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CORR Insights®: Débridement and Reconstruction Improve Postoperative Sagittal Alignment in Kyphotic Cervical Spinal Tuberculosis

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Where Are We Now?

Although tuberculosis of the spine is an uncommon condition in most developed countries, the disease remains common in many underdeveloped regions. Patients with this condition, particu-

larly in the early stages, generally are treated with antituberculosis drugs, spinal orthotics for improved stability, and improved nutrition [1, 4, 6]. However, some patients develop neurological deficits, epidural or paravertebral abscesses, spinal instability, or considerable deformity of the spine. Generally, these patients are treated with surgical débridement and stabilization [1, 6].

The surgical approach for débridement and stabilization varies depending upon the anatomic portion of the spine affected, the magnitude of the deformity, and the surgeon's preferences. In the current study, Pan and colleagues performed a retrospective

study of patients with cervical spinal tuberculosis causing kyphosis who underwent surgical débridement and reconstruction. The authors reported four important findings: (1) All patients were successfully treated and showed bone fusion on CT scans, (2) anterior débridement and reconstruction is successful in improving cervical spine realignment in patients with kyphosis due to tuberculosis, (3) use of titanium mesh cage and instrumentation is safe in these patients, and (4) patients reported improvement in the Neck Disability Index (NDI) after surgery that correlated best with C2 to C7 sagittal vertical axis.

Pan and colleagues suggest treating patients with kyphosis greater than 0° with surgical treatment regardless of the presence of neurological deficits or spinal cord compression. While a good treatment option, the selection of any kyphosis greater than 0° is somewhat arbitrary and the amount of kyphosis that should indicate surgical débridement and realignment has yet to be clearly defined.

This CORR Insights® is a commentary on the article "Débridement and Reconstruction Improve Postoperative Sagittal Alignment in Kyphotic Cervical Spinal Tuberculosis" by Pan and colleagues available at: DOI: 10.1007/s11999-017-5306-9.

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Various parameters are used to assess appropriate cervical balance in the sagittal plane. The mean cervical lordosis from C2 to C7 is approximately 10° [2, 3, 9]. However, unlike in the lumbar spine, we do not know the ideal postoperative cervical lordosis that should be achieved in order to have a good patient-reported outcome as a strong correlation between cervical lordosis or kyphosis and health-related quality-of-life outcomes has not been found. Interestingly, studies have found a better correlation between C2 to C7 sagittal vertical axis and health-related quality-of-life measures [2, 5, 9]. A C2 to C7 sagittal vertical axis of greater than 4 cm has been correlated with worse NDI scores [2, 9].

Where Do We Need To Go?

The current article by Pan and colleagues also reports that the C2 to C7 sagittal vertical axis correlated most with improvement in NDI. Therefore, in patients with cervical spine tuberculosis and kyphosis without neurological deficits or compression of the spinal cord, we should perhaps use C2 to C7 sagittal vertical axis as a measure for considering operative treatment instead of cervical kyphosis greater than 0°.

Patients with cervical spine tuberculosis who have neurological deficits,

failure of medical treatment, or considerable cervical spine deformity may indeed benefit from débridement, arthrodesis, decompression, and realignment of the cervical spine. However, it is not clear whether the small subset of patients who do not have neurological deficit or spinal cord compression would benefit as much from surgery even if they have cervical kyphosis greater than 0°.

We also must determine when to add posterior fixation when performing anterior débridement and arthrodesis. Combined anterior and posterior arthrodesis and fixation results in excellent correction of cervical kyphosis and resists loss of correction over time [10]. The current article reports fusion in all patients treated with surgery, but does not address how much subsidence is achieved over time as previous studies have done [7, 8]. Researchers may want to report on the amount of subsidence and correction lost in patients with more than two-level anterior only arthrodesis. It would be important to study the effect of this loss of correction on the NDI.

How Do We Get There?

Obtaining answers to these questions would involve collaboration among centers that treat a large volume of patients with cervical spine

tuberculosis. The first step would be to identify those societies, such as the Cervical Spine Research Society or the Scoliosis Research Society that can potentially help coordinate an effort like this. The second step would be to perform a retrospective case series of the pooled data from those centers with the aim of answering the following questions: (1) Regarding anterior alone versus combined anterior and posterior approach for more than two-level cervical spine tuberculosis, what is the rate and amount of subsidence for anterior only approaches compared to the combined approaches? (2) When is it necessary to augment fixation with posterior instrumentation to avoid pseudarthrosis? (3) Do patients with cervical spine deformity from tuberculosis without neurological deficits do better with surgical versus nonsurgical treatment? (4) What thresholds should be used in these cases to define cervical deformity that would benefit from surgery? (5) What cervical alignment goals should be used for patients undergoing surgical treatment in order to achieve ideal outcomes?

Based on such a study, the final step would be to establish a randomized trial among these centers to study the remaining controversial questions.

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