

Functional and Radiological Outcome Analysis of Anterior Cervical Discectomy and Fusion in Cervical Spondylotic Myeloradiculopathy

A Saravanan¹, N Deen Muhammed Ismail², S Mohan Kumar³, E Rajarajan³, Heber Anandan⁴

¹Senior Assistant Professor, Department of Orthopaedics, Institute of Orthopaedics and Traumatology, Madras Medical College, Chennai, Tamil Nadu, India, ²Director and Professor, Department of Orthopaedics, Institute of Orthopaedics and Traumatology, Madras Medical College, Chennai, Tamil Nadu, India, ³Junior Resident, Department of Orthopaedics, Institute of Orthopaedics and Traumatology, Madras Medical College, Chennai, Tamil Nadu, India, ⁴Senior Clinical Scientist, Department of Clinical Research, Dr. Agarwal's Healthcare Limited, Chennai, Tamil Nadu, India

Abstract

Introduction: Anterior cervical fusion is commonly performed for cervical compression myeloradiculopathy.

Aim: To analyze the functional and radiological outcome analysis of anterior cervical discectomy and fusion in cervical spondylotic myeloradiculopathy.

Methods: Retrospective analysis of 30 patients who underwent single/double level discectomy and anterior cervical fusion by auto graft and stabilization by plate and screws were included. Functional outcome was analyzed by Modified Odom's Criteria.

Results: Outcome was satisfactory in 29 patients with one patient with fair result in the series who had signal changes in pre-operative magnetic resonance imaging and no patients required further surgery in the same level. Average period of fusion was 4 months except for one patient who got delayed fusion due to superficial infection. Commonly fused levels fused levels were at C5-C6 7 patients at C6-C7 4 patients remove. There were no major complications.

Conclusion: We conclude that discectomy and anterior cervical fusion by bone graft and stabilization by H plate and screws is an excellent procedure in case of cervical degenerative spondylotic myeloradiculopathy.

Key words: Cervical spondylotic myeloradiculopathy, Spine, Spondylosis

INTRODUCTION

Cervical spondylotic myeloradiculopathy is a spinal cord dysfunction accompanying typical age related degeneration of the cervical spine.¹ Spondylosis degenerative process that leads to decreased disc height, annular bulge/tear of disc material producing pressure effect over cord and nerve root.² Clinical features vary from neck pain, radiating pain in the upper limb to numbness and weakness of the upper limb.³ The majority of patients with symptoms respond well to conservative treatment in the form of analgesics

and physiotherapy. Patients with deterioration of symptoms presence of sensory deficit, motor weakness and not responding to conservative management for more than 3 months, are taken up for surgical treatment using anterior cervical discectomy with removal of posterior osteophytic complex with autologous iliac crest bone graft ensuring spinal stabilization by fusion and addition of locking H plate fixation to prevent graft migration and collapse.⁴

Aim

To analyze the functional and radiological outcome analysis of anterior cervical discectomy and fusion in cervical spondylotic myeloradiculopathy.

MATERIALS AND METHODS

This retrospective study was conducted in Institute of Orthopaedics and Traumatology, Madras Medical College.

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Corresponding Author: A Saravanan, Senior Assistant Professor, Department of Orthopaedics, Institute of Orthopaedics and Traumatology, Madras Medical College, Chennai, Tamil Nadu, India. Phone: +91-8056200386. E-mail: saravananorthodr@gmail.com

30 patients who underwent single/double level discectomy and anterior cervical fusion by auto graft and stabilization by plate and screws were included.

Inclusion Criteria

Symptoms and signs of Cervical Compressive myelopathy, Persistent radicular pain not responding to conservative management for 3 months, and Compressive Cervical radiculopathy with progressive neurological symptoms.

Exclusion Criteria

Cervical spine Trauma, listhesis, and tumor infectious etiology. Data collected: Visual Analog Scale scoring for neck pain and radiculopathy pre- and post-operative, Clinical and neurological charting, Plain X-ray cervical spine anteroposterior and lateral with follow-up X-rays, computed tomography cervical spine if ossification of the posterior longitudinal ligament is suspected, and cervical spine magnetic resonance imaging (MRI). Follow-up: Radiographic determination of union and osseous incorporation based on the continuation of trabeculae and complete osseous union of the graft/bone interface.



