ALICI SPINAL SYSTEM AND COMPRESSIVE INTERSPINOUS WIRING IN THE TREATMENT OF THORACOLUMBAR FRACTURE-DISLOCATIONS

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SUMMARY:

It's very difficult to obtain reduction and to maintain the reduction with instrumentation in fracture-dislocations of spine. For this reason, in cases with thoracolumbar fracture - dislocations interspinous compression by means of rods or wires may be necessary in order to enhance the stability.

In this study, we evaluated the results of Alıcı Spinal System combined with interspinous compressive wiring in the treatment of thoracolumbar fracture-dislocations. Mean follow-up was 22.3 months in 25 of 27 patients. Their mean age was 30, 12 of them were male and 15 of them were female.

In one case, reduction and instrumentation was technically unsuccessful, intraoperatively. Spinal alignment was anatomically successful in the other cases. 24 (20 of were complete and 4 were incomplete) of 25 fully followed cases had neurodeficits preoperatively. In the follow-up, only, 2 of the cases had shown partial neurologic recovery. In the late follow-up, spinal alignment has been still preserved.

In the light of our results, we can suggest Alıcı Spinal System in combination with interspinous wiring in the treatment of fracture-dislocations of the spine.

Key words : *Thoraco-lumbar spine, fracture-dislocation, Alıcı Spinal System, interspinous compression wiring.*

INTRODUCTION

Surgery and instrumentation in the treatment of unstable spine fractures and fracture-dislocations aim stabilisation, anatomic alignment of spine, medullary decompression and shortening of the rehabilitation time (2, 6, 7, 8, 9, 10, 13, 15). Fracture-dislocations of the spine are the most unstable injuries of spine (5, 6, 8, 9) and almost always associate with neurodeficits (4, 5). In addition, other difficulties in the surgical treatment of fracture-dislocations are reduction and stabilisation (8). Distraction systems may cause excessive distraction and instability in such cases (3, 6, 8, 11). In order to prevent such complications, while some authors (6, 8, 10, 11, 14) suggest inter-spinous wiring, the others (6) suggest compressive rod application to spinous processus. In this paper, we evaluated 27 patients who were undergone combined Alıcı Spinal System and interspinous wiring.

MATERIALS AND METHODS

In this study, we evaluated 27 patients who were undergone surgery because of thoracolumbar fracture-dislocation. Mean age of our patients was 30 (range 15 to 58). Twelve of them were male and 15 of them were female. Causes were traffic accident (44 cases), fall from height (8 cases) and crush under heavy material (5 cases). Five patients had additional injuries.

Spinal injury levels are summarized in Table-1. The most common level was $T_{11\text{-}12}$.

Neurologic evaluation was based on Frankel's clasification (12). According to Frankel's classification (12), neurologic evaluation is summarized in Table-2. AP and lateral radiograms and CT were routinely performed preoperatively. Following radiologic investigations, fracture-dislocation types were determined according to Denis's classification (4, 5) (Table 3).

Mean time from injury to operation was 2.2 days (range 5 hours to 18 days). Surgical apporoach was posterior in al cases. Dura was torn in 7 cases and they were repaired. Reduction was performed by grasping spinous processus with towel clips. Following reduction, compression was achieved by means of 0.8-1.0 mm cerclage wire. In cases of spinous processus fractures the next lower or upper levels were choosen. Following wiring, standard application of Alıcı Spinal

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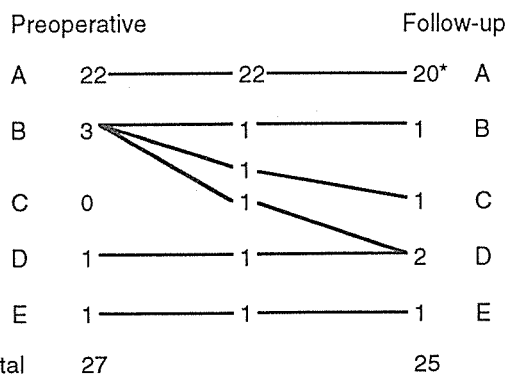
System (hooks and rods) was performed. In 3 cases, instead of hooks, transpedicular screws and in one case hooks-transpedicular screws combination were choosen. Fusion was performed only in 4 cases. Mean operation time was 2.5 hours (range 1.5 to 4 hours).

Only 14 of 27 patients took methyl prednisolon in the early postoperative period.

Table 1. Level of Fracture Dislocations

Level of Fracture-Dislocations	Number
T_{1-2}	–
T_{2-3}	–
T_{3-4}	–
T_{4-5}	2
T_{5-6}	1
T_{6-7}	–
T_{7-8}	1
T_{8-9}	–
T_{9-10}	2
T_{10-11}	2
T_{11-12}	7
$T_{12}L_1$	6
L_{1-2}	4
L_{2-3}	1
L_{3-4}	1
L_4	–

Table 2. Preoperative and Postoperative Neurological Status of Cases (Frankel's Classification) (12)



* : 2 cases were excluded because of death

Table 1. Level of Fracture Dislocations

Type of Fracture Dislocations	Number
Flexion-rotation	19
Shear	5
Flexion-distraction	3

RESULTS

Two of the cases were excluded because of death. Cause of death in two cases was cardiopulmonary failure (1 case T_{4-5} and 1 case T_{5-6}). Remaining 25 cases were evaluated prospectively. Mean follow-up was 22.3 months (not less than 6 months).

Only two cases (one L_{1-2} and one T_{12}-L_1 fracture-dislocations) showed partial neurologic recovery (Table 2).

Mean hospitalisation time in the postoperative period was 12 days. Only one case (L_{2-3} fracture-dislocation) was without neurodeficit and mobilised with corset support. Others were undertaken rehabilitation.

In the early postoperative period we had superficial wound infection in one case and treated with antibiotherapy.

In all cases, we had conventional radiograms (AP and Lateral) and postoperative CT Scans routinely. Only in one case (T_{11-12}) reduction was insufficient (subluxation) and others had good alignment. In the follow-up period, in one case (L_{1-2} fracture-dislocation) we observed loosening of transpedicular screws (also one of them was bent). There was no other complications related to instruments.

In the follow-up period, except insufficiently reduced one case (T_{11-12}) all cases preserved alignment. There was no non-union.

In the final follow-up, 18 patients were able to mobilise with the help of ortheses, but 6 of the patients were bedridden.

Kyphosis angle of our cases were showing increasingly 2.3° progression from postoperative to final follow-up radiograms.

DISCUSSION

Although fracture-dislocations of spine are the results of flexion-rotation, shear or flexion-distraction injuries (4, 5) and are certainly involving three-columns, unstable and almost always associated with

neurodeficits (4, 5, 6, 8). Reduction is a great problem during instrumentation of thoracolumbar fracture-dislocations (8). Floman et al (10, 11). Eismont et al (8), Sesli et al (4) and Denis et Burkus (6) introduced interspinous compressive wiring, in order to prevent excessive distraction an instability in the treatment of such injuries. For this purpose, we also performed interspinous compressive wiring in the treatment of 27 patients with thoracolumbar fracture-dislocations. Floman et al (10, 11) performs interspinous wiring without perforating spinous processus, in the contrary Sesli et al (14) performed it by perforating spinous processus. We also prefer the latter method, but we use thicker wire (0.8-1.0 mm) different from Sesli et al (14), in order to increase stability.

Interspinous compressive wiring was combined with Harrington system by some authors (6, 8, 10, 11, 14), while some authors (6) used it in combination with Cotrell-Dubousset System. We prefered Alıcı System in combination with interspinous wiring. We had only one unsuccessful case.

In 4 of 27 cases we haven't been able to achieve fusion. But we haven't observed instability in these cases.

As a result we decided that, interspinous wiring in combination with posterior instrumentation (Alıcı Spinal System) is a useful method in the treatment of thoraco-lumbar fracture-dislocations.

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