Clinical and Radiographic Outcomes of Uncoforaminotomy in Anterior Cervical Discectomy and Fusion (ACDF): Our Experience

Shahbaz Khan Panhwer[1], Nida Hameed[2], Pir Zarak Khan[3], Imtiaz Hashmi[4]

[1]Assistant Professor, Department of Orthopaedic, Ziauddin University Hospital, Karachi
[2]Post Graduate Student, Department of Orthopaedic, Ziauddin University Hospital, Karachi
[3]Research Assistant, Department of Orthopaedic, Ziauddin University Hospital, Karachi
[4]Chairman Orthopedics, Department of Orthopaedic, Ziauddin University Hospital, Karachi

Authorship and contribution Declaration:
Each author of this article fulfilled ALL 04 Criteria of Authorship:
1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.
4. All authors agree to be responsible for all aspects of their research work.

Corresponding author:
Shahbaz Khan Panhwer
Email:shahbazpanhwer149@gmail.com

ABSTRACT

Objective: To evaluate clinical and radiological outcomes of individuals undergoing ACDF with or without Uncovertebral joint decompression.

Methods: This retrospective study was conducted in Orthopedic and Spine department of Ziauddin University hospital Karachi. Patients meeting inclusion criteria were included. Operative as well as radiological evidence of Uncoforaminotomy was documented. Pre op and Post-Operative VAS score, neck disability index (NDI) and Odom criteria was assessed for neck pain and arm pain immediately, at 2 weeks, 6 weeks and 3 months post op

Results: There were 48(68.6%) females and 22(31.4%) male patients. Majority of our patients were in 40-60 years' age group (34, 48.6%). Most common level involved was C6-7 (48, 68.6%) followed by C5-6 (19, 27.1%). Uncoforaminotomy was performed in 61 (87.1%) of cases. There was significant improvement in NDI and VAS score in 61 (87.1%) cases. Excellent outcome was achieved in 64 (91.4%) of cases as per modified Odom criteria. Significant correlation was found in patients without UF and higher VAS score post op (p-0.001). No significant correlation was found between higher Neck disability index (p-0.075) and presence of Uncoforaminotomy. Subsidence rate was comparable between two groups. No significant correlation was found between Gender and higher post op VAS score (p-0.617).

Conclusion: Uncoforaminotomy in ACDF with cervical radiculopathy offers direct decompression of nerve root. Using larger cage in ACDF leads to over distraction of facet joint resulting in stretching of facet capsule and neck pain and higher VAS scores post operatively. Proper knowledge of anatomy of Uncovertebral joint and availability of armamentarium to decompress foramen directly yields excellent outcomes along with minimizing risk of complications.

Keywords: Degenerative disc, ACDF, Neck disability score

This article may be cited as: Panhwer SK, Hameed N, Khan PZ, Hashmi I. Clinical and Radiographic Outcomes of Uncoforaminotomy in Anterior Cervical Discectomy and Fusion (ACDF): Our experience. J Pak Orthop Assoc.2023;35(1):40-42.

INTRODUCTION

The degenerative disc disease affecting cervical spine can be incapacitating and can affect activities of daily living due to radicular and axial pain. It affects both genders with male preponderance with M: F ratio (2:1).[1] Cervical radiculopathy peaks in 5th and 6th decade and risk factors include white race, female sex, axial loading, cigarette smoking and history of lumbar radiculopathy.[2] Cervical radiculopathy is caused by disc herniation or nerve compression due to spondylosis, with disc herniation being the most common cause in young people.Neck pain radiating to the upper limb occurs in 68% of cases, scapular pain in 53%, paresthesias in 46 %, and headache in 10% of cases.[4]Anterior cervical discectomy and fusion (ACDF) is the treatment of choice for patients who have failed conservative management,[5] patients with considerable radicular discomfort, a young age, a single level soft disc, male gender, non-smokers,

Clinicoradiological correlations, and preserved neurology have the best patient reported outcomes.[6]

Due to the near proximity of exiting cervical nerve roots to Uncovertebral joint (Luscha), osteophytes growing from the uncinate process can cause foraminal stenosis and radicular symptoms.[7]However, some authors believe that symptomatic relief can be achieved through disc space distraction leading to indirect decompression, and resorption of osteophytes after solid fusion, but that over distraction can result in graft subsidence, facet joint capsule overstretching, neck pain, and non-unions, as well as increasing the incidence of adjacent segment disease.[5]

The objective of our study is to evaluate clinical and radiological outcomes of individuals undergoing ACDF with or without Uncovertebral joint decompression.

MATERIALS AND METHODS

We conducted this retrospective clinical and radiological review of 70 patients who underwent single or two levels ACDF at a single institution by well experienced spine surgeons.