Figure 1: Pre-operative X-ray (lateral view) of cervical spondylosis, magnetic resonance imaging showing cord compression at C5-6 level. Per-operative photograph



Figure 2: Post-operative X-ray with plate and screw at C5-6 in A-P view, post-operative X-ray with plate and screw at C5-6 in lateral view

The presence of bridging bone between the adjacent vertebra.

Post-operative Protocol

Immediate post-operative patient was given soft cervical collar and sutures removed on the 12th post-operative day. Patients discharged with soft cervical collar for 1 month. Depending on the level of job activity patient was instructed to resume to work 3-4 weeks for minimal labor and 6-8 weeks for moderate labor and 12 weeks for heavy labor. Post-operative evaluation included clinical examination and cervical spine radiograph at 3,6,12 weeks and 6 months then annually to assess fusion and progression of bony incorporation at the graft vertebral interface.

RESULTS

About 26 males and 4 females’ patients were included in our study, and the average age was 50.2 years (32-73 years of age). In our study, among 30 patients 86.7% males are affected by cervical disease. Only 13.3% females are affected by cervical disease. The average duration of symptom was 8 months. The most of our cases were single level disc with posterior osteophyte complex disease with most common level was C5-C6 level, and 2 patients had two level disc decompression (Table 1 and Figure 1). The average period of fusion was 4 months except for one patient who got delayed fusion probably due to superficial infection. The clinical outcome (sensory, motor, and reflex) by the clinical tests and overall functional outcome with Modified Odom’s criteria (Table 2). Outcome was excellent in 23 patients, good in 5 patients, and fair in 2 patients (Table 3). One patient did not show good neurological improvement in the series who had signal changes in pre-operative MRI and no patients required further surgery in the same level. There are no complications such as donor site morbidity, dysphonia, pseudoarthrosis, and neurological deterioration (Table 4). There were no graft related complications like graft dislodgement. There was no plate breakage, screw migration or cerebrospinal fluid leakage.

Table 1: Distribution of level of fusion

Fusion	Number of patients (%)
C3-C4	4 (13)
C3-C4-C5	2 (7)
C3-C4-C5-C6	1 (3)
C4-C5	2 (7)
C4-C5-C6	6 (20)
C5-C6	7 (24)
C5-C6-C7	4 (13)
C6-C7	4 (13)

Table 2: Distribution of clinical outcome

Symptoms and sign	Methods	Pre-operative	Post-operative	
			6 months	1 year
Neck pain	VAS	7.5±1	1±0.5	1±0.25
Arm pain		8±0.5	1.5±0.5	1±0.25
Sensory	Clinical	16	1	1
Motor		06	1	1
Reflex		20	1	1

VAS: Visual Analog Scale

Table 3: Distribution of functional outcome

Modified Odom's Criteria	Functional outcome		
	Excellent	23	76%
Good	5	17%	
Fair	02	7%	
Poor	00	0%	

Table 4: Distribution of complications

Complications	Number of patients (%)
Wound infection	1 (3)
Donor site morbidity	0 (0)
Transient dysphagia	0 (0)
Dysphonia	0 (0)
Graft related	0 (0)
CSF leakage	0 (0)
Neurological deterioration	0 (0)

CSF: Cerebrospinal fluid

DISCUSSION

The natural history of Cervical Spondylotic Myeloradiculopathy has not been thoroughly defined and documented. Almost all patients worsen if left untreated and most studies report significant numbers (over 50%) of patients progressing to severe disability.⁵ Indications for instrumentation in these patients are less clear,⁶ but the excellent outcome of rigid internal fixation and theoretical advantages of decreasing graft migration have made plating an attractive (Figure 2).⁷ The demographic variables of this series were comparable to Ali *et al.*,⁸ where male patients were predominant and C5/6 level was the most common involved site. The significant clinical improvement (neck pain, arm pain, motor, sensory, and reflex) improvement was comparable to Wang *et al.*⁹

Connolly *et al.*¹⁰ reported fusion rates with auto graft ranging from 87% to 97%, and Emery *et al.*¹¹ reported 20-27% of pseudoarthrosis. The risk of pseudoarthrosis increases with each additional level of surgery.¹⁰ Although we had 100% fusion and no pseudoarthrosis, the results might have varied with longer follow-up and larger study population.

CONCLUSION

One or two level anterior cervical discectomy and fusion with or without anterior plating for cervical spondylotic radiculopathy and myelopathy is a safe and effective procedure which provides excellent early return to activity with minimal complication rate.

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