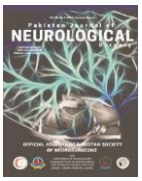

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Original Article (SPINE)

Anterior Cervical Discectomy and Fusion Surgery: Results with Zero-Profile Spacer/Cage

Tariq Imran Khokhar, Sumaira Kiran, Muhammad Naveed Majeed, Khawar Anwar, Asif Bashir
Neurosurgery Unit III, Punjab Institute of Neurosciences (PINS), Lahore Pakistan

ABSTRACT

Objective: Study provides proof to support the promised benefits of employing stand-alone zero-profile cages in multilevel ACDF procedures, as the stand-alone zero-profile device has proven safety and a reduction of the risk of dysphagia in single-level ACDF surgeries.

Materials and Methods: This is a retrospective descriptive study, conducted at the Punjab Institute of Neurosciences, Lahore, Pakistan. Data of 36 patients evaluated for post-operative dysphagia and fusion, who had multi-level ACDF surgery employing stand-alone zero-profile cages.

Results: Total of 36 patients underwent ACDF surgeries. 86.1% (31/36) patients operated for 2 levels and 13.9% (5/36) patients operated for 3 levels. Dysphagia developed postoperatively in 2 (5.6%) patients in which zero-profile stand-alone cages were used. Fusion was achieved in 94.4% (34/36) patients.

Conclusion: Stand-alone zero-profile cages in multi-level ACDF surgeries have a good outcome in terms of post-operative less dysphagia and higher fusion rates.

Keywords: Anterior Cervical Discectomy (Decompression) And Fusion (ACDF), Zero-Profile Cages, Cervical Spondylotic Myelopathy.

Corresponding Author: Khawar Anwar
Neurosurgery Unit III
Punjab Institute of Neurosciences, Lahore
Email: Khavaranwar@gmail.com

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INTRODUCTION

Cervical Spondolytic myelopathy (CSM) is a degenerative disease of the cervical spine and usually requires ACDF surgery. Presentation of CSM includes pain and radiculopathy and usually causes functional impairment. The gold-standard treatment for degenerative cervical spondylosis has been anterior cervical discectomy and fusion (ACDF). Many devices are used in ACDF surgery, which also includes newly introduced stand-alone zero-profile cages. This The most prevalent cause of functional disability of the spinal cord is cervical spondylotic myelopathy (CSM), which is

characterized by disc herniation, enlarged osteophyte, and hypertrophied or ossified ligaments. [1] In a cohort from eastern Asia, the rate of CSM-related hospitalization was 4.04 per 100,000 people per year.[2] After conservative medicinal treatment fails, symptomatic patients usually require surgical intervention. Anterior cervical decompression and fusion (ACDF) have been the gold-standard procedure for degenerative cervical spondylosis since the 1950s.[3] After cervical discectomy, the fusion component of the treatment comes. Many choices for repair of the discectomy defect are available, including autologous bone graft, autologous iliac graft, dynamic cages, cages (PEEK or titanium) with and without plate, and an artificial disc. The intervertebral cages (particularly PEEK) with a cervical plate are now one of the most regularly employed techniques.[4,5] Cages with anterior plating have several advantages in ACDF procedures, including increased fusion rate, spine stability, the sagittal balance of the cervical spine, decreased graft/cage sinking, and retropulsion. However, many patients get dysphagia as a result of anterior plating, particularly those who have had many procedures.[6] As a result of these difficulties, zero-profile implants have recently been created to reduce the risks of anterior cervical plating with keeping the advantages of fast and solid fixation.[7,8] Though that stand-alone zero-profile device has shown safety and a decreased rate of dysphagia in single-level ACDF surgeries[9-15], level-one evidence to substantiate all anticipated benefit in multilevel surgeries is lacking. In two or more level ACDF surgeries, the clinical and radiological effects of a zero-profile stand-alone cage were investigated. We expected the zero-profile stand-alone spacer/cage to lead to a lower risk of dysphagia and a high fusion rate in long-term follow-up.

PATIENT AND METHODS

Study Design and Setting:

It is a retrospective descriptive study conducted at the Punjab Institute of Neurosciences, Lahore, Pakistan. Data of 36 patients, operated for ACDF surgeries with zero-profile spacer/cage between the period January 2018 to December 2020, was collected.

Inclusion Criteria

This study included all male and female patients aged 18 to 70 yrs who underwent ACDF surgeries with zero-profile spacer/cage.

Exclusion Criteria

The study excluded all those patients unfit for surgery.

Data Analysis

JASP V 0.14.1.0 was used for statistical analysis. The frequencies and percentages were used to present the data. P-value < 0.001 consider significant. Binomial t-test applied.

RESULTS

Demographic Data

In a total of 36 patients, there were 28 (78%) males and 8 (22%) women in our study, with ages ranging from 18 to 70 yrs. (mean age, 44yrs) **Table 1.**

Table 1: Demographic Data (N = 36).

