

Isolated Thoracic and Lumbar Transverse Process Fractures: Do They Need Spine Surgeon Evaluation? A High Volume Level I Trauma Center Experience with Cost Analysis

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INTRODUCTION: Transverse process fractures (TPF) of the thoracic and lumbar spine have become increasingly identified due to CT imaging. At many institutions the spine service, neurosurgical or orthopaedic, is consulted for further evaluation and management. There are several studies that demonstrate no difference in clinical outcome with or without spine service intervention (bracing, surgery, etc.). However, no study to our knowledge provides an additional cost analysis. We hypothesize that isolated transverse process fractures of the thoracolumbar vertebrae are structurally and neurologically stable injuries. Furthermore, spine service consultation and evaluation results in increased healthcare costs.

METHODS: Patients were identified using the trauma registry data at Saint Louis University (SLU) from January 2012 to August 2018. The registry was queried for CPT code 22305 (closed treatment of vertebral process fracture). Chart and imaging review was performed to determine if any additional spine fractures were identified by the spine team which were not included in the initial radiology report. TPF associated with other spinal injuries were characterized by the presence of one or more thoracic and/or lumbar TPF in addition to any other acute fracture or dislocation in the cervical, thoracic, or lumbar spine. A separate cost analysis with institution-specific charges was also performed.

RESULTS: Six-hundred-eighty-two patients with TPF from January 2012 to August 2018 were identified. Two-hundred-twenty-eight patients met the criteria to be included in this study. Of these, four-hundred-seventy-seven lumbar TPFs and one-hundred-three thoracic TPFs were identified. Additional spinal pathology that was not included in the initial radiology report was identified in 5 (2.19%) patients, none of which required surgical intervention. These included two nondisplaced facet fractures (T6 and L3) that were treated nonsurgically, a nondisplaced C7 laminar fracture treated with a rigid cervical orthosis, and a T3/4 widening which was suggestive of possible posterior ligamentous injury on a subsequent MRI exam which was treated with bracing. Cost analysis demonstrated additional costs associated with spine service intervention totaled \$3,366,048.28. Average cost per patient in our cohort summed to \$14,763.37.

DISCUSSION AND CONCLUSION: These data support that isolated TPF of the thoracic and lumbar spine are stable injuries that likely do not require spine service intervention and in fact may represent unnecessary financial burden. Foregoing unnecessary consultation can alleviate time constraints within spine service practices and reduce healthcare costs by eliminating costly extraneous interventions from the patient's care.

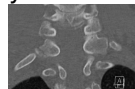
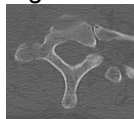


Table 1: Demographic Data	Table 2: Distribution of Spine Fractures
Age (Mean)	Thoracic (n=103)
Age (SD)	Lumbar (n=477)
Gender (Male/Female)	Thoracic (n=103)
Insurance Type	Lumbar (n=477)
Admission Type	Thoracic (n=103)
ICD-9-CM Code	Lumbar (n=477)
ICD-10-CM Code	Thoracic (n=103)
ICD-9-CM Procedure Code	Lumbar (n=477)
ICD-10-CM Procedure Code	Thoracic (n=103)
ICD-9-CM Discharge Code	Lumbar (n=477)
ICD-10-CM Discharge Code	Thoracic (n=103)
ICD-9-CM Death Code	Lumbar (n=477)
ICD-10-CM Death Code	Thoracic (n=103)

Demographic category	N (%)
Average age	46.3
Male	543 (85%)
Female	85 (13%)
Total TPF fractures	582
Thoracic TPF fractures	103 (18%)
Lumbar TPF fractures	479 (82%)
Average length of stay	5.28 days
Outcomes discharged	6
Follow-up visits	27

Fracture Type	Number	Percentage
Thoracic TPF	103	17.7%
Lumbar TPF	479	82.3%
Total TPF	582	100%

Total N: 582 patients
Average cost per patient: \$14,763.37