Reviewer's report

Title: Minimally Invasive Scoliosis Surgery in Adolescent Idiopathic Scoliosis: Surgical Technique

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Reviewer: Neel Anand

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MAJOR COMPULSORY REVISIONS NEEDED

The authors describe a minimally invasive surgical treatment for Adolescent Idiopathic Scoliosis. This truly pertains to a vulnerable small subset of patients at the tender young age of their development.

The technique described consists of three small midline incisions to access the spine, through which instrumentation; correction maneuvers and fusion are all performed. This raises many questions as to the efficacy of this technique.

Scoliosis surgery in the adolescent is very well documented in the literature with excellent outcomes and near perfection with today's traditional techniques. This reviewer believes that for any new technique to be used the clinical results and functional outcomes must justify its use both in early and long term follow-up. Unfortunately the authors give us no clinical data to justify any of the perceived benefits that they state. The only information we have is two case reports with no clinical data.

A number of questions remain unanswered and are enumerated below:

Clinical Data:

1. The number of patients treated with this technique
2. Intra-operative challenges, issues, complications with this technique
3. Early peri-operative and post-operative problems encountered if any, as this may be directly related to the technique
4. The blood loss, operative time and length of stay would all be relevant with any new technique so as to make an accurate assessment as to its validity

Technique:

1. The authors need to describe how the access to the intervening segment is obtained in a satisfactory way so as to perform an adequate osteotomy, facet resection and preparation of the fusion bed
2. What pedicle screw instrumentation system is used
3. What does the author mean by MIS screw with open connector and a reduction screw as Figure 4 shows the same screw with a different attachment?
4. Given the amount of retraction needed the reviewer is concerned as to the incidence of skin necrosis with this technique and unsightly scarring in this adolescent population.

5. The passage of the rod subfascial is critical to prevent muscle tethering and necrosis. How exactly do the authors manage this especially in the intervening segment?

6. The dose of RhBMP2 if used would be important to know and also when do the authors decide to use the same and on how many patients was it used.

7. The adequacy, tensile strength and the quality of the bone fusion mass all remain very concerning with this technique.

8. The figures and legends do not correspond especially with reference to 10 a,b,c,d and similarly Figure 11 a,b,c.

9. All figures subsequent to this are of sequence.

10. The first patient’s post-operative picture continues to show right shoulder elevation and significant coronal imbalance to the left.

11. The second patient also has an elevated right shoulder with decompensation to the left.

12. Both patients also show significant flattening of their sagittal profile as compared to pre-op and the second patient is in sagittal decompenstaion.

13. This truly raises concern as to the adequacy of correction especially with regards to correction of the thoracic prominence and maintenance of sagittal profile.

14. Also the post-operative films appear to be immediate post-op films and follow-up radiographs would be very useful to see as the authors have at least a year of experience with this technique.

Comments:

The authors have described an interesting technique of corrective surgery in adolescent idiopathic scoliosis and should be commended, but have raised many concerns that clearly need to be resolved in this reviewers view, prior to publication.

The reviewer believes that no technique or case report should be published without clinical data and on this vulnerable population of adolescents the clinical and functional outcome are of paramount importance.

The authors have not justified any of their conclusions and not given us any data that substantiate the former.

MAJOR COMPULSORY REVISIONS are in order before this manuscript can be considered for publication.

Level of interest: An article whose findings are important to those with closely related research interests.
**Quality of written English:** Needs some language corrections before being published

**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'