Original Research

ANTERIOR CERVICAL CORPECTOMY WITH ILIAC CREST BONE GRAFT VERSUS TITANIUM MESH CAGE IN DEGENERATIVE CERVICAL SPONDYLOTIC MYELOPATHY: A TERTIARY CARE CENTER EXPERIENCE

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ABSTRACT

Background: Degenerative cervical spondylotic myelopathy (DCSM) is a leading cause of progressive spinal cord dysfunction in adults. Anterior cervical corpectomy with reconstruction is a well-established surgical approach for multilevel ventral compression. Various reconstruction options exist, including autologous iliac crest bone grafts and titanium mesh cages.

Objective: To evaluate and compare clinical and radiological outcomes following anterior cervical corpectomy reconstructed using iliac crest bone graft or titanium mesh cage in patients with DCSM.

Methods: This prospective observational study included 60 patients with DCSM who underwent anterior cervical corpectomy between August 2021 and December 2025. Single-level corpectomy was performed in 52 patients, while 8 patients underwent two-level procedures. Clinical outcomes were assessed using the modified Japanese Orthopaedic Association (mJOA) score and Nurick grading. Radiological evaluation included fusion status, cervical alignment, graft subsidence, and implant-related complications. The minimum follow-up duration was 3 years.

Results: All patients demonstrated significant postoperative neurological improvement. The mean mJOA score improved from 9 preoperatively to 14 at final follow-up. Fusion rates were comparable between both groups. Donor-site complications were observed exclusively in the iliac crest group, whereas cage subsidence occurred more frequently in the titanium mesh group without affecting clinical outcomes.

Conclusion: Both reconstruction techniques provide satisfactory clinical and radiological outcomes. Titanium mesh cages offer comparable fusion rates while avoiding donor-site morbidity, making them an effective alternative to autologous bone grafts.

Keywords: Cervical Spondylotic Myelopathy, Cervical Corpectomy, Iliac Crest Graft, Titanium Mesh Cage, Anterior Cervical Surgery.

INTRODUCTION

Degenerative cervical spondylotic myelopathy (DCSM) is the most common cause of spinal cord dysfunction in the adult and elderly population. It arises from progressive degenerative changes such as intervertebral disc degeneration, osteophyte formation, hypertrophy or ossification of the posterior longitudinal ligament, and segmental instability. These changes lead to gradual narrowing of the spinal canal and compression of the cervical spinal cord.

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Surgical intervention is often required in patients with progressive neurological deficits or failure of conservative treatment. Anterior cervical corpectomy is particularly indicated in cases with multilevel ventral compression, retrovertebral pathology, or when adequate decompression cannot be achieved by discectomy alone. This approach allows direct removal of compressive pathology and effective decompression of the spinal cord.

Reconstruction following corpectomy is essential to restore spinal stability, maintain cervical alignment, and achieve solid fusion. Autologous iliac crest bone graft has traditionally been considered the gold standard due to its osteogenic, osteoinductive, and osteoconductive properties. However, complications related to graft harvesting, including donor-site pain, infection, and hematoma, remain significant concerns.

Titanium mesh cages filled with bone graft have emerged as a viable alternative. They provide immediate structural support, maintain cervical lordosis, and eliminate donor-site morbidity. However, concerns such as cage subsidence and long-term stability persist.

This study aims to evaluate and compare the clinical and radiological outcomes of anterior cervical corpectomy reconstructed using iliac crest bone graft and titanium mesh cages in patients with DCSM.

MATERIALS AND METHODS

Study Design and Population

This prospective observational study was conducted at a tertiary care center after obtaining approval from the institutional ethics committee. A total of 60 consecutive patients diagnosed with DCSM and undergoing anterior cervical corpectomy were included.

Inclusion Criteria

- Age greater than 18 years
- Clinical and radiological evidence of DCSM
- Multilevel cervical cord compression requiring corpectomy
- Failure of conservative treatment or progressive neurological deterioration

Exclusion Criteria

- Traumatic, infectious, neoplastic, or inflammatory cervical spine conditions
- Previous cervical spine surgery
- Severe osteoporosis

Surgical Technique

All procedures were performed under general anaesthesia using a standard anterior cervical approach. Depending on the level of pathology, either single-level or two-level corpectomy was carried out. Adequate decompression was confirmed intraoperatively. Reconstruction was performed using either a tricortical iliac crest bone graft or a titanium mesh cage packed with autologous cancellous bone. An anterior cervical plate was applied in all cases to enhance stability.

