

RESULTS OF TRANSPEDICULAR SCREW-ROD FIXATION IN THORACOLUMBAR VERTEBRA FRACTURES

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Fiftyeight patients who had thoracolumbar vertebrae fractures and that were fixed with transpedicular screw and rod combination between 1987-1993 were evaluated after a minimum follow-up of one year. Mean age of patients were 38.08 (14-66) years. In their follow-up, patients were evaluated clinically and and radiologically considering changes in neurological findings, functional status, number of vertebrae that were fused; development of spinal deformity and implant failure. The status of the neural canal was evaluated by CT. At the end of the first year in some of the patients. In conclusion, fixation with transpedicular screw-rod combination was found to be a good stabilizing system that enabled early rehabilitation.

Key words: Thoracolumbar vertebra, traetme transpedicular screw-rod.

Today, orthopedic surgeon has to deal with more high energy trauma patients because of technologic improvements. For that reason spinal injuries are more frequently seen by the surgeons. There are a lot of treatment alternatives for these injuries which makes the problem difficult. In toracolumbar spinal fractures fixation with transpedicular screw-rod combination offer a good stabilizing system but which is technically difficult. In that study results of transpedicular screw-rod fixation in thoracolumbar spinal fractures, treated at Hacettepe Univ. Faculty of Medicine, Dept. of Orthopedics and Traumatology has been presented.

MATERIAL AND METHOD

Between 1987-1993 eighty patients were hospitalized because of unstable thocolumbar spinal fractures and 58 of them were treated with transpedicular screw and rod combination. Forty patients were male and 18 female. Mean age was 38.08 (14-66) years old. At first admission to emergency department patients were evaluated by complete physical examination, direct radiogram and CT. Neurological status of the patients were noted according to Frankel scale. Sagittal index, kyphosis were obtained. Neural canal status was evaluated by CT.

Thirty-three first lumbar, twelve second lumbar, six twelfth thoracic, four third lumbar and three eleventh thoracic vertebral fractures were present.

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

All operations were done with image intensifier. Laminectomy were not done for observing the pedicle. Isola, TSRH, Alici, IQL, Dick fixateur Interne were

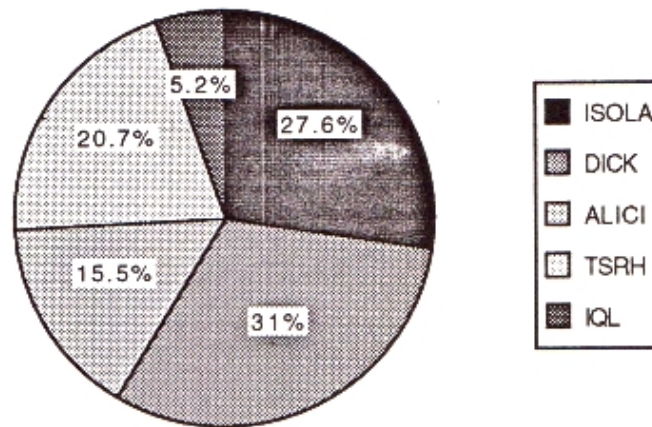


Figure 1.

used for stabilization (Figure 1). Patients were stand-up and walked at the third day of the operation if their neural status good enough to do it. All the patients tried to get upright position as soon as possible. External support were used after all of the operations.

At follow-up period patients were evaluated complete physical examination, direct radiogram and twelve of the patients by CT. Spinal deformity and displacementpercent of vertebral column were calculated for all the patients. Spinal deformity were calculat-

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ed according to Dickson and Harrington (4). At follow-up, functional status of the patients were obtained.

RESULTS

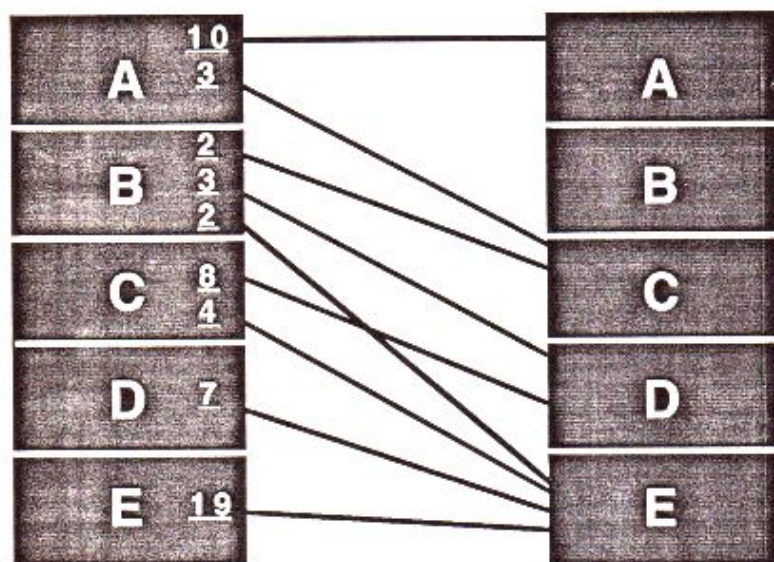
At first admission to the hospital, by direct radiological examinations mean sagittal index were found 28 degree (6). Spinal deformity according to Dickson and Harrington were found 24 degree; vertebral displacement were found 26% for the patients (4). Post-operative spinal deformity was 4 degrees, vertebral displacement was 7%. At the end of the follow-up, 11 degrees spinal deformity, 10% vertebral displacement was observed.

In the study group, 3.28 spinal segment fusion were obtained. At the end of the follow-up period any pseudoarthrosis were seen which had been demonstrated

plied to these patients. First of all was thirth lumbar spinal fractures which was stabilized by IQL system. In this patients upper pedicle screw was found to be broken at the third other patients was operated because of L-1 unstable burst fractures. Dick "fixateur interne" had been used to that patient (3). Upper pedicle screw was found to be broken at the follow-up period. The other two patients were operated because of unstable twelfth thoracic and first lumbar spinal fractures. Alici spinal instrumentation system had been used to these patients. Upper vertebral pedicle screw was found to be broken in these patients too. These patients had any subjective symptoms. They also rejected to implant removal.

Two post-operative superficial wound infection were obtained which were controlled by antimicrobial chemotherapy. Any deep wound infection were found. No cases of pulmonary embolism or death were observed.

Table 1.



by clinic or radiological examination.

Functional neurologic status of the patients were evaluated by Frankel scale at first admission and in the follow-up period (8) (Table 1).

Twelve of the patients were evaluated by CT at the end of the one year follow-up. In this examinations any spinal stenosis were obtained (9).

Four implant failure occurred in the follow-up period. Two Alici, 1 IQL, and 1 Dick system had been ap-

DISCUSSION

Clinical instability is defined as the loss of the ability of the spine under physiologic loads to maintain relationship between vertabrae in such a way that there is neither initial nor subsequent damage to the spinal cord or nerve roots, and in addition there is no development of incapacitating deformity or severe pain (14). As a result of this define, spinal instability is the major factor that effects the surgical decision. The goals of the surgical management of spine injuries are to provide stability to the axial skeleton, regain sagittal and frontal alignment and create a stable environment to enhancing neuro-

logic recovery and function. Decompression necessary in conjunction with with stabilization may enhance neurologic recovery (2, 10). But it is well known that laminectomy does not decompress the neural elements, since often the offending structures are anterior to the cord or cauda equina (1, 5, 7, 13). For that reason we didn't do any laminectomy to our patients to provide decompression.

There are numerous advantages to surgical manage-

ment of thoracolumbar fractures. Operative fixation of spine fractures enables reduction of the fracture and deformity, allows decompression, either direct or indirect of the neural canal and stabilization. With transpedicular screw four point fixation can be obtained. Fixation with transpedicular screw offered by Boucher at first and after that popularized by Roy-Camille at 1960-70 (12).

According to some authors; PLL. is the key factor for the posterior instrumentation. If neural canal narrowing is between 30-50% reduction can be obtained by posterior instrumentation because P.L.I., is partially ruptured. If canal narrowing is more than 50% P.L.I., is totally ruptured for that reason ligamentotaxis is not a good way for reduction (1, 7). But in this study we observed that with posterior instrumentation reduction can be achieved in patients whose canal narrowing is more than 50%.

Fixation with transpedicular screw is technically demanding and needs image intensifier. The other problem is root injuries and anterior vital blood vessels (9). For that reason surgeon must be familiar with this technique. In this study we didn't see any vascular or root injuries.

Post-operative spinal deformity were obtained 11 degrees in our patients. This kyphotic progression can be prevented by hook application to upper vertebra.

Implant failure is an another important problem. Although the patients had no subjective complaint, pseudoarthrosis is an important factor that cause this complication. Microfractures which occur bone-metal interface is an important factor that cause implant failure (11). In addition to that pedicular screw and rod combination is an unconstrained construct; for that reason we can explain somehow screw breakage occurred. Wittenberg et al. had been showed that Luque plate is stiffer than Dick "Fixateur Interne" (15). But rigidity is nor the only factor that effects the outcome of the instrumentation. If the fusion does not happen fatigue failure is going to happen to every kind of instruments. In this point of view technique of the arthrodesis getting more important. In this study, we observed 3,24 spinal segment fusion. With this technique uninjured spinal segments can be protected.

As a result transpedicular screw and rod combination is a good stabilizing system. But it is technically demanding but in an experienced hands the complication rates can be reduced.

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