

APPLICATION OF "ALICI" POSTERIOR INSTRUMENTATION IN THORACOLUMBAR VERTEBRAL FRACTURES

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Summary: "Alici" posterior instrumentation was performed in twenty patients with fractures of thoracolumbar vertebrae in department of orthopedics & traumatology in Ankara Hospital between August 1990 and December 1991. Patients were followed up for 9 months. The improvements in the angle of local kyphosis, the anterior height of the vertebrae and the posterior height of the vertebrae were 24%, 19% and 9% respectively. As the only complications a haematoma developed in one case, infection in another and loosening of implant in a third and last one.

Key words: Thoracolumbar spine injuries, Burst fracture, Posterior transpedicular fixation

Nowadays a number of different instruments is being used in the surgical treatment of thoracolumbar vertebral fractures. The objectives of spinal trauma surgery are to obtain anatomical reduction, to restore spinal canal, to achieve early mobilization, to prevent possible future deformities (12).

Although various classifications of thoracolumbar vertebral fractures have been made, the current one among these is the three column theory of Denis. (4) Denis classifies fractures of thoracolumbar vertebrae in 4 groups in terms of stability.

1. **Anterior column fractures:** Compression fractures
2. **Anterior and middle column fractures:** Burst fractures
3. **Middle and posterior column fractures:** Seat belt fractures
4. **Fractures of all three columns:** Fracture-dislocation instability is of three types according to Denis: (5)

First degree mechanical instability: Serious compression fractures and seat belt fractures are included in this group. Spinal cord is not damaged. Treatment is immobilisation in extension.

Second degree neurogenic instability: burst fractures are included in this group. In the management of this type of fractures some authors are in favour of sur-

gical treatment while others support conservative treatment. Because of the presence of potential neurological risk, surgical treatment is believed to give better results.

Third degree mixed instability: serious burst fractures with neurological deficit and fracture-dislocations are in this group. Decompression and internal fixation are to be done.

MATERIAL and METHODS

"Alici" posterior instrumentation was performed in 20 patients with fractures of thoracolumbar vertebrae between August 1990 and December 1991 in the department of orthopedics and traumatology in Ankara Hospital, Ministry of Health. Patients had been followed up for 9 months.

14 of the patients were male (70%), 6 were female (30%). The oldest was 61 years of age and the youngest 17. Causes of fractures were as follows:

1. Falling from a height: 9 patients (45%)
2. Traffic accident: 11 patients (55%)

The neurological evaluation of the patients was done according to Frankel classification.

- 1 patient was F.A (5%)
3 patients were F.D (15%)
16 patients were F.E (80%)

Thus, 80% of the patients were intact neurologically. Besides conventional radiographies, preoperative computerized tomographies of all cases were obtained. Because of technical difficulties, it was not possible to attain postoperative computerized tomographies.

The distribution of fracture types was as follows:
3 cases of Compression fracture (15%)

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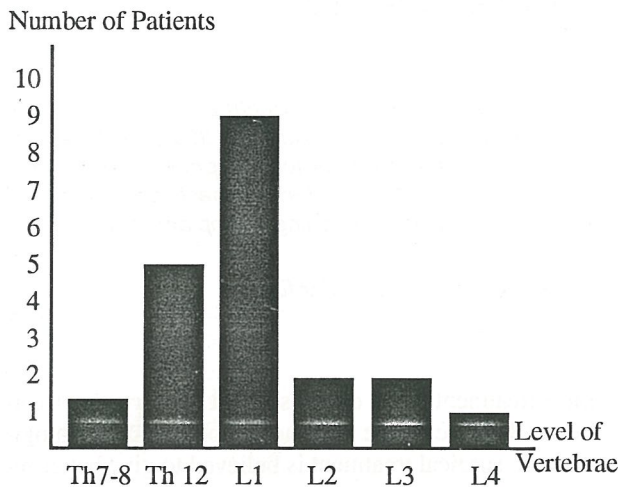
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15 cases of Burst fracture (75%)
2 cases of Fracture dislocation (10%)

The distribution according to the level of fracture is shown in table 1.

Table 1. Level of fractures in 20 patients.



- The angel of local kyphosis was measured:

Minumum : 10 degrees

Maximum : 31 degrees

Mean : 24 degrees (was found out.)

- The decrease in the anterior height of the vertebrae was measured:

Minumum : 34%

Maximum : 55%

Mean : 46%

- The decrease in the posterior height of the vertebrae was measured:

Minumum : 21%

Maximum : 48%

Mean : 34%

Except from one patient who had had large laminectomy and another patient who had had fractures of thoracal 7th and 8th vertebrae and paraplegia resulting from this, posterior fusion was not done in any case. External support was applied to first 15 cases for 15 months postoperatively, while last five cases did not receive any external support. Mean duration of surgery was 2,5 hours and approximately 2,5 units of blood were transfused per operation. None of the cases was put any drain.

THE EVALUATION OF CASES and COMPLICATIONS:

Radiological Evaluation:

The empravement in the angel of local kyphosis was on average 24%. The improvements in the anterior height of vertebrae and the posterior height of vertebrae were 19% and 9% respectively.

Clinical Evaluation:

The patient classified as Frankel A did not show any improvement while 2 of the 3 Frankel D patients were totally cured.

Complications:

- Haematoma (drainage) in one case
- Superficial infection (antibiotics) in one case
- Loosening of the implant in one case
- Subjective complaint of local pain in one case.

Discussion:

The treatment of stable thoracolumbar vertebral fractures is conservative. On the other hand, the treatment of unstable fractures with or without neurological deficits is surgery. Sullivan reported some advantages of the surgical treatment of thoracolumbar vertebral fractures. These are:

- Anatomical reduction
- Decompression of spinal canal
- Stabilization
- Prevention of late deformities

Figure 1. 37 years old, male patient. Burst fracture at L1. Preoperative radiograph.

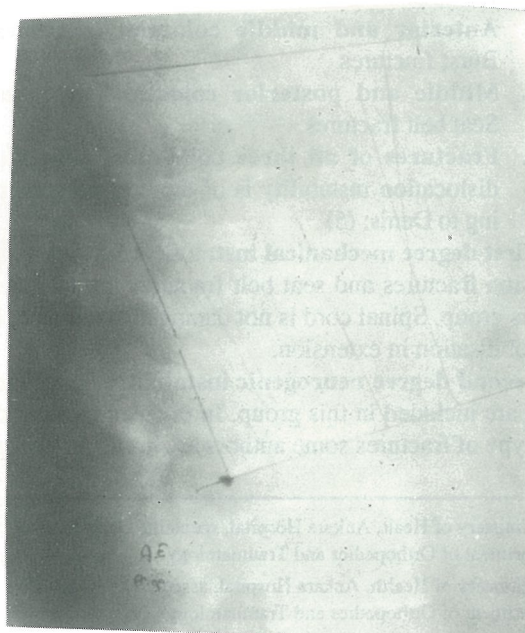
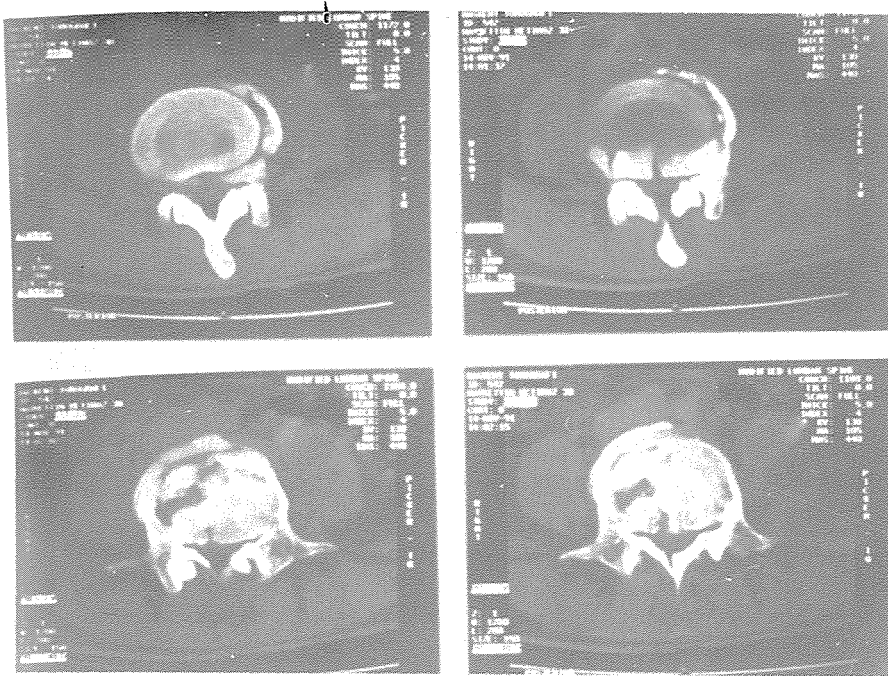


Figure 2. Preoperative CT of the same patient.



Since:

1. They fix a small number of segments.
2. They provide rigid stabilization.
3. They make fracture reduction easier.
4. They eliminate the necessity of postoperative external fixation.

As a result;

We applied "Alici" spinal instrumentation in our department because it is cheap, its stabilization is good and it is familiar to us. We decided that this instrument is well-developed in terms of stability for the surgical treatment of vertebral fractures.

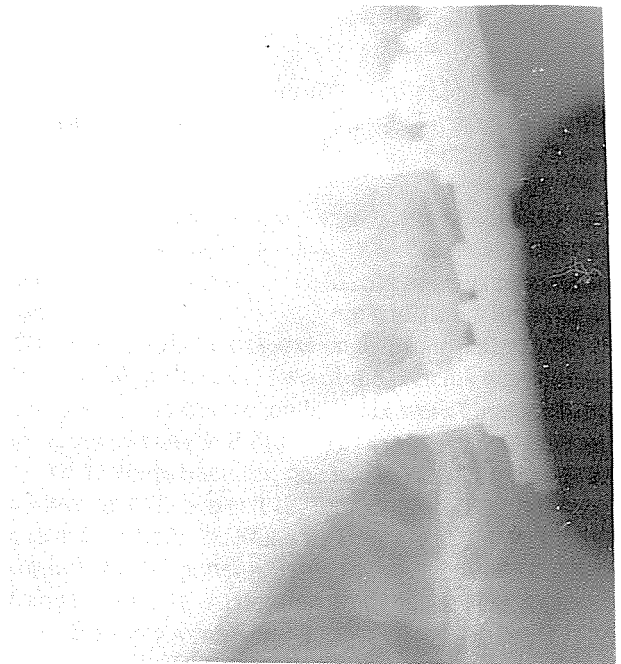
In the treatment of vertebral fractures Harrington rods were used for the first time in 1958. Until today various instruments have been developed. The low resistance of Harrington rods to rotational and lateral forces has led to the emergence of its modifications. Roy Camille reported the technique of transpedicular screw and plate-fixation for the first time in 1963 (involving 5 segments). (11) Lague (9) described the method of segmental subaminar wiring in 1970 and claimed to have attained rigid internal fixation of the spine. The methods of Harrington and Lague were used in combination with the name Harri-Lague. Megerl et. al. reported the transpedicular application of an external fixation system in the surgical treatment of vertebral fractures in 1977. (10) Dick et. al. develop the AO internal fixation system in 1982. (6) Besides these, the CD instrumentation designed by Cotrel and Debussset has been started to be used in vertebral fractures. (3) In 1984 Dunn and Kostwik published their anterior approach with rod systems. (7-8)

AO external fixator,

CD instrumentation and

"Alici" instrumentation developed in Turkey by Prof. Dr. Emin Alici seem to be the most advantageous system for today.

Figure 3. Postoperative AP and lateral graphies o the same patient.



REFERENCES:

1. Akbarnia, B.A., Fogarty, J.P., and Taob, A.A.: Contoured Harrington instrumentation in the treatment of unstable spinal fractures. *Clin. Orthop. and Related Research*, 189 oct. 1984.
2. Alici E.: Stable spinal instrumentation A new group of instrument used in deformities and diseases of the columna vertebralis. 1. *Turkish Spine Surgery !*. (1) 1-3, 1990.
3. Cotrel, Y.: *New instrumentation for surgery of the spine*. Freund Publishing House ltd. London, 1986.
4. Denis F.: Spinal instability as defined by the three column spine concept in acute spinal trauma. *Clin. Orthop. and Related Research*. 189: 65, 1984.
5. Denis F.: Acute thoracolumber burst fractures in the absence of neurologic deficit. *Clin. Orthop. and Related Research*. 189: 142, 1987.
6. Dick W.: The fixateur interne as a versatile implant for spine surgery. *Spine* 12: 9. 882-900, 1987.
7. Dunn H.K.: Anterior stabilization of thoracolumber injuries. *Clin. Othop. and Related Research*. 189: 116, 1984.
8. Kostwik, J.P.: Anterior fixation for fractures of the thoracic and lumber spine with or without neurologic involvement. *Clin. Orthop. and Related Research*. 189: 103, 1984.
9. Lague, E.L.: Segmental spinal instrumentation of thoracolumber spine. *Clin. Orthop. and Related Research* 203: 126, 1986.
10. Megerl, F.P.: Stabilization of lower thoracic and lumber spine with external skeletal fixation. *Clin. Orthop. and Related Research*. 189: 125, 1984.
11. Roy Camille: Internal fixation of the lumber spine with pedicle screw plating. *Clin. Orthop. and Related Research* 203: 7, 1986.
12. Sullivar, A.: Sublamimer wiring of Harrington rods for unstable thoracolumber spine fractures. *Clin. Orthop.* 189: 178-85. 1984.