Postoperative Care and Follow-up

Patients were mobilized with a cervical collar and followed up at regular intervals (6 weeks, 3 months, 6 months, and 12 months, and annually thereafter). Clinical outcomes were assessed using mJOA score and Nurick grading. Radiological evaluation included plain radiographs to assess fusion, alignment, and implant integrity. CT scans were obtained when required.

Statistical Analysis

Data were analysed using appropriate statistical methods. Continuous variables were expressed as mean values, while categorical variables were presented as proportions. Preoperative and postoperative outcomes were compared using paired statistical tests. A p-value of less than 0.05 was considered statistically significant.

Demographic and Clinical Characteristics

Parameter	Value
Total patients	60
Mean age	54 years
Sex (M/F)	48 / 12
Single-level corpectomy	52
Two-level corpectomy	8
Most common levels	C4–C6
Mean follow-up	3 years

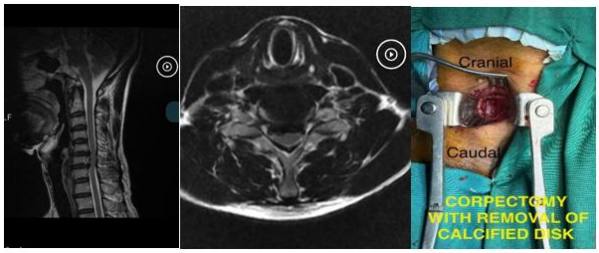
The majority of patients were male, with a mean age of 54 years. The most commonly affected levels were between C4 and C6.

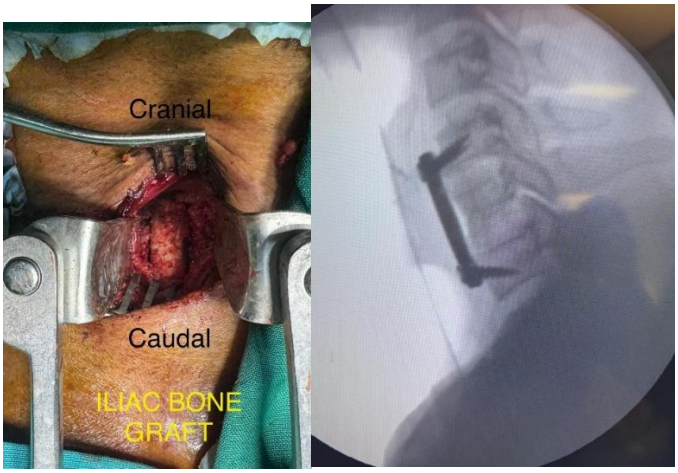
Clinical Outcomes

All patients showed neurological improvement at final follow-up. The mean mJOA score improved significantly from 9 preoperatively to 14 postoperatively. Functional status, as measured by the Nurick grading system, improved by approximately one grade in most patients, reflecting better gait and daily activity performance.

The improvements were sustained throughout the follow-up period, with no significant difference between reconstruction methods.

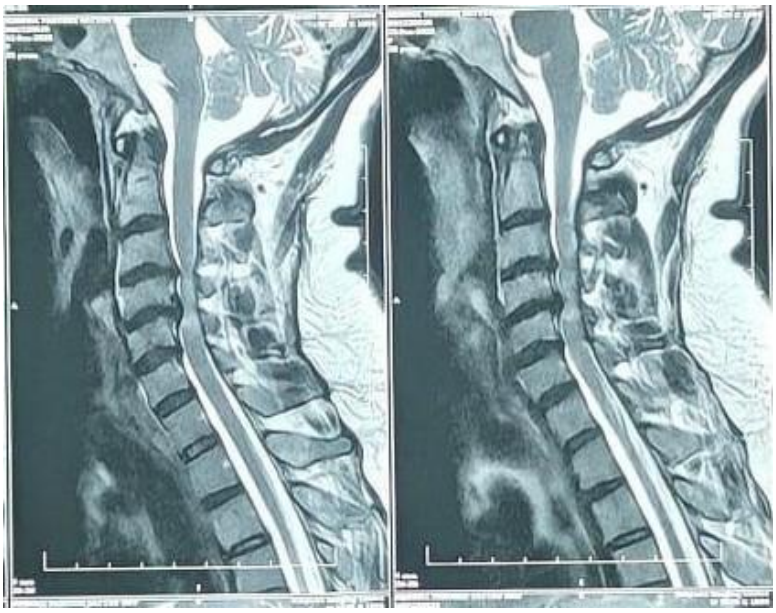
Illustrative cae of C6 corpectomy for cervical myeloradiculopathy with reconstruction done autologus bone graft

