Author's response to reviews

Title: Risk factors for rod fracture after posterior correction of adult spinal deformity with osteotomy: a retrospective case-series

Authors:

Cameron Barton (Cameron.Barton@UCDenver.edu)
Andriy Noshchenko (Andriy.Noshchenko@ucdenver.edu)
Vikas Patel (Vikas.Patel@ucdenver.edu)
Christopher Cain (Christopher.Cain@ucdenver.edu)
Christopher Kleck (Christopher.Kleck@ucdenver.edu)
Evalina Burger (Evalina.Burger@ucdenver.edu)

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Author's response to reviews: see over
To Whom It May Concern:

Thank you for considering our study “Risk factors for rod fracture after posterior correction of adult spinal deformity with osteotomy: a retrospective case-series” for publication. We believe this study is important to publish due to its significant findings pertaining to risk factors for rod fracture after osteotomy for adult spinal deformity. Surgeons should be aware of these risk factors in order to decrease the incidence of rod fracture in their patients. We have no issues relating to the editorial policies of *Scoliosis* and have no competing interests to disclose.

We would like to sincerely thank the reviewers for their comments. Below is our response to each comment by reviewer:

Reviewer #1, Jean Dubousset

1) “Unfortunately no study was done about the amplitude of motion in 3D around the neutral zone even done clinically to check the long term risks and results.” Thank you for your comments, we appreciate your help in improving the quality of our manuscript. You are correct, we didn’t perform a neutral zone analysis in these patients. This was a retrospective review, and the only data available for collection was data already listed in the patient’s medical chart or from previously obtained radiographs. Unfortunately, it is impossible for us to include any details about the neutral zone in these patients.

2) “Missing are recommendations for the surgeons doing such care to these patients. It seems to me that this can be done easily by the authors.” Thank you for this comment. As this is a retrospective case series, the significant data only can show association of a specific variable and outcome. This was represented by odds ratios, corresponding to risk factors for rod fracture in our study. Because this only shows association, we initially didn’t feel that making clinical recommendations based on these associations is sufficient, as further studies should be conducted to confirm these findings. However, after your recommendation we did add a final paragraph in the discussion that gives recommendations based on our initial findings, but provides the disclaimer that these results are preliminary and reminds readers of the study limitations. This is found in the last paragraph of the discussion.

Reviewer #2, Anastasios Christodoulou

1) “What is the benefit of bone grafting [autografts or other types]. Bone grafting has not been mentioned at all. If there has been used, what was its influence to the bony fusion and finally the long term protection to the metal work from failure?” Thank you for this comment, as addition of bone is an important factor in posterior fusion constructs. As it was surgeon preference at our
institution to add bone graft in all patients undergoing long posterior fusion, all patients in this series received bone graft, classifying these fusions as posterolateral fusions rather than posterior fixation alone. Therefore, we couldn’t identify any affect that addition of bone grafting posteriorly had on rod fracture, as all patients in this series received bone grafting posteriorly. With regards to anterior interbody fusion with bone graft, we didn’t analyze differences based on the specific interbody device or allograft type, only the presence of this device after surgery. The rationale for this decision pertains to the fact that many patients had previous anterior fusions that were incorporated into the later posterolateral fusion with osteotomy. Incomplete records were found pertaining to the type of interbody device (e.g. femoral ring allograft, PEEK cage, titanium cage, etc) and confounders likely existed with this incomplete data. Therefore, we decided to analyze for presence of interbody device after the osteotomy surgery, which would include both previous anterior fusions and anterior fusions performed during the osteotomy operation. We found no difference in rod fracture outcomes with respect to presence of interbody fusion post-osteotomy. With regards to the specific type of bone graft, this wasn’t documented sufficiently in the medical record, and therefore wasn’t analyzed as a risk factor. We have added several statements about this in the manuscript to clear up the ambiguity of bone grafting in this study.

2) “Do the authors have to propose a reliable method of early recognition of pseudarthrosis before metal work failure?” Thank you for this comment. Evaluating methods of pseudarthrosis detection was outside the aims of our study goals. However, this study does show that patients with evidence of radiographic nonunion after 1 year postoperatively should be regarded as at risk of device failure, and thus they should be at more careful observation. We have added this statement in the manuscript.

The following documents have been uploaded via online submission:

1. Title Page
2. Abstract
3. Revised Manuscript Body with Tables
4. Figures 1 and 2

Please feel free to contact me if there are any questions during the continued review.

Sincerely,

Cameron Barton
MD Candidate 2016
Department of Orthopedics
Cameron.Barton@ucdenver.edu