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CASE STUDY

STAGE MANAGEMENT OF SEVERE CRANIOCEREBRAL AND CERVICAL SPINE INJURIES

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Abstract

Associated craniocerebral and spinal traumas are devastating pathologies, which mostly affect young males; these injuries result in a high degree of disability and mortality; the treatment outcomes are frequently dissapointing medical doctors.

The case presents our experience on stage management of severe craniocerebral and cervical spine injury in a 17-year-old male suffering from a severe traumatic brain injury and C_7 cervical spine fracture with associated spinal cord injury and tetraplegia.

Considering the degree of spinal cord damage and the early time of hospitalization (2 hours after trauma) the decision was made to manage the patient immediately with high doses of intravenous steroid Dexamethazone at 55 mg dose level followed by the urgent surgical intervention: decompressive craniotomy with removal of depressed bone fragments, metallic foreign body and epidural hematoma, C_7 corpectomy and decompression of the cervical spinal cord, C_6-Th_1 spondylodesis with replacement of vertebral body by a bone graft taken from the iliac crest.

The graft was stabilized by anterior fixation with a titanium plate and screws.

However, due to inadequate behaviour of the patient, after an abrupt head turning the repeated computed tomography displayed anteposition of the metallic construct and bone graft. The patient was again operated and C_6-Th_1 anterior fixation, as well as posterior lateral mass fixation with metallic rods and screws, was performed.

There were no complications in postoperative period. The patient was discharged from the hospital in good condition, with clear consciousness and full recovery of movements and sensory functions.

Two-year follow-up examinations revealed the excellent outcome and complete recovery of spinal cord functions.

Keywords: *traumatic brain injury, cervical spine trauma, cervical corpectomy, anterior fusion.*

Associated craniocerebral and spinal traumas are devastating pathologies, which mostly affect young males resulting in a high degree of disability and mortality; treatment outcomes are often dissapointing medical doctors.

We present a case from our experience on stage management of severe craniocerebral and cervical spine injury. A 17-year-old male (L.N.) suffered from a severe traumatic brain injury and C_7 cervical spine fracture with associated spinal cord injury inflicted on September 12, 2010 at 3:30 a.m. due to motor vehicle accident. The victim was immediately transfered to the Intensive Care Unit of "Heratsi" No. 1 Clinic of the Yerevan State Medical University. The patient was severely injured, his consciousness by Glasgow Coma Scale (GCS) was rated as 7-8, pupils were narrow, D=S, slightly reactive and corneal reflexes were supressed. The patient reacted to pain only by facial grimace, which made an impression of tetraplegia.

In the left parietal region there was a contused skin laceration with the metallic foreign body inside (Figure 1 a; b).

Fibroscopic intubation followed by the urgent computed tomography (CT) of the brain and spine was performed. The patient was diagnosed to have a severe associated penetrating traumatic cranial

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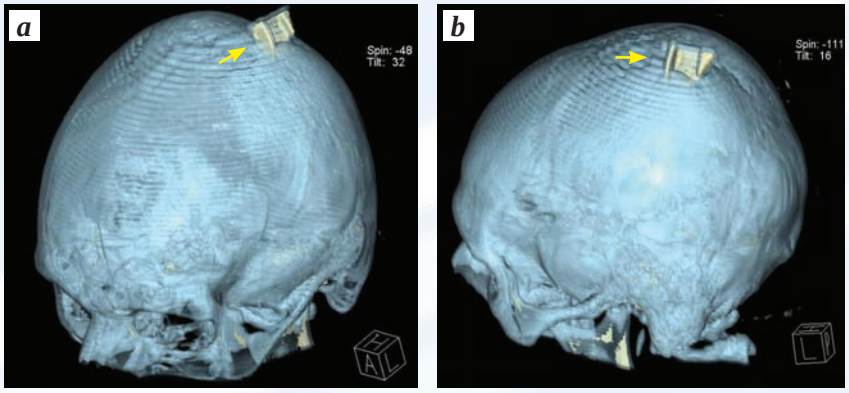

***Figure* 1.** *CT 3D reconstruction of skull: a – anterolateral; b – lateral. The metallic foreign body is shown by the white arrow.*

and cervical injury, depressed skull fracture of the left parietal region with metallic foreign body inside, left parietal epidural hematoma, severe brain contusion with compression, wound in the left parietal region, C_7 burst fracture with spinal cord compression (Figure 2 a; b), C_2 body fracture, C_6 ventral compression fracture, Th_3 linear fracture with tetraplegia, pelvic disfunction. Fracture-dislocation of head and neck of humerus was recorded. Contusion of both lungs was revealed.

