AN ANALYSIS OF CONSERVATIVE OR SURGICAL MENAGEMENT OF THORACOLUMBAR FRACTURES

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Between 1986 and 1922, 70 patients were treated for thoracolumbar fractures, 40 of them, who were adequately followed up, were evaluated. 35 patients had major injury; 20 of them were treated conservatively and 15 were treated surgicaly. The neural status of all conservatively treated patients except one was Frankel E. No neurogical deterioration was seen in these patients. Various degrees of pain were present in most of the patients. The mean initial deformity kyphosis, scoliosis and loss of vertebral body height were 13.3°, 3.3°, % 39; residual deformity kyphosis, scoliosis and loss of vertebral body height were 15.9°, 2.4°, % 31.7 respectively. Of the 15 patients who were treated surgically, in 8 patients Frankel E, in 2 patients Frankel D, in 3 patients Frankel C, in 2 patients Frankel A were determined. 4 patients were applied.

Harrington Instrumentation (HI + Laminectomy (L) + Posterior Fusion (PF), 2 patients were applied HI + PF, 3 patients were Alici Spinal.

Instrumentation (ASI) + L + PF were applied, 5 patients were applied ASI, and 1 patient was applied ASI + Anterior Fusion (AF) by an anterior approach. No improvement was seen in Frankel A group. 1 patient showed neurological deterioration while 4 patients had improvement in their neurological status. The mean kyphosis, scoliosis angles and loss of vertebral body height were found to be 15.3°, 1.5°, % 19.2 postoperatively (inital values were 23.1°, 1.8°, % 47.5). These values were determined as 20.8°, 1.6°, % 24.3 at the most recent follow up.

We suggested that either conservative or surgical treatment can be useful in thoracolumbar fractures when indicated properly.

The thoracolumbar part of the spinal column supports the trunk, contributes to normal postural alignment and load bearing and protects neurologic structures. Any destruction in this structure may render the thoracolumbar spine incapable of achieving these physiological functions. Especially the neurologic deficits and angular deformities are dismal outocomes of this thoracolumbar injuries that restricts the activites of daily living. The concetration of a large number of patients with thoracolumbar vertabrae's injuries has resulted more modern conservative and operative managements. But the menagement of fractures of the thoracic and lumbar spine remains a challenge to the spinal surgeon as there has still no universally accepted quindelines for the treatment of thoracolumbar fractures (19). The purpose of the present study is to reviev the follow up evaluations of cases with thoracolumbar injuries treated by either operative or nonoperative means.

MATHERIALS and METHODS

This retrospective study was conducted on a total of 70 patients with thoracolumbar injuries. They were all treated at the Department of Orthopadics and Traumatology, Faculty of Medicine, Cumhuriyet University between January 1986 and March 1992. Follow up evaluation was obtained in 40 of these 70 patients and these patients were taken into study. The avarage follow up period was 12 months (6 months to 6 years). The mean age of the patients was 39.9 years 5range, 16-77). There were 24 men and 16 women.

Table 1: The distribution of major thoracolumbar injuries according to their subtypes

No of patients	Compresion fracture			Burst fracture				Dislocatio
n	Type I	Type II	Type III	Type A	Type B	Type C	Type D	
	5	6	5	9	6	1	1	2
%	14.3	17.1	14.3	25.6	17.1	2.9	2.9	5.8

The injuries were due to fall from height (22 patients), motor vehicle accidents (8 patients), falls (6 patients), industrial accident (2 patients) and earthquake (2 patients). The cases were diagnosed and classified by the three-column spine concept 54). There

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were 5 minor and 35 major injuries. Of the 35 patients who presented major injuries, 16 had compression fractures (45,7 %), 17 had burst fractures (48.5 %) and 2 had fracture-dislocations (5.8 %) [TABLE I]. Most of the injuries were seen at the thoracolumbar junction, fractures at two different levels were observed in 2 patients [TABLE II]. Both initially and at follow up evaluation neurologic function was rated with the Frankel scale (12). In 27 patients Frankel E, in 3 patients Frankel D, in 3 patients Frankel C, and in 2 patients Frankel A were determined. The initial and residual deformity kyphosis, scoliosis and loss of vertebral body height were determined in each patient. At the most recent follow up evaluation of pain was rated with the Denis' pain scale (5) [TABLE III].

