Author's response to reviews

Title: Reverse LISS plating for intertrochanteric Hip Fractures in elderly patients

Authors:

Zhang CQ Shanghai Sixth People's Hospital (zhangchqin@yahoo.cn)
Sun Y Shanghai Sixth People's Hospital (sycedar@hotmail.com)
Chen SB Shanghai Sixth People's Hospital (chengshengbao@126.com)
Jin DX Shanghai Sixth People's Hospital (david1979982@126.com)
Zeng BF Shanghai Sixth People's Hospital (zeng21109@sohu.com)

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Author's response to reviews: see over
Dear editor:

Thank you and all the reviewers for the kind advice. We revised the manuscript in accordance with the reviewers’ comments, and carefully proof-read the manuscript to minimize typographical, grammatical, and bibliographical errors. Should you have any questions, please contact us without hesitate.

Here below is our reply to the comments on MS: 2242316302815313

**Reviewer: Professor Michael Zlowodzki**

1. Comments:

The AO classification is not useful for proximal femur fractures. It is much more useful to know 1) how many of the fractures had a subtrochanteric extension, 2) how many were reverse oblique, 3) how many had a comminution of the posterior-medial cortex, and the remainder stable. Please present your results separately for those groups and the remaining stable fractures. (This is essentially the Evans classification)

Reply:

Thanks for the reviewer’s suggestion. We have revised the corresponding section according to Evans classification.

According to the Evans classification, there were 2 Type I fractures, 2 Type II fractures, 3 Type III fractures, 13 Type IV fractures, 6 Type V fractures and 2 Type R fractures. Among them, 10 fractures had a subtrochanteric extension, 2 fractures were reverse oblique, 11 fractures had a comminution of the posterior-medial cortex.

2. Comments:

What was the weight-bearing protocol for the patients?
On the second postoperative day, range of movement exercises and straight leg lifts were started. On the third postoperative day, patients began walking using crutches or a frame, with touch-down weight-bearing. Progressive weight-bearing was encouraged. One month after surgery, the patients were mobilized and full weight-bearing weight bearing without any limitations.

3. Comments:

The first paragraph of the discussion states “The key to understanding the problem of hip fractures was once addressed by Koval and Zuckerman 8, who stated that ”all too often, the operation is successful in terms of healing of the fracture but the patient is unable to regain the pre-injury level of function and independence. Based on the view that hip fractures are a complex coupling of fragile patients with fragile bone, an optimal treatment method should address both issues9. We think that the reverse LISS plate is such a system.” Since no functional outcomes are presented in this study this paragraph should be deleted.

Reply:

We agree with the reviewer’s idea. We have deleted the paragraph in the discussion.

4. Comments:

The methods sections contains actual results. All numbers related to the sample population need to be presented in the results (avg. age, fracture classification etc)

Reply:

According to the reviewer’s comments, we made the corresponding revision in the
manuscript.

5. Comments:

Table 1: You can’t say that the alignment and range of motion is “normal”. You either have to delete those two column of present the actual values. Delete “side”– it’s irrelevant whether the left of right side was operated on. What is the “Traumatic Hip Rating Scale.”

Reply:

According to the reviewer’s comments, the corresponding revision has been made in the manuscript.

With respect to “Traumatic Hip Rating Scale.”, we referred to the following article:

6. Comments:

Figure 3: Some of the screws penetrate the far cortex. Is that on purpose? Did you try to achieve bicortical fixation in all fractures. It looks like two of the screw are not locking screws, but actual lag screws. You did not mention that in your surgical technique! Please add. How often did you do that? Always?

Reply:

Thanks for the reviewer’s comments. During the operation, some of the screws did penetrate the far cortex, but that is not on purpose. As a fixation technique, “LISS” system can be considered as a biomechanical internal fixator. Its angular stable locking screws act as an internal fixator to transfer the load over the screws along the
bone axis, which differs from conventional plates to transfer the strain in an axial loading. In our opinion, bicortical fixation is not necessary for these fractures. Single cortical fixation also could be used.

