Author’s response to reviews

Title: Radiographic characteristics in congenital scoliosis associated with split cord malformation: a retrospective study of 266 surgical cases

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Version: 2 Date: 12 Aug 2017

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Dear Editor,

Thank you very much for the comprehensive review of our manuscript entitled: “Radiographic characteristics in congenital scoliosis associated with split cord malformation: a retrospective study of 266 surgical cases ” number BMSD-D-16-01143.

Below we provide a point-by-point response to the comments and highlight all the all changes to the manuscript.

Reviewer 1

(1) Question: Materials and Methods Line 9 - How many patients were excluded?

Response: In our series, 21 patients with previous spinal surgery, spinal fractures were excluded. The related information has been added in the revised text (Methods section, line 11, page 4). Thank you for your careful review.
(2) Question: Results Line 25-26 - Please include p values for female to male comparison and age comparison between type I and type II groups

Response: No significant differences were detected between two groups in gender (P= 0.633) or age (P= 0.715). The related information has been added in the revised text (Results section, line 21-22, page 5).

(3) Question: Results Line 40 - ".. the main curve was higher" is misleading as line 44 indicates p=0.434

Response: Following your advice, the misleading description has been deleted. The average Cobb angle of the main curve was 71.5° (range 14°–165°) in Type I group and 68.9° (range 30°–158°) in Type II group. There were no significant differences between two groups (P=0.434). The misleading description has been deleted (Results section, line 27-28, page 5).

(4) Question: Results Line 17 (on the following page) - Please reference "volcano-shape deformity".

Response: In Pang’s series[10], they demonstrated the hypertrophic lamina and bulbous spinous processes at the level of the midline septum were common findings among patients with SCM. Occasionally, two or three adjacent laminae were fused into a massive ganal, which we described as the “volcano-shape” deformity (as shown in Figure 3). (Results section, line 15-16, page 6)

(5) Question: Conclusions - Please list all of the significant differences between type I and type II SCM that your study documented.

Response: The length of the split segment in Type I SCM was significantly shorter than that in Type II SCM. Compared with Type II SCM, patients with Type I SCM presented with higher incidence of kyphotic deformity, more extensive and complicated vertebral anomalies, and more complex rib anomalies. The related information has been added in the revised conclusions. (Conclusion section, line 1-4, page 10).
(6) Question: Figure Legends Line 44 - Fig 3 - Please provide further description of the anatomy in the legend or on the figure itself. The image is confusing and it is difficult to appreciate the anatomy. Maybe descriptors with arrows in the figure?

Response: According to your suggestion, descriptors with arrows has been added in the revised figure and legends. Images of an eight-year-old male patient diagnosed with congenital scoliosis and the type I split cord malformation. Three-dimension CT showed hypertrophic lamina and bulbous spinous processes in the middle thoracic region. These exuberant neural arches can be described as the “volcano-shape” deformity (with arrows in the figure).

Reviewer 2

(1) Question: There are discrepancies between the study question and the protocol. In the study question its stated that the aim is to report about abnormalities in congenital scoliosis. Then in the methods there is subgrouping with comparisons among between congenital scoliosis and hemicords. This point should be clarified, giving more details in the study question. It's also necessary to define group 1 and group 2, adding more details.

Response: Thank you for your review. The purpose of this study is to identify the vertebral, rib and intraspinal anomalies in congenital scoliosis patients associated with split cord malformation (Abstract section, line 6, page 2; Background section, line 1-2, page 4). According to Pang’s classification [7,8], all patients were divided into two groups: type I group is defined as two hemicords, each within a separate dural tube separated by a bony or cartilaginous medial spur, while type II group is defined as two hemicords within a single dural tube separated by a nonrigid fibrous septum. Following your suggestion, more descriptions have already been added in the revised Abstract (line 12-15, page 2) and Text (Background section, line 19-21, page 3).

(2) Question: The paragraph describing the included patients should be moved to the results. Only the inclusion criteria should be reported in the methods..

Response: According to your advice, the paragraph describing the included patients has been deleted. (Results section, line 19-21, page 5).
(3) Question: Moreover, it would be important to report the total number of patients record assessed to find the 266 included subjects.

Response: In our series, 281 consecutive patients of congenital scoliosis associated with SCM undergoing spinal correction surgery between May 2000 and December 2015 were retrospectively reviewed. Among these patients, 266 fulfilled the following inclusion criteria: (1) definite diagnosis of congenital scoliosis with SCM; (2) patients with complete medical records and radiological data. Other 21 Patients with previous spinal surgery, spinal fractures were excluded. The related information has been added in the revised methods (Methods section, line 7-12, page 4). Thank you for your professional comments.

(4) Question: In the Radiographical mearument paragraph, two subjects are described. Also this part should be moved to the results.

Response: Thank you for this careful comment. But this is a misunderstanding. They are not two subjects in our study, only example details on classification of rib anomalies described by Tsirikos and McMaster[13]. “A patient with a simple rib anomaly included a localized fusion of two or three ribs or a small chest wall defect that was due to a deviation of one or two ribs or an absence of a rib. A patient with complex rib anomalies included multiple extensive rib fusions, usually without a set pattern, combined with an adjacent large chest wall defect that was because of an absence or deviation of ribs.”

(5) Question: The discussion is quite long. I suggest to work on it and be more focused on the comparison of the present findings with previous literature.

Response: According to your suggestion, we revised the discussion part and focused on the comparison of the present findings with previous literature. We hope this revision could be satisfying.
(6) Question: It's helpful in the introduction report data about the prevalence of congenital scoliosis, which is quite rare with respect of idiopathic, and not frequent as stated by the authors.

Response: Congenial scoliosis is a kind of rare spinal deformity. Large population studies utilizing screening low-dose radiography of the spine suggested a congenital scoliosis prevalence of 0.5% to 0.11%. According to your suggestion, the related information has been added in the revised text (Background section, line 10-11, page 3). Thank you for this professional comment.

Many thanks to you and two reviewers for the time and efforts spent on this paper. I sincerely hope this revised manuscript will be accepted for publication.