

COMPLETE DISLOCATION WITH A FRACTURE WITHOUT NEUROLOGIC DEFICIT IN THE UPPER LUMBAR VERTEBRAE

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ABSTRACT

Complete dislocations with fractures in the spine are the injuries in which the stability of the spine is severely damaged. In fact, the integrity of three columns is generally disrupted and severe neurologic deficit occurs. This study tries to explain the mechanism of the sparing of neural elements in a case of fracture-dislocation with ptosis without neurologic deficit.

Key words: Fracture dislocation, Lumbar vertebrae, Neurologic deficit.

ÖZET

ÜST LOMBER VERTEBRALARDA NÖROLOJİK DEFİSİTİ OLMAYAN KOMPLET KIRIKLI ÇIKIK

Omurganın komplet kırıklı çıkıkları, stabilitenin şiddetli bir şekilde zararlandığı yaralanmalardır.

Her üç kolonun bütünlüğü bozulmakta ve ciddi nörolojik defisit oluşmaktadır.

Bu çalışmada, nörolojik defisiti bulunmayan ptozis'li bir kırıklı çıkık olgusunda nöral yapıların sağlam kalma mekanizması açıklanmaya çalışılmıştır.

Anahtar sözcükler: Kırıklı çıkık, Lumbar vertebra, Nörolojik defisit.

INTRODUCTION

In this case report, the mechanism of a complete fracture - dislocation without neurologic deficit in the upper lumbar region is discussed.

CASE REPORT

A woman, 25 years old, sitting at the back of the car without a seat-belt had an accident. Then she was taken to our emergency room. Physical and radiographic signs proved that there was a complete dislocation with a fracture laterally displaced at the L1-2 level. The evaluation of muscles were: quadriceps 5, tibialis anterior 5, EHL 5, gastrocnemius 5, bilaterally without any neurologic sign.

Lateral X-ray indicated a kyphosis of 28 degrees through L1-2, dislocation in anterior and lateral area in the way that the anterior and superior angles of the upper vertebrae with superposition on the 1/4 part of

the vertebrae. Spinous processes were intact.

Plain X-ray suggested a 3 cm. lateral translation between the lines which unite the spinous processes in the distal and proximal column segments, a fracture in the right posterolateral elements of L2 vertebra and in the left posterolateral elements of L1 vertebra.

Magnetic resonance imaging emphasized a rotation towards the opposite side of L1 and L2 vertebrae, a fracture in the lamina, pedicle and spinous processes of dislocated vertebrae, ending of conus medullaris on L2 vertebra and extending fibers of cauda equina in oblique fashion between dislocated vertebrae.

The patient was treated in order to recover edema preoperatively. However, she was able to be operated two days after the accident since she did not have a social insurance.

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At the operation, laminectomy of L2 vertebra and partial laminectomy of L1-3 were performed. It was seen that dura and medullar cord were undamaged. Nevertheless, there was a hemorrhage in the epidural area. Then, four transpedicular screws were inserted and distraction-reduction was performed by ALICI-1 posterior spinal system. After that, decortication and fusion between L1-3 were accomplished.

Postoperatively, the patient was treated for relief of edema. After seven days, she was mobilized by means of TLSO. During that period, neurologic examination showed that there was paresthesia in L3 dermatome. In addition, EMG showed the clear evidence of partial denervation in the right segments of L3, SEP also proved that there were positive symptoms of conduction block in the lower afferent system.

After one and a half years, there were bending in the proximal screws due to fatigue, fracture in the distal screws and kyphosis in the lumbar area. The patient complained about neurologic claudications in the right L5-S1 dermatome during walking.

There was no pseudoarthrosis and no defect in fusion. Transverse processes were not included in fusion and facet joints were hardly observed.

Two pedicular screws were placed in the proximal part of the pedicle of L4 in which the screws had been broken and transpedicular screws were inserted in the right pedicle of L2 and each pedicles of L1. Then, the bended screws were replaced with the new ones in T12.

Osteotomy was performed in external cortex from foramen to foramen which is the apex of kyphosis with high speed T.U.R. Thus, the nerve roots which spread out from foramen of L2-3 were released bilaterally. The rods were fixed in each side of the screws after bending the rods suitable for desired sagittal vertebral columns. One DDT was applied. The graft which had been taken from iliac crest was put at the osteotomy side. Postoperatively, the patient did not complain about neurologic deficits except for the pain lasting for

a few days in the left anterior thigh. The angle of (L1-5) lumbar lordosis increased from 22 degrees to 36 degrees. The angle of apical kyphosis went down from 20 degrees to 8 degrees. Within the second week, the patient who walked by vitraten TLSO did not complain about the problems which she had preoperatively.

