

## OUTCOME OF CERVICAL DISECTOMY AND FUSION WITH STABILIZATION IN SINGLE LEVEL CERVICAL DISC

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**Background:** Cervical radiculopathy is a common and distressing problem. Only those patients who failed conservative treatment should undergo surgery. The anterior cervical disectomy is the procedure which offers maximal exposure of the disc space. It easily removes the portion of disc which compresses the nerve root. Possibility of developing late kyphosis from disc space collapse supported the fusion procedure after single level disectomy. The goal of instrumentation is to provide immediate stability, increase fusion rate, prevent graft failure, improve rehabilitation process and possibly no need for external orthosis. Objective of study was To see the results and complications of cervical disectomy thru anterior approach and fusion and stabilisation with titanium made plate.

**Methods:** This was a prospective study, comprised of 32 patients admitted during period from 2005–2008. Patients presented with radiculopathy or radiculo-myelopathy were evaluated. MRI was carried out in all the cases. Each patient was carefully evaluated to confirm clinico-radiological correlation and patients with significant disc and failure of conservative treatment were included in the study. **Results:** Males were 28 (87.5%) and female were 4 (12.5%). Twenty patients (62.5%) were in fourth decade. C<sub>5,6</sub> was involved in 18 (56.25%) patients. No significant postoperative complications noted. Persistent neck and back pain noted in patients in disectomy group without plating. **Conclusion:** Anterior cervical disectomy, fusion and stabilisation with plating is a safe and easy procedure in single level cervical disc disease without significant complications.

**Keywords:** Cervical disectomy, fusion, anterior approach, cervical plating

### INTRODUCTION

Anterior cervical disectomy and fusion (ACDF) with or without instrumentation is a surgical procedure performed to remove a herniated cervical disc which has an irritative and compressive effect on the neural elements, producing features of either discogenic neck pain, radiculopathy, or myelopathy.<sup>1,2</sup> Some surgeons began to perform simple disectomy without the addition of a fusion procedure.<sup>3</sup> Possibility of developing late kyphosis from disc space collapse supported the fusion procedure after single level disectomy. Several techniques of anterior cervical inter body fusion have been described, though the approach is same but technique is different. The Robinson interbody fusion technique involve the placement of tricortical iliac crest wedge graft into the disc space.<sup>4</sup> The Cloward technique uses a bicortical dowel shaped graft.<sup>5</sup> The Simmons technique uses a ‘key-stone’ shaped graft.<sup>6</sup> Bailey and Badgley technique involves developing an anterior trough on vertebral bodies.<sup>7</sup>

The role of instrumentation in single level cervical disectomy is still controversial. The goal of instrumentation is to provide immediate stability, increase fusion rate, prevent graft failure, improve rehabilitation process and possibly no need for external orthosis.<sup>8</sup> Anterior disc excision and fusion has been noted to produce good results in single level cervical disc disease.<sup>9,10</sup> We are presenting our results of surgery in single level cervical disectomy thru anterior approach with fusion and stabilisation by titanium plate.

### MATERIAL AND METHODS

This is a prospective study, comprised of 32 patients admitted during period from 2005 to 2008. Patients presented with radiculopathy or radiculo-myelopathy were evaluated. MRI was carried out in all the cases. Different variables like age, sex, level of involved disc and neurological deficit recorded. Each patient was carefully evaluated to confirm clinico-radiological correlation and patients with significant disc and failure of conservative treatment were included in the study. Patients with traumatic or multilevel discs were excluded from study. Patients included in the myelopathy group were evaluated pre-operatively by Nurick grade (Table-1).

**Table-2: Nurick Grades of disability**

Grade	Description
0	Signs or symptoms of root involvement but without evidence of spinal cord disease.
1	Signs of spinal cord disease but no difficulty in walking.
2	Slight difficulty in walking that does not prevent full-time employment.
3	Difficulty in walking that prevents full-time employment or the ability to do all housework, but that is not so severe as to require someone else’s help to walk.
4	Able to walk only with someone else’s help or with aid of a frame.
5	Chairbound or bedridden.

