Complications of Multilevel Cervical Corpectomies and Reconstruction with Titanium Cages and Anterior Plating
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INTRODUCTION: The ideal surgical choice for multilevel cervical spondylosis is unclear. The purpose of our study is to review our experience, specifically the complications of multilevel cervical corpectomies and reconstruction with titanium mesh cages and anterior plating.

METHODS: A retrospective analysis was performed on 21 consecutive cases that had multilevel anterior cervical corpectomies (2 or more levels) and reconstruction with titanium cages and anterior cervical plating. The average age at the index surgery was 57 years (range 37 to 77). The average follow-up period was 37 months (range 24-68 months). There were 14 males and 7 females in the study. Four patients had previous cervical spine surgeries. Thirteen patients were smokers at the time of surgery. Co-morbidity was present in 11 patients. Indications for surgery were myelopathy in 13 cases and refractory radiculopathy in 16 cases. Two-level corpectomies were performed on 16 patients. Three patients had three-level corpectomies. One patient had corpectomies of C4 and C5, and hemi-corpectomy of C6 (2½ level). Another had corpectomies of C4 to C6, and a hemi-corpectomy of C7 (3½ level). Anterior reconstruction was performed using titanium cages in all cases. The cages were filled with autogenous bone graft derived from the resected vertebrae in 20 cases. One case had iliac crest strut graft packed inside the titanium cage. All were stabilized with anterior cervical plates.

RESULTS: The mean operative time was 165 minutes (range 100 to 210 minutes). The estimated blood loss was on the average 329 cc (range 100 to 1,000 cc). The average hospital stay was 5.8 days, ranging from 1 to 45 days. Only 2 patients stayed more than 8 days in the hospital. Duration of cervical collar usage ranged from 5 weeks to 6½ months (mean 3.7 months). We did not have any deaths, dural tears, wound infections, vertebral artery injuries, or recurrent laryngeal nerve palsy. We had one case of acute respiratory distress post-operatively requiring tracheostomy. The implants were found to be in good position on radiographs. None had neurologic deterioration on follow-up. There was no case of cage extrusion. Two cages were noted to subside gradually. One of these 2 cases had significant osteopenia on radiographic evaluation. Three cases had backing out of the proximal screws, necessitating removal in one case. One patient had dysphagia due to backing out of the inferior aspect of the plate and required removal of the plate and screws. There was radiographic evidence of bony fusion in 20 patients. The average time to bony fusion was 6 months, ranging from 3 to 16 months. Nineteen out of twenty-one patients had evidence of bony fusion at 11 months after surgery. The average initial correction of sagittal alignment after surgery was 7 degrees (range -3 degrees to +35 degrees). Two patients had worse initial sagittal alignment than before surgery. The final correction of sagittal alignment averaged 5 degrees (range -5 degrees to +32 degrees). Five patients eventually had worse sagittal alignment than before surgery. Three of these were associated with cage subsidence and/or plate complications.

DISCUSSION/CONCLUSION: There is little agreement with regards to the best treatment for multilevel cervical disease. Some advocated cervical laminectomy or laminoplasty for involvement of 4 or more disc levels. Others reported good results with combined anterior and posterior approaches. Early failure of long segment anterior cervical plate fixation and bone grafting in one study prompted the authors to conclude that this technique affords inadequate stability post-operatively. Others reported their experience in anterior fixation that extended 2 to 5 vertebral bodies using anterior plating and autogenous bone graft, and found satisfactory fixation and fusion in all but 2 cases. In our study, none had neurovascular complications. No patient developed neurologic deterioration on follow-up. The rate of repeat surgery was 14%. Sixty-seven percent of our patients (14 out of 21) did not experience any complications. Twenty out of twenty-one patients (95%) achieved bony fusion on radiographic evaluation. Fifty-three percent of our patients maintained correction of their sagittal alignment after surgery. Our complication rate (33%) for multilevel corpectomies is higher than our earlier reported series of 12% for both single and multiple level cervical reconstructions. This finding is expected, as multiple level corpectomies are fraught with complications and pitfalls. This is perhaps the reason why there are various approaches in managing this problem. We feel that anterior multilevel corpectomies will still be the ideal treatment of choice for multisegmental cervical spondylosis. Anterior corpectomy allows decompression of significant osteophytes and herniated discs in a safe and reliable fashion. The use of titanium cages offers several advantages. They are avoidance of bone graft harvesting with its potential morbidity, reduced hospitalization time and subsequent treatment costs, good biocompatibility of titanium combined with immediate strong anterior column support and minimal hardware complications. Addition of cervical plating provides more rigid
immobilization, avoids requirement for halo immobilization, and is associated with predictable bony fusion. Attention to technical details (plate contouring, proper placement of screws, contouring of cage in lordosis, ensuring a snug fit on impaction of the cage) may avoid the complications related to the hardware. This in turn leads to better correction and maintenance of sagittal alignment. Supplemental posterior stabilization maybe considered for cases with spasticity or greater than 2-level corpectomies.