

TRANSPEDICULAR FIXATION IN THORACOLUMBAR FRACTURES

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ABSTRACT:

48 patients with unstable thoracolumbar fractures treated with pedicle screw-plate and pedicle screw-rod combinations, during the period between September 1987 and May 1993 were evaluated retrospectively. The mean age at admission was 34 years. There were 33 male, 15 female patients. This group of patients was divided into two separate groups depending on the spinal fixation systems used. The first group, treated with pedicle screw-spinal plate combination consisted of 13 patients and the second group, treated with pedicle screw-rod combination consisted of 35 patients. The two groups were compared on clinical and radiological basis. In pedicle screw-rod combination Dick, IQL, Alici, Isola, TSRH systems were used. Burst fractures, flexion-distraction and translational injuries were the type of the trauma. There were not any significant difference in the post-operative course and in the functional results, but significantly more spinal segments had to be fused in the pedicle screw-spinal plate group. We suggest that pedicle screw-spinal plate combination offers a satisfactory and relatively cheap alternative to pedicle screw rod combination.

Key Words : Thoracolumbar Fractures, Pedicular Fixation

In the treatment of unstable thoracolumbar fractures different surgical methods have been used. Today, many surgeon prefer to use pedicle screw-rod combination (2,5). But pedicle screw-spinal plate combination offers a satisfactory and cheap alternative to pedicle screw-rod combination. (1,5,6,7,8,9) In this study results of pedicle screw-spinal plate and pedicle screw-rod combinations compared.

MATERIALS AND METHODS

Between September 1987 and May 1993 sixty-eight patients were hospitalized because of unstable thoracolumbar fractures and forty-eight of them were treated with pedicle screw-spinal plate or pedicle screw-rod combination. This group of patients was divided into two separate groups depending on the spinal fixation system used. In the first group pedicle screw-spinal plate system and in the second group pedicle screw rod combination were used for fixation. St. George spinal plate used for the first group patients. For the second group fourteen Dick, two IQL, seven Alici, seven Isola, five TSRH systems were used with pedicle screw. The mean age for the first group was 29 (8-38), and for the second group 34 (11-59) years. The

first group consisted of nine male and four female patients. The second group consisted of twenty-four male and eleven female patients.

Seventy-seven percent of the first group patients were followed up twenty-seven months, and ninety-six percent of the second group were patients followed up eleven months in average.

In the first group two eighth thoracic, one tenth thoracic, two twelfth thoracic, one first lumbar, two second lumbar and two third lumbar vertebral fractures were present. In the second group one eleventh thoracic, four twelfth thoracic, fourteen first lumbar, seven second lumbar, five third lumbar and four fourth lumbar vertebral fractures were present. The first group injury of the vertebral column whereas the second group consisted of four flexion-distraction injuries twelve translational injuries, nineteen unstable burst fractures.

The first generations cephalosporin was administered as a prophylactic antibiotic for twenty-four hours for all the patients. For the purpose of lavage, saline solution was used.

All operations were done with image intensifier. Laminectomy were not done for observing the pedicle. Patients were stand up and walked at the third day of the operations if their neural status good enough to do it. All the patients tried to get upright positions as soon as possible. External support were used after

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all operations. In the first group ten patients and in the second group thirty-two patients followed up regularly. A-P, lateral and oblique radiograms were evaluated at the controls. In addition to that, six of the first group patients and seven of the second group patients were evaluated with CT. Spinal deformity and displacement percent of vertebra column were calculated for all the patients (4). Neurologic status of the patients were evaluated according to Frankel Scale.

RESULTS

Neurologic status of the patients were obtained at first admission and after the operations for all the patients. Result are given Table 1 and 2:

Table 1.

Group 1.

Pre-Op. Frankel Grade	Post-Op Frankel Grade	Number of Patients
A	A	3
E	E	2
D	E	3
B	C	1
A	B	3
A	D	1

Table 2.

Group 2.

Pre-Op. Frankel Grade	Post-Op Frankel Grade	Number of Patients
A	A	7
E	E	11
B	D	1
B	E	3
A	D	2
B	C	2
C	D	4
A	C	2
D	E	3

In the first group 4.85 spinal segment fusion obtained but in the second group only 3.21 spinal segment fusion were found (p=0.01). This result make us to think that spinal plate screw combination cause more segment fusion.

Spinal deformity were calculated according to Dickson and Harrington (4). In the first group average angle of deformity were found 22 degrees before the operations, this angle were found zero degree after the operations. In the second group average angle of deformity were found twenty-four degree before the operations, this angle were found four degree after the operations.

Vertebral displacement were found out % 0 before the operations in the first group. In the second group average vertebral displacement were found out % 26 before the operations and % 7 after the operations. In the follow up period that values were obtained respectively eight degree and % 6 the first group and ten degree and 8 in the second group.

If it was possible sagittal CT were done to the patients. With this method metal artifact was less than coronal CT. Spinal plates and rods cause the same amount of metal artifact. Sagittal CT provide to observe the pedicle screw route in the pedicle. A pedicle screw were observed on the aorta shadow in a sagittal CT but any vascular problem were not found at the patient who was in the first group. In an another patient two screw were found in the inter vertebral disc space. This patient was also in the first group. A pedicle screw were observed in the spinal canal and this caused to root irritation which was resolved after the implant removal. In the first group in addition to these complications, one screw breakage and one superficial wound infection were observed.

In the second group tree implant failure were obtained. First of all was third lumbar vertebral burst fracture. IQL spinal system was implanted to that patient. At the third control a pedicle screw was found to be broken. The fusion was complete. Another screw breakage was found at a Dick internal fixator. The patient had no complaint and refused to implant removal. The thirth implant failure was observed in an Alıcı implant. A screw breakage was found out five months after the operation.

DISCUSSION

Spinal stability depends on vertebral body, posterior elements and position of the vertebra (3). If one of them is insufficient, vertebral instability is present. Spinal fixation with pedicle screw very popular now. These results show that pedicle screw with spinal plate or rod can provide sufficient fixation in thoraco-lumbar fractures. Pedicular screw rod combination cause less spinal segment fusion. But spinal plate pedicle screw combination is a cheap alternative to screw rod combination.

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