

Spinal Fracture Patterns in Patients with Ankylosing Spondylitis

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Purpose: Patients with ankylosing spondylitis are susceptible to fractures of the spinal column, even from minimal trauma. However, the literature describing patients with ankylosing spondylitis and spinal fractures consists largely of case reports and small case series. The purpose of this study is to characterize fractures of the ankylosed spine, including the patient population, locations of fracture, associated spinal cord injuries, and adverse events in a large, nationally representative sample.

Methods: All patients with a diagnosis of ankylosing spondylitis with a primary or secondary diagnosis of fracture of the spinal column admitted between 2005 and 2011 were identified in the Nationwide Inpatient Sample (NIS). Modified Charlson comorbidity index (CCI) was calculated for each patient. Patient demographics, fracture types, and complications were characterized with descriptive statistics.

Results: A total of 939 patients with ankylosing spondylitis admitted with a spinal fracture were identified in NIS. The average age was 68.4 ± 14.7 years and 798 (85%) of patients were male. Modified CCI scores of 0, 1, 2, 3, or 4 or more were distributed approximately evenly (20% each). Table 1 details the injury patterns in these patients. The distribution of fractures in each spine region followed a gradient from superior to inferior. Cervical fractures were the most common (53.0%), followed by thoracic (41.9%), lumbar (18.2%), and sacral (1.5%). Spinal cord injury was present in 21.1% of cases. The proportion of fractures involving spinal cord injury also followed a gradient from superior to inferior. Cervical fractures involved spinal cord injury in 25.3% of cases and 16.0% of thoracic fractures involved spinal cord injury, while no fractures in the lumbosacral spine were associated with spinal cord injury. Fractures involving more than one region of the spine occurred in 15.2% of patients. Adverse events occurred in 29.4% of patients. 6.6% of patients died during their admission. The most common adverse events were urinary tract infection (9.6%), intubation (8.5%), acute kidney injury (7.0%), and pneumonia (6.3%).

Conclusion: The distribution of spinal fractures in the ankylosed spine follows a gradient from cephalad to caudad, as does the association with spinal cord injury. In fact, more than one fifth of patients had spinal cord injury associated with their fracture, the majority of which were cervical. It is very important to note that more than 15% of patients had fractures in more than one region of the spine. These results emphasize the need to evaluate the entire spine in ankylosing spondylitis patients with possible spinal fracture. Further, morbidity is high in the ankylosing spondylitis population with spinal fracture, and mortality was 6.6% during their hospitalization. These results provide clinicians with a better understanding of the distribution, associated injuries, and the high morbidity and mortality of fractures in the ankylosed spine.

Table 1. Fracture types in ankylosing spondylitis patients.

Fracture Type	No.	%
Total	939	100%
Region		
Cervical	498	53.0%
Thoracic	393	41.9%
Lumbar	171	18.2%
Sacral	14	1.5%
With Spinal Cord Injury	198	21.1%
Cervical	137	14.6%
Thoracic	63	6.7%
Lumbar	0	0%
Sacral	0	0%
Multiregion Injuries	143	15.2%
Cervical and Thoracic	71	7.6%
Cervical and Lumbar	22	2.3%
Thoracic and Lumbar	50	5.3%
Cervical, Thoracic and Lumbar	10	1.1%

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.