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Original Article

Orthopaedics Section

A Prospective Study of the Functional Outcome of Anterior Cervical Discectomy With Fusion in Single Level Degenerative Cervical Disc Prolapse

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ABSTRACT

Introduction: Cervical spondylotic myelo-radiculopathy is a form of spinal cord dysfunction syndrome and usually accompanies age related degeneration of the spine.

Aim: To determine the functional outcome of anterior cervical discectomy with fusion and plating in single level degenerative cervical disc prolapse.

Materials and Methods: A total of 20 patients diagnosed with degenerative single level cervical disc prolapse who presented to the Department of Orthopaedic Surgery, Justice KS Hegde Charitable Hospital, Mangalore from the period of November 2012 to May 2014 were enrolled in the study. Complete clinical and radiological evaluation of the patients was done. A trial of conservative management was tried in all these patients for a period of two months. They were taken up for surgery only when conservative management had failed. Scoring of neck function before the surgery was done as per the Modified Japanese Orthopaedic Association (MJOA) score. All patients underwent anterior cervical discectomy and fusion (ACDF) with tricortical iliac crest bone grafting. Fixation was performed with titanium locking cervical plates. All patients were reviewed at 6 weeks and 6 months postoperatively. Assessment of neck function was done as per the MJOA scoring during all the reviews. Radiographic assessment was also done during all the reviews. The complications noted were documented. The statistical analysis was done using percentages; the arithmetic mean was calculated using SPSS software (version 16.0).

Results: Amongst the 20 patients included in the study, 1 patient died postoperatively due to oesophageal rupture. of the remaining 19 patients reviewed and followed up, all of them had improvement of symptoms and were reported to be in the 'mild category' as per the MJOA score. One patient developed dysphonia, in the immediate postoperative period due to recurrent laryngeal nerve palsy which recovered in a period of three months postoperative.

Conclusion: Single level anterior cervical discectomy with fusion and anterior cervical plating for degenerative cervical disc prolapse with or without myelo-radiculopathy is an effective and safe surgical procedure with minimal complication rate.

Keywords: Spondylosis of the cervical spine, Modified japanese orthopaedic association score, Tricortical bone graft, Cervical spondylotic myelo-radiculopathy, Cervical locking plate

INTRODUCTION

Spondylosis of the cervical spine is a growing cause of neural dysfunction now-a-days [1]. Disc herniation, formation of osteophytes, hypertrophy of osteoarthritic facet joints, and hypertrophy of ligaments are the degenerative changes noted. The condition is considered to be asymptomatic in most cases but it is noted that in 10-15% of the cases there is compression of the cord and the nerve roots which can cause clinical symptoms [2].

Conservative management is commonly employed in the management in these cases. The conservative management commonly employs cervical immobilisation, physical therapy, anti-inflammatory medications, etc [3].

Surgical management of any sort is usually reserved for patients with progressive neurological findings and pain which cannot be relieved with conservative management. For degenerative cervical spine diseases anterior cervical discectomy with fusion was introduced in the 1950s and early 1960s by Bailey and Badgley, Smith and Robinson and Cloward [4-6]. Anterior cervical plating was later recommended to avoid graft related problems like resorption, dislocation and pseudarthrosis [7].

AIM

To study the functional outcome of surgical management of degenerative single level cervical disc prolapse with anterior cervical discectomy with fusion and plating. To study the complications that occur with this procedure.

