Physical Education, Health and Social Sciences
https://journal-of-social-education.org
E-ISSN: 2958-5996
P-ISSN: 2958-5988

Clinical Outcomes of Anterior Cervical Discectomy and Fusion: Assessment of Pain Reduction and Surgical Complications

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DOI: https://doi.org/10.63163/jpehss.v4i1.1785

Abstract

Background: Anterior cervical discectomy and fusion is currently the gold standard for Cervical disc Herniation which is a prevalent neurosurgical procedure that's been carried out on regular basis with overall good results. The procedure however isn't risk and complication free, the data however in the literature is scarce on it. This study is therefore carried out to evaluate the outcome of ACDF in terms of pain improvement and the peri-operative complications that comes along its peri-operatively.

Objectives: This study explores the outcome of ACDF in terms of pain free interval and complication's post operatively. The study aims to explore the effectiveness of the procedure in terms of pain and exploration of morbidity caused by complications that comes along it. Timely and prompt management is hereby recommended to lessen the morbidity of the disease on quality of life.

Methods: A prospective study was conducted on a total of 104 patients diagnosed with prolapsed cervical intervertebral disc herniation on MRI. Patient underwent ACDF Between March 2024 T0 March 2025 at Neurosurgery Department of Bacha Khan Medical College. Inclusion criteria encompassed individuals age 20-70y with persistent radiculopathy diagnosed with prolapsed cervical disc herniation on MRI Cervical Spine.

Results: A total of 104 patients were enrolled in the study. Males contributed 77.8% of the population while females 22.1%. The commonest presenting symptom was brachialgia 86.5%. The most common level involved was C5-6 75%, followed up by C6-7 17.3% and C4-5 7.6%. Screw dislodgment 8% was the commonest complication reported, followed up by wound infection 7% and dysphagia 3.8%. Pain as major preoperative symptom got improved in 84% of the patients.

Conclusion: In summary ACDF demonstrates promising results in addressing preoperative pain improvement with an 84% success rate with overall very little, yet manageable risk of perioperative complications.

Keywords: Evaluation, Complications, Anterior Cervical Discectomy, Fusion.

Introduction:

Cervical radiculopathy is a pathological condition that results from spinal degeneration involving the cervical nerve roots and spinal cord. (1) Commonest cause of cervical radiculopathy is Cervical disc herniation and cervical spondylosis (2). Cervical radiculopathy/ Brachialgia in young population commonly occurs due to soft intervertebral disc herniation while in old age the cause is usually attributed to foraminal stenosis secondary to osteophytes

formation, disco-ligamentous injury due to chronic wear and tear and or facet joint hypertrophy (spondylosis)[3] Conservative management of cervical radiculopathy includes rehabilitation and conservative measures with medications. Pain Killers such as NSAIDS, muscle relaxant, and anticonvulsants are frequently used along with epidural steroids injections and physiotherapy (4). Anterior cervical discectomy and fusion is a well-established surgical intervention for radiculopathy and myelopathy [5] A variety of complications however are associated with anterior cervical discectomy and fusion. The airway complications range from acute airway obstruction to chronic vocal cords dysfunction. Others are Horner's syndrome, thoracic duct injury, wound infection, epidural abscess, dural tears intraoperatively, spinal contusions, adjacent level disease and many more [1]

Material & Methods:

Study Design

A prospective study was conducted on a total of 104 patients at Neurosurgery Department of Bacha Khan Medical College With cervical disc herniation who underwent ACDF. The study focussed on patients diagnosed with cervical disc herniation on MRI. Clinical outcome in terms of pain and accompanying complications were evaluated and analysed.

Patient Population:

A total of 104 patients were enrolled with a primary diagnosis of cervical disc herniation. Patients underwent ACDF and their post- operative data was analysed prospectively.

Inclusion Criteria:

The study included patients aged 20-70y with diagnosed prolapsed cervical intervertebral disc herniation on MRI C Spine T2W axial sagittal cuts, persistent radiculopathy, those failed at conservative treatment and those with progression of symptoms, Gait disturbances and motor weakness.

Exclusion Criteria:

Patients under 2y and over 70y, Huge Multinodular Goitre, cardiac patient, those who have undergone an ACDF previously, OPLL, and hard posterolaterally located prolapsed intervertebral disc were excluded off the study.