Considering the degree of spinal cord damage and the early time of hospitalization (2 hours after

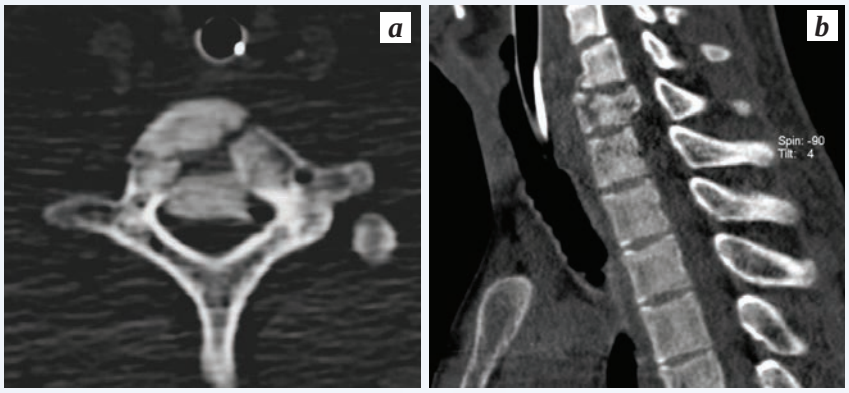

***Figure* 2.** *Reconstruction of non-contrast CT of the cervical spine: a – axial; b – sagittal. The white arrow shows C_7 body fracture with 50% narrowing of the spinal canal.*

trauma) the decision was made to manage the patient immediately with high doses of intravenous steroid Dexamethazone at 55 *mg* followed by urgent surgical intervention:

at 5:45 a.m. decompressive craniotomy with removal of depressed bone fragments, metallic foreign body and epidural hematoma was performed;

at 6:30 a.m. C_7 corpectomy and decompression of cervical spinal cord, C_6-Th_1 spondylodesis with replacement of vertebral body by a bone graft taken from the iliac crest was performed. The graft was stabilized by anterior fixation with a titanium plate and screws (Figure 3 a; b).

During the first post-operation days the patient's consciousness progressively became clear, slight movements in the proximal parts of all extremities were noted, which improved during the folowing week. The general condition of the patient was stabilized, and he was transferred to the Department of Neurosurgery to continue rehabilitation therapy.

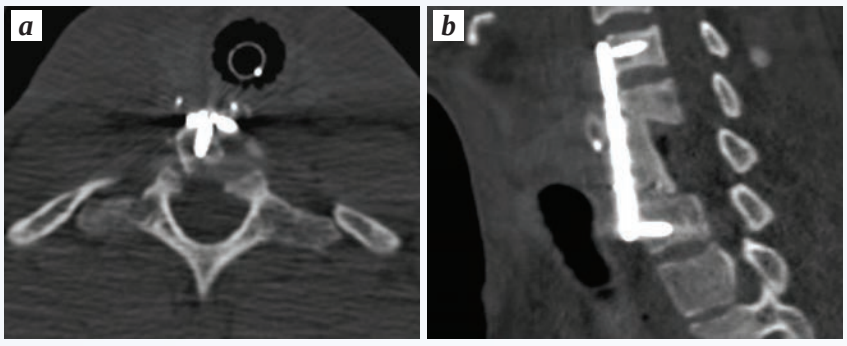

***Figure* 3.** *Reconstruction of non-contrast CT of the cervical spine (an anterior fixation): a – axial; b – sagittal.*

However, due to inadequate behaviour of the patient on September 23, 2010 after an abrupt head turning he felt severe pain in the cervical spine. The repeated CT displayed anteposition of metallic construct and bone graft. Temporary immobilization by Halo-vest system was performed.

After the stabilization of general condition and behavioural irregularities regress on October 4, 2010 the patient was again operated; C_6-Th_1 anterior fixation, as well as posterior lateral mass fixation with metallic rods and screws was performed (Figure 4 a; b).

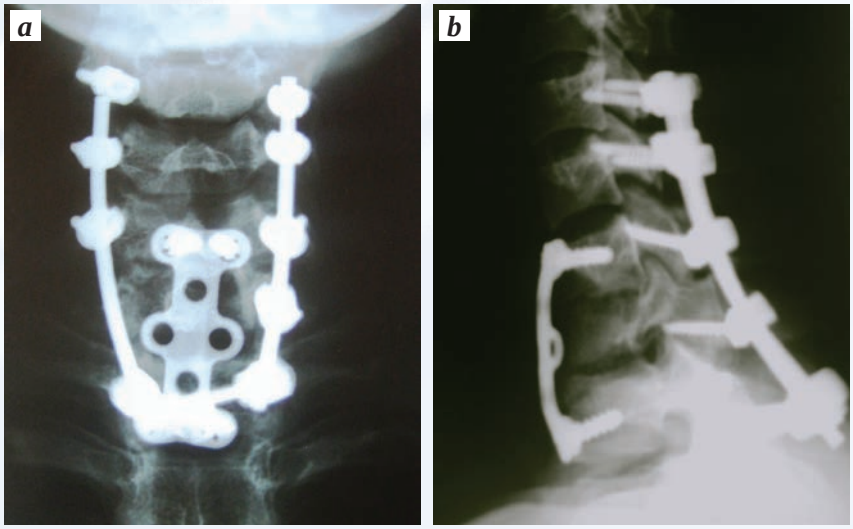

***FIGURE* 4.** *X-ray of the cervical spine: a – anterior-posterion projection; b – lateral projection.*

The postoperative period was without complications. The patient was discharged from the hospital in good condition, with clear consciousness and full recovery of movements and sensory functions.

In February 2011, the patient was admitied to the Department of Neurosurgery, where on February 28, 2011 cranioplasty of the cranial bone defect with protacril was performed.

On March 31, 2011 open reposition and screw osteosynthesis, osteoclasia and correction of subluxation of left humerus was performed due to fracture dislocation.

Two-year follow-up examinations revealed excellent outcomes and complete recovery of the spinal cord functions.