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Case Series

Post Traumatic Spinal Cord Transsection – A Case Series

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ABSTRACT

Road traffic accidents are increasing as an alarming annual rate of three percent in India experiencing an increasing trend in spinal injuries. Spinal cord transsection is becoming prevalent day by day and has become an important aspect in medicolegal autopsy [1]. The present study aims to assess the anatomical distribution of spinal injuries corresponding to its relation with mechanical trauma and also focuses on various causative factors of spinal injuries. Study also emphasis to assess spinal cord in different cases of mechanical trauma. Spinal cord transsection is a complete interruption of white matter tracts, segmental grey matter, and associated nerve roots in spinal cord at any point between cervical- medullary junction and tip of conus medullaris. Depending upon the level of transaction, it may prove to be fatal or lead to permanent disability below the level of transection. It has been found to affect mostly young active individuals. The most common cause of spinal cord transection is penetrating injuries such as knife wounds or severe trauma such as vertebral fracture–dislocations or a complicated childbirth [2]. We present 4 cases of complete spinal cord transsection, observed at post-mortem examination of road traffic accident victims and fall from height.

Keywords: Spinal cord transsection, Road traffic accident, Fall from height

CASE SERIES

Spinal cord transsection is rather uncommon in all of cases of road traffic accidents or fall from height. A total of 106 cases came for autopsy conducted by the Department of Forensic Medicine and Toxicology from January 2022 to August 2022. Out of these, 54 cases were due to injuries sustained following mechanical trauma. Amongst 54 cases, 4 cases showed complete spinal cord transsection with associated fracture and dislocation of vertebral column at the different level. The description of the cases brought to the mortuary of Shree Krishna Hospital are as follows:

Case No. 1

A dead body of 32-year-old male was brought to mortuary for post mortem examination with history of fall from 4th floor while doing labour work on 7/02/2022 at 1:00PM (Figure 1).

On external examination: Dead body was identified, body was well built, rigor mortis fully developed over

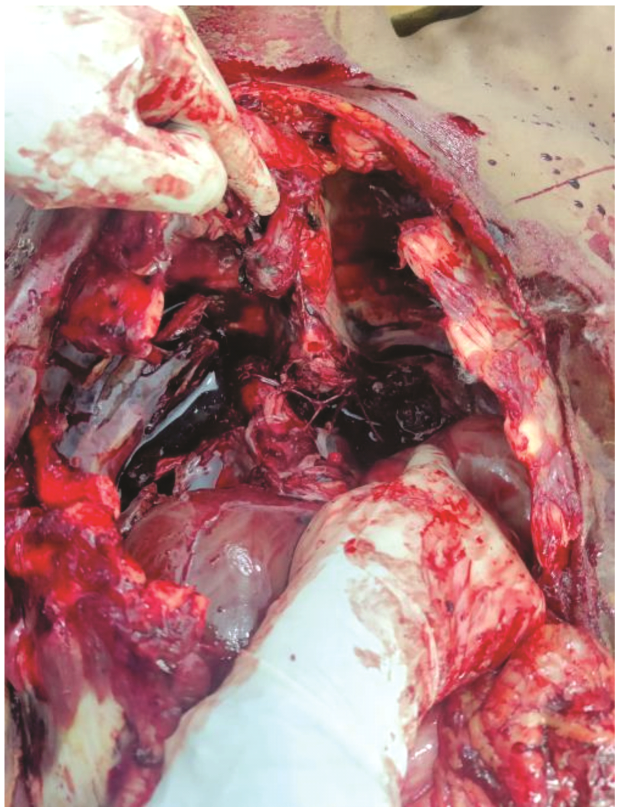

Figure 1: CASE No. 2

all the muscles of the body, post mortem lividity was fixed. Nothing particular in appearance of the body. Laceration of size 10x2 cm, bone deep, vertically situated, present over right side of the head, 5cm right to midline, 3cm above right eyebrow. Laceration of size 13x6 cm, bone deep, stellate shape, present over left side back of head,2cm left to midline,3cm above occipital protuberance. Surgically created wound for intercostal drainage of size 1x1cm present over left lateral aspect of chest,3cm left and 1cm below the left nipple. Abrasion red in color of size 2x1 cm present over lateral aspect of middle one third of left arm. Contusion red in color of size 2x2 cm present over left cubital fossa. Fracture present over lower one third of shaft of left humerus and upper one third of shaft of right ulna and radius.

