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Case report

Single Stage Global Fusion for Fracture Subluxation of Cervical Spine Injury-Case Report

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ABSTRACT

Introduction: Fracture subluxation following cervical spine injury is commonly encountered. Fracture subluxation can result in a serious spinal injury due to compression of the spinal cord. Though decompression of spine is done either anterior or posterior depending upon the site of compression, there is no consensus regarding the stabilization of spine either anterior or posterior or both after decompression of the spinal cord. Global fusion involves combined anterior and posterior stabilization of cervical spine. We report a case of fracture subluxation of C6 over C7 vertebra for whom global fusion was done in a single stage to prevent neurological deficit. Thirty six year old male patient who was a construction worker was brought to casualty after history of fall from height of 20 feet. Patient was immediately immobilized with Philadelphia collar and examined clinically for neurological deficits. On examination patient had no motor weakness and had hypoesthesia in C8 dermatome bilaterally. Radiological examination was done and patient was taken up for surgery. Global fusion following decompression was done for the patient. Anterior decompression with bone grafting and anterior cervical plate fixation followed by posterior stabilization with interspinous wiring and bone grafting was done. Postoperative period was uneventful. Patient recovered from hypoesthesia and immediate mobilization was started. Conclusion: The combined single-stage anterior and posterior stabilization procedure represents a viable option in the treatment of patients with fracture subluxation following cervical spine injury than with single anterior or posterior approach alone.

Keywords: *Cervical fracture subluxation, single stage global fusion, cervical spine injury*

INTRODUCTION

Surgical stabilization is indicated when there is disruption of the normal protective anatomy of the spine. However there is no consensus regarding, indication for anterior, posterior or combined surgical approaches particularly in cases of severe fracture-subluxation of cervical spine. Global fusion is basically a bi-directional (anterior and posterior) approach, is best used to provide solid internal stabilization [1]. Restoration of structural integrity of the spine and protection of vital neural elements are major concerns because the post traumatic instability of the spinal column delays rehabilitation and secondary neural compromise worsens spinal cord deficits. Generally stabilization was done by single approach either anteriorly or posteriorly apart from decompression of spinal cord. But recurrence of dislocation were reported due to inadequacy in one approach [2]. Recently many spinal surgeons have advocated the concept of combining both the above procedures [3], which would then give ideal stabilization for these devastating injuries.

Mostly the anterior and posterior approaches in global stabilization were performed in two, three or even four stages [4]. Single stage global fusion reduces the operating time, morbidity and hospital stay in these cases. Herein, we present a case fracture subluxation of C6 over C7 vertebrae for whom global fusion was done in a single stage.

Case Report

Thirty six year old male patient who was a construction worker was brought to casualty after h/o fall from height of 20 feet. Patient had hypoesthesia in C8 dermatome bilaterally. There was no motor weakness and patient was able to move all four limbs with full power. Patient was immediately immobilized with a Philadelphia collar. The cervical spine X-rays (Antero-posterior and Lateral view) (Fig.1a and 1b) and CT (Computerized tomography) scan showed C6-C7 dislocation with jumped facets (Fig. 2a, 2b). MRI (Magnetic Resonance and Imaging) revealed fracture of posterior elements causing compression of the cord associated with cord edema (Fig.3). The patient was taken up immediately for surgery after obtaining anesthesia fitness. Oral and written consent were taken and post operative complications were explained to the patient and the attenders. Under general anesthesia patient was put in supine position with neck extended. A 5cm transverse incision was made close to the midline of the neck. Platysma muscle was incised vertically in line with its fibers. Sternocleidomastoid and carotid sheath were retracted laterally and using blunt retractors oesophagus and trachea were retracted. Anterior aspect of cervical spine was palpated. Two screws were introduced anteriorly into C6 and C7 and distraction was done. Followed by distraction decompression was done. Followed by which the herniated disc was removed. Cancellous iliac graft was

harvested after decompression and discectomy between C6 and C7. Following decompression and graft insertion anterior stabilization with anterior cervical plate was done. Wound was closed in layers and immediately patient was put in prone position. Posterior stabilization with interspinous wiring and bone graft was done immediately and wound was closed in layers. Both anterior and posterior stabilization were done on a single stage.

Following an uneventful three hours of procedure, the patient was transferred to the recovery room and was monitored in Intensive Care Unit and was discharged one week later. Hypoesthesia resolved completely within 48 hours. On postoperative follow up, he remained neurologically intact and pain free. He has been followed for more than 10 months now.

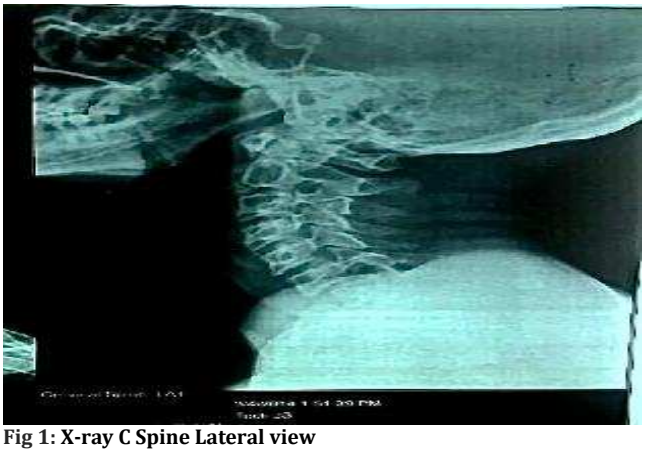

Fig 1: X-ray C Spine Lateral view

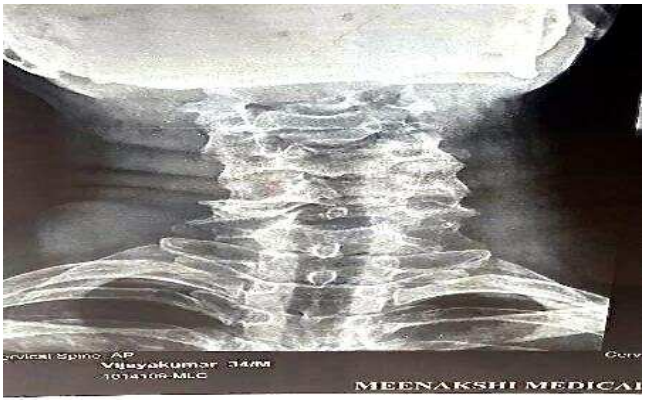

Fig 2: X-ray C Spine AP view

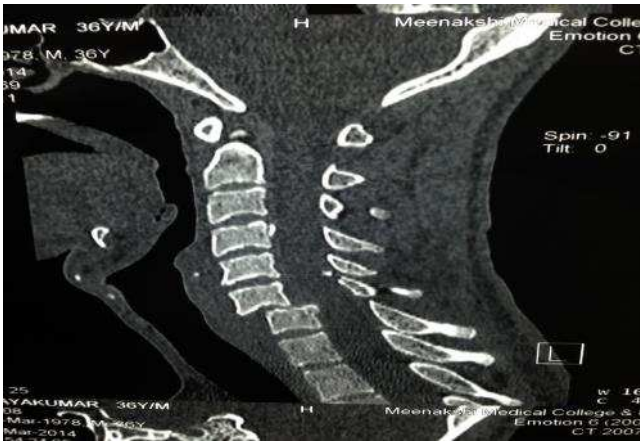

Fig 3: CT cervical spine showing fracture subluxation of C6 over C7

Fig 4: MRI showing subluxation of C6 over C7 with disc herniation causing edema

Fig 5: Post-op X ray Lateral view

DISCUSSION

Surgical management of fracture subluxation of cervical spine is based on decompression of the impaired neural elements and restoration of the normal spinal arch with stabilization. CT and MRI imaging show with clarity the relation ship between bony injuries and spinal cord damage.

Bohlman et al [5] mentioned that anterior decompression may allow for maximal neurological recovery in patients with incomplete neurological deficits and radiographic evidence of persistent spinal cord compromise. Stauffer et al [6] and Tucker [7] reported that the use of anterior fusion alone was associated with the development of kyphotic deformity and graft dislodgement, most likely as a result of coexisting posterior ligamentous and osseous injury. Hence they decided to perform the combined anterior decompression and fixation and the posterior fixation for further stabilization of dislocated cervical spine.

Many authors like Kostuik et al [2] have described loosening of the plate or screws in up to 17% of their patients after only anterior cervical plate fixation even after a short duration of follow up. Paul C et al [3] have opted for one-stage combined anterior and posterior cervical approaches which is associated with decreased rate of postoperative graft dislodgement, failure of the instrumentation, pseudoarthosis. There is an optimum neurological recovery with combined benefits of both anterior and posterior direct decompression of the spinal canal with global fusion. Payer M [8] has

published five cases of traumatic bilateral cervical locked facets of which four were tetraplegic. He has suggested immediate open anterior reduction by inter body distraction and gentle manual traction, followed by global fusion. He concluded that immediate open anterior reduction followed by global fusion obviates the time loss from attempted closed reduction by traction for such cases. Several authors have also suggested for a combined single staged anterior and posterior approach for acute surgical management permitting early restoration of anatomic alignment and decompression while optimizing the environment for neurological recovery [3].

From a biomechanical point of view, posterior fixation devices have an advantage over anterior devices for fixation of posterior instability such as severe fracture dislocations with 3-column in stability[9,10]. In traumatic spondylolisthesis with fracture dislocation of spine, three column instability commonly exists. In the presence of both anterior and posterior ligamentous and bony disruption combined technique provides far greater stabilization than either procedure performed alone [11]. Apart from traumatic spondylolisthesis, global fusion is also advocated for complete dislocations with unsatisfactory anterior reduction, in flexion-extension and rotation injuries associated with complete spinal cord injury, in order to favor functional rehabilitation free from orthosis [12].

Zeidman S et al [13] have proposed that combined stabilization is also indicated in patients with posterior ligamentous disruption or facet fracture and simultaneous anterior compression by a herniated disc. In this situation anterior procedure is to be performed first to relieve the cord compression [13]. Also in multiple level of burst fracture, combined procedure is necessary.

When signs of frank disc herniation are found on the pre operative MRI anterior discectomy is mandatory to avoid neurologic detoriation during reduction, as recommended by Eismont et al [14].

CONCLUSION

The combined single-stage anterior decompression and global stabilization procedure represents a viable option in the treatment of patients with fracture subluxation following cervical spine injury. This technique provides immediate rigid stabilization of the cervical spine and higher rate of fusion is achieved with this combined approach than with single anterior or posterior approach alone.

Conflict of Interest: Nil

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