Limited oblique corpectomy for treatment of ossified posterior longitudinal ligament

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Objective: We present our experience with treating four cases with ossified posterior longitudinal ligaments (OPLL) causing cervical cord compression by limited oblique and strategic corpectomy. Materials and results: Four patients with cervical OPLL were treated by the discussed technique during the period of October 2000 to January 2005. The ages of the patients ranged from 46 to 72 years. All patients presented with symptoms of progressively increasing myelopathy. Two patients had four level OPLL and two patients had two level OPLL. Surgery involved anterior cervical exposure and partial oblique corpectomy, which was essentially an extended midline and lateral undercutting of the body. The procedure provided a wide exposure for resection of the OPLL. No metal instrumentation or any other kind of fixation procedure was simultaneously carried out and there was no need for postoperative cervical immobilization. During the period of follow up that ranged from 6 month to 5 years (mean: 33 months) all the four patients have shown sustained clinical improvement. Neuroimaging studies confirmed satisfactory anatomical cervical cord decompression in all patients. Conclusions: The technique of oblique and strategic corpectomy provided a wide exposure for resection of the OPLL and preserved the stability of the region.

Key words: Corpectomy; ossified posterior longitudinal ligament; spinal instrumentation.

A number of surgical treatment options have been proposed for ossified posterior longitudinal ligament (OPLL) that results in progressive cord compression. Considering the usually encountered wide extension of the pathology both in the vertical and horizontal directions, surgical exposure necessitates wide and multiple level corpectomy. As such a corpectomy destabilizes the spine, a variety of stabilization procedures have been advocated. The extensiveness of such an operation has led to advocacy of a more conservative posterior laminectomy or a laminoplasty surgical approach. We present our experience with use of oblique corpectomy for the treatment of OPLL, and discuss briefly the issues related to the subject. On our review of literature we found that in the year 1999, Ozer et al. had described a similar technique in the treatment of OPLL.^[1] We found reports mentioning the use of bone preserving corpectomy techniques in the treatment of extensive cervical spondylotic myelopathy.^[2,3]

Materials and methods

Clinical material

The clinical profile of the four patients is summarized in the [Table 1]. The patients were treated in the neurosurgery department of King Edward memorial hospital and Lilavati Hospital, Mumbai, during the period of October 2000 to January 2005. There was no history of significant antecedent factor or trauma in any patient. All the four patients had varying degrees of quadriparesis and sensory dysfunction. The symptoms of myelopathy ranged from 8 months to 4 years in duration. Nurick's grading system was utilized to assess the extent of myelopathy.

Investigations

All patients were examined with plain radiography, computed tomography (CT) and magnetic resonance imaging (MRI). Two patients had four vertebral levels OPLL, and two patients had two vertebral levels OPLL. There were compression related cord changes in all patients.

Surgical technique

The routine surgical procedures for anterior cervical vertebral body exposure are carried out. The level of the spinal exposure is confirmed with intraoperative fluoroscopy. The vertebral bodies corresponding to the levels of the OPLL are exposed. Wide discoidectomy is first carried out both above

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and below the level of affected vertebra. The intervertebral space available after discoidectomy is widened by additional drilling of the part of the vertebral body or oblique corpectomy with the aim to provide avenue for undercutting the posterior rim of the vertebral bodies adjoining the disc space both in the midline and laterally. The procedure is done from both the superior and inferior aspect of the vertebral body, exposing the entire OPLL. The procedure preserves a large part of the vertebral bodies in the anterior aspect and in the region of its lateral pillars. For multiple level exposures the strategic oblique corpectomy is carried out at multiple levels. After the wide resection of the OPLL, and satisfactory decompression of the cord, the wound is closed. No external or internal stabilization or fixation was carried out in the presented four cases.

Postoperative outcome

During the period of follow up that ranged from 6 months to 5 years, all patients showed improvement in neurological symptoms [Table 1]. Imaging confirmed satisfactory anatomical decompression in all patients [Figure 1]. None of the patients had any symptoms that could suggest features of instability.

Discussion

Treatment of OPLL is amongst the more challenging surgi-

cal problems. Whilst a successful decompression of the spinal cord can lead to a gratifying postoperative and long-term outcome, any complication can be seriously disabling or even life threatening for the patient. The difficulty in treatment stems from the usually encountered long segment extension of the OPLL in vertical and horizontal directions, location posterior to the vertebral bodies, firm nature of the tissue and frequently encountered involvement of the dura. Wide corpectomies have been advocated to expose the lesion. The procedure has been seen to de-stabilize the spine and warrants the need for extensive fixation procedure incorporating metal instrumentation and bone grafting. Due to the extensiveness of the procedure, for long segment OPLL, a posterior decompressive laminectomy surgery has been advocated. A variety of laminoplasty techniques have also been extensively used.

The technique of corpectomy described in this report preserves a significant portion of the anterior and lateral aspects of the vertebral body. Ozer et al. discussed a similar technique in 1999 and called it an open-window corpectomy technique.^[1] The OPLL is exposed in the midline and laterally from both the superior and inferior aspects of the vertebral bodies. It was observed that the long-standing OPLL and relative lack of motion in the affected region, leads to partial or complete fusion of the entire vertebral segments, imparting stabilization of the region. The partial corpectomy did not affect the stability of the cervical spine and there was no addi-



Figure 1: A. Image of Case 4 [Table 1]. T2-weighted MRI showing OPLL and severe cord compression. B. Sagittal postoperative CT scan showing partial resection of C3 to C6 vertebral bodies. C. 3D reconstruction showing that a large part of lateral pillars and bodies are intact. D. Postoperative T1-weighted MRI showing the decompression of the cord. Blood occupies the parts of the C3-C6 bodies resected

Table 1: Table summarizing the clinical features						
Patient	Age/sex	Preoperative	Duration	Extent of	Duration	Clinical grade at
No.		clinical grade	of myelopathy	OPLL	of follow up	maximum follow up
Case 1	46 years/M	Grade 2	11 months	C4-C5	5 years	Grade 1
Case 2	72 years/M	Grade 3	8 months	C4-C5	3 years	Grade 2
Case 3	52 years/M	Grade 5	4 years	C3,C4,C5,C6	6 months	Grade 4
Case 4	51 years/M	Grade 4	3 years	C3,C4,C5,C6	26 months	Grade 2

*Clinical grading system. Grade 0 – Root signs and symptoms. No evidence of cord involvement. Grade 1 – Signs of cord involvement. Normal gait. Grade 2 – Mild gait involved. Able to be employed. Grade 3 – Gait abnormality present but ambulant without support. Grade 4 – Able to ambulate with assistance. Grade 5 – Chair/bed-ridden.

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tional need for a stabilization procedure. None of our patients was advocated immobilization of the neck or even advised to use a cervical collar. During the period of follow up, none of the patients in our series developed symptoms suggestive of postoperative spinal instability. Karalar et al. conducted *in vitro* biomechanical analysis of cervical multilevel oblique corpectomy, a technique similar to that discussed in this report, in sheep and concluded that the procedure does not result in instability of the spine.^[4]

The relative ease of the described procedure, avoidance of any metal instrumentation and provision of a wide exposure to the OPLL are the positive features of the described technique.

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