

## Original Article

# Our experience regarding management of C6 and C7 cervical spinal injuries by-anterior approach

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Nineteen cases of C6 and C7 cervical spinal injuries have been operated by anterior approach from 2014 to 2016 in Medical college, Kolkata and R.G.KAR medical college, Kolkata. Male to female ratio was 16:3. Mean age of presentation was 32 years. Only 3 cases were above 50 years of age. Outcomes of the cases were studied.

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**Key words :** Spinal cord injury, Quadriplegia, Stem cells.

In the United States, the incidence of spinal cord injury has been estimated to be about 40 cases (per 1 million people) per year or 12,00 cases per year<sup>1</sup>. In China, the incidence of spinal cord injury is approximately 60,000 per year<sup>3</sup>. In the United States there are around 250,000 individuals living with spinal cord injuries. 80 % of spinal cord injuries occur in males, and 20% in females. Exact incidence is not known in India<sup>2</sup>. Approximately 20,000 cases of spinal injuries are added each year in India. The average age for spinal cord injuries is 38 years old<sup>4</sup>. There are many causes leading to spinal cord injuries. These include motor vehicle accidents (24%), work-related accidents (28%), sporting/recreation accidents (16%), and falls (9%). The age distribution of patients presenting with lower cervical spine and spinal cord injuries is bimodal. Injuries in persons aged 15-24 years are usually the result of high-energy trauma, such as motor vehicle accidents, accidents resulting from sporting activities, or acts of violence. Injuries in persons older than 55 years usually result from low-energy trauma, such as falls from the standing position<sup>3,4</sup>. Cases of lower cervical spinal injuries have been selected based on case selection criteria and operated by anterior approach (Decompression and stabilization) and outcome was studied.

### *Clinical Presentation :*

Patients presented with combination of clinical features like Quadriplegia, Quadriplegia, Flaccidity, Areflexia, Fecal incontinence, Loss of bulbocavernosus reflex, Neurogenic Shock evidenced by Hypotension paradoxical bradycardia Flushed, dry and warm peripheral skin and Autonomic Dys-

function eg, Urinary retention, Poikilothermia.

### *Indication of Operation :*

The primary indication for surgical intervention in our study include malalignment of the spine, with or without neurologic deficits, and progressive neurologic deterioration in the face of persistent compression from bone or disk fragments, detected by clinical examination, X-Ray and MRI (Fig 1).

### MATERIALS AND METHODS

Anterior cervical corpectomy was done with bone grafting and plating in all cases through anterior approach. All the plates were made up of titanium. G-Bone was used as Bone graft. C6 Cervical injuries was managed by C6 corpectomy with C5 to C7 anterior cervical plate fixation. In case of C7 cervical spinal injuries (Twelve cases) C6-T1 fixation could be achieved successfully through anterior approach (Fig 2). All the cervical plates were made up of titanium. Any case presenting with combined C6 and C7 cervical spinal injuries was not found.

### RESULTS

Motor power improved in 11 cases Sensory improvement was there in 60% patients. Incontinence improved only in 5 cases. Superficial wound infection was noted only in 1 patient. Excellent fusion rate (98.9%) was noted at an average of 3.2 month postoperatively.

### DISCUSSION

Patients with lower cervical spine injuries, suffering from minor bony or ligamentous injury can result in severe neurologic injury. However, the converse is also true: major bony or ligamentous injury to the lower cervical spine can present with only neck pain. Thus, a thorough and orderly approach to the examination is paramount. Recognizing injury to the lower cervical spine is important because of the association between these injuries and spinal cord and nerve root injury. Little room for malalignment exists in the lower cervical spine, and safe expedient realignment is of the utmost priority<sup>1,2</sup>. Cervical injuries usu-

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Fig 1 — C7 Vertebral body fracture impinging over spinal cord



Fig 2 — Lateral view C7 corpectomy with C6 to T1 fixation

ally result in full or partial tetraplegia (Quadriplegia). Motor vehicle accidents, falls, and accidents are the leading causes of injuries to the lower cervical spine. Motorcycle accidents account for approximately 20% of motor vehicle accidents leading to spinal cord injuries<sup>3,6</sup>. The most common cervical spinal injuries involve C4 or C5. C5 injuries results in potential loss of function at the shoulders and biceps, and complete loss of function at the Wrists and hand. C6 injuries results in limited wrist control, and complete loss of hand Function, whereas C7 and T1 injuries results in lack of dexterity in the hand and fingers, but allows for limited use of arms. C7 is generally the threshold level for retaining functional independence<sup>4,5</sup>. Treatment options for acute, traumatic non-penetrating spinal cord injuries include the administration of a high dose of an anti-inflammatory agent, methylprednisolone, within 8 hours of injury. This recommendation is primarily based on the National Acute Spinal Cord Injury Studies (NASCIS) I AND II. However, in a third study, methylprednisolone failed to demonstrate better effect in comparison to placebo. Penetrating trauma rarely causes cervical spine fractures but may result in significant neurologic deficits. Presently, administration of cold saline acutely after injury is gaining popularity, but there is a paucity of empirical evidence for the beneficial effects of therapeutic hypothermia. One as yet uncommon approach to improve chances of recovery is to increase blood pressure, thereby counteracting possible underprovision of nerve cells<sup>6</sup>. The American Spinal Injury Association (ASIA) defined an international classification based on neurological responses, touch and pinprick sensations tested in each dermatome, and strength of ten key muscles on each side of the body, eg, shoulder shrug (C4), elbow flexion (C5), wrist extension (C6), elbow extension (C7), hip Flexion (L2). Traumatic spinal cord injury is classified into five categories by the American Spinal Injury Association and the International Spinal Cord Injury Classification System: A indicates a “complete” spinal cord injury where no motor or sensory function is preserved in the Sacral segments S4-S5. B indicates an “incomplete” spinal cord injury where sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5. This is typically a transient phase and if the person recovers any motor func-

tion below the neurological level, that person essentially becomes a motor incomplete, ie, ASIA C or D. C indicates an “incomplete” spinal cord injury where motor function is preserved below the neurological level and more than half of key muscles below the neurological level have muscle grade of less than 3, which indicates active movement with full range of motion against gravity<sup>2,5</sup>. Cervical spine injury has been reported in 2-4.6% of patients presenting with blunt Trauma. It is the most devastating musculoskeletal injury and occurs most frequently in Young patients. Spinal cord injury occurs in more than 11,000 patients per year, or in 40-50 persons per million population<sup>7</sup>. Injuries to the cervical spine produce neurologic damage in approximately 40% of patients. In approximately 10% of traumatic cord injuries, radiographs reveal no obvious evidence of bony abnormality. Recent advances include advances in identification of an effective therapeutic target. Proprietary centers offering stem cell transplants and treatment with neuroregenerative substances are fuelled by glowing testimonial reports of neurological improvement. It is also evident that when stem cells are injected in the area of damage in the spinal cord, they secrete neurotrophic factors, and these neurotrophic factors help neurons and vessels grow, thus helping repair the damage<sup>8,9,10</sup>.

### Conclusion :

Follow-up in our studies detected less than 2% incidence of significant complications, related specifically to the use of anterior hardware and anterior decompression, bone grafting, and metallic osteosynthesis are thought to provide a valuable means of treating acute lower cervical spine trauma, including C7 cervical spinal injuries.

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