

Largest Series of Mild-Moderate MVA Associated Thoracolumbar Compression Fractures: Prognosis and Outcome

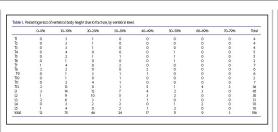
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Introduction

Thoraco-lumbar compression fractures (TLCF) are common following trauma, with 2-7.5% incidence with blunt trauma (mostly MVC or falls). They have been the focus of multiple attemtpts at clinical and pathophysiogic classification (Azam and Sadat-Ali, 2015). Differentating classification modificaions have been aimed at extent of injury and forces at work to elucidate the benign versions of these fractures. They have generally been reported to be stable in the absence of deformity or posterior complex injury (Park et al., 2016). The biomechanics involved are axial loading with modest flexion. Management decisions for TLCF have been a subject of continuous research and debate. This is evident in mild TLCF (<30% loss of height), which have been regarded as benign and were classically treated with bracing, unless associated with neurologic deficits or other unstble fractures (Vaccaro et al., 2005).

Methods

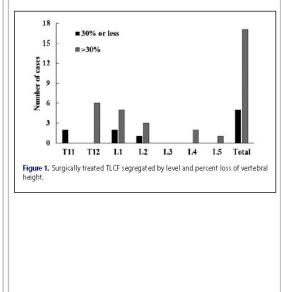
A retrospective chart review of patients admitted to our center with traumatic TLCF between 2008 and 2015 was conducted. We collected data on demographics, mechanism of injury, physical examination, management decisions, brace use, levels fused and long -term outcomes to determine the threshold of permanent injury. Severity of TLCF was based on CT/X ray review, as a percentage of loss of height at the point of maximal compression, compared to normal adjacent levels. Statistical analysis was performed using descriptive and logistical regression model.



Results

1470 patient records were reviewed for this effort, fullfilling search criteria for traumatic fractures to the thoracolumbar spine. 695 patients with isolated TLCF were identified, of which 194 were occupants in auto accidents presenting with 198 TLCF. Ages ranged from 19 to 82, with a male : female ration of 60:40. The fracture segregation by level and severity yielded a higher incidence at the TLJ (T12-L2) with 113 fractures peaking at L1. Surgically treated TLCF peaked at T12.

22 patients underwent surgery (17 patients with fractures >30% lossof height and 5 with TLCF 30% or less). The latter group all presented with neurologic deficits, while all sugical patients demostrated retropulsion and spinal canal compromise.



In the non-operative group with mild (30% or less) loss of height (122 patients), only one presented with chronic pain 3 months following injury, while in the more severe loss of height group 50% had the same outcome. 50% of the mild loss of height group (71 patients) have not been braced. Orthosis use (TLSO) was of no value in that subgroup in terms of outcomes.

	Number of patients	Mean % Ioss VB height	Median % loss of VB height	of VB		Maximum % loss VB height
Non-surgical	172	20.59	20	13.38	5	75
Surgical	22	46.38	50	18.18	10	78

Strong evidence of association between loss ofheight and surgery (p <0.001). ROC analysis was used to calculate the optimal cuttoff value of percent compression that distinguished surgical and non-surgical groups, and found to be 30.4%.

	Estimate	Std. Error	Z value	Pr(>z)
Intercept Percent Loss of Height	0.088 - 4.8	0.016 0.67	5.6 - 7.2	P<.01 P<.01
able 4. Validation of cut-ofi bercent height loss > 30.4.	by fitting a not	her logistic reg	ression with	indicator
	by fitting a not Estimate	her logistic reg Std. Error	ression with Z value	indicator Pr(>z)

Discussion

TLCF involve injury to both the anterior andmiddle columns of the vertebr. Those with significant loss of height could cause modest structural kyphosis, in addition to neurologic compromise due to bone retropulsion into the canal space. To classify these fractures as unstable would indicate a higher risk for future morbidity, and a risk for neurologic or structural compromise with mobilization. Our data strongly suggests that isolated compression fractures of less than 30% in the absence of neurologic deficit or destabilizing injuries to other elements of the spine are selflimiting, carrying no risk to life, and requiring at most six weeks in an orthosis for pain control. Indeed, it may well be that, in the absence of significant retropulsion or neurologic deficit, a good outcome will result, regardless of the degree of loss of vertebral body height. The majority of patients have a good functional outcome with minimal pain with or without orthosis use.

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References

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VaccaroAR, Zeiller SC, Hulbert RJ, et al. The thoracolumbar injury severity score: a proposed treatment algorithm. Journal of Spinal Disorders & Techniques. 2005;18(3):209–215.