Table 2: The distribution of major Thoracolumbar injuries according to their levels

	Level	n	%
Thoracal	4	1	2.7
	5	1	2.7
	6	1	2.7
	8	1	2.7
	10	3	8.1
	11	2	5.4
	12	9	24.3
Lumbar	1	8	21.7
	2	6	16.2
	3	5	13.5
Total		37	100

Table 3: Denis' Pain Scale

P1: No Pain
P2: Occasional minimal pain with no need for medication
P3: Moderate pain with occasional medication but no interruption of work or significant change in activities of daily living
P4: Moderate or severe pain with frequent medication and occasional absence from work or significant change in activities of daily living
P5: Constant or severe pain in capacitating pain, chronic medication

35 patients were separated into two groups. Group I included 20 patients who had treated conservatively. Immobilization for 45 days, then mobilization with thoracolumbar brace in all but one case was performed. The remaining patient was immobilized for 15 days then applied a body cast for mobilization. Group II consisted of 15 patients who had treated by operative means. Surgical stabilization with ASI was the treatment of choise in this group. Of the 15 patients, 4 of them were performed HI+L+PF (Fig. 1), 2 patients had undergone HI+PF (Fig. 2). ASI+L+PF, ASI were applied to 3 and 5 patients respectively (Fig. 3, 4). ASI + AF was performed by an anterior approach in the remaining patient.

RESULTS

GROUP I (Conservatively treated group): 19 patients were rated Frankel E and one was found in Frankel D initially. No neurologic deficit developed in these patients. The Frankel rating was E in all cases at the latest follow up evaluation. The mean angle of kyphosis was 13.3° and increased to 15.9° after treatment. The mean angle of scoliosis was found to be 3.3° initially, a value of 4.2° was recorded at the latest follow up. Height loss of vertebral body decreased to 31 % from 39 %. All the patients were evaluated according to Denis' pain scale at the latest follow up. 6 rated P1, 4 rated P2, 6 rated P3, 2 rated P4 and 2 rated P5. The evluation of pain with recommended to 2 patients who were rated P5. Corpectomy, ASI+AF was performed by anterior approach as a salvage procedure to one of these patients.

GROUP II (Surgically treated group): The Frankel rating was A in 2 cases, C in 3 cases, D in 2 cases and E in 7 cases preoperatively. No neurologic improvement was seen in 2 patients after surgical intervention who were rated Frankel A initially. 4 for of the 5 operated patient who had incomplete neurologic deficits recovered in their neurologic function, at least partially, following surgery. The neurologic status of a patient who presented a postraumatic kyphosis for 11 years had worsened from Frankel E to Frankel B in the early postperative period. After 6 months observation she reversed Frankel D from Frankel B. The neurologic results of the different surgical managements were

Table 4: The Evaluation of pain with regard to the type of fracture in conservatively treated patients

		Pain Scale					
Compression Fracture	Type	n	P1	P2	P3	P4	P5
	1	5	4	-	1	-	-
	2	5	2	1	2	-	-
	3	2	-	-	-	1	1
Burs Fracture	A	4	-	1	2	1	-
	B	3	-	1	1	-	1
	E	1	1	-	-	-	-

Table 5: The neurologic results of different surgical managements

Type Of Surgery	n	FRANKEL	
		Preop	Postop
HI + PF	1	C	D
		E	E
HI + L + PF	4	A	A
		C	C
	3	C	D
		D	E
ASI + L + PF	5	A	A
		C	D
		E	E
ASI		E	E
		E	E
		E	E
		E	E
		E	E
ASI + AF		E	B-D

summarized in TABLE V. The mean angle of kyphosis decrased to 15.3° from 23.1° in the early postoperative period, but tended to increase at latest follow up (20.8°). The mean values of scoliosis angles were recorded as 1.8°, 1.5°, 1.6° before operation in the early postoperative period and at the latest follow up respectively. The mean height loss of vertebral body had decreased just after the operation 547.5 % and 19.2 %) but some loss of correction was seen at the latest follow up (24.3 %). The mean preoperative, early postoperative and the follow up values of kyphosis and scoliosis angles and loss of vertebral body height with regard to the type of surgery were documented in TABLE VI.

A postoperative deep wound infection was seen in 1 patient and he was treated with proper antibiotics. Urinary infection developed in 2 of the 6 patients who had neurogenic bladder; these were treated medically. 5 patients had complications related to the instrumentation proximal and distal hooks (Fig. 5). Proximal hook dislodgment was seen in 1 patient who had undergone HI + L + PF. Two rods were broken in another patient who was applied HI+PF (Fig. 6). Loosening of telescopic nuts was detected in 2 patients with ASI.

