

THE RESULTS OF EARLY OPERATIVE TREATMENT OF THE LUMBAR VERTEBRA FRACTURES WITH NEUROLOGIC DEFICIT

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Between 1986 and 1990 three patients with neurologic deficit because of lumbar vertebrae fracture were operated in Orthopaedics Department of S.B. Ankara Hst. and S.B. Haseki Hst. Istanbul. The cases were prepared to surgical procedure within 6-24-36 hours separately, and followed -up to one year. The type of the fractures were determined, by x-ray and CAT scans. The criterium were the degree of the deficit according to the Frankel classification, the response to the Bulbocavernose Reflex and the obstruction of the neural canal. The technique applied was neural decompression combined with classical Dual Harrington Distraction Rods. I observed the recovery of medullar compression, beginning from the post-operative second day and a good recovery with in 6-12 months.

Key Words : In a paraplegic patients inspite the motor and sensorial loose, the return of the reflex in post-traumatic 24-48 hours, show that the prognosis is bad, proving the lesion is in the cord and irreversible. In two of the patients the reflex did not exist in 36 hours and give us the indication to open reduction and posterior decompression before 48 hours to eliminate the neural ischemia. The third patient with total paraplegia had free bone fragments in the neural canal and the Bulbo-Cavernose Reflex was negative. He was operated in the sixth hour after the trauma. The prognosis is reported below.

The fractures of lumbar vertebrae, as in general are grouped into two such as STABLE and UNSTABLE. The stable fractures with the absence of neural deficit are treated non-operatively indeed.

The vertebral lesions with or without injury of the spinal cord or nerve roots have been classified on the basis of the clinical and roentgenographic findings into five groups:

I. Pure Flexion, which causes a wedge fracture, is stable, Lateral Flexion fractures are also stable but may cause scoliosis later.

II. Flexion-Rotation, which produces an unstable fracture-dislocation with rupture of the posterior ligament complex, avulsion of the spinal processes, a slice fracture near the upper border of the lower vertebra and dislocation of the lower articular process of the upper vertebra.

III. Extension, which causes rupture of the intervertebral disc and the anterior common ligament along with avulsion of a small bone fragment from the anterior border of the dislocated vertebra. The dislocation almost always reduces spontaneously and is stable in flexion.

IV. Vertebral Compression, which results in a fracture of the end plate as the nucleus of the intervertebral disc is forced into the vertebral body and causes into burst with outward displacement of fragments of the body. Since the ligaments remain intact,

this comminuted fracture is stable.

V. Sharing, which results in forward displacement of the vertebra and unstable fracture of the articular processes or pedicles.

Accurate diagnosis and prognosis of the neurologic lesion depend on knowledge of the anatomy of the spinal cord and nerve roots, a careful neurological examination shortly after the original injury and repeated examination there after, comparison of the level of paraplegia.

Medulla Spinalis ends at the inferior border of the first lumbar vertebra corpus. S1 segment is localized in the upper border of the first lumbar vertebra and L1 segment at the level of tenth thoracic vertebra. Thus between the levels of T12 and L1 vertebrae, the segments L5 and S1 exist. Therefore in the fractures-dislocations in between this region, S1 segment and the complete lumbar nerve roots is to be injured.

The lumbar paraplegia originates from the injury of the nerve roots and recovers like as peripheral neuropathy but sacral paraplegia originating from chordal damage never returns back.

Different authors have different classification about the spinal stability. DENIS had divided the whole vertebra into three columns vertically and excepted as unstable, in the presence of fractures at least two of the three columns. Robberts and Curtis maintain anterior and posterior stability separately, White and Panjabi have criterium at least five about clinical, radiologic and neurologic findings Chakirgil had reported all the dislocated lumbar vertebra and rotational fractures of this region should be operated, as they are unstable.

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Also the common idea is that the compression in the corpus more than 50% and the existence of neural injury.

PATIENTS AND METHOD

Three patients of lumbar vertebra fracture with neurologic deficit are included in this article. One was caused by traffic accident, the two were fallen down from height. The types of fractures and the neurologic findings are shown in the table below.

