

Early Clinical Outcome of Anterior Cervical Discectomy and Fusion with Titanium Cages: Our Experience with 36 Cases

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ABSTRACT

Background: Anterior cervical discectomy is a surgical procedure done commonly nowadays for patients with cervical disc prolapse.

Objectives: The aim of this study was to evaluate the early clinical outcome of anterior cervical discectomy and fusion with titanium cages.

Materials and Methods: This study was conducted in 36 consecutive cases referred to Department of Neurosurgery, SSG Civil Hospital, Baroda Medical College, Baroda, Gujarat, India from November 2017 to July 2019. Clinical outcome assessed with Nurick scale of Myelopathy, Odom's criteria for functional outcome and Visual Analogue Scale (VAS) for both neck and arm pain. Operative complications were reported.

Results: Total 36 cases were operated, 22 male (61.1%), 14 female (38.9%), Age range was 30-76 years, 26 were single level (72.2%), 8 were double level (22.2%), 2 were triple level (5.6%). Total 52 levels were operated. At the 18 months of follow-up, there was significant post-operative improvement of Nurick scale, VAS scale. According to Odom's criteria 28/36 patients were graded excellent-good.

Conclusion: Anterior cervical discectomy and fusion with titanium cage is an effective treatment for cervical disc prolapse with satisfactory clinical outcome.

Keywords: Clinical Outcome, Anterior Cervical Discectomy, Titanium Cages.


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INTRODUCTION

Cervical disc prolapse is a common cause of cervical pain in many people around the world. They present with pain in neck and arms, shoulder girdle, scapula, hand. It can occur because of aging process, wear and tear. Disc degeneration is a cause and can occur with both degenerative disc disease and aging.¹ The two main methods of treating cervical disc prolapse is conservative and surgery. The candidate for surgery would have persistent neck and arm pain with radiological evidence of disc prolapse. Spinal fusion offers the surgeon an opportunity to remove the pathologic process, eliminate painful motion and obtain decompression of neural elements.² Currently over 95% fusion rate occurs after application of anterior cervical implants.³ The indication of anterior cervical discectomy and fusion (ACDF) include Radiculopathy, Myelopathy, Myelo- radiculopathy involving single or multiple level.⁴ Three types of graft are used.

Autograft, bone comes from patient's own body commonly iliac crest. Allograft, bone comes from donor. Third type is artificial substitute, comes from hydroxy apatite.⁵ Ceramics, titanium etc. It has shown that discectomy provide pain relief sooner than non-

surgical treatment.⁶ There are different complications of using graft alone such as graft collapse, extrusion and pseudo arthrosis.⁷

MATERIALS AND METHODS

This study was conducted from November 2017 to July 2019 in 36 consecutive patients referred to Department of Neurosurgery at SSG Civil Hospital, Baroda Medical College, Baroda, Gujarat, India. All the patients had either clinical evidence of Radiculopathy, Myelo-radiculopathy, and Myelopathy. All the patients had failed conservative treatment and hence referred to us. Duration of symptoms ranged from 2 months to 12 months. Detailed examination of each and every patient was carried out in our indoor department. The pain category was scored using a VAS⁸, Nurick Scale was used for Myelopathy⁹, Odom's criteria were for functional outcome.¹⁰ Patient with recurrent disc prolapsed; neoplasia, trauma and infection were excluded from this study. Cervical spine MRI, X-ray and CT scan was done in all cases. Patients were followed up at 3,6,12 and 18 months.

Nurick Scale: A six grade system (0-5) based on the 'difficulty in walking'.

Grade Description:

1. Signs or symptoms of root involvement but without evidence of spinal cord disease.
2. Signs of spinal cord disease but no difficulty in walking.
3. Slight difficulty in walking which does not prevent full-time employment.
4. Difficulty in walking which prevented full time employment or the ability to do all housework, but which was not so severe as to require someone else's help to walk.

5. Able to walk only with someone else's help or with the aid of a frame.
6. Chair bound or bedridden.

Odom's Criteria:

Excellent: All pre-operative symptoms relieved, abnormal findings improved. **Good:** Minimal persistence of preoperative symptoms, abnormal findings unchanged or improved.

Fair: Definite relief of some pre-operative symptoms, other symptoms unchanged or slightly improved.

Poor: Symptoms and signs unchanged or worse.

