THA and BHA must add the bibliographic reference

Some references were added.

Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests: 'I declare that I have no competing interests'