All patients were operated under general anaesthesia. Patients were placed in supine position. A transverse incision made depending on the level of involved disc. Right side was preferred in discs at or above C<sub>5,6</sub> and left side in case of disc at C<sub>6,7</sub>. After identification of the involved disc thru fluoroscope,

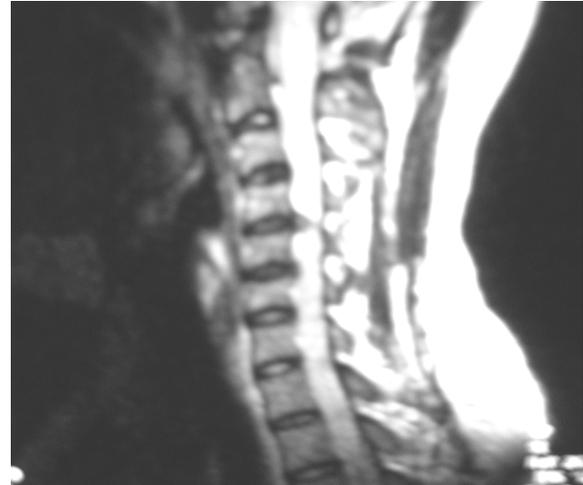
discectomy was performed. Curette used for removal of disc. Bone graft was harvested from the iliac crest, and was shaped to conform to the shape of the disc space. The graft was impacted into the disc space, and stabilisation was done by titanium made plate except 3 cases. Postoperatively, patient was allowed to sit and walk on second day and discharged from hospital on 3<sup>rd</sup> day. Patients were evaluated for improvement in pain and weakness at 1 year.

**RESULTS**

This study includes the patients who under went single level discectomy. Thirty two patients were included from period of 2005 to 2008. The demographic results are summarised in Table-2. There were 28 (87.5%) male and 4 (12.5%) females. Age was ranged from 20–65. The maximum number of patients were under fourth decades 20 (62.5%). Patients with only radiculopathy were 27 (84.37%) and those with myelopathy were 5 (15.62%). Most common disc involved was C<sub>5-6</sub> (56.25%) (Table-2) (Figure-1a & 1b). Surgery was performed at C<sub>5-6</sub> level in 18 (56.25%) patients and C<sub>6-7</sub> level in 10 (31.25%) patients (Table-2) (Figure-2). Follow up period ranged from 6 months to 1 year. At follow-up all patients were assessed clinically and radiologically. Excellent results were found in patients with radiculopathy. Patients in myelopathy group had varying results but all were well after surgery. Two patients with mylopathy were at nurick grade-5 which were improved to grade-1. Two patients were at grade-4 improved to grade-1. One patient was at grade-5 associated with ankylosing spondylitis was remain at grade-5. Three patients were operated for discectomy without plating (Figure-3). At follow up, these patients were complaining of persistent axial neck pain and graft was failed to fuse and displaced from the site when x-rays done on follow-up. No significant post operative complications were noted. (Table-3) Transient dysphagia and hoarseness was found in most patients but improved within days. Failure and non union of graft was found in three patients where plating was not done. There was no wound infection in this series of patients.

**Table-2: Demographical data**

	No. of patients	Percentage
<b>Age</b>		
30-40 yrs	5	15.62
41-50 yrs	20	62.5
51-60 yrs	7	21.87
<b>Sex</b>		
Male	28	87.5
Female	4	12.5
<b>Cervical Disc involve</b>		
C 4-5	4	12.5
C 5-6	18	56.25
C 6-7	10	31.25
<b>Complaints</b>		
Only radiculopathy	27	84.37
Axial pain with myelopathy	5	15.62



