Surgical Management of Traumatic Fractures of the Upper Thoracic Spine (T1-T6)
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Introduction:
Management of traumatic upper thoracic spine fractures (T1-T6) is complex due to the unique biomechanical characteristics and the nature of the injuries, which are commonly associated with multiple other traumatic injuries. Fractures in this region of the spine are often associated with severe spinal cord injury. We describe the safety and efficacy of surgical treatment for achieving stability of, and in maintaining reduction of, upper thoracic spine fractures.

Methods:
This study was an analysis of a prospectively collected series of traumatic unstable upper thoracic (T1-T6) spine fractures treated at one facility from 1993-2016. Preoperative evaluation included neurological exam and radiographic analysis. Indications for surgery were spinal instability and neurological deficit. Clinical and radiographic outcomes included neurological status, fusion rates, both hospital and ICU lengths of stay, kyphotic deformity, complication rates, and successful fixation of the fracture.

Results:
43 patients (29 male, 14 female) were included in the study. Mean age was 37.7 years (range 14-83 years). From 1993-1999, eight patients were treated with hook and rod constructs, and from 1995-2016, 35 patients were treated with pedicle fixation. Fluoroscopy or CT navigation was used in each case to assess pedicle screw placement and sagittal alignment. There were 178 total levels fixed, and no intraoperative vascular or neurologic complications. Hardware was removed post-fusion in five patients due to pain, wound infection, or hardware failure. Mean hospital length of stay was 21.1 days (range 4-59 days). Fusion rate was 95%.

Conclusion:
Surgical treatment of upper thoracic spine fractures, although complex, is safe and effective. Reduction and fixation of these fractures results in reduced risk of further neurological complications and allows for earlier mobilization, which correlates with shorter hospital lengths of stay and improved patient outcomes.

Figure 1: Imaging of a 19 year-old male with a Thoracic 5 flexion-compression fracture after a motorcycle collision.
A: initial imaging
B: 6 months postoperatively
C: 18 months postoperatively