Author’s response to reviews

Title: Hip stability after total hip arthroplasty predicted by intraoperative stability test and range of motion: a cross-sectional study

Authors:

Hiromasa Tanino (tanino@asahikawa-med.ac.jp)
Tatsuya Sato (s-tatsu@zd5.so-net.ne.jp)
Yasuhiro Nishida (nishiday@asahikawa-med.ac.jp)
Ryo Mitsutake (mitutake@asahikawa-med.ac.jp)
Hiroshi Ito (itohiro@asahikawa-med.ac.jp)

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AUTHOR’S RESPONSE TO EDITOR’S COMMENTS 7/9/2018

The authors wish to thank the Editor for invaluable suggestions. The manuscript has been revised according to the editor’s comments. A point-by-point reply is given below. The line, figure and table numbers noted in the replies refer to the revised manuscript. In the following response, the editor’s comments are shown in italics and our responses appear immediately below in normal type.

Comment 1: Please rewrite the manuscript according to the Strobe guidelines.

Reply: Manuscript was rewritten according to the Strobe guidelines [1]. Below was added or changed.

Title

Title was changed to ‘Hip stability after total hip arthroplasty predicted by intraoperative stability test and range of motion: a cross-sectional study’.
Abstract

Abstract was completely rewritten according to the Strobe guideline.

Page 6; Line 47:

Hospital name (Asahikawa Medical University Hospital) was described instead of one hospital.

Fig. 1

A flow diagram was added to depict patient inclusion and exclusion.

Table 1

‘No data missing.’ was added.

Page 11; Line 121-124:

A short summary of the main findings of this study was described at the beginning of Discussion. ‘We investigated the usefulness of intraoperative stability tests, and other risk factors to predict hip stability after THA. Intraoperative stability testing, especially IR angle, was a useful method to predict hip stability after THA, and a larger intraoperative ROM reduced the likelihood of dislocation after THA with a cutoff point of 51°. Cerebral dysfunction and a history of previous hip surgery are also risk factors for the incidence of dislocation after THA.’

Comment 2: Include subheadings in M&M and results, ie study population, data collection, surgery (approach, implant etc) and statistics.

Reply: Subheadings (Study population, Surgery, Data collection, and Statistical analysis) were included in Methods.
Comment 3: Statistics: highlighten your power calculation, include baseline data in the multivariate log reg calculation, C-statistics with ROC curves are valuable in deciding the cut of value for the degrees.

Reply: We discussed the analyses with a statistician. Power calculation for IR angle was performed. Multivariate logistic analysis was performed using all eight variables; age, height, weight, gender, cerebral dysfunction, preoperative diagnosis, history of previous hip surgery, and IR angle in the revised manuscript. ROC curve was applied to determine the cut of value for IR angle. The cutoff value for IR angle was 51°.

Power calculation for IR angle

A large series study reported the dislocation rate after THA was 2.84% [2]. In the study measuring intraoperative ROM, standard deviation of IR angle was 8.1 [3]. If the true difference in the patients with posterior dislocation and patients without dislocation is 10, we need to study 5 patients with posterior dislocation and 171 patients without dislocation to be able to reject the null hypothesis that the IR angles of the patients with posterior dislocation and patients without dislocation are equal with probability (power) 0.8. The Type I error probability associated with this test of this null hypothesis is 0.05.

This study included ten patients with posterior dislocation and 175 patients without dislocation. According to the power calculation, it is possible for this study to investigate IR angle.

Logistic regression analysis

In our previous manuscript, logistic regression was performed using the variables that were statistically significant in a chi-square test or an unpaired t-test. So, cerebral dysfunction, history of previous hip surgery, and IR angles were used as the variables, and logistic regression analyses determined that significant risk factors were the presence of cerebral dysfunction, history of hip surgery, and IR angle. In the revised manuscript, logistic regression was performed using all eight variables; age, height, weight, gender, cerebral dysfunction, preoperative diagnosis, history of previous hip surgery, and IR angle. Logistic regression analyses determined that significant risk factors were same as before; the presence of cerebral dysfunction, history of hip surgery, and IR angle. So, we think logistic regression analyses in this study are robust.
We greatly agree that ROC curve is valuable in deciding the cut of value for IR angle. In the revised manuscript, ROC curve was applied to determine the cut of value for IR angle, the cutoff value for IR angle was 51°. We added below sentences and Fig. 2.

The receiver-operating characteristic (ROC) curve analysis suggested that the optimal cutoff point for IR angle was 51° (area under curve=0.768). Dislocation rate in larger IR angle group was significantly lower than the rate in smaller IR angle group when patients were divided by 51° (p=0.002). (Page 3, Line13-15)

Receiver-operating characteristic (ROC) curve was applied to determine the optimum cutoff point for IR angle. The cutoff point was determined by the Youden index [13]. The area under curve (AUC) was also calculated from ROC curve. (Page 8, Line84-86)

The ROC curve analysis suggested the optimal cutoff point for IR angle was 51°, with a sensitivity of 0.50, a specificity of 0.95, a positive likelihood ratio of 9.67, and a negative likelihood ratio of 0.53. The AUC measured 0.768 (p=0.004, 95%CI 0.621-0.915). Dislocation rate in larger IR angle group was significantly lower than the rate in smaller IR angle group when patients were divided by 51° (3.5% vs 33%; p=0.002). (Page 9-10; Line 109-113)

References:
