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Article

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Large armored bridging over fractured vertebra with intraspinal tumor mimicking bony mass caused by migrated fragments of burst cervical vertebra presenting with severe cervical myelopathy

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Abstract: Vertebral body may get displaced anterior or posteror with elements of rotation. However, burst cervical spine vertebral fracture may migrate anteriorly and posteriorly simultaneously. However anterior displaced fragment forming armor like mass is very rare. Similarly, the posteriorly propelled fragments migrating caudally and posterolaterally producing a large osseous mass inside spinal canal mimicking bony tumour causing severe cervical canal stenosis and presenting with marked myelopathy is extremely rare. To the best knowledge of authors, association of such traumatic dual pathology represents first of its kind in western literature, who was neglected early medical advice and presenting with marked compressive cervical myelopathy. She underwent successful surgical decompression with gradual recovery of spastic limb weakness and recovery of sensation. Authors also highlights the importance of early resuscitation and adequate maintainace of mean arterial pressure following acute spinal cord injury. Pertinent literature is briefly reviewed.

Key words: axial loading, cervical burst fracture, armor like mass, intraspinal large bony mass

Introduction

The unstable cervical spinal injury and its subsequent management is challenging as early diagnosis can be difficult, but a missed spine injury can be associated with devastating long-term consequences. [1] As a dictum spinal column injury is presumed to occur until it is excluded. In a case with suspected cervical spine injury, the neck movement should be minimized and should be transported on a backboard with a semi-rigid collar, with the neck stabilized on the sides of the head with sand bags or glass bottles, taped from side to side of the board. In cases of

suspected spinal mal-alignment, skeletal traction with tongs is applied at the earliest even if clinically no evidence of neurologic deficit exists. [2, 3] Detailed neuroimaging evaluation is indicated in patient with myelopathy features, altered sensorium from head injury or intoxication with severe neck pain or tenderness or patients of poly-trauma [4, 5, 6]

Case Illustration

A 21 – year -old female college student had road traffic accident six months back developed spastic quadriparesis immediately following injury, however, showed gradual improvement over the next three months but again noticed worsening of neurological symptom, which mainly involved difficulty in walking and occasional incontinence of urine.

On admission, examination revealed healthy female with stable vitals, neurological evaluation revealed hypertonia of all four limbs with power of 4/5, X-ray cervical spine revealed fracture of the sixth cervical vertebra with presence of a large armor like mass placed anteriorly to verbral body and getting attached at lower part of anterior surface of the fifth cervical vertebra and extending across the sixth and finally attaching to anterior surface of the seventh cervical vertebra. (Figure 1). CT cervical spine, sagittal section clearly demarcated the fracture of sixth cervical vertebra with presence of armored mass and also revealed posterolateral migration of vertebral body fragments and disc against posterior surface of upper part C7 body and C6 level into the adjoining spinal canal forming intraspinal large osseous tumor mass producing significant secondary spinal canal stenosis. (Figures 2, 3) MRI cervical spine, T1 weighted image, revealed presence of intraspinal large mass, probably formed due to migration of vertebral fragments in the postero-lateral and caudal direction in acse of axial loading, producing an osseous mass, which was extensively projecting into the spinal canal at C6 and C7 levels mimicking osseous neoplasms, producing significant secondary canal stenosis with displacement and indentation of thecal sac and also delineated armor like osseous. (Figures 4, 5, 6)

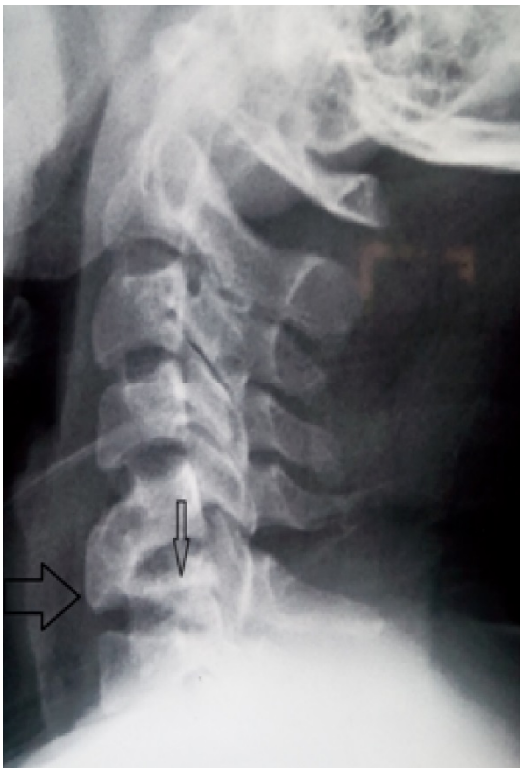

Figure 1 - X-ray Cervical spine, lateral view showing collapse of sixth cervical vertebra (small arrow head) with arched large bony mass like an armored fused with fifth vertebra (horizontal large arrow)

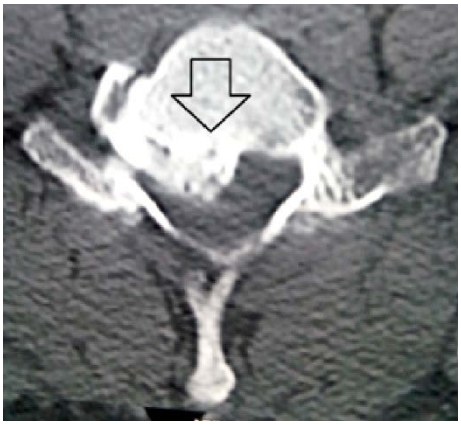

Figure 2 - NCCT cervical spine, axial section image at seventh cervical vertebral body showing caudal migrated posterolateral fragment causing formation of an intraspinal large mass producing severe canal stenosis (large arrow head)

Figure 3 - NCCT cervical spine, sagittal section showing fracture of sixth cervical vertebra with posterolateral migration of disc against C7 body (Arrow head) and cranial migrating and fused with fifth cervical forming large armor extending across the collapsed sixth cervical vertebra

Figure 4 - MRI sagittal section, T1 Weighted image, showing intraspinal large bony mass lying against seventh cervical body a (small Arrow head) and also armored like mass anterior bridging over collapsed sixth cervical vertebra (large arrow)

Figure 5 - MRI sagittal section, T2 Weighted image, showing fracture of sixth cervical vertebra with postero-lateral and caudal migration of disc fragment lying against seventh cervical body (Arrow head)

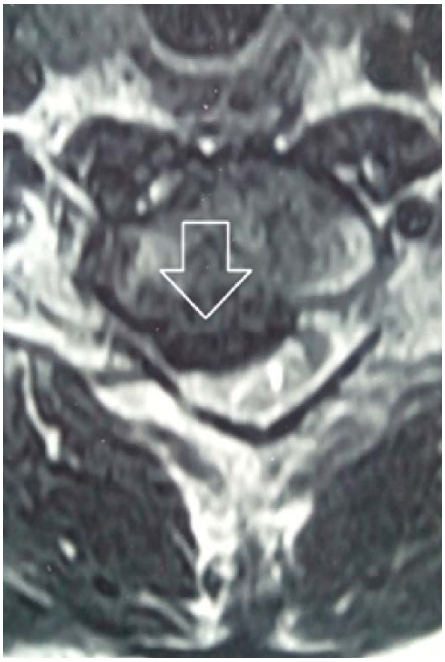

Figure 6 - MRI axial section T2Weighted image showing fracture fragments of sixth cervical vertebra with postero-lateral migration and lying against C7

She underwent surgery through anterior cervical approach and corpectomy of sixth cervical vertebra along with c5-6 and c67 discectomy was carried out. Removal of anteriorly placed large armor like bony mass, which was covering fifth and most of sixth vertebral body was completely drilled out using Midas diamond drill. Intraoperative, presence of a large intraspinal space occupying bony mass lesion was noted, which was producing marked canal stenosis, under microscopic assistance meticulous drilling was also carried out with Mida's Rex cutting and diamonds drill very patiently. The consistency of armored mass and intraspinal fragments were very hard and extremely vascular, while the latter was adherent to posterior longitudinal ligaments. Adequate thecal sac decompression was finally achieved, posterior osteophyte of C5 and C7 level was also removed and adequate removal of posterior longitudinal ligament was carried out intraoperatively, however, no dural breach was noted. At the end of surgery, thecal sac was lax and nicely pulsating. After achieving adequate hemostasis, appropriate sized iliac crest graft harvested and placed in corpectomy space and stabilized using anterior cervical plating and bi-cortical anterior cervical screws.

Discussion

The cervical spine fractures may cause collapse of vertebral body and fragmentation, which may either lie at same level in the anterior or posterior displaced or can even show migration in the cranial or caudal direction, and in association with other osteo-ligamentous disruption produces significant motor, sensory, autonomic neurological deficit. Nature of injury could be flexion injury, flexion-rotation injury, extension injury or vertical axial compression injury or complex type of cervical spine injury. [7, 8, 9]

The basic biomechanics of burst fracture of the cervical vertebral body usually occurs with downward transmission of compressive force to lower cervical spine levels, the vertebral body can get shatter circumferentially and typically producing typically burst vertebral body fracture and cause disruption of the anterior and middle vertebral columns, with a variable degree of posterior protrusion of the middle column into the spinal canal producing spinal canal stenosis. [1]

On X- ray cervical spine and CT scan shows presence of a vertical fracture line and with further loading degree of further comminution and protrusion of the vertebral body fragments can occur anteriorly and posteriorly or even caudal or cranial migration with respect to the contiguous vertebra in a different permutation and combination can occur. Reduction of vertebral body height, displacement of disco-ligamentous complex may enter spinal canal producing spinal canal stenosis. [6]

The origin, position and size, direction of displacement fragments are usually related to the mechanism of genesis and vector of impact forces leading to vertebral fracture. [1] However, anteriorly propelled vertebral fragment may fuse with upper vertebral body and forming big armored mass and providing natural stability, while the posteriorly displaced fragment may enter into canal and in association with extruded disc can cause severe canal compromise causing severe cervical myelopathy feature, necessitating early diagnosis and early surgical intervention should be carried out to provide good neurological outcome. Unfortunately current case could not seek early advice, may be due to poverty tried to delay and presented to us after a delay of six month following accident.

The cartilaginous inter-space that underlies the dural origin of a nerve root of c5, c6 and c7 is the inter-space of an uncovertebral articulation. It is interposed between the central core cartilage of the disc and the nerve root originating from dura. [2, 3] A cervical nerve roots do not lies in contact with the interspace of intervertebral disc between dural origin to intervertebral foramina. A cartilage fragment originating from disc may compress intradural segment of the nerve root by migrating within the epidural space, but entry to area near the origin of the nerve root covered in a dural sheath is blocked by uncovertebral joint interface filled with fibrocartilage. [2]

Early evacuation of patient from site of injury, proper stabilization, early resuscitation, with aim to maintain adequate circulation and breathing, monitoring of mean arterial pressure augmented blood pressure even with support of vasopressor drugs , care and monitoring in the critical care unit and early surgical intervention may offers the chances of improved neurological recovery. These cases may require anterior stabilization, or in addition may need posterior fixation or 360 degree circumferential fusion depending upon degree of spinal instability, clinical feature and progressive neurological deterioration, extent of neural canal compromise, degree of loss of vertebral height, facetal dislocation, rotational component, associated fracture of lamina and associated systemic injury. [8-12]

An intensive resuscitation and maintainace of adequate blood pressure under vasopressor support with a mean arterial pressure of 85 mm Hg should be maintained for at least seven days following acute spinal cord injury need to highlighted to improve the neurological outcome,. As in resource starved centres, inadequate infrastructure not only delay in referral to hospital and many of these cases does not get adequate treatment and monitoring in the intensive care unit.

Witiw et al observed current advancement of knowledge of early secondary phases of spinal cord injury pathophysiological processes led to development of targeted medical management with emphasis on improving tissue perfusion and oxygenation by induction of hypertension, avoidance of hypotensive episodes and also noted earlier surgical decompression of traumatic spinal cord injury improves neurological recovery. [9] Vale et al. observed early aggressive medical management is important factor and can optimizes the potential for enhanced neurological recovery of patients suffering with traumatic acute spinal cord injuries. [10] Readdy et al. conclude after analysis of 34 cases with acute traumatic central cord syndrome, who were administered vasopressor agents to maintain targeted mean arterial pressure, definitely led to improvement in neurological status in all the treated patients. [11]

Catapano et al. highlighted an important social issue and tried to explore the widely prevalent biased attitude of physician as well as paramedical staff towards spinal cord injury victims, especially those with complete neurological deficit while providing resuscitation or inside the hospital care and called for immediate and radical social change on humanitarian approach . Further, such patient should also be helped to get social inclusion. [12] Care of associated injury is of paramount importance. However, rehabilitation and social inclusion are also important steps towards managing cases of spine injury suffers. [4, 6, 8]

Conclusion

Authors advocate early surgical management can lead to development of advanced spinal deformity and severe neurological deficits. Management of spine injury should start from the site of accident and prehospital care, adequate resuscitation and continued care is paramount importance. Meanwhile adequate care of air way and breathing and proper circulation is highly important in the early first week following acute spinal cord injury, Neglected cases may develop spinal deformity, which is not east y technically and highly challenging. However, presence of armored like mass in association with intraspinal migrate fragment forming large mass is extremely rare, and although rare, possibility of such condition should be considered in neglected cervical spine cor injury sustain axial loading with burst fracture.

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