All injuries are antemortem in nature and possible with hard and blunt impact force.

On Internal examination: Scalp ecchymosis present over right side fronto-parietal region and left side occipital region. Diffuse subarachnoid hemorrhage present over cerebrum, cerebellum and under surface of brain. Fracture present over left fourth to tenth rib at posterior aspect. 300ml blood noted in left side chest cavity. Multiple laceration present in left middle lung lobe over anterior surface. Coronaries were patent on naked eye examination. 450ml of blood noted in abdominal cavity by suctioning. Multiple area of contusions present in mesentery. Contusion, an area of 10x7cm present over posterior surface of right lobe. Multiple lacerations present on anterior surface of spleen.450ml of blood noted in abdominal cavity.

Spine and spinal cord injuries: Translational type fracture of body, pedicles and articular process present between thoracic 10 and 11 vertebrae.

Cause of death: Multiple injuries sustained over the body and its sequela.

Case No. 2

A dead body of 21-year-old male was brought for post mortem examination with history of collision of two motorcycle on 21/05/22, early morning (Figure 2).

On external examination: Dead body was identified, body was moderately built, rigor mortis fully developed over all the muscles of body, post mortem lividity was fixed. Nothing particular in appearance of the body. Abrasion red in color of size 34x29 cm present over front of chest. Laceration of size 10x6 cm, subcutaneous tissue deep present over front right side of chest, involving right nipple. Laceration of size 3x2cm, muscle deep present over medial aspect middle third of right arm. Multiple abrasions red in color of varying size from 3x1 cm to 2x1 cm present over lateral aspect of left elbow region. Laceration of size 3x1.5cm, muscle deep present over medial aspect upper third of left leg. Laceration of size 11x5cm, muscle deep present over

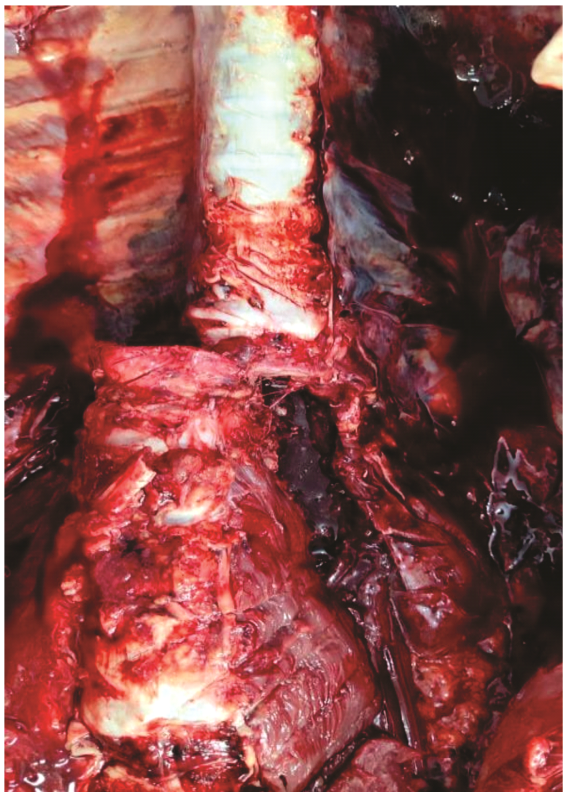

Figure 2: CASE No. 1

dorsum of left foot. Fracture of right humerus mid shaft and right ulna & radius mid shaft present.

On internal examination: Diffuse subarachnoid hemorrhage present over cerebrum, cerebellum and under surface of brain. Fracture of right 2nd to 8th rib in mid axillary line and 3rd to 7th at posterior aspect present with surrounding tissue ecchymosis. Multiple ruptures present corresponding to rib fracture (700ml blood noted in right side chest cavity). Multiple lacerations present in right lung. Laceration of size 3x0.3cm, tissue deep present over posterior surface of right ventricle.500 ml blood noted in abdominal cavity. Multipletranscapsular lacerations varying in size from 6x0.8cm to 4x0.5cm present over anterior and posterior surface of right lobe of liver.

Spine and spinal cord injuries: Transection of spine resulting from fracture of body, pedicles at level of thoracic 8 and 9 vertebrae.

Cause of death: Due to multiple injuries sustained on the body.

Case No. 3

A dead of 53-year-old male brought for post mortem examination with history of collision of truck hitting motorcycle from behind on 19/06/22 at 10:30.

