

Surgical Management of Unstable Thoraco-lumbar Injuries

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SUMMARY

Surgical management of Spinal Injuries is still a controversial subject. Unstable thoraco-lumbar and lumbar spine fractures present immediate and late management problems. Operative stabilisation and neural canal decompression, both indirect and direct was studied in Ten patients with and without neurological deficit. Locally manufactured Fixator-Internae and Web-Morley implants were used. The patients were evaluated for anatomical reduction, neurological recovery, pain and functional status. Average correction of vertebral height was 79%. Average correction of kyphotic deformity was 22.7 degrees. Nine improved neurologically. All achieved solid local fusion's and at six month follow up were pain free. We found the locally manufactured implant effective in fresh cases of thoraco-lumbar fractures. Anterior surgery was only needed in patients presenting late. Short hospital stay, easier nursing care and early ambulation were the immediate advantages of surgical management in our patient group. On follow up our patients were pain free with solid healing of their fractures and functional status was excellent.

INTRODUCTION

Spinal trauma, even with out neurological injury presents a difficult clinical situation, and when associated with paralysis is one of the more tragic medical problems.

The aim of treatment in Unstable Thoraco-Lumbar fractures is restoration of spinal alignment to relieve neural compression, establishment of spinal stability providing freedom from post injury pain or a delayed progression of deformity and restoration of the patient as quickly as possible to the highest level of function compatible with his neurological function.

We were able to achieve these aims in ten patients by managing them surgically.

PATIENTS AND METHODS

Ten patients presenting to our Orthopaedic unit at Shaikh Zayed hospital over a two and half year period from January 1993 till July 1995, with unstable thoraco-lumbar and lumbar fractures were studied.

Mean age was thirty five years, range being fourteen to seventy years. Seven were male. Seventy percent were less than forty years old.

Fall from height was the most common cause of these injuries (70%). Only one had a road traffic accident (Table 1).

Table 1: Mechanism of injury.

Mechanism of Injury	No. of patients	Percent
Fall from height	7	70
Fall of heavy object on the back	2	20
Road traffic accident	1	10
Total	10	100

Seventy percent had injury at thoraco-lumbar junction, involving D12 or L1. Only three had lumbar only involvement.

Injury was classified using McAfee¹ system and neurological deficit was recorded according to

Frankel grades^{2,4}. Seven i.e. 70% had flexion compression, while three i.e. 30% had flexion distraction type of injury. Neurological status was, five in grade C, Two in grade B, Two in grade E and One in grade D (Table 2).

Apart from fracture calcaneum no other significant associated injury was seen. Fracture of the Os-calcis was noted in three patients.

Presentation to us was 12.1 days mean, since injury. Range being 1-33 days. (Table 3).

Table 2: Neurological status with fracture type.

Neurological grade	McAfee Fx. type		Total
	Flexion compression	Flexion distraction	
A			0
B	2	-	2
C	2	3	5
D	1	-	1
E	2	-	2

Table 3: Time lapse at presentation.

Time interval in days	Number	Percent
0 - 7	4	40
8 - 14	3	30
> 14	3	30
Total	10	100

Flexion compression injuries had on the average a Kyphotic deformity of 14 degrees (Range: 3-23 degrees). In flexion distraction injuries average Kyphotic angle was 20 degrees (Range: 9-40 degrees). Flexion compression injuries causing Burst fractures had on the average a 38% vertebral height as compared to the normal adjacent vertebrae height (Range: 17-66%). The average translation in the sagittal plane was 42% (Range 35.5-45%) of the AP diameter of adjacent normal vertebrae.

Surgery undertaken was Ligamento-Taxis and Internal fixation with fixator internae in nine patients. In two who presented late ligamento-taxis was not possible due to tightening of anterior

structures and they had Anterior decompression, Tri-cortical iliac strut grafting and Web-Morley instrumentation. One having both anterior and posterior stabilisation after neural decompression. Postero lateral fusion was done in eight patients, anterior fusion in one and combined antero-posterior in one patient.

Radiographs were taken immediately after operation, at 2 weeks, at 4 weeks, at 12 weeks, 3 months, 6 months and 9 months after surgery.