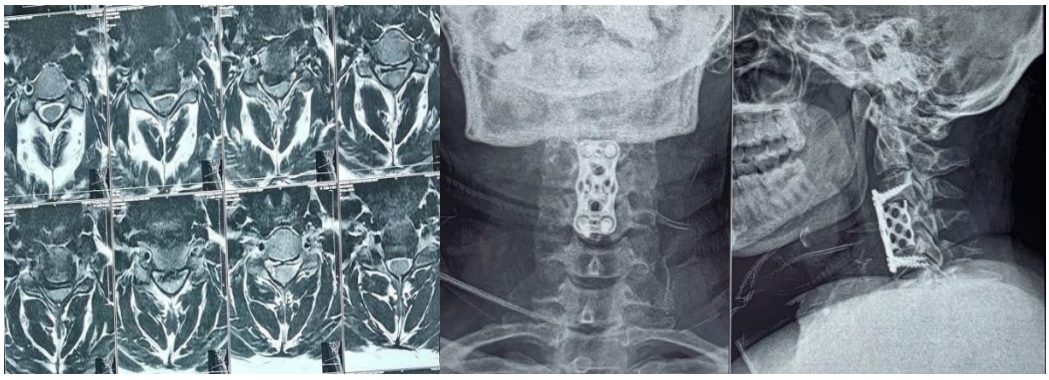




A- Sagittal T2 MRI image showing C5-C6 and C6-C7 level disk protrusion causing significant canal compromise B- T2 Axial image showing both central and bilateral foraminal narrowing. C- Intraop picture after removal of C5 vertebral body and C5-C6 and C6-C7 disks and ligament. D- Picture of iliac bone graft at corpectomy site E-Anterior plate fixation.

Illustrative case of C4 corpectomy with reconstruction using titanium mesh cage filled with bone graft





A-T2 MRI Sagittal image showing significant compression at C3-C4 and C4-C5 level due to disk protrusion. B-Axial T2 image showing significant right and central compression at C3-C4 level and uniform canal stenosis at C4-C5 level with cord intensity changes at same level. C-Image showing defect reconstructed with titanium mesh with anterior plate fixation.

Radiological Outcomes

Radiological assessment demonstrated successful fusion in the majority of patients in both groups. Cervical alignment was well maintained, with minimal loss of lordosis.

Donor-site complications, including pain and infection, were observed only in patients who underwent iliac crest graft harvesting. Cage subsidence was noted in a small proportion of patients in the titanium mesh group; however, this did not result in clinical deterioration or require revision surgery.

Complications

The overall complication rate was low. Implant-related failure occurred in one patient in the form of plate dislodgement. One patient experienced postoperative neurological deterioration. Superficial surgical site infections were observed in two patients—one at the cervical incision and one at the graft donor site.

DISCUSSION

Anterior cervical corpectomy remains a reliable surgical option for managing DCSM, particularly in cases with multilevel ventral compression or retro vertebral pathology. The procedure enables direct decompression of the spinal cord and facilitates restoration of spinal alignment.

In the present study, both iliac crest bone graft and titanium mesh cage reconstruction resulted in significant and sustained neurological improvement, as demonstrated by mJOA and Nurick scores. These findings are consistent with previously published studies reporting favorable outcomes following anterior decompression and reconstruction.

Autologous iliac crest bone graft continues to be considered a standard option due to its biological advantages. However, donor-site morbidity remains a notable limitation. In this study, all donor-site complications were confined to the iliac crest group, highlighting this drawback.

Titanium mesh cages offer several practical advantages, including immediate structural stability, ease of use, and avoidance of graft harvesting complications. Although cage subsidence was observed in some patients, it did not adversely affect clinical outcomes. This supports existing evidence suggesting that mild subsidence is often clinically insignificant when proper surgical technique and anterior plating are employed.

The inclusion of both single-level and two-level corpectomies, along with a follow-up period of four years, strengthens the findings of this study by allowing assessment of long-term outcomes and construct stability.

Overall, the findings suggest that titanium mesh cages provide outcomes comparable to autologous bone grafts while eliminating donor-site morbidity, making them a preferred option in many clinical scenarios.

CONCLUSION

Anterior cervical corpectomy with reconstruction using either iliac crest bone graft or titanium mesh cage yields favorable clinical and radiological outcomes in patients with DCSM. Titanium mesh cages offer comparable neurological recovery while avoiding donor-site complications, making them a reliable and effective alternative.

Limitations

- Single-center study
- Non-randomized design
- Limited sample size for two-level corpectomy subgroup
- Absence of detailed statistical subgroup comparison

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