Anterior fusion in the L1-2 level without instrumentation was planned in the next stage.

DISCUSSION

The lateral X-ray shows that vertebral bodies are intact and the posterior elements are bilaterally fractured in an asymmetric way. All these criteria prove that the trauma brings about flexion-distraction and reminds us Gumbley Type 3.

In spite of the fact that it is difficult to count the lumbar vertebrae, careful observation of X-rays and costo-vertebral junction in T12 in the left side show that there are 5 lumbar vertebrae and there is not a transitional abnormality. Besides, it supports the idea above that the costae in T11 is bigger than the generally observed 12th costae. Despite the fact that the lateral X-ray is inadequate, it can be claimed that there is a relationship between the undamaged nerve roots and the fractured L1 spinous processes and the left pedicle which was revolved in the same direction and in the same degree like the fractured right pedicle of L2, otherwise, the roots would be able to expose to the shearing forces between the posterior elements rotating in different directions and angles. At last, neurologic deficits would appear.

It is well-known that, firstly, Chance introduced, the term flexion-distraction trauma to the literature in 1948. Whereas, his cases show a line of the fracture which passes through the spinous processes, lamina, transverse processes, pedicle and vertebral body in a transverse way. Later, Howland and Smith announced the same cases which occur due to the lap seat-belt. They also attracted our attention to the cases which include the abdominal injuries.

The patient, the topic of this study, was sitting at the back seat of the car and she did not use a seat

belt. For this reason, it must be accepted as a good fortune that the patient whose complete dislocation with a fracture shows a complete antero-lateral translation and ptosis, did not have any neurologic finding at L1-2 level. Smith and Kampfner came across L1 paraplegia with anterolateral translation in their research which constitute 20 cases of Chance fracture.

The case in our study is not really a Chance fracture. Nevertheless, our case of complete dislocation without deficit may be interesting when it is compared to Dennis four cases - three of them paraplegic-which led by the force of flexion-distraction and showing subluxation and dislocation.

Evaluation of MR and lateral X-ray represent that the lamina and the left pedicle of L1 revolved from the area where they were broken to the right. Thus, neural elements did not suffer from the trauma. Nonetheless, it is a disadvantage that the patient was examined by means of CT immediately after the accident.

After excising the fractured posterior elements and fixing two pedicular screws in L3 and T11, reduction was performed by distracting with ALICI-1. The distractive forces especially rupturing discus caused an extreme distraction between L1 and L2 and the rod was curved into sagittal contour leading to lumbar kyphosis. Anterior fusion was not carried out so as to form stability in the late period.

In was seen that fusion mass was solid in the mid-line. The absence of anterior support in L1-2 produced kyphosis leading to screw breakage.

Our case is similar to the case of Jacob in which bilateral pedicles of L4-5 were broken and the body was displaced anteriorly, whereas, neurologic pathology did not exist. It is a fortune that neural elements were not injured although the pathology was just next to the spinal cord.

It may be observed that the optimum conditions for the stability of the nerve roots and / or the spinal cord exist in this case.

The pedicle of the displaced vertebrae under the ptotic column and the pedicle of ptotic vertebra which

is opposite to displacement were broken and revolved into ptosis without translation in sagittal direction. However, they had a translation in coronal direction. Thus, the integrity of spinal cord was achieved between the segments of the displaced two columns. In addition, the shearing forces on the roots occur at the minimum degree.

In such a case, it will be seen that the distance between the consecutive pedicles will not change despite ptotic corpus. Otherwise, the loss of distance between the two consecutive pedicles, would be observed.

A line bisecting the vertebra on the transverse plane will create one hemilaminopedicular unit at each side if we neglect the body which is generally intact in similar cases.

If there is a ptotic dislocation in anterolateral direction, the ideal situation to avoid the root from injury and to provide the integrity of the cord is that the hemilaminopedicular unit at the opposite side of the displacement of the displaced vertebra and hemilaminopedicular unit in the the same direction with the displacement of the displaced vertebra should both be broken and they should have a rotation in such a way that they keep the anatomic distance in the direction of displacement. In addition, the interpedicular distance should not be lessened.

The described situation above occurs in our case. In fact, the fracture is not in the middle of the spinous processes. However, it exists in direction of displacement. That the fracture does not occur in the middle of the spinous processes by such a force is not expected. Nevertheless, it is not possible to clarify at which side the spinous processes would be broken by the help of information we have.

In conclusion, the situation of neural elements in cases of fracture dislocation with the ptosis was examined in our study. It is claimed that examining the behavior of the hemilaminopedicular unit in plain x-ray will give an idea about the neurologic situation just at the beginning of the investigation.

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