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LETTER TO THE EDITOR

Letter to the Editor

Combined Anterior-Posterior Surgery is the Most Important Risk Factor for Developing Proximal Junctional Kyphosis in Idiopathic Scoliosis

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To the Editor

I read with great interest the article, ''Combined Anterior-Posterior Surgery is the Most Important Risk Factor for Developing Proximal Junctional Kyphosis in Idiopathic Scoliosis'' by Kim et al. [4]. I have several comments on the risk factors for developing proximal junctional kyphosis (PJK).

Previous studies [1, 3, 6, 8] have implied that PJK may arise iatrogenically and suggested the importance of preserving the posterior soft tissues. Rhee et al. [6] reported PJK is more commonly associated with posterior instrumentation than with anterior instrumentation in patients with adolescent idiopathic scoliosis. Yagi et al. [8] also reported that an anterior surgical approach was associated with a lower incidence of PJK (6%) than a posterior approach (27%) in patients who underwent surgery for adult idiopathic scoliosis. Verma et al. [7] showed no significant change in the proximal junctional angle (PJA) at the 2-year followup in patients with thoracolumbar adolescent idiopathic scoliosis who underwent anterior spinal fusion. In addition, previous studies demonstrated that PJK was evident immediately after surgery. Rhee et al. [6] reported that the increase in PJA from postoperatively to preoperatively was 1° in patients with anterior thoracic surgery and 6° in patients with posterior thoracic surgery. Kim et al. [5] reported an immediate postoperative change in PJA from 6° to 13° in the PJK group, whereas a smaller change from 6° to 8° was noted in the nonPJK group. Similarly, Yagi et al. [8] reported an immediate postoperative change in PJA from 2.3° to 11.4° in the PJK group, while an increase from 4.6° to 6.2° was noted in the nonPJK group. The thoracic spine is inherently more rigid than the lumbar spine owing to the support of the rib cage. Therefore, these immediate increases in PJA do not resemble typical adjacent segment disease that might arise from prolonged mechanical stress.

In fact, preservation of the facet joint capsule of the supraadjacent level in the thoracic spine during surgery is not easy. The facet joint capsule of the thoracic spine is not as thick or well defined as that of lumbar spine and is easily disrupted during surgical exposure. In addition, pedicle screw placement in the upper thoracic spine often violates or affects the supraadjacent facet capsule [1]. The entry point of the pedicle screw is very close to the supraadjacent facet joint, particularly when an anatomic trajectory is performed to prevent the screw from going into the upper disc space. When the facet joint capsule, and/or either the supraspinous or interspinous ligaments providing posterior stabilization are disrupted, this can lead to an immediate increase in kyphosis because the alignment of the upper thoracic spine is kyphotic. Preservation of muscle attachment is also important in retaining posterior stabilization and preventing kyphosis. The splenius capitis originates from the ligamentum nuchae and spinous processes of the C7 vertebra and T1–3 vertebrae, and it inserts on the lateral portion of the

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occipital bone, the superior nuchal line, and the mastoid process of the temporal bone [2]. The splenius cervicis muscle originates from the spinous processes of T3–6 and rises to insert on the transverse processes of C1–3 [2]. These muscles serve to extend the spine but often are dissected to expose the upper end segment, while efforts are made to preserve the supraspinous and interspinous ligaments.

On the basis of the abovementioned observations, posterior soft tissue disruption attributable to surgery may be the strongest risk factor for the development of PJK. Unfortunately, the current literature does not include this as a risk factor in the analysis because it is difficult to assess disruption of the posterior soft tissues by current imaging modalities, especially with instrumentation. Although previous studies implied the importance of preserving the posterior soft tissues, this needs more emphasis. Meticulous preservation of the posterior soft tissues (ie, facet joint capsule, ligaments, and muscles) during surgery would dramatically reduce the incidence of postoperative PJK.

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