In the presented case, two lag screws were used to fix the medial fracture fragments. When the medial fracture fracture fragments were large, the lag screws could be used. Not always.

7. Comments:

Figures 4 and 5 demonstrate that the locking screws are backing out. Given the current interest in locking plate for proximal femur fractures it would be very important to know how often that happened in this study. Please add this to your results.

Reply:

Thanks for the reviewer’s comments. We have added this section to the results.

The situation (backing out and loosing of the locking screws) did not often happened in this study. According to our data, in all 28 cases, backing out and loosing of some locking screws was observed in 2 cases, which were performed in initial stage of our technique. In our opinion, backing out and loosing of the locking screws may well be related with the placement of the plate. As we know, there is a fixed angle between the screw and the plate of locking plate system, at the beginning of this technique, we encountered the problem that how to make the directions of screws optimal for fixation of proximal fragment and be locked with the plate at the same time. By research on the cadaver bone and clinical practices, we find the placement of the plate
is very important. In order to allow multiple screws up the femoral neck fragment and be locked, the plate should be externally rotated by 5-10 degrees and be placed below the top of great trochanter. In proximal femur, at least three locking screws should be used and locked. The situation (backing out and loosing of the locking screws) did not happen after we pay attention to these tips.

8. Comments:

A major downside of this study is that no functional outcomes are presented. Limitations of this study need to be presented in the discussion section.

Reply:

Thanks for the reviewer’s comments. Limitations of this study have been added to the discussion section in the manuscript.

**Reviewer: Professor A. Alex Jahangir**

1. Comments:

First, what is the weight bearing status of these patients after surgery?

Reply:

On the second postoperative day, range of movement exercises and straight leg lifts were started. On the third postoperative day, patients began walking using crutches or a frame, with touch-down weight-bearing. Progressive weight-bearing was encouraged. One month after surgery, the patients were mobilized and full weight-bearing weight bearing without any limitations.
2. Comments:

Secondly, and more importantly, the 4 & 16 week post operative x-rays that the authors submitted for their case demonstrated that even the locking screws have backed out and are loose. The author need to address this and also provide the journal at least 2 additional cases which demonstrate the 4 and 16 week post op x-rays without any hardware failure. I believe that this is a Major Compulsory Revisions that needs to be addressed prior to approval for publication.

Reply:

Thanks for the reviewer’s comments. We have added this section to the results.

The situation (backing out and loosing of the locking screws) did not often happened in this study. According to our data, in all 28 cases, backing out and loosing of some locking screws was observed in 2 cases, which were performed in initial stage of our technique. In our opinion, backing out and loosing of the locking screws may well be related with the placement of the plate. As we know, there is a fixed angle between the screw and the plate of locking plate system, at the beginning of this technique, we encountered the problem that how to make the directions of screws optimal for fixation of proximal fragment and be locked with the plate at the same time. By research on the cadaver bone and clinical practices, we find the placement of the plate is very important. In order to allow multiple screws up the femoral neck fragment and be locked, the plate should be externally rotated by 5-10 degrees and be placed below the top of great trochanter. In proximal femur, at least three locking screws should be used and locked. The situation (backing out and loosing of the locking screws) did not
often happen after we pay attention to these tips. We provided additional two cases.
Case 25
A 78-year-old man had communicated fracture of the left proximal femur which had been treated by reverse LISS.

Figure 1. Initial radiograph of the case showing unstable intertrochanteric fractures of the left femur. Figure 2. Lateral radiograph and AP radiograph at 4 weeks post fixation

Figure 3. AP and lateral radiograph at 16 weeks post fixation showing union of the fractures

Figure 4. AP and lateral radiograph at 1 year post fixation showing union of the fractures
Case.12
A 75-year-old woman had intertrochanteric fracture of the left femur which had been treated by reverse LISS.

Figure 1. Initial radiograph of the case showing intertrochanteric fractures of the left femur.
Figure 2. Lateral radiograph and AP radiograph at 8 weeks post fixation
Figure 3. AP and lateral radiograph at 16 weeks post fixation showing union of the fractures