Original Research Article

Post treatment kyphosis in thoraco-lumbar burst fractures managed non-operatively and its correlation with pain score

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Abstract

Background: Thoracolumbar burst fractures result from axial compression with rupture of the anterior and medial columns of the vertebral body, with retropulsion of bone fragments into the spinal canal and an increased interpedicular distance. This region is a common site of injury, with an incidence ranging from 10% to 45%. Various treatment methods have been used to manage thoracolumbar fracture. The main goals of treatment are to provide stability, to relieve pain, to restore function, and to reduce the deformities such as kyphosis or lordosis associated with spinal fracture. Various conservative treatments have been recommended including postural reduction, bed rest, body cast, and use of orthoses. **Aim:** to assess kyphosis post conservative treatment in thoraco lumbar burst fractures and to see correlation between kyphosis and visual analog pain scale in these patients. **Methodology:** This was a hospital based prospective, before and after interventional study done for the duration of one year. Thirty five subjects with thoraco lumbar burst fracture were included. **Results:** Initial kyphosis was 12.34±9.36 and final kyphosis was 12.34±9.36. The difference between initial and final kyphosis was statistically insignificant.

Keywords: Thoracolumbar burst fractures,Kyphosis,pain score,lordosis

Introduction

Thoracolumbar burst fractures result from axial compression with rupture of the anterior and medial columns of the vertebral body, with retropulsion of bone fragments into the spinal canal and an increased interpedicular distance[1]. This region is a common site of injury, with an incidence ranging from 10% to 45%[1-3].About 90% of all fractures of the spine occur between T11 and L4 and around 14 to 17% are classified as burst fractures. This region is sensitive to injury for three reasons: the loss of stabilization provided by the ribs and chest muscles, the transition of thoracic kyphotic curvature into lumbar lordotic curvature and changes in the orientation of joint facets from coronal in the thoracic spine to sagittal in the lumbar spine[4].

Some patients with burst fractures develop progressive mechanical instability, characterized by increased kyphosis, back pain, and neurological sequelae[5] superimposed rotational component.Various treatment methods have been used to manage thoracolumbar fracture[6]. The main goals of treatment are to provide stability, to relieve pain, to restore function, and to reduce the deformities such as kyphosis or lordosis associated with spinal fracture.

Various conservative treatments have been recommended including postural reduction, bed rest, body cast, and use of orthoses. Currently, bracing is a fundamental part of conservative treatment for thoracolumbar fracture even after surgery.

Despite the large number of publications on the conservative treatment of thoracolumbar burst

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fractures, most of the studies do not address or discuss the relationship between the final kyphosis and functional outcome in patients that are treated conservatively. When we look at this analysis, in general, the authors use their own questionnaires or the patient's subjective interpretation of pain, making interpretation of results difficult[7,8]. The objective of this study was to observe the correlation between post-traumatic kyphosis and the symptoms of patients, specially pain, undergoing conservative treatment of thoracolumbar burst fractures.

Methodology

This was a hospital based prospective, before and after interventional study. This was conducted for the duration of 1 year at Department of Orthopaedics, SMS Medical College & Hospital, Jaipur, Rajasthan, India. Patients admitted to the department of Orthopedics and fulfilling the inclusion criteria were selected as subjects. Sample size was calculated to be 29 subjects at alpha error 0.05 and power 90% assuming 0.563 correlation between post treatment kyphosis and pain score[9] in thoraco lumbar burst cases treated non operatively (as per seed article). Hence, for the study purpose 35 cases of thoraco lumbar burst fracture without neurological deficit were included. The data was entered in MS Excel and the file was moved to SPSS software version 21.0 for statistical analysis.

(a) Inclusion criteria :

(i) Thoracolumbar burst fracture without neurological deficit
(ii) Age 17-80 years
(iii) Time of injury <10 days
(iv) Who will give written informed consent for this study.

(b) Exclusion criteria

(i) Pathological fracture

Results

Among our study participants, more than half [51%] of the subjects belonged to 31 to 50 years age group. 82.86% patients were male and 17.14% patients were female. Initial kyphosis was 12.34±9.36 and final kyphosis was 12.34±9.36. The difference between initial and final kyphosis was statistically insignificant [Table 1]. 20.00% patients were having VAS score 5 followed by 14.28% patients were having VAS score 5 & 8 each,11.42%patients were having VAS score 2, 8.57%patients were having VAS score 1&7 each, 5.71%patients were having VAS score 3 and 2.85% patients were having VAS score 6 [Table 2]. The correlation coefficient between final kyphosis and VAS pain score was found to be positive [p<0.05].