Follow up at regular intervals was done, average follow up was 11.6 months (Range: 9-18 months). Patients were evaluated for Pain, Fusion, Bladder and Bowel symptoms, Status of implants and Reduction and functional status of the individual.

RESULTS

We were able to achieve the goals set out by us while treating these Ten patients. All the aims of treatment mentioned earlier were met.

Spinal alignment was restored, and neural canal decompressed by indirect (ligamento-taxis) in eight patients and by a direct anterior approach in two patients. Stabilisation was with Fixator Internae in eight (Fig. 1), Web-Morley (Fig. 2) in two, one having both implants. Vertebral height was restored to 79% (Range: 70-85%), Kyphotic angle correction was to 8.7 degree Lordosis and there was no sagittal translation postoperatively. During the follow up period an average loss of correction of 2.4 degrees was noted (Range: 1-5 degrees).

All fused with out any evidence of Pseudo-Arthrosis. All were pain free on last follow up and function was compatible with their neurological status. Neurological assessment showed improvement by 2 grades in five patients, by 1 grade in one patient while four maintained the same grade as at presentation (Table 4).

Complications seen were Urinary Tract Infection in 2 patients, this was treated with A'Biotics and supra-pubic catheter. Equinus contracture of foot was seen in 2 patients, they were managed by stretching exercises and ankle foot orthosis's (AFOs). There was only one incidence of implant failure, in this case one of the holding nuts became loose causing the rod to tent the skin, forcing us to remove the implant at four months post surgery with no deterioration in the neurological status of the patient. Only one of our patient

developed pressure sores over the sacral area, this was managed by aseptic dressings and it healed. There was one malpositioned screw out of a total of thirty six in the fixator internae group, this malpositioning did not have any detrimental effect on the outcome.



Fig 1: Fixator Internae providing maintenance of reduction and restored alignment.

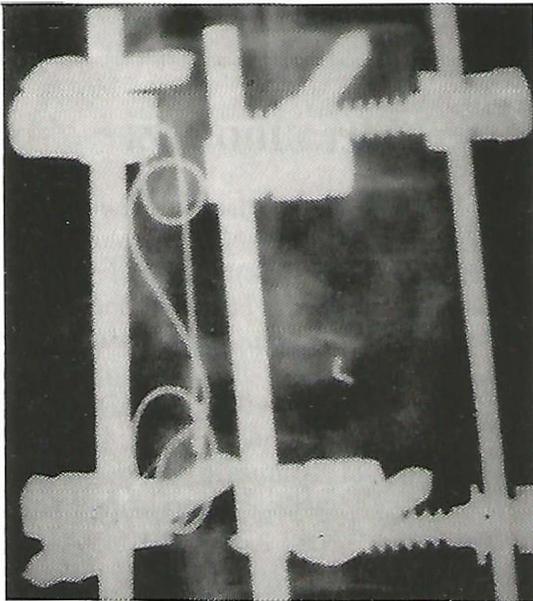


Fig 2: After anterior decompression and stabilisation.

DISCUSSION

Development of specialized spinal injury centres and introduction of antibiotics has over the recent

past revolutionised the care of the spinally injured. Paraplegics had a 100% mortality from the effects of sepsis or pressure ulceration³ prior to formation of these specialized centres. The world famous spinal injury treatment centre at Stoke Mandeville in England was founded by Sir Ludwig Guttman, upon which many similar institutes have been modelled all over the world. Except in our country which as yet does not have a special centre for spinal injuries.

Table 4: Neurological improvement.

Frankel grades	No. of patients	Improved
2 Grades	5	
..... B-D		2
..... C-E		3
1 Grade		
..... B-C	1	1
Same Grade		
..... D-D	1	0
..... E-E	2	0
..... C-C	1	0
..... Total	10	6

Sir Guttman used postural reduction method, first described by Hippocrates⁴, for the skeletal components of the injury. Then with the use of specially designed turning beds, pressure sores were prevented. This form of recumbent treatment was carried out for a period of 6-8 weeks, till the spine was considered stable enough to allow vigorous rehabilitation. This system of treatment yielded fantastic results, and when these were compared with early failures of surgical endeavours the conservative camp out shone the surgical enthusiasts⁵. Furthermore it has been shown clearly that early removal of retropulsed fragments does not alter the neurological outcome⁶. Also that remodelling takes place and neural canal encroachment lessens with passage of time⁷. Long term look (20 years) at a large group of patients with thoraco-lumbar fractures treated conservatively showed 90% to return to their usual jobs and that degree of Kyphosis was mild⁷.