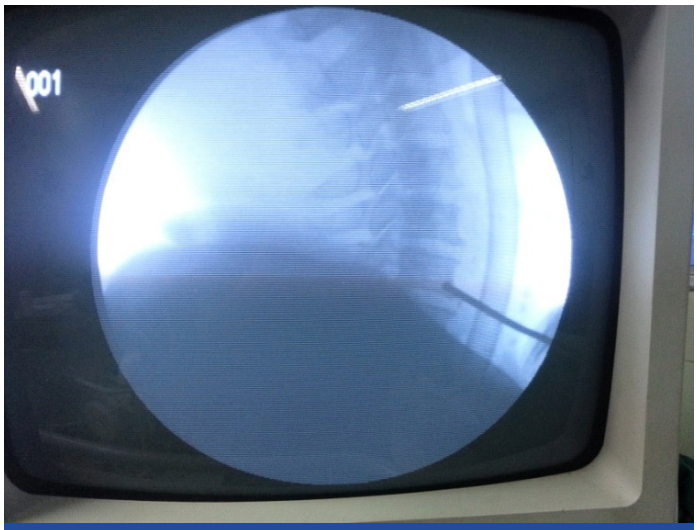
MATERIALS AND METHODS

A prospective study was conducted from November 2012-May 2014 in the Department of Orthopaedics, Justice KS Hegde Charitable Hospital, Mangalore after obtaining clearance from the ethical committee (Nitte university). Informed consent was taken from all the patients before enrolling them into the study. A total of 20 patients were enrolled in the study. The inclusion criteria encompassed patients with diagnosed single level degenerative disc prolapse with intractable pain, not being relieved on any form of conservative management, progressive neurological deficits and cervical myelopathy. Patients of the age groups between 40-70 years were included in the study. Patients with history of acute cervical trauma, tumour or on-going infection were excluded from the study.

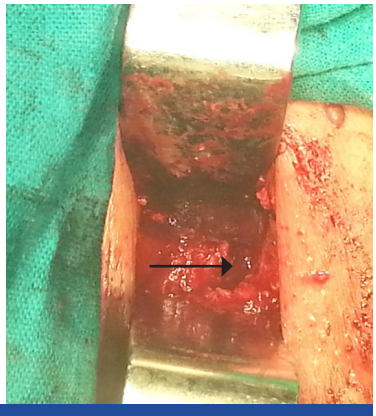
A complete clinical and radiological analysis was performed in all these patients. Clinical evaluation included a detailed history from the patient regarding the onset of symptoms and complete neurological assessment of motor power, sensory deficits, bulk and tone of all the limbs was evaluated. Antero-posterior and lateral radiographs of the cervical spine was taken to note the changes in the vertebrae and look for pathologies. Magnetic Resonance Imaging (MRI) of

the cervical spine and screening of the whole spine was done to confirm the diagnosis and degree of compression of the spinal cord. An average of two months of conservative management was tried in these patients before taking up for surgical intervention. Only patients who did not attain any benefit from conservative management and those whose symptoms worsened over the period of time were taken up for surgery. Modified Japanese Orthopaedic Association (MJOA) scoring for neck function was done preoperatively in all these cases. Informed consent for surgery was taken and preoperative intravenous antibiotics were administered.

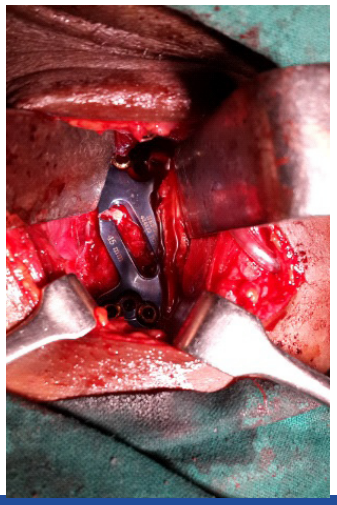
The surgical technique [8] involved positioning the patient supine with skull traction over the operating table. Firstly, the level of the disc was marked on the neck under fluoroscopic guidance [Table/Fig-1]. Anterior approach for exposure of the cervical spine was employed. Transverse incision was made over the marked site. The platysma was then cut in line with the skin incision [Table/Fig-2]. The anterior border of the sternomastoid muscle was marked and the deep cervical facia was incised avoiding the carotid artery by noting the carotid pulsation by palpation. On retracting the carotid sheath and sternomastoid laterally the anterior border of the cervical spine was palpated. The trachea and oesophagus were retracted medially. The pretracheal and prevertebral facia was divided and longus colli muscle was reflected out to expose the uncovertebral joint. The disc was exposed; the level was reconfirmed under fluoroscopy. Discectomy was performed till posterior longitudinal ligament was visualised [Table/Fig-3]. Tricortical iliac crest graft was harvested and was placed in the intervertebral space and Titanium plate was fixed with screws [Table/Fig-4]. Skin closure was done in layers over a suction drain.



