Changes in Incidence, Etiology, Concurrent Injuries and Complications Among 488,262 Traumatic Cervