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Outcomes of traumatic thoracolumbar fractures managed with Pedicular screw fixation system: A study of 25 cases

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Abstract

Thoracolumbar spine trauma is important burden of society. Early operative measures brings up better outcomes then conservative management posterior screw fixations has its own benefits in terms of outcomes. The goals of treatment in thoracolumbar fractures are restoring vertebral column stability and obtaining spinal canal decompression, leading to early mobilization of the Patient. 25 patients were operated for traumatic thoracolumbar vertebral fractures prospectively. Outcomes were measured on basis of frankle grade, complications and clinically. Thoracolumbar neurosurgical problem in road traffic accidents and fall from height; more commonly involve thoracolumbar junction; D11 to L2 region, It may be of burst compression and fracture dislocation type or wedge compression type. Surgical treatment is a better option for ambulation and faster recovery then conservative management.

Keywords: Thoracolumbar spine, frankle grade, pedicular screw, vaccaro score

Introduction

The goals of treatment in thoracolumbar fractures are restoring vertebral column stability and obtaining spinal canal decompression, leading to early mobilization of the patient ^[1] The appropriate treatment of thoracolumbar fractures remains a subject of controversy ^[2, 3]. Different schools of thoughts for each modality, ranging from conservative management with reduction by pillow and extending today to anterior/posterior instrumentation systems for fixation, have proved that neither is an ideal method and much more needs to be done to reach an ideal modality of management ^[2, 4, 5].

Aims and Objectives

1. To study the functional outcomes of pedicular screw fixation system for thoracolumbar vertebral fractures.
2. To evaluate the effectiveness of pedicular screw in thoracolumbar vertebral fractures.
3. To evaluate complications, rate of infection, rate of improvement correction of wedge angle and vertebral height after fixation with pedicular screw.
4. To assess the overall results of thoracolumbar vertebral fractures and its management with pedicular screw.

Materials and Methods

Thirty patients with posttraumatic instability of lower thoracic or upper lumbar spine were surgically managed at the department of Orthopaedics, Rajkot. All those patients who were operated for thoracolumbar junction injuries with pedicle screw fixation were included.

The patients with preexisting systemic illness or associated extra spinal injuries significant enough to result in increased morbidity or mortality were excluded from the study. all patients underwent open reduction and internal fixation by posterior approach. Laminectomy to decompress spinal cord was carried out at the involved level and bone was saved to be used as bone graft.

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Inclusion Criterias

1. age >18 years and <65 years
2. traumatic spinal injuries with Vaccaro score ≥ 4 ^[12]
3. willingness of the patient
4. history of fall from height, motor vehicle accident and other injuries with significant neurological compromise
5. failure of conservative rehabilitation program

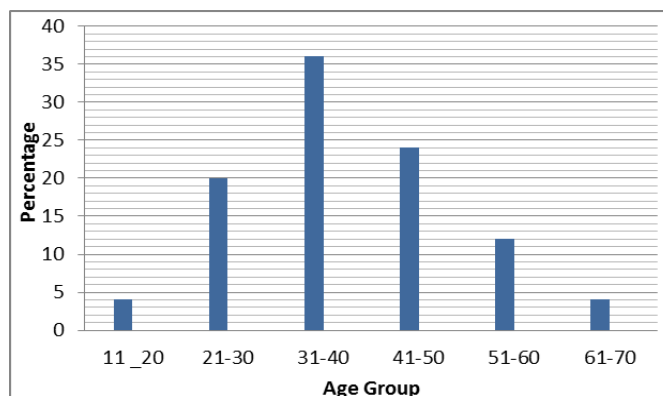
Exclusion Criterias

1. Age < 18 years and >65 years

2. Noncompliant patient
3. Underlying non traumatic spinal diseases
4. Vaccaro score <4 ^[12].

Observations and Analysis**Table 1: Sex Distribution**

Sex	Number	Percentage
Male	11	44%
Female	14	56%

**Fig 1: Age Group**

This table shows age distribution in our study which shows that 30 to 40 years of age group has maximum chances of this

injury (36%). whereas extremes of age have lower incidence of thoracolumbar vertebra fractures.

Table 2: Mode of Injury

Mode of injury	Number	Percentage
Fall from height	21	84
Road traffic accident	4	16

This table suggests type of injury in patients with thoracolumbar fractures. Most common type of injury is fall

from height (84%).

Table 3: Level of vertebral injury

Vertebral level	Frequency	Percentage
D10	1	4%
D11	1	4%
D12	10	40%
L1	7	28
L2	3	12
L3	1	4
L4	1	4
L5	1	4
TOTAL	25	100

This table shows level of vertebra injured in pathology; maximum chance is at dorsolumbar junction (D11-L2). D11 shows more predominant injury among it (40%) whereas higher level of vertebra is less commonly involved.

pathology is being wedge compression type (56%) and least common among all is fracture dislocation type (8%)

Table 4: Type of Fracture

Type of fracture	Frequency	Percentage
Burst	9	36
Wedge Compression	14	56
Fracture dislocation	2	8
Total	25	100

This table shows type of pathology in vertebral fractures. there are 3 most common pathology. Burst, wedge compression and fracture dislocation. Most common

Table 5: Injury Surgical Interval

Injury surgical interval	Frequency	Percentage
>7 DAYS	16	64
<7 DAYS	9	36
Total	25	100

This table shows injury surgical interval of our patients; out of 25 patients; 16 patients were operated more than 7 days of injury (64%) and 9 patients were operated in less than 7 days of injury (36%). no patient was operated within 48 hours of injury.