**Figure-1(a): MRI cervical spine showing C<sub>4-5</sub>**



**Figure-1(b): MRI cervical spine showing C<sub>5-6</sub> disc**



**Figure-2: Per-operative view of anterior cervical discectomy at C<sub>5-6</sub> level**

**Table-3: Post-operative complications n=32**

Complications	No. of Patients
Wound infection	1
Graft site infection	1
Hoarseness	5
Vocal cord paralysis	0
Dysphagia	15
Spinal cord injury, motor/sensory	1
Pseudoarthrosis	4
Oesophageal/Trachial injury	0
Implant failure/breakage	0



**Figure-3: Post-operative X-rays showing ACDF without stabilisation with plate**

## DISCUSSION

The anterior cervical discectomy is the procedure which offers maximal exposure to the pathology centred around the disc space.<sup>11</sup> Following discectomy, many authors favour the use of a fusion procedure.<sup>5,7,12,13</sup> The necessity of adding a fusion procedure is not universally accepted.<sup>14,15</sup> In the cervical area, fusion has its own set of complications in addition to those of discectomy alone.<sup>16</sup> Arguments in favour of anterior approach to cervical spine with fusion for single level cervical disc disease include the maintenance of disc space height which minimizes the potential to develop late kyphosis. Also, fusion will remove the instability component which may cause progressive deterioration.<sup>17</sup>

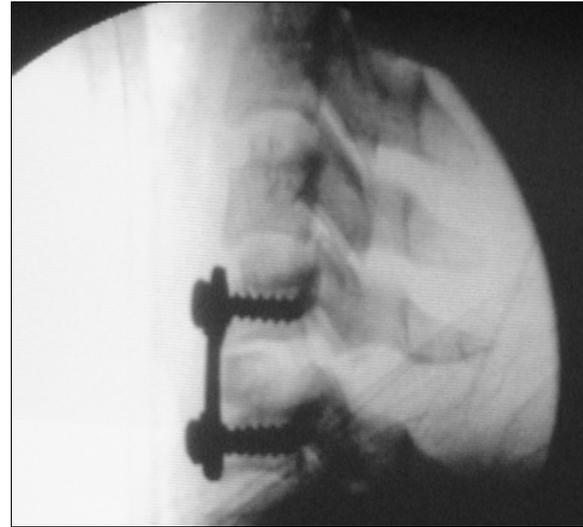
Postoperative results of cervical radiculopathy vary depending on type of approach and severity of problem.

Excellent results in terms of pain relief were found in our patients who underwent anterior cervical discectomy with fusion and plating that can be compared with international results.<sup>18-21</sup> The anterior approach carries the advantage of visualising the pathology directly, and allow better removal of disc.<sup>11</sup>

Literature shows that routine use of plating in single cervical disc remains controversial.<sup>22-24</sup> Caspar *et al.* concluded that cervical plating results in a higher arthrodesis rate and a lower rate of re-operation.<sup>25</sup> Grob *et al.* compared the results of anterior cervical discectomy with or without plating, and reported equal pain relief and fusion rates, but better fusion quality with the use of a plate.<sup>26</sup> Routine anterior cervical

plating for one-level disc disease provides immediate stability, avoids anterior graft dislodgement, restores a normal lordotic curve, enhances the quality of fusion, and shortens the fusion time.<sup>27,12.</sup>

Author agree that fusion alone produce pain in neck and back. Use of anterior cervical plate after single disc surgery provides better postoperative results than fusion alone (Figure-4).



**Figure-4: Per-operative view of fluoroscope showing anterior cervical plate used to stabilise the spine after ACDF**

Various complications reported in literature that can be vascular, neural and respiratory. Pseudoarthrosis rates after grafting range from 0 to 26%.<sup>28,29</sup> This can be due to osteoporosis, overdistracted of disc space and discectomy without plating. Except mild hoarseness and dysphagia, no significant post-operative complication noted compared to literature.<sup>30-32</sup> One patient developed paresthesias in different body parts and that were distressing. Three patients had graft failure as plate was not used, but very excellent fusion found in rest with the use of plate.

## CONCLUSION

Anterior cervical discectomy, fusion and stabilization with plating is a safe and easy procedure in single level cervical disc disease without significant complications. It provides rapid relief in pain due to disc and improvement in motor power.

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