HARRINGTON STABILIZATION IN THORACOLUMBAR INJURIES WITH NEUROLOGIC DEFICIT

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Laminectomy, Harrington instrumentation and posterolateral spine fusion were performed in the patients with thoracolumbar vertebra fracture and neurologic deficits. Progressive improvement in neural deficits was found in 87.5 % of the patient. Pain was dissappeared or decreased in 75 %. No hook or rod complication was observed . This method seemms to have advantages of maintaining vertebral column stabilization till bone fusion occurs and improving the present functions of patients at this period.

Key Words : thoracolumbar injury - Haarrington instrumentation

Surgical or nonsurgical treatment is controversial in patients with thoracolumbar fracture 3,8,15. Particularly in patients with incomplete cord lesion, the improvement with surgical intervention was reported faster than without 11.

Vertebral column injuries may be seen in different types 3,6,7,12,15. A part of them is suggested to be stable. Denis indicated that tch cases with the kyphotic angle more than 20 , narrowing of the diameter 20-50 % or more, height loss of the corpus 50 % or more are unstable 3. The main goals of the surgical treatment in vertebral column injuries may be summarized as effective decompression of the spinal canal, maintaining recovery without unstability, preventing pain or deformity, providing early mobilization and rehabilitation. Open reduction and stablizatiion are preeferred in fracture-dislocations aven though they arc diffucult to perform. Anterior or posterior decompression and stabilization arc recommended in advanced compression and burst fracture 3,4,5,6,14,18. In vertebral stabilization, fixation is achieved with using various devices and techniques 1,2,9,14,17. In this article, 16 cases of thoracolumbar fracture with neural deficits in which harrington stabilization and fusion was done, arc presetend .

MATERIAL AND METHOD

Sixteen patients with thoracolumbar fracture who admitted to the Department of Ncurosurgcry, Faculty of Medicine, Akdcniz University From March, 1988 to May, 1989 were included in this study. The patients have had burst or severe compression fracture and neural deficits.

Following admittion, neurological examination was done and the patients were graded according to Frankel classification.

Frankel A : Complete loss of both motor and sensory function below the scgmenlal level of the cord lesion.

Frankel B : Some sensation present bolow the level of the lesion but motor paralysis complete.

Frankcl C : Sensory only: Some motor power present below the level of the lesion but not sufficient to be of practical use.

Frankel D : Motor useeful: Useful motor power below the level of the lesion.

Frankcl E : Intact: No neural deficit or symptoms.

Pain and clinical deformity were recorded in all patients. Fracture aype and kyphotic angle was maintained with evaluation of the radiograms. Myclography was done to all patients. Myelographic block was used for the indication of laminectomy. Total laminectomy was perfomed in all patients. Harrington distraction rods were used in fixation. Hooks were placed in facets of 2 upper and lower vertebrae and posterolateral fusion was done with bones removed from iliac crest along the segment of fractured and one upper and lower vertebrae. Hypcrextension mold was applied to 11 patients, brace was used in 5 for postoperative external support, for a period of 4 to 6 months. At the end of this period the external suspports were removed unless any unstabilizalion was observed in the flexion extension radiograms. All the patients have had rehabilitation program. The ambulation of the patients was provided in 1-4 weeks After discharge, the patients were followed monthly. Pain, neurologic findings, clinical deformity and kyphotic angle in direct radiograms were evaluated in follow up examinations. Conventional tomography was used for the evaluation of fusion in 9 patients at the first year postoperatively. (Fig 1)

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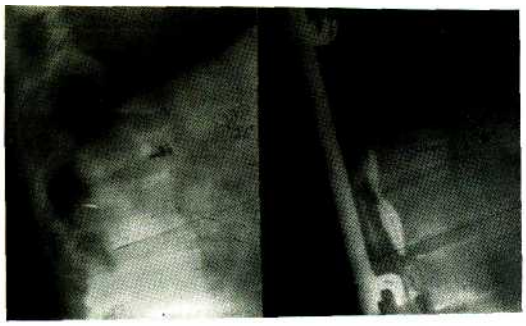

Fig.1 : Lateral X-rays of Case II, shows the improvement of kyphos angle pre and postoperatively, respectively.