Case 1: Single Level Anterior Cervical Discectomy



Fig 1: Pre-op MRI Scan



Fig 2: Intra-op Pictures



Fig 3: Post-op Clinical Picture

Case 2: Double Level Anterior Cervical Discectomy



Fig 1: Pre-op MRI Scan



Fig 2: Intra-op Pictures



Fig 3: Post-op Clinical Picture

Case 3: Triple Level Anterior Cervical Discectomy

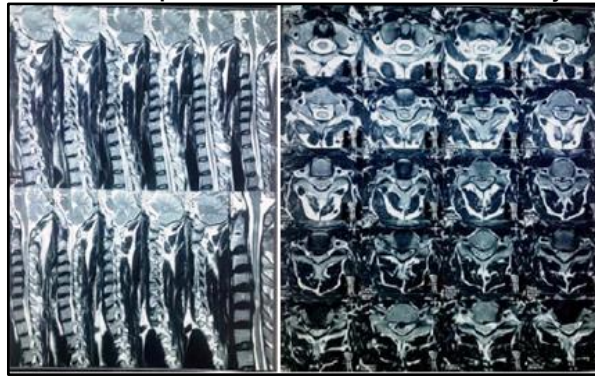


Fig 1: Pre-op MRI Scan



Fig2: Intra-op Picture



Fig3: Post-op Clinical Picture

RESULTS

This study included 36 patients. Out of 36 cases 22 (61.1%) were male and 14 (38.9%) were female. Age range was 30-76 years, 21-30 years: -1 (2.7%) case, 31-40 years:-2 (5.5%) cases, 41-50 years:-10 (27.8%) cases, 51-60 years:-13 (36.2%) cases, 61-70 years:-8 (22.3%) cases, 71-80 years:-2 (5.5%) cases.

Out of 36 cases, 26 (72.2%) were single level, 8 (22.2%) were double level, 2 (5.6%) were triple level hence total of 48 levels. C3-4:- 8 (16.6%) level, C4-5:- 12 (25%) level, C5-6:- 22 (45.9%) level, C6-7:- 6 (12.5%) level.

Duration of symptoms was from 2 months to 12 months.

Cases were followed up for 18 months. We reported significant post-operative improvement of Nurick Scale and VAS for arm and neck pain comparative to pre-operative record.

According to Odom's Criteria, 18/36 (50%) cases were grade excellent, 10/36 (27.8%) cases were graded good, 8/36 (22.2%) cases were graded fair. No patient had poor grade.

There were some transient complications like 5/36 (13.9%) cases had transient dysphagia, 2/36 (5.6%) cases had superficial wound infection, 1/36 (2.8%) cases had hoarseness of voice. Cage subsidence of 3mm occurred in 4/36 (11%) cases i.e. 4/48 level (8.3%). Fusion occurred in 30/36 (83.3%) cases.

Average operating time for one level was \approx 45 minutes.

Blood loss for each level was \approx 25-30 ml. Average hospital stay was 6-10 days.

DISCUSSION

In our study, good early clinical outcome has been aided by fusion technique apart from the good decompression which was done preceding it. Because discectomy alone may lead to poor clinical result due to loss of disc height, narrowing of neural foramen and

due to mal-alignment of cervical spine because of the resulting kyphosis of motion segment.¹¹⁻¹³ A fusion cage not only ensures primary stability between the vertebra but also allow bone in growth to achieve secondary stability without losing the structural integrity of the segment.¹⁴ In our study, fusion occurred in 30/36 (83.3%) cases which is comparable with other studies.¹⁵⁻²¹

In our study, all cases were graded good to excellent in Odom's criteria, 6/8 cases which were graded good had late presentation in our OPD, hence we have found out that earlier intervention sometimes bring satisfactory results. Our cage subsidence rate was also comparable to other studies.²³ Our Complication rates are also comparable with standard studies.²⁴ Our overall study results are also comparable with other studies.²⁵⁻³⁰

CONCLUSION

Our study with limited cases has led us to conclude that good clinical outcome of patient with cervical disc prolapse having, clinical and radiological manifestation is related to good decompression and fusion with titanium cage and in some cases quite early intervention. However much bigger data is needed in order to come to a definite conclusion. But presently the results of our study are comparable to other standard studies also.

REFERENCES

1. Del Grande F, Maus TP, Carrino JA. Imaging the intervertebral disk: age-related changes, herniations, and radicular pain. *Radiol Clin North Am* 2012;50(4):629-49.
2. Hilibrand AS, Robbins M: Adjacent segment degeneration and adjacent segment disease: The consequences of spinal fusion. *Spine. J.*2004;4:S190- 194.