Demographics		**n (%)**
Gender	Male	28 (78%)
	Female	8 (8%)
Age (Years)	Mean	44
	Minimum	18
	Maximum	70

Levels Operated, Fusion and Dysphagia

A total of 36 patients, underwent ACDF surgeries with stand-alone zero-profile spacer/cages. mean age was 44yrs, and male: female 7:2. 86.1% (31/36) patients operated for 2 levels and 13.9% (5/36) patients operated for 3 levels. Dysphagia developed postoperatively in 2 (5.6%) patients in which zero-profile stand-alone cages were used. There is a study that showed the development of dysphagia in 12% of patients post-operatively.[4] Fusion rate was also high among the study group. Fusion was achieved in 94.4% (34/36) of patients **(Table 2).**There existed a significant difference (P-value < 0.001) between levels (2/3), fusions (no/ yes) and dysphagia (no/yes).

Frequencies and percentages For Fusion and Dysphagia are also noted in **(Table 3)**. P-value < 0.001 considered significant.

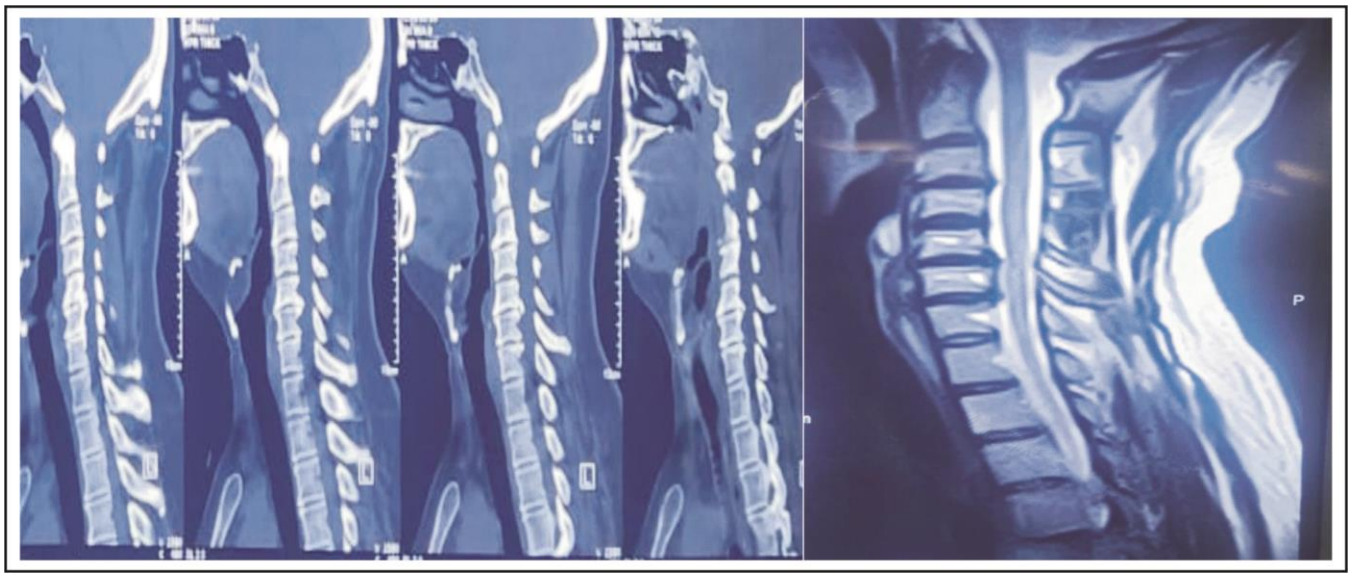
Table 2: Analysis of Levels Operated, Fusion, and Dysphagia (n = 36).

Variable	Level	Counts	Total	Proportion	P-Value
Levels	2	31	36	0.861	< .001*
	3	5	36	0.139	
Fusions	No	2	36	0.056	< .001*
	Yes	34	36	0.944	
Dysphagia	No	34	36	0.944	< .001*
	Yes	2	36	0.056	