Table 6: Improvement of franked grade

Number of Patients	Improve in grade	Percentage
3	0	12%
4	1	16%
3	2	12%
7	3	28%
8	4	32%

Above table shows that Out of 25 patients 3 patients had no improvement 4 had improvement in 1 grade, 3 had improvement in 2 grades, 7 had improvement in 3 grades, 8 had improvement of 4 grades.

Table 7: Complications of Pedicular Screw

Complication	Frequency	Percentage
Infection	2	8%
Implant loosening	2	8%
Bedsore	3	12%
None	18	72%

This table shows postoperative complication of pedicular screw fixation. out of 25 patients 21 had no complication and 2 had implant loosening and 2 patients had postoperative infection.

Discussion

Table 8: Age Comparision

Age group	Current Study 2017	Roopsingh <i>et al.</i>	Shailendra Khare <i>et al.</i> 2003
11-20	4%	7.2%	-
21-30	20%	18.6%	44.0%
31-40	36%	27.8%	28%
41-50	24%	24.2%	20%
51-60	12%	12.0%	8.0%
61-70	4%	10.4%	-
Total	100%	100%	100%

In our study maximum patients are in the age group 31-40 years and mean age is 39.7years which can be comparable to study of Roopsingh *et al.* in which maximum patients are in the same age group (27.8%) and Shailendra Khare *et al.* included 25 patients in his study in which maximum patients

are in 16- 25 years of age group (44%). and in Naushad Husain *et al.* has included in 33 patients in study maximum patients being in 30-40 years of age and mean age is 37.6 years. Ling wang *et al.* has included 20 patients in his study in which mean age group is 38.4 years.

Table 9: Gender Comparison

Sex	Current study	Roop Kumar <i>et al.</i>	Naushad Hussain <i>et al.</i>	Ling Wang <i>et al.</i>	Shailendra Khare <i>et al.</i>
Male	44%	70%	91%	75%	72%
Female	56%	30%	9%	25%	28%
Total	100%	100%	100%	100%	100%

In our study we have included 25 patients in which 14 are female and 11 male as compared to Roopkumar *et al.* has included 66 patients in his study in which there are 46 male and 20 females and Naushad Hussain *et al.* has included 33 patients in their study in which 3 were females and 30 were males. As compared to Ling Wang *et al.* has included 20 patients in which 15 were males and 5 were females and Shailendra Khare *et al.* included 25 patients in which 18 were

males and 7 were females.

Comparison of mode of injury

The commonest mode of injury in our study was fall from height which coincides with Shailendra Khare *et al.* in which 12 patients had similar history and 8 patients had road traffic accident. Whereas in study of Roy Camille *et al.* and Howards *et al.* accounted road traffic accidents in majority of cases.

Table 10: Comparison of level of vertebra

Vertebral level	Current study 2017 N=30	Shailendra Khare <i>et al.</i> N=07	Ling wang <i>et al.</i> n=20
D9	-	14.3%	-
D10	4%	14.3%	-
D11	4%	-	-
D12	40%	28.6%	25%
L1	28%	28.6%	10%
L2	12%	14.3%	45%
L3	4%	-	15%
L4	4%	-	5%
L5	4%	-	-
T1	-	-	-

In our study most common vertebral level is D11- L2 which is dorsolumbar junction. As compared to Roopkumar *et al.* studied that 58 patients had single vertebral fractures, 8 had 2 or more vertebral fractures. The level of single vertebral fractures was maximum at L1 level followed by D12 and D11 levels which coincides with Ibrahim *et al.*

Injury surgical interval

In our study; out of 25 patients; 20 patients were operated within 7 days of injury (66.6%) and 10 patients were operated more than 7 days of injury (33.3%). no patient was operated within 48 hours of injury.

Roopsingh *et al.* showed the mean time interval between

injury and surgery was 13.1 days (range, 3–31 days). Patients were divided further in two groups for analysis. Group 1 included patients that were operated within 7 days (early surgery group, n=20) (30.3%) and group 2 included patients

that were operated after 7 days (late surgery group, n=46). (69.9%) The two groups were compared to evaluate whether timing of surgery had any effect on the final outcome.

Table 11: Post op complication

	Current study 2017 n=7	Shailendra Khare <i>et al.</i> n =13	Chadha <i>et al.</i> N=12
Wound infection	28.7%	7.7%	16.7%
Implant loosening	28.7%	23.2%	8.3%
bedsores	3%	30.8%	33.3%
UTI	-	38.4%	41.7%

In our study post of complication were implant loosening and wound site infection. As compared to Shailendra *et al.* showed wound infection bed sore and implant loosening and UTI. and chadha *et al.* showed maximum chances of UTI in postoperative patients. Katonics showed in his study that 1% of iatrogenic neurologic insults secondary to erroneous placement of screw.

Conclusion

Thoracolumbar injury is a common neurosurgical problem in road traffic accidents and fall from height. Thoracolumbar injuries are more commonly involve thoracolumbar junction; D11 to L2 region. It may be of burst compression and fracture dislocation type most commonly being wedge compression type. Surgical treatment is a better option for early ambulation and faster recovery than conservative management. An early/immediate surgery in the form of pedicle screw fixation with decompression provides better relief in neurological recovery also.

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