Table 1: KYPHOSIS scores Mean [SD]

	Mean	SD
Initial KYPHOSIS	12.34	9.36
Final KYPHOSIS	13.51	9.53
P value	0.305	

Table 2: Visual Analog Scale among subjects

	Number of Patients	Percentage
Score 0	5	14.28
Score 1	3	8.57
Score 2	4	11.42
Score 3	2	5.71
Score 4	5	14.28
Score 5	7	20.00
Score 6	1	2.85
Score 7	3	8.57
Score 8	5	14.28
Total	35	100.00

Table 3: Correlation between final kyphosis and VAS score

	Sample size (n)	Correlation coefficient (r)	Significance 'p' Value
VAS	35	0.487	0.002 (S)

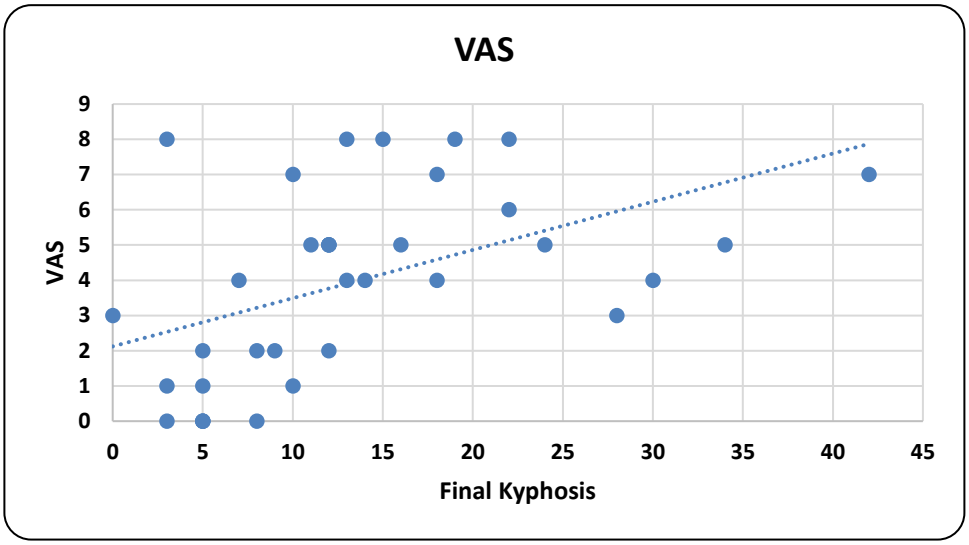

Fig 1: Scatter diagram showing correlation between final kyphosis and VAS

Discussion

The treatment of burst fractures of the thoracolumbar spine is a topic of debate and discussion in the literature. In general, surgical treatment is proposed for patients with associated neurological damage[10]. However, doubt remains as to the best conduct to be adopted when the patient presents normal neurological function. Should we classify this type of fracture as unstable, in order to justify a surgical indication? Observational studies in patients with burst fractures of the thoracic and lumbar spine and normal neurological function have not shown any differences in the functional results in the long term, independently of whether they received surgical or conservative treatment [11-14]. In our study average age of patients 43.40 years. Similar result observe by Osmar Avanzi et al[9] they found that the average age of patients was 50.83 years, with a minimum of 13 and maximum of 83 years. In another study of the meta-analysis type, Sonali et al.[15]assessed four clinical trials on the treatment of thoracolumbar burst fractures, with a total of 79 patients (41 with surgical treatment and 38 with conservative treatment). The mean follow-up ranged from 24 to 118 months. Differences were found between the groups in terms of the improvement in kyphosis in the group treated with surgery. However, the surgical treatment did not show any superiority in relation to pain or the rate of return to work. They therefore concluded that surgical treatment of thoracolumbar burst fractures without neurological deficit can improve the residual kyphosis, but does not improve the pain, and is associated with higher rates of complications and costs.In present study initial kyphosis was 12.34±9.36 and final kyphosis was 12.34±9.36. The difference between initial and final kyphosis was stastically Insignificants. Osmar Avanzi et al[9] observed that the mean initial kyphosis in the radiographic evaluation was 12.16°, ranging from 0 to 40° and the mean final kyphosis was 13.41°, ranging from 0 to 45°. There was no significant difference between the initial Cobb values and those at the end of treatment (12.1 vs. 13.4, $p < 0.05$).In contrast to the findings of Weinstein *et al* [16] and Mumford *et al* [17], we observed a correlation between the VAS score and the final kyphosis. But it is noteworthy that this correlation was weak. This assessment tool, which goes from 0 to 10, compared with Denis scales ranging from

1 to 5, can facilitate the numerical analysis of statistical estimation of pain in these patients. Future studies with larger series of cases may show a tendency that has not been observed in current studies with fewer patients.

Conclusion

Based on these results, it can be concluded that conservative treatment is at par in treating thoraco-lumbar burst fractures. The statistically insignificant difference between initial and final kyphosis post conservative management, also supports the fact. The patient may return back to work, since the functional ability was found to be good post conservative treatment.

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