Surgical Procedure:

Patients were placed supine with a slight head and neck tilt to the left with right shoulder padding. A vertical incision medial to Sternocleidomastoid was given platysma dissected, dissection carried down to anterior vertebral bodies, intervertebral disc space distraction followed up by microdiscectomy and interbody graft fusion and fixation were carried out each one step at a time. Followed up by wound closure.

Post Operative care:

Participants included were kept in patient for 1 week post operative. Outcome of pain in terms of VAS and perioperative complications were assessed, documented and analysed.

Data Analysis:

Statistical analysis was performed using the statistical package for the social science SPSS version 27. Descriptive statistics were employed for data assessment.

Results:

A total of 104 patients were included in this study with 81(77.8%) male and 23 (22.1%) females with mean age 38+-7.5. One level was involved in patients with cervical brachialgia was 86

(82%) while two levels were involved in 18 (17%) of patients. Commonest level involved was C5,6,7,8 (75%). Of which patients followed up by C6,7 in 18 (17.3%) of patients while C4,5 was involved in 8 (7.6%) of the patients. Presenting complaints were brachialgia in 90 (86.5%) of patients with paraesthesia's in 70 (67.3%) with neck pain in 66 (63.4%), weakness of extremity in 14 (13.4%) and bladder and bowel dysfunction in 4 (3.7%) of patients. In our study the pain improved in 84 (80.7%) of patients with 16 (15.3%) of patients were still having mild pain and in 4 (3.8%) had moderate degree of pain on VAS. Complications like acute airway obstruction and vocal cord paralysis were not seen in our study while dysphagia was seen in 4 (3.8%) of patients. Surgical site infections i.e. superficial and deep-seated infections were encountered in 7 (6.5%) and 5 (4.8%) respectively. Screw dislodgment was seen in 8 (7.8%) of patients. While there was no recurrent laryngeal nerve paralysis, CSF leaks and epidural hematoma.

Discussion:

Anterior cervical discectomy and fusions is commonly used surgical technique that has been proved to be effective and safe for cervical spinal pathologies with approximately 132000 cases performed each year in the US[6] ACDF first appeared in the literature in 1955 when George smith and Robert Robinson published a novel surgical technique to decompress the cervical spine through anterior approach[7] their technique involved the use of a horse shoe shaped autograft taken from the iliac crest and packed into the disc space for fusion. Three years later, Cloward modified his own method for achieving interbody fusion in ACDF -A MODIFICATION OF Wildberger's fusion technique applied in the lumbar spine[8] In our study a total of 104 patients were involved with males 77.8% and females 22.1% which closely matches to the results shown by Yadav et al[1], 80% were men 20% were women while the results showed by Adamson showed it to be 48.4% were men that could be because of that in our society males are more active as compared to females,

In our study usually a single was involved with commonest level was C5,6(75%) followed up by C6,7 (17.3%) and C4,5 (7.6%) which closely reaches to the results showed by Kim jh et al [10] in which he divided the cervical spine into upper and lower levels. Upper level included C3/4, C4/C5 and lower levels included C5,6, C6,7. So the commonest location was lower level i.e. 73% as compared to the upper level i.e. 27 % [10] In our study the most common presenting symptom was brachialgia 86.5% followed by paraesthesia's 67.3% neck pain 63.4%, weakness of extremity 13.4% and bladder bowel dysfunction in 3.7%. Again, which closely matches to the results shown by Yadav et al [1] i.e. 78%,65%,49%, and 33% respectively. Our study showed that 80.7% of patients were pain free and satisfied with the procedure while 15.3% had mild neck pain and 3.8% had moderate brachialgia while Adamson et al [9] had shown 95% satisfaction rate with ACDF without complications. In our study dysphagia was seen in 3.8% superficial wound infection in 6.5% deep site wound infection in 4.8% and screws dislodgment in 7.6% of patients which matches to the results published by Yadav et al [1] in his study he showed CSF leak in 3.1% and anterior graft dislodgment in 1.5% while in our study there were no CSF leaks and graft dislocation because of the use of p cages. Dysphagia in our patients were temporary which gradually resolved in patients with slight modification of diet for screw dislodgment we reopened the patients and placed bigger p cages and screws that resolved the problem with restoration of near normal lordotic angulation.

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