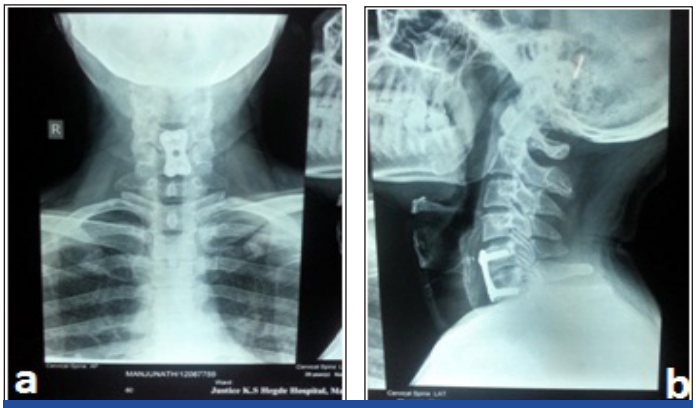
[Table/Fig-1]: Marking of the vertebral level under fluoroscopic guidance before the incision.



[Table/Fig-2]: Transverse incision over the neck for anterior approach and incision of the platysma in line with the skin incision. **[Table/Fig-3]:** After intervertebral disc removal. Note the vacant intervertebral space marked by the arrow.



[Table/Fig-4]: Marking of the vertebral level under fluoroscopic guidance before the incision.

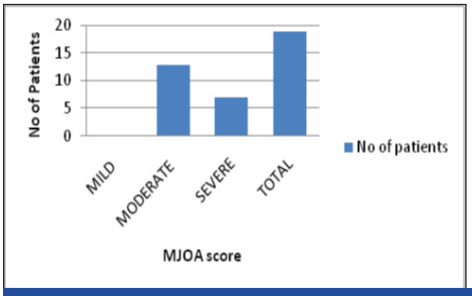


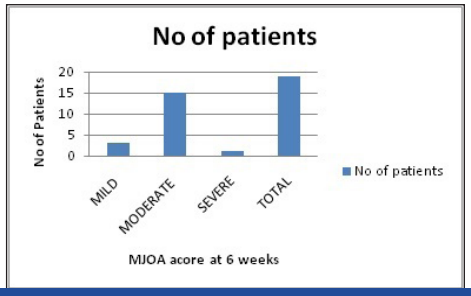
[Table/Fig-5a,b]: (A) and (B): Post-operative anteroposterior and lateral radiographs of the cervical spine after ACDF.

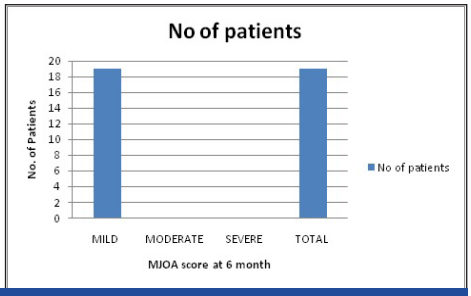
Postoperatively, patient was administered intravenous antibiotics for three days and oral antibiotics were instituted for the next five days. Ryles tube was inserted in the immediate postoperative period and an appropriate sized Philadelphia collar was applied. Immediate postoperative x-rays were taken [Table/Fig-5a,b]. Ryles tube feeding was done till postoperative day three and oral soft diet was started after removal of the tube. Patient ambulation with Philapdephia collar was started on postoperative day four. Suture removal was done at postoperative day 10 and patient was discharged on day 10. Upper limb physiotherapy in terms of range of motion exercises and muscle strengthening exercises were instituted in patients with myelopathy from postoperative day 4. The patients were then reviewed at postoperative week six and then later at six months. Philadelphia collar was continued till 6 weeks, then was removed and isometric neck exercises were started. The collar was then advised only while working and travelling. At the final review at 6 months the collar was discarded.

The MJOA scoring [9] scoring of neck function was done during all the reviews and results were tabulated. During the course of the study, surgery related complications like neurovascular injury, wound haematoma, infection, scar dehiscence, hoarseness of voice, dysphagia, oesophageal injury, tracheal injury, dural tears, CSF leaks, etc were documented. Implant related complications like failure of implant, implant fracture, implant related infection, loosening of implant, etc were assessed for during the review radiographs. Graft related complications like graft resorption, dislocations, pseudarthrosis, graft failure, etc were also looked in for during the follow radiographs.

