Reviewer's report

Title: Evaluation of Implant Loosening Following Segmental Pedicle Screw Fixation in Adolescent Idiopathic Scoliosis: A 2 Year Follow-up with Low-Dose CT

Version: 4 Date: 20 June 2014

Reviewer: Ian Stokes

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Major Compulsory Revisions

The purpose and significance of the work remain unclear since the degree of concordance between (1) evidence of loosening by CT (2) evidence of loosening by plain radiography (3) pseudo-arthrosis and pain, is not thoroughly addressed. Especially the apparent high sensitivity of CT may be evidence of false positives, since in Table 3 there are 15 cases of loosening by CT, no loosening by plain x-ray. Also, in Table 2 there are 28% of cases of apparent loosening (by CT) but no pain.

Specifically:

(1) the Abstract makes no mention of plain radiography or of patients’ reports of pain, while the Introduction additionally states "Subsequent aims were to evaluate the degree of correction loss in the short term and to find out if the occurrence of loosening had any impact on the clinical outcome. Furthermore, we aimed to compare the rate of screw loosening detected by CT with that using plain radiography." The Tables and Results provide substantial information about these aspects, but the paper provides little insight into interpretation of the findings. For instance, the Results state that there was poor agreement between CT and plain radiography, but there is no discussion of which radiological method might be the more accurate, and therefore preferable in clinical follow-ups.

(2) The Discussion provides comparisons between the present findings and those in the literature without adequate explanation of (1) whether comparisons are being made between CT and plain radiography (whose agreement is shown here to be poor), and (2) whether the clinical series referred to are for pedicle screw usage in adolescent patients with scoliosis (as in the present study) or adult patients with degenerative or other conditions. The Discussion and Conclusions state that CT is more sensitive than plain radiography in detecting evidence of implant loosening. The reader is left unclear as to whether this additional sensitivity provides greater accuracy, or whether it provides false positive information - therefore it is unclear which radiological method is preferable.

Somehow the authors should provide a clear explanation of what they sought to determine by means of the present study, and how the findings should be
interpreted - i.e. the authors recommendations for radiological examinations in
follow-up of these patients.

Minor Essential Revisions:
Abstract, Results, Line 10: "1 patients" -> "1 patient"

Introduction, paragraph 1, line 3: explain 'weight bearing forces' (with respect to
failure of pedicle screw fixation. Probably the muscular forces are more important
than gravitational forces.

Page 5, penultimate paragraph, line 2: this would be reports of pain, not
occurrence of pain in medical records, presumably.

Page 7, first full paragraph: 'Among patients with evidence of loosening,' Authors
should clarify that this is evidence of loosening by CT.

Page 7, first full paragraph: ‘The misplacement rate for the whole amount of
screw was 11.8 %’ - delete ‘for the whole amount of screw’.

Throughout the manuscript use the abbreviation 'et al.' for 'et alia' as is the
normal convention.

Page 10, Conclusion, line 3: 'loosening *occurs*'.

Page 10, Conclusions, line 3: 'Evidence of loosening *occurred* in one third of
patients'.

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

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