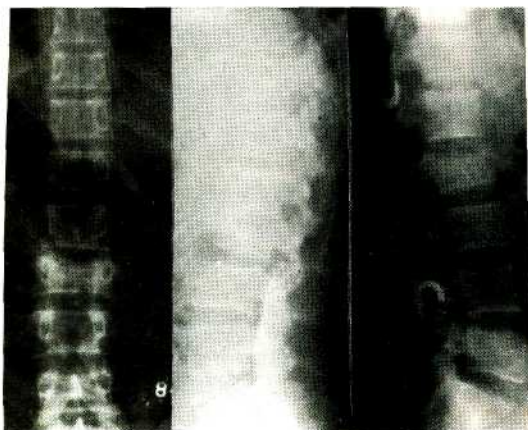


Fig 1. : Pre and post-operative roentgenograms of a Burst type fracture, showing the reduction at L2 vertebra.

Age	Level	Type	Neurologic Deficit	Operation Time
24	L ₂	VI - Burst	Total paraplegia	6-Hrs post-trau.
18	L ₁	II - Flex.	Total paraplegia	36-Hrs post-trau.
16	L ₁	I - 50 %	Paraparesia	24-Hrs post-trau.

Table 1: Showing the pre-operative findings and operation time post-traumatic.

Two of the patients with paraparesis were examined for the return of sphincter reflex and decided for the operative treatment at about 24 and 36 hours following the initial trauma. The third patient with the free bone fragments had also no sphincter reflexes and was operated 6 hours later.

Harrington Instrumentation: As soon as the patient is prepared for the operation it must be carried out. The free bone fragments must be cleared away if exist, with laminectomy, and after the Harrington Hooks are

applied two levels over and below the fractured vertebra. As distraction is carried out with out-rigger, the reduction could be obtained easy with thumb-pressure. After that two rods are inserted through hooks and distracted. The tension of the anterior longitudinal ligament, while distraction helps the reduction of the anterior fragments. Moreover the negative pressure occurred in the fracture area reduces the fragments of the corpus. (Fig. I-A)

The goal of the procedure is to have a very early reduction as soon as possible to restore the medullary cavity, to get rid of the compression of the cord caused by edema and haematoma.

In a paraplegia without a cord section, the pathology is the ischemia of the cord caused by direct compression and/or the medullary edema.

The post-operative care and early rehabilitation is carried out in a classical manner. A plaster corset is applied for eight to twelve weeks post-operatively.

RESULTS

The patient with type I fracture and paraparesis at almost close to plegia, had a recovery beginning from the post-operative 48 hours. Initially his sensorial feeling tends to come back. Two months after the operation he didn't need to use crutches but remaining hypoesthesia in L5-S1 segments. Six months after the operation, there were no complaints of the patient, no neurological findings. The second one with Type II fracture had the same neurologic findings. The medulla seemed ischemic and laminectomy was carried out because of the vertebral rotation. His recovery was slower performing to walk with crutches two months after the operation. His sensorial recovery extends to six months and remained no complaints at the end of twelve months.

The patient with burst type fracture had total paraplegia. Total to L1 and partial to L2. laminectomy was accessed. Postero-lateral decompression and dual Harrington was applied. His motor function began to return one week after the operation gently but Cauda Equina lesion remained.

DISCUSSION

The fractures and fracture-dislocations of lumbar region are very complicated injuries. The classification is varying and non of them has a quantitative value.

Non of them involves both structural and neurologic situations. The preoperative methods like x-ray, myelography, BT, ultrasound, etc. help to know about the structure of the fractured vertebrae, and almost some idea about the cord. But non of them is useful about the diagnosis of the damage at the neurologic elements and vertebral ligaments. Only the direct vision at the operation gives idea.

But the fact is that, the sooner we operate, the earlier and better recovery is obtained, at the indicated cases. In this article the method of reduction and/or stabilization is not discussed. Various methods could be used such as Luque, Cotrell Debousset, Internal KFixateurs and transpedicular screws for some types of dislocations. The choice of the method varies according to the type of the fracture, the experience of the surgeon and economical situations. The aim is a correct decision and early operation to restore the medullary cavity as soon as possible and to get rid of the causes of neural ischemia.

As a summary, in a patient with paraplegic, if motor functions of some muscle groups return back, it means the spinal cord has a portion not damaged and recovery is expected. But no change in the plegia in 24 hours shows the total injury of the cord. On the other hand, besides the motor and sensorial loss, the return of the reflex activity is the sign of the bad prognosis. It means distal cord segment is disconnected with the cortex.

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