As far as pain rating was concerned, 7 patients were rated P1, 4 P2, 3 P3 and 1 P4. Distribution of pain scores according to the type of surgery were presented in TABLE VII.

DISCUSSION

In neurologically intact patients with stable fractures (minimal or moderate compression fractures), nonoperative treatment has been shown to be succesful in the functional rehabilitation of the patient (2, 14, 16, 18, 20). In the 10 patients who were neurogically intact and had stable fractures, nonoperative treatment allowed all of them to gain their activities of daily living and pain was of no or mild problem.

Therapeutic indications in Burst fractures and severe compression fractures which hadn't led to a neurologic deficit remain controversial Both conservative and operative menagement have been recommended in such conditions (5, 6, 7, 14, 18, 23). In our study, although any neurological deterioration was not seen in such conservatively treated patients, 4 of the 10 patients presented severe pain (rated P4 or P5 according to Denis' scale) that effects their activities of daily living. Many authors have reported that operated patients were significantly better than conservatively treated patients in terms of kyphosis, pain, return to work, neurologic stability and early mobilization (1, 2, 3, 5, 6, 7, 9). In our study we also found a mobilization (1, 2, 3, 5, 6, 7, 9). In our study we also foun a significant difference between conservatively and operatively treated neurologically intact patients with severe compression or Burst fractures. When follow up evaluations of kyphosis, scoliosis and loss of vertebral body

Table 6: The mean preoperative, early postoperative and the follow-up values of kyphosis and scoliosis angles and loss of vertebral body height with regard to the type of surgery

Type of surgery	n	Angle of kyphosis (Degree)			Angle of scoliosis (Degree)			Lose of vertebral body height (%)		
		Preop	Postop	Follow-up	Preop	Postop	Follow-up	Preop	Postop	Follow-up
HI+PF	2	23.5	12	30	0	2.5	1	47.2	18.9	36.2
HI+L+PF	4	24.5	17	21	4	2	2	40.6	24.7	43.5
ASI+L+P	3	34.6	9.6	12.3	2	1.3	1.3	50	18.3	23.3
ASI	5	17.7	10.7	17.2	2	0	1.5	49.4	18.7	32.4
ASI+AF	1	29	20	24	0	3	3	60	-	-

Table 7: Distribution of pain scorer according to the type of surgery

Type of surgery	n	Pain Scale				
		P1	P2	P3	P4	P5
HI+PF	2	-	1	1	-	-
HI+L+PF	4	-	1	2	1	-
ASI+L+P	3	2	-	1	-	-
ASI	5	3	2	-	-	-
ASI+AF	1	1	-	-	-	-

21, 7, 9, 10, 11, 18). In our study, we achieved surgical reduction and stabilisation with or without laminectomy by HI or ASI. Similar neurologic recovery rates were seen after both kinds of instumentation system. But HI was associated with much more instrumentatiol complications. Indeed, a gradually increasing number of

Consequently, we suggested that the patients who have unstable thoracolumbar fractures with or without neurologic deficits are the candidates of operative treatment. While conservative treatment is an appropriate method for the patients who have stable thoracolumbar fractures.

Table 8: The mean intial and the follow up values of kyphosis, scoliosis angles, and loss of vertebral body height and immobilization times of neurologically intact patients with unstable fractures treated surgically or conservatively

	n	Angle of kyphosis (Degree)		Angle of scoliosis (Degree)		Loss of vertebral body height (%)		İmmobilization time (Week)
		Before Treatment	After Treatment	Before Treatment	After Treatment	After Treatment	After Treatment	
Surgical Treatment	6	19.4	18.3	2	1	48.80 %	32.20 %	1
Conservative Treatment	10	17.5	21.2	3.6	4.7	44.70 %	42.30 %	6

height early mobilization and pain were taken into consideration. So we suggested that prophylactic stabilization by ASI in such cases gave more satisfactory results than conservative treatment (TABLE IV, VII, VIII).

Early surgical reduction and stabilization are reported to yield ease of nursing care and prompt rehabilitation in the patients with unstable fractures who presented complete neurologic deficit (1, 7, 8, 11, 17). We didn't obtain any neurological recovery in 2 such patients, but the patients could have been sent to a rehabilitation center immediately after the operation.

The treatment of unstable fractures with incomplete neurologic deficit has still create a great problem in its therapeutic indications. There has no universally accepted quidelines for the treatment of such fractures and much controversies exist in the literature. Although some autors reffered surgical reduction and stabilization with, laminectomy (3, 8, 22), surgical reduction and stabilisation without laminectomy are now recommended by a cumulative number of authors (1,

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