*significant result

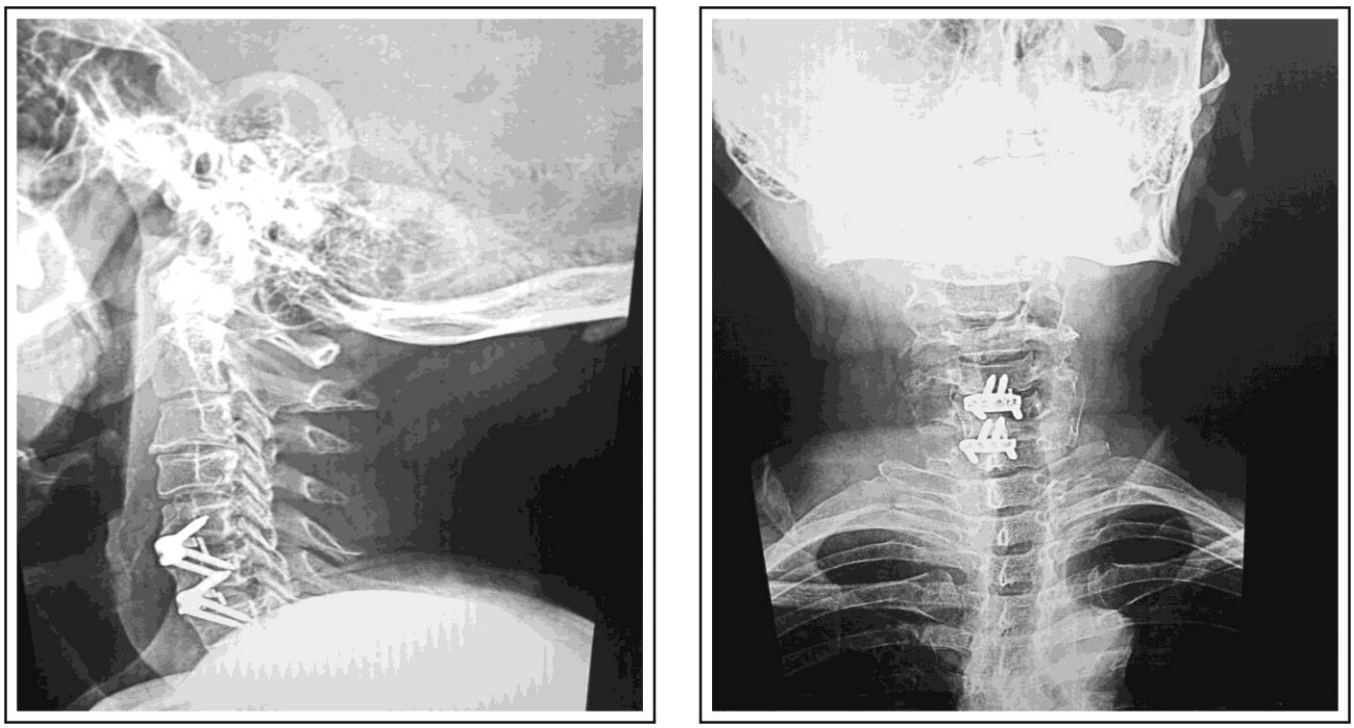
Table 3: Frequencies and percentages for Fusion and Dysphagia.

Fusion	Dysphagia	Frequency	Percent
No	No	2	100.000
	Yes	0	0.000
	Missing	0	0.000
	Total	2	100.000
Yes	No	32	94.118
	Yes	2	5.882
	Missing	0	0.000



(a) (b)

Figure 1: Preoperative Sagittal view of the cervical spine (a) CT cervical spine (b) T2 weighted MRI of the cervical spine. (scans included with the patient's consent)



(a) (b)

Figure 2: Postoperative x-rays, (a) lateral view (b) AP-view. (scans included with the patient's consent)

DISCUSSION

Cervical Spondolytic myelopathy (CSM) is a degenerative disease of the cervical spine and usually requires ACDF surgery. Presentation of CSM includes pain, and radiculopathy and usually causes functional impairment.[2,3] In ACDF surgery, when a cervical disc is removed there is a need for some devicethat can be placed between the cervical vertebrae to gain the aim of surgery which is pain reduction, reversal of curvature, and alignment of the cervical spine along with fusion.[13-18] Different types of cages/spacers are used in ACDF surgery to achieve the goal of surgery. We have evaluated the retrospective data of 36 patients who operated for ACDF surgery and the zero-profile stand-alone cage/spacer used in these cases. 86.1% (31/36) patients operated for 2 levels and 13.9% (5/36) patients operated for 3 levels. Dysphagia developed postoperatively in 2 (5.6%) patients in which zero-profile stand-alone cages were used. There is a study that showed the development of dysphagia in 12% of patients post-operatively.[4] Fusion rate was also high among the study group. Fusion was achieved in 94.4% (34/36) patients. Stand-alone zero-profile cages are now newly introduced devices used in ACDF surgeries, their application in multi-level ACDF surgeries has not been established yet. This study has proven that these devices have many acceptable results in multi-level ACDF surgeries in terms of post-operative dysphagia and fusion.

CONCLUSION

Stand-alone zero-profile cages in multi-level ACDF surgeries have a good outcome in terms of post-operative less dysphagia and higher fusion rates.

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Additional Information

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Human Subject: Consent was obtained by all patients/participants in this study.
Conflict of Interest:
In compliance with the ICMJE uniform disclosures form, all authors declare the following:
Financial Relationships: All authors have declared that they have no financial relationship at present or within the previous three years with any organizations that might have an interest in the submitted work.
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AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Tariq Imran Khokhar	1. Study design and methodology.
2.	Sumaira Kiran	2. Paper writing and data calculations.
3.	Muhammad Naveed Majeed	3. Data collection and calculations.
4.	Khawar Anwar	4. Analysis of data and interpretation of results etc.
5.	Asif Bashir	5. Literature review and referencing.