The changes in the muscle power, sensory deficits, symptoms and neck function were assessed and followed up. MJOA scoring was done in these patients during all the reviews. The results of the MJOA score and complications (aforementioned) noted were documented.







[Table/Fig-6]: Bar graphs showing the distribution of patients as per the MJOA score on admission. 13 patients had moderate scores and 6 had severe scores, none had mild scores. **[Table/Fig-7]:** Bar graphs showing the distribution of patients as per the MJOA score at 6 weeks review. 3 patients had mild scores, 15 patients had moderate scores and one patient had severe scores. **[Table/Fig-8]:** Bar graphs showing the distribution of patients as per the MJOA score at 6 months review. All 19 patients had mild scores.

STATISTICAL ANALYSIS

The statistical analysis was done using percentages, the arithmetic mean was calculated using SPSS software (version 16.0).

RESULTS

One patient died in the immediate postoperative period due to oesophageal perforation. 11(55%) patients of the remaining 19 patients under the study were between the age group of 40-50 years. 17 of the 19 patients were males and two were females. C5-C6 disc prolapse was the most common level of cervical disc prolapse noted.

Thirteen of the nineteen patients had moderate and six patients had severe MJOA scores on admission [Table/Fig-6]. At six weeks 15 patients had moderate scores, three had mild and one had severe scores [Table/Fig-7]. At six months, all the patients had mild scores [Table/Fig-8]. One patient developed dysphonia in the immediate postoperative period due to recurrent laryngeal nerve palsy and recovered in a period of 3 months. No other complications such as infections, vascular injury, failure of fixation and grafting, graft resorption or pseudarthrosis etc were noted.

DISCUSSION

Cervical spondylotic myelo-radiculopathy is a chronic condition that progresses with age [10]. The disease impairs the functioning and activities of daily living of the patient due to pain and neurological deficits. It is a matter of major concern amongst doctors for an effective management plan. A major matter of importance is of the extent of the disease and the level of neurological recovery after the procedure [9].

The age group which was most commonly affected was between 40-50 years in our study. This was comparable to the reports of Azimi et al., whose results reported a range of 54±8.3 years [9]. 17(85%) of our patients were male patients, this is comparable to series of to Ali et al., where male patients were noted to be predominantly affected. C5-C6 disc prolapse was the most common level of disc prolapse noted in our study which was comparable to the series of Ali et al., [11].

At the end of 6 months all of our patients were categorised under mild category as per the MJOA score. This was comparable to the results of Fehling MG et al., who reported significant improvement in the MJOA scores at the end of one year follow up [12].

Dysphonia was noted in one of our patients who recovered at 3months. This is comparable to a reporting rate of 3% due to recurrent laryngeal nerve palsy as a study by Liao JC et al., [13] No other complications like implant failure or infection, wound haematoma were noted in any of our cases. Fehling MG et al., concluded in their series, that surgical decompression of degenerative cervical myelopathy showed improvement in terms of functional outcome as well as quality of life [12].

Islam and colleagues that one or two level ACDF for spondylotic radiculo-myelopathy was an effective procedure with rapid return to activity return to activity [14]. Hessler and colleagues reported an 80% improvement in symptoms and neurological status in their patients and concluded that ACDF was a safe and effective procedure for degenerative cervical disc disease [15]. Ali et al., reported 71.43% excellent results in their case series of performing ACDF in 129 cases [11]. Shiban E et al., reported high fusion rates and low rates of follow ups after anterior cervical discectomy with fusion [16].

LIMITATIONS

The time period of follow-up of patients was short as six months was the final review of all patients. Only two follow-ups were done at six weeks and then at six months, as most of our cases were from distant cities and places, we could not follow them up at regular intervals.

CONCLUSION

Single level anterior cervical discectomy and fusion with cervical plating for degenerative cervical disc prolapse with or without radiculo-myelopathy is an effective and safe surgical procedure with minimal complication rate.

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