Reviewer's report

Title: Reinstrumentation for Rapid Curve Progression After Implant Removal Following Posterior Instrumented Fusion in Adolescent Idiopathic Scoliosis: A Case Report

Version: 1 Date: 24 March 2013

Reviewer: Tomasz Kotwicki

Reviewer's report:

Every case of complication consisting of rapid deterioration after scoliosis implants removal is interesting and worth publishing. This case report requires several major and minor revisions.

The authors present a case of loss of correction after implant removal as unusual complication which is true. However, their explanation of the situation does not seem to sufficiently analyze the case. This reviewer's opinion is that the reader should not be left with a message that "such miracle can happen" as the authors seem to pass in their case report.

The authors identify the curve as Lenke 1 type. Is it really? It looks much more Lenke 2 (double thoracic) with structural left proximal Th1-Th5 curve. No bending for this curve is presented. Also, this curve follows King's description for King type V (Th1 is not horizontal but tilts into concavity) so description of a double thoracic one. It seems that the authors did not recognize the curve type up to their final operation: the transverse hook on the right side directed distally should be better replaced with any implant that allows opposite force (screw or pedicle hook) while a transverse hook would be helpful on the left side to diminished obliquity of Th1 and resulting shoulder imbalance.

It can be matter of debate whether instrumentation of one distal thoracic curve only in case of double thoracic scoliosis could contribute to the loss of correction after implant removal. One possible mechanism of correction loss is that rebalancing the shoulders by postural control system might increase left proximal thoracic curve and secondarily right thoracic main curve. This mechanism is not sure based on examination of Xrays attached which do not prove change of shoulder level. Another mechanism possible would be by forces raised by the kyphotic junction of the proximal and the main thoracic curves. Junctional kyphosis is well seen and contributes to diagnosis of Lenke 2 and not Lenke 1 type. This mechanism is also not sure.

So, the possible explanation of this rare complication is lack of good quality spinal fusion at first surgery together with lack of good quality revision of spinal fusion during the second surgery. Then, implants removal has finally created good conditions for spinal fusion which developed during the period between the second surgery (removal surgery) and the third surgery (re-instrumentation
surgery). This option should be at least discussed.

The authors’ speculation that a simple instrumentation is more risky for non-fusion than pedicle screw construct is really groundless. We experienced hundreds of patients operated on with simple Harrington distractor (one rod, two hooks) who had systematic implant removal three years later and who did not lose more than usual 5-10 degrees. This reviewer would argue the opposite: more complex the instrumentation, less place and less time for good quality spinal fusion.

The authors’ conclusion: “do not remove implants” seems somewhat too general. At least three other options should be mentioned and discussed: (1) CT scans or bone scintigraphy before implant removal to evaluate quality of spinal fusion, (2) intraoperative careful check of spinal fusion and meticulous re-fusion with iliac graft or bone substitutes, (3) postoperative cast/brace immobilization.

On the other hand, the authors can be congratulated for honest referring of the complication in spite of the policy of systematic implant removal adopted previously. This reviewer had used systematic implant removal during the time of Harrington rod but not after the segmental instrumentation arrived because then the removal surgery became as big and risky as the original surgery.

Page 4, Line 16/17: The reason for implant removal was (1) prominent implant or (2) avoiding corrosion or both? There is no mention about implant corrosion in this patient.

What was the indication for irradiating CT myelogram in a healthy adolescent with normal neurological exam and normal MRI, performed before the first surgery?

Why the CT was not performed before the second surgery (removal surgery)?
On CT scans, did the authors examine the transverse and the sagittal scans level by level or did they only looked at the posterior surface of the fusion mass as illustrated by the Figure 4 (this is not enough).

Finally, the authors can be congratulated for nice reinstrumentation and good final result.

Minor revision
Page 6, line 2: should be “during her third operation”

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Declaration of competing interests:

I declare that I have no competing interests.