Case no	Age	Preoperative Neurologic Grade	Level of Injury	Type of Fracture	Postoperative Neurologic Grade	Improvement in Kyphos angle
1	43	Frankel B	L1	Wedge	Frankel D	8°
2	29	Frankel C	L2	Wedge	Frankel E	6°
3	37	Frankel B	Th12	Burst	Frankel D	12°
4	61	Frankel D	Th10	Wedge	Frankel E	8°
5	39	Frankel A	Th12	Burst	Frankel A	9°
6	31	Frankel B	Th12	Wedge Frac-dislo	Frankel D	6°
7	43	Frankel D	L1	Wedge	Frankel E	10°
8	34	Frankel C	L1	Wedge	Frankel D	3°
9	36	Frankel B	L2	Burst	Frankel E	12°
10	17	Frankel B	L1	Wedge Frac-dislo	Frankel D	5°
11	23	Frankel B	L1	Burst	Frankel D	10°
12	27	Frankel C	L2	Burst	Frankel D	5°
13	49	Frankel C	L1	Wedge	Frankel D	0
14	41	Frankel B	Th12	Wedge	Frankel D	6°
15	33	Frankel A	Th10	Burst	Frankel A	10°
16	21	Frankel B	L1	Burst	Frankel D	13°

Table 1: Data of the patients who were performed laminectomy, Harrington satbilization and posterolateral fusion.

RESULTS

The age of the patienst ranged from 17 to 61 (mean 30.4). 3 patients were female, 13 were male. Trauma was due to traffic accident in 12 and fall in 4. At first neurologic examination, the most ofv the patients were found in Frankel B (8 cases), 14 (87.5 %) of the patients were found to be Frankel D or E at the examination in the 6th month postopcralively. No clinical difference was observed in 2 patients who were Frankel A at the beginning (Table I). In radiologic examinations, the injury level was found at LI in the majority of patients. Fracture was in burst type in 6. Dislocation was associated with wedge fracture in 2 patients. The level of the lesions and the type of the fracture were shown in Table I.

Severe or mild pain was found in all patients preopcratively. Pain was mild in 4 and relieved with analgesics in 2 patients postoperatively. Preoperative and postoperative clinical deformity was not observed . No hook or rod complication was determined postopcratively. Skin infection was seen in 2 patients, pressure sores in 1 and trombophlcbitis in 1. 8 patients were mobili/.ied in 10 days and 4 in one week. Traumatic hip luxation was accompanied to thoracolumbar fracture in one patient. Arnbulation was delayed due trombophlcbitis in 1 patient and to total cod lesion in 2. The kyphotic angle was persisted in 12 in 1 patient, but no difference was found in clinical examination prc and postopcratively. An improvement as 3-6 was determined in 9 patients. Improvement as 10 or more was found in 5 patients (Table I). No fusion mass was detected in 2 of the 9 patients whose conventional tomography was taken at the postoperative first year. However no clinical and radiological disarrangement was found in these patients.

DISCUSSION

Thoracolumbar vertebra injuries with neurologic deficits generally show necessity of surgical interven-

tion. Decompression of the spinal canal in these patients, may be maintained with distraction, lamincctomy and/or anterior approach 6,14. Laminectomy alone may increase unstability 8,10, 12, 14. Distraction alone does not produce an adequate decompression. Flesch el al summarized the laminectomy indications as myelographic block at the fracture site, bone imprigment on the spinal canal, progressive paraparesis and the need to inssspect the neural elements at the time of stabilization 4. Decompression of the spinal canal increase the recovery of neural structures. Complet or nearly complete recovery was found in all of the patients, with incomplete lesion, in this study.

The other important advantage of the surgical intervention in these injuries, is early mobilization and rehabilitation with the stabilization of vertebral column. One of the most common used devices in achieving stabilizatiion till fusion occurs, are Harrington instruments 4&5,6,9,11,18. Fixation of a long segment and especially the displacement of the upper hook may be counted as disadvantages of this instrument. In contrary, fixation of shorter segment and producing an external support make the transpcdincular fixation instruments more advantageous against harrington instruments 1,14,17.

We had the purpose of decompression of spinal canal in addition wilh salbilization of vertebral column and early mobilizatiion of Ihc patient. We believe in that we achieved the purpose with mobilizating 75 % of the patients in 10 days. The majority of authors are agree in that the incidence of pain is decreased by stabilization 4,16,17,18. Hardcastle ct al suggested that surgical aeffect on pain was controvcrsicl and reducing pain might be possible with conservative treatment in the same rate 8. Pain was disappeared in 60 % of our patients and it was mild in 25 %.

It is known thai a loss of reduction with the timing of operation may be seen with Harrington instruments. Gertsmein ct al suggested that Harrington stabilization alone was not sufficient and therefore anterior stabilization and grafting should be considered as well. However same authos found no correlation between kyphotic angle and pain 5.

In conclusion, Harrington instrumentation being used with laminectomy provides an adequate and sufficient decompression of the neural elements and also with early mobilization it prevents the complications and improves the present functions of the paticnis particularly with incomplete lesions.

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