Inclusion criteria:

1. Patients with radiculopathy secondary to herniated disc, spondylosis or combination not responding to conservative management
2. Failure of conservative management (progressive neurological deficit, failure of medical treatment for 3 months, severe symptoms affecting ADL <3 months.
3. Adult patients of both genders (18-65 years)
4. Patients who underwent single or two level ACDF

Exclusion criteria:

1. Patients who underwent corpectomy
2. More than three-level degenerative disc disease
3. Patients with cervical myelopathy
4. Insignificant clinic-radiological correlation

Pre op workup including X-ray Cervical spine (AP and lateral), flexion-extension views, and MRI cervical spine, was performed in all cases. Clinicoradiological correlation was assessed, and patients meeting inclusion criteria were studied. All patients were operated on by well-experienced spine surgeons. Synthetic bone graft was used for fusion in all cases. Operative, as well as radiological evidence of Uncoforaminotomy, was documented. Pre op and Post-Operative VAS score, neck disability index (NDI), and Odom criteria was assessed for neck pain and arm pain immediately, at 2 weeks, 6 weeks and 3 months post op. The data were collected and stored in a spreadsheet format and analyzed by SPSS statistical software. Statistical tests used to analyze different data parameters for statistical significance included analysis of variance, t tests, and chi-squared analyses. Statistical significance was established at $p < 0.05$.

RESULTS

There were 48 (68.6%) female and 22 (31.4%) male patients. The majority of our patients were in the 40-60 years age group (34, 48.6%). The most common level involved was C6-7 (48, 68.6%), followed by C5-6 (19, 27.1%). Uncoforaminotomy was performed in 61 (87.1%) of cases. There was significant improvement in NDI and VAS scores in 61 (87.1%) of cases. Excellent outcomes were achieved in 64 (91.4%) of cases as per modified Odom criteria. A significant correlation was found in patients without Uncoforaminotomy and higher VAS scores post-op (p-0.001). No significant correlation was found between a higher Neck Disability Index (p-0.075) and the presence of Uncoforaminotomy. The subsidence rate was comparable between the two groups. No significant correlation was found between gender and higher post-op VAS scores (p-0.617).

DISCUSSION

Robinson and Smith published the first description of anterior cervical discectomy and fusion in 1955. In their initial description, the uncovertebral osteophytic spurs were not removed during the original operation. In later revisions, Cloward stressed the importance of directly decompressing the offending uncovertebral osteophytes and the need to address all compressive structures. Since then, the merits of direct uncovertebral joint decompression vs. indirect decompression via interbody height distraction and osteophyte resorption have been fiercely disputed. The improvement in radicular symptoms may be due to a number of factors, including indirect decompression through intervertebral disc space distraction and the removal of pathologic motion by achieving a solid arthrodesis in patients who underwent ACDF without direct uncovertebral joint decompression. When a patient has cervical spondylosis, the osteophytes in the uncovertebral joint press against the nerve roots as they emerge from behind the uncovertebral joint, thus increasing the success of Uncoforaminotomy in relieving pressure over the nerve and significantly decreasing radicular pain.

CONCLUSION

Uncoforaminotomy in ACDF with cervical radiculopathy offers direct decompression of the nerve root, making it a useful procedure if done properly without damaging vital structures and increasing operative time. Using a larger cage in ACDF leads to overdistraction of the facet joint, resulting in stretching of the facet capsule and neck pain, leading to higher VAS scores post-operatively. Proper knowledge of the anatomy of the Uncovertebral joint and the availability of armamentarium to decompress the foramen directly yields excellent outcomes while minimizing the risk of complications.

Conflict of Interest: None

Grants/Funding: None

REFERENCES

1. Wong JJ, C^ ote P, Quesnele JJ, Stern PJ, Mior SA. The course and prognostic factors of symptomatic cervical disc herniation with radiculopathy: a systematic review of the literature. Spine J 2014;14 (8):1781–9.
2. Caridi JM, Pumberger M, Hughes AP. Cervical radiculopathy: a review. HSS J 2011;7(3):265–72. Oct
3. Hirvonen T, Siironen J, Marjamaa J, Niemel€a M, Koski-Palken A. Anterior cervical discectomy and fusion in young adults leads to favorable outcome in long-term follow-up. Spine J 2020;20(7):1073–84
4. Iyer S, Kim HJ. Cervical radiculopathy. Curr Rev Musculoskelet Med 2016;9:272–80
5. Shen FH, Samartzis D, Khanna N, Goldberg EJ, An HS. Comparison of clinical and radiographic outcome in instrumented anterior cervical discectomy and fusion with or without direct uncovertebral joint decompression. The Spine Journal. 2004 Nov 1;4(6):629-35.
6. Anderson PA, Subach BR, Riew KD. Predictors of outcome after anterior cervical discectomy and fusion: A multivariate analysis. Spine (Phila Pa 1976) 2009;34:161-6
7. Tanaka N, Fujimoto Y, An H, Ikuta Y, Yasuda M. The anatomic relation among the nerve roots, intervertebral foramina, and intervertebral discs of the cervical spine. Spine 2000;25:286–91
8. Robinson R, Smith G. Anterolateral cervical disc removal and interbody fusion for cervical disc syndrome. Bull Johns Hopkins Hos 1955; 96:223–4.
9. Cloward RB. The anterior approach for removal of ruptured cervicaldiscs. J Neurosurg1958;15:602–14.