All this work done and published by the conservative camp compounded by the early surgical disasters gave birth to a controversy that still exists

all over the world, where these special spinal injury units are available. Despite the gloomy view held for early surgical intervention by the conservatists, there is a definitive and increasing role for operative treatment in the management of thoraco-lumbar injuries with or without neurological damage^{3,8-12} especially in a setting like ours in Pakistan. The newer implants give better fixation and stability^{5,13}, resulting in early ambulation and less intensive nursing care which can easily be carried out at home by the patients attendants after receiving adequate instructions from the hospital staff. In the group of patients studied by us the locally manufactured fixator internae fared well by giving us good fixation and stability to ambulate our patients early in orthoses according to their neurological status.

It has been said "The best approach to a given patient is the one that permits the best healing of the bony and neural injury with least morbidity".

In our country where no spinal injury centre exists and a 6-8 weeks hospitalisation is a big drain on the state and the citizen. We feel after studying our group of patients that early surgical intervention gives us the best hope of achieving results equivalent to those achieved at specialized centres in the developed world. Provided surgical expertise and facilities are available¹⁴.

REFERENCES

1. McAfee PC, Yuan HA, Frederickson BE, Lubicky JP. The value of computed tomography in thoraco-lumbar fractures. *JBJS* 1983; 4A: 461.
2. Rockwood CA Jr, Green DP, Bucholz RW. Rockwood and Green's fractures in adults. In: *The thoracolumbar spine* (eds. Montesano PX, Benson DR) 3rd edition. 1991; vol. 2, pp. 1362. J.B. Lippincott Company.
3. Osebold WR, Weinstein SL, Sprague BL. Thoraco-lumbar spine fractures. Results of treatment. *Spine* 1981; 6: 13-31.
4. Frankel HL, Hancock DO, Hyslop G, et al. The value of postural reduction in the initial management of closed injuries of the spine with paraplegia and tetraplegia. *Paraplegia* 1969; 7: 179-92.
5. Bedbrook GM. Fracture dislocations of the spine with and without paralysis: the case for conservatism and against

- operative techniques. In *Controversies in Orthopaedic Surgery* (eds. Leach RA, Hoaglund FT, and Riseborough EJ), Saunders, Philadelphia. 123 (1982)
6. Gaines RW, Humphreys WG. A plea for judgement in management in thoraco-lumbar fractures and fracture dislocations: a reassessment of surgical indications. *Clin Orthop* 1984; 189: 36-42.
7. Weinstein JN, Collalto P, Lehmann TR. Thoraco-lumbar burst fractures treated conservatively: a long term follow-up. *Spine* 1988; 13: 33-8.
8. Guttman L. Spinal deformities in traumatic paraplegia and tetraplegia following surgical procedures. *Paraplegia* 1966; 4: 63-84.
9. Weiss M. Dynamic spine alloplasty (spring loaded corrective devices) after fracture and spinal cord injury. *Clin Orthop* 1975; 112: 150-58.
10. Bradford DS, Akbarnia BA, Winter RB, et al. Surgical stabilisation of fractures and fracture dislocation of the thoracic spine. *Spine* 1977; 2: 185-96.
11. Jacobs RR, Casey MP. Surgical management of thoraco-lumbar spinal injuries. *Clin Orthop* 1984; 189: 22-35.
12. Luque ER, Casis N, Ramirez, Wiella G. Segmental spinal instrumentation in the treatment of fractures of the thoraco-lumbar spine. *Spine* 1982; 7: 312-17.
13. Dubousset J, Graf H, Miladi L, et al. Spinal derotation with CD instrumentation. *Orthop Trans* 1986; 10: 36.
14. Gaines RW, Humphreys WG. Thoraco-lumbar spinal injuries: role of operative treatment. *Current Orthopaedics* 1988; 2: 231-35.

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