

Time to Surgery Affects Outcomes in Neurologically Intact Patients with Thoracolumbar Fractures

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INTRODUCTION:

Thoracolumbar fractures are the most common spine fractures affecting patients. Previous literature has largely focused on the association between early surgical intervention of thoracolumbar fractures and neurological outcomes; meanwhile few have looked specifically at patients who are neurologically intact and undergo early versus late surgical fixation. To our knowledge, this is the first study to look solely at neurologically intact patients with thoracolumbar spine fractures that undergo surgery and explore the relationship between time to surgery and outcomes. The present study analyzes the effect of time elapsed from first presentation to a healthcare facility as well as time elapsed from hospital admission to spinal stabilization on in-hospital complications, postoperative complications, and length of stay (LOS).

METHODS:

This was a retrospective review of patients admitted to a Level 1 Trauma Center between 2018-2022 with an operatively treated thoracolumbar spine fracture without neurological injury. Time to surgery was analyzed both as total time from first presentation to a medical center versus time to surgery from arrival at the treating facility and was categorized into three different groups: within 24 hours, between 24-48 hours, and greater than 48 hours. The primary outcomes were in-hospital and postoperative complications. The secondary outcome was length of stay (LOS).

RESULTS:

Seventy-one patients were included in this study. There was a 25.35% in-hospital complication rate and a 21.13% postoperative complication rate. There was one mortality. Increased time to surgery after arrival to treating hospital increased the risk of in-hospital complications ($p=0.002$), but did not increase risk of post-discharge complications ($p=0.57$). After adjusting for age and whether the patient had other injuries requiring surgery, compared to the >48hr group, the 24-48hr group had an 83.5% risk reduction in in-hospital complications (OR=0.165, 95% CI=0.032, 0.845). Compared to the >48hr group, the <24hr group had an 86.5% risk reduction in in-hospital complications (OR 0.135 95% CI=0.024, 0.772). Time to surgery, age, and whether or not the patient had other injuries requiring surgery were all found to be significant predictors of in-hospital complications. Increased time to surgery led to a significantly longer LOS ($p<0.0001$). Age, Charlson Comorbidity Index, and other injuries requiring surgery all led to increased risk of delay to surgery.

DISCUSSION AND CONCLUSION:

In neurologically intact patients with thoracolumbar fractures, early surgery (<48 hours) is preferred. Significant reductions in the incidence of in-hospital complications were seen with early surgical stabilization in patients with thoracolumbar fractures. There was also a significant reduction in length of stay. Further studies should be performed, ideally in a prospective randomized fashion, to determine the full impact of timing of surgery in neurologically intact patients with thoracolumbar fractures.

Effect of Time to Surgery on In-hospital and Postoperative Complications		
<u>In-hospital Complications</u>	p-value	Odds Ratio (95% CI)
<u>Time to Surgery from Admission</u>		
Continuous	0.002	1.018 (1.006, 1.029)
Categorical with three groups	0.0446	
24-48 hours versus > 48 hours		0.165 (0.032, 0.845)
<24 hours versus > 48 hours		0.135 (0.024, 0.772)

Time to Surgery and Length of Stay (LOS)				
<u>Time to Surgery</u>	<u>Group</u>	Least Square Means difference in LOS (Log Scale)	Std Error	p-value
<u>From Admission</u>				<0.0001
	24-48 hours vs < 24 hours	0.3111	0.1282	0.0152*
	24-48 hours vs > 48 hours	-0.7473	0.1677	<0.0001*
	<24 hours vs > 48 hours	-1.0583	0.1730	<0.0001*

*Tukey-Kramer adjustment for multiple comparisons

<u>Postoperative Complications</u>		
<u>Time to Surgery from Admission</u>	p-value	Odds Ratio (95% CI)
Continuous	0.5742	1.003 (0.994, 1.011)
Categorical with three groups	0.3700	
24-48 hours versus > 48 hours		0.373 (0.089, 1.565)
<24 hours versus > 48 hours		0.442 (0.104, 1.877)