3. Mummaneni PV, Burkus JK, Haid RW, Traynelis VC, Zdeblick TA: Clinical and radiographic analysis of cervical disc arthroplasty compared with allograft fusion: A randomized controlled clinical trial. *J. Neurosurg. Spine.* 2007;6(3):198-209.
4. Mobbs RJ, RAO P, Chandran NK: Anterior cervical discectomy and fusion: Analysis of surgical outcome with and without plating. *J. Clin. Neurosci.* 2007;14:639-642.
5. Kim SC, Kang SW, Kim SH, Cho KH, Kim SH: Clinical and radiological outcomes of anterior cervical interbody fusion using hydroxyapatite spacer. *J. Korean. Neurosurg. Soc.*2009;46:300-4.
6. Manuov, EG. Surgical treatment of low back pain. *Prim Care* 2012;39(3):525-31.
7. Chou YC, Chen DC, Hsieh WA, Chen WF, Yen PS, Harnod T, Chiou TL, Chang YL, Su CF, Lin SZ, Chen SY: Efficacy of anterior cervical fusion: Comparison of titanium cages, polyetheretherketone (PEEK) cages and autogenous bone grafts. *J. Clin. Neurosci.*2008;15:1240- 1245.
8. Huskisson EC: Measurement of pain. *J. Rheumatol.*1982; 9:768-769.
9. Nurick: The pathogenesis of the spinal cord disorder associated with cervical spondylosis. *Brain.*1972;95:87- 100.
10. Odom GL, Finney W, Woodhall B: Cervical disc lesions. *JAMA.*1958;166:23-28.
11. Dan NG: Spinal angulation after anterior discectomy and graftless fusion. *J. Clin. Neurosci.*2000;7:124.
12. Savolainen S, Rinne J, Hernesniemi J: A prospective randomized study of anterior single-level cervical disc options with long-term follow-up: Surgical fusion is unnecessary. *Neurosurgery.*1998;43(1):51-55.
13. Xie JC, Hurlbert RJ. Discectomy versus discectomy with fusion versus discectomy with fusion and instrumentation: a prospective randomized study. *Neurosurgery* 2007;61(1):107-16.
14. Lind B, Zoega B, Rosen H: Autograft versus interbody fusion cage without plate fixation in the cervical spine: A randomized clinical study using radiostereometry. *Eur.SpineJ.*2007;16:1251-56.
15. Topuz K, Colak A, Kaya S, Simsek H, Kut-lay M, Demircan MN, Velioclu M: Two-level contiguous cervical disc disease treated with peek cages packed with demineralized bone matrix: results of 3-year follow-up. *Eur Spine J.* 2009 Feb; 18(2): 238-43.
16. Gercek E, Arlet V, Delisle J, Marchesi D: Subsidence of stand-alone cervical cages in anterior interbody fusion: Warning. *Eur. Spine J.*2003;12(5):513-516.
17. Demircan MN, Kutlay AM, Colak A, Kaya S, Tekin T, Kibici K, Ungoren K: Multilevel cervical fusion without plates, screws or autogenous iliac crest bone graft. *J. Clin. Neurosci.*2007;14:723-8.
18. Eck KR, Lenke LG, Bdridwell KH, Gilula LA, Lashgari CJ, Riew KD: Radiographic assessment of anterior titanium mesh cages. *J. Spinal. Disord.*2000;13: 501-510.
19. Lied B, Roenning P, Sundseth J, Helseth E: Anterior cervical discectomy with fusion in patient with cervical degeneration a prospective outcome study of 258 patients (181 fused with autologous bone graft and 77 fused with a PEEK cage. *BMC Surgery.*2010;10:1-9.
20. Mobbs RJ, Rao P, Chandran NK. Anterior cervical discectomy and fusion: analysis of surgical outcome with and without plating. *J Clin Neurosci* 2007;14(7):639-42.
21. Dickerman RD, Reynolds AS, Morgan B. Polyetheretherketone (PEEK) cage filled with bone morphogenic protein and demineralised bone matrix in anterior cervical discectomy and fusion. *Int Orthop* 2008;32(5):717.
22. Odom GL, Finney W, Woodhall B: Cervical disc lesions. *JAMA.*1958;166:23-28.
23. Bartels RH, Donk RD, Feuth T: Subsidence of stand- alone cervical carbon fiber cages. *Neurosurgery.* 2006;58:502- 508.
24. Fountas KN, Kapsalaki EZ, Nikolakakos LG, Smisson HF, Grigorian AA, Lee GP, et al. Anterior cervical discectomy and fusion associated complications. *Spine (Phila Pa 1976)* 2007;32(21):2310-7.
25. Xie JC, Hurlbert RJ. Discectomy versus discectomy with fusion versus discectomy with fusion and instrumentation: a prospective randomized study. *Neurosurgery* 2007;61(1):107-16.
26. Mobbs RJ, Rao P, Chandran NK. Anterior cervical discectomy and fusion: analysis of surgical outcome with and without plating. *J Clin Neurosci* 2007;14(7):639-42.
27. Dickerman RD, Reynolds AS, Morgan B. Polyetheretherketone (PEEK) cage filled with bone morphogenic protein and demineralised bone matrix in anterior cervical discectomy and fusion. *Int Orthop* 2008;32(5):717.
28. Bohlman HH, Emery SE, Goodfellow, DB, Jones PK. Robinson anterior cervical discectomy and arthrodesis for cervical radiculopathy. Long-term follow-up of one hundred and twenty-two patients. *J Bone Joint Surg* 1993;75(9):1298-307.
29. Johnson JP, Filler AG, McBride DQ, Batzdorf U. Anterior cervical foraminotomy for unilateral radicular disease. *Spine (Phila Pa 1976)* 2000;25(8):905-9.
30. Murrey D, Janssen M, Delamarter R, Goldstein J, Zigler J, Tay B, et al. Results of the prospective, randomized, controlled multicenter Food and Drug Administration investigational device exemption study of the ProDisc-C total disc replacement versus anterior discectomy and fusion for the treatment of 1- level symptomatic cervical disc disease. *Spine J* 2009;9(4):275-86.

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