On external examination: Dead body was identified, body was well built, rigor mortis partially developed over face, jaw and neck, faint red color post-mortem lividity present over back of body in patches and not fixed. Nothing particular in appearance of the body. Abrasion red in color of size 1x1 cm present over tip of nose. Abrasion red in color of size 53x42 cm present over back of right side of thorax and right-side buttock. Abrasion red in color of size 8x5 cm present over dorsum of right foot and front of ankle region. Open book fracture present over pubic symphysis. All injuries were antemortem in nature.

On internal examination: Head examination was unremarkable. Fracture of right 3rd to 5th rib noted with surrounding tissue ecchymosis. 1100 ml blood noted in retroperitoneal cavity.

Spine and spinal cord injuries: Transection of spine resulting from fracture dislocation of body, pedicles at level L4 and L5 vertebrae.

Cause of death: Hemorrhagic shock due to by pelvic injuries.

Case No. 4

A dead body of 44-year-old male brought for post mortem examination with history of fall from 40ft while doing labour work on 3/08/22.

On external examination: Dead body was identified, body was moderately built, rigor mortis partially developed over face, jaw and neck, faint red color

post-mortem lividity present over back of body in patches and not fixed. Nothing particular in appearance of the body. Laceration of size 4x1.5 cm, subcutaneous deep present over left side back of head ,5cm back to left mastoid process. Laceration of size 2x1 cm, muscle deep present over left side back of abdomen. Abrasion red in color of size 5x1 cm present over left lateral aspect of abdomen. Abrasion red in color of size 3x2 cm present over back of left elbow region. Laceration of size 5x3cm, bone deep present over middle third front of right leg. Fracture present at shat of right and left tibia and fibula bone.

On Internal examination: scalp ecchymosis of size 5x3 cm present over left occipital region. Linear fracture noted over left posterior cranial fossa. Diffuse subarachnoid haemorrhage present over cerebrum, cerebellum and under surface of brain. Fracture of right 3rd to 6th rib at anterior axillary line. Right 4th an d5th posterior aspect and left 3rd to 9th rib at posterior aspect present with surrounding tissue ecchymosis. Multiple ruptures present corresponding to rib fractures. 1230 ml (580 ml in right side and 650 ml in left side) of blood noted in chest cavity. Multiple contusions varying in size from 3x2cm to 1x1 cm present over both lungs. Laceration of size 2x2 cm, lung substance tissue deep present over posterior surface of superior lobe of right lung. Subendocardial haemorrhages present over left ventricle. Multiple laceration varying in size from 7x0.8 cm to 4x0.8 cm, liver substance deep present over anterior surface and diaphragmatic surface of right lobe of liver. Left iliac bone found fractured in multiple pieces. 1500 ml blood noted in abdominal cavity.

Spine and spinal cord injuries: Translational type fracture of body, pedicles and articular process present at level of 11 thoracic vertebrae.

Cause of death: Multiple injuries sustained over body leading to haemorrhagic shock.

DISCUSSION

All segments of spine are vulnerable to trauma; however cervical part holds most of the interest mainly because of its close association with head injuries and vehicular accidents [3]. Vertebral column fracture mostly occurs from compression force, hyperextension and hyperflexion stress. Mechanism of fracture of atlas is said to be an axial impact via head, when occiput is held rigidly in line with the spine by contracted weak muscles. Anterior dislocation can be caused by fall onto back of head and posterior dislocation caused by blows to jaw or face that jolt the head backwards with hyperextension element [4].

Case No. 1 & 4 (Fall from height) sustained multiple injuries over the body with transection of spine at level of T10 and T11 resulting due to compression fracture on superior atlantal articulating facets. Case No. 2 (Road Traffic accident) where two motorcycles collide with each other sustained multiple injuries with transection of spinal cord at level of T8 and T9 resulting due to hyperflexion and rebound hyperextension. Case No. 3 (Road Traffic accident) where truck collides with two-wheeler from behind sustained multiple injuries with transection of spine at L4 and L5 vertebrae resulting from hyperextension followed by hyperflexion.

CONCLUSION

The cases represent 20–40-year ages in consonance with the available literature that spinal cord transsection is commonly seen in young active individuals. Apart from injuries to head, spine is another part that can get damaged at various levels in accidental trauma, either increasing mortality or morbidity in terms of associated substantial financial costs for acute treatment and lifetime supportive therapy. Thus, spinal cord injury should be always rule out in every case of RTA, fall from height, fall of object.

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