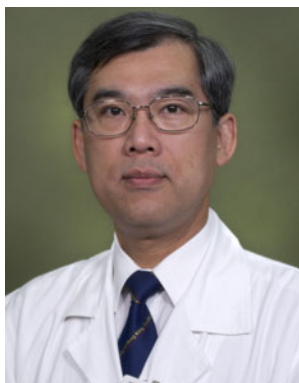


Expert's comment concerning Grand Rounds case entitled “Closing–Opening Wedge Osteotomy for Severe, Rigid Thoraco-Lumbar Post-tubercular Kyphosis” (by S. Rajasekaran, P. Rishimugesh Kanna and Ajoy Prasad Shetty)

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Abstract



Prevention or correction of severe kyphotic deformity in addition to eradication of the infective focus has become the modern standard of management of tuberculosis of the spine. Circumferential excision of the kyphus is now technically feasible with the development of rigid pedicle screw fixation system and intraoperative spinal cord monitoring in the past two decades.

Keywords Tubercular kyphosis · Osteotomy · Spine

Although combination chemotherapy is, in general, effective in controlling tuberculous infection of the spine, severe kyphotic deformity and paraplegia of late disease are still dreaded complications. When presenting late, the kyphosis

is typically severe and rigid. The compensatory lordosis above and below are also stiff and may not be totally reversible. In a series of 15 patients who were deemed cured with chemotherapy during their childhood disease and who presented to our institution with neurologic deterioration in late adulthood, all had severe kyphotic deformity of over 90°. Only two had recurrence of active disease and the remaining were quiescent but without bony fusion. Because of the poor pulmonary function, myelomalacia and syringomyelia from the chronic spinal cord compression, these patients are very poor surgical candidates and the chances for neurologic recovery are small even if surgical decompression is successful [1, 3, 4, 7]. The MRC criteria of ‘clinical satisfactory outcome’ in the 1960s in which ‘the patients should exhibit no signs of active disease and could walk across the room’ are no longer satisfactory by today’s standard. Prevention or early correction of deformity with bony fusion should also be included in the modern standard.

The best time to achieve deformity correction is during the first surgery when the disease is early, the deformity mild and before secondary structural changes have taken place in the compensatory segments. Unfortunately, access to medical care is often limited in developing countries where tuberculosis is still prevalent. Decompression by internal kyphectomy and in situ fusion without deformity is a compromise [7]. There has been not much new advancement in the correction of severe kyphosis since the report of the staged osteotomies and slow distraction using the halopelvic apparatus by Yau and Hodgson in the 1970s [8]. A spinal shortening is a logical method to correct a severe kyphosis without excessive lengthening of the already stretched spinal cord. Technological advancement has permitted new developments in the past decade. Intraoperative spinal cord monitoring can enhance the

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safety of circumferential osteotomies. Modern segmental instrumentation provides rigid stabilization after multi-segment vertebral resection. Studies have also confirmed the safety of metal implants in tuberculous foci because of the different pathomechanism of TB than pyogenic infection [5].

Learning from the experience of total en bloc vertebrectomy for spinal malignancies, one has to remember that excessive shortening of the spine can also cause vascular insult to the spinal cord. The Kanazawa group has demonstrated in an animal model that an acute shortening of the spinal cord by more than 2/3 of a vertebral segment height may cause ischaemia to the spinal cord [2]. Because of the typical multiple vertebral body destruction in TB spine with preservation of the posterior neural arches, a simple excision of all the corresponding laminae will result in excessive spinal cord buckling. Thus, a balance between the amount of anterior column height restoration and posterior column shortening is essential. Small series of this procedure done from a single posterior approach have been reported from different centers in the past few years.

Before proceeding with this procedure, one should be mindful of the flexibility of the compensatory hyperlordosis proximal and distal to the kyphus. Particularly if the thoracic lordosis is not reversible, any overcorrection of the thoracolumbar kyphosis may result in stresses being thrown into the cervical segment. Thus, the best indication for this procedure would be for children or young adults without neurology as described in the present grand round case where the compensatory curves are still flexible and can be reversed with the segmental instrumentation.

In patients who are already presenting with neurologic deficits, we believe that in addition to the mechanical deformation or compression of the spinal cord, there is already significant ischaemia with ultrastructural changes in the grey matter. With the slow and long term compression, the cord is already at the limit of its tolerance. Any additional surgical insult, even the slightest, may become the final straw. Unfortunately, to date there is no good method to assess the reserve of the cord in these patients. Our preliminary unpublished work using fMRI

have shown some interesting findings in myelopathy of the cervical cord. Hopefully future developments in this field can further enhance the safety of circumferential spinal osteotomies in severe deformities where the cord is already jeopardized.

The authors of this case report have extensive experience in the treatment of spinal tuberculosis. They have also recently published the result of 17 such cases with a 3-year follow-up [6]. The description of the technique in the present case has made the procedure look easy. I would, however, emphasize that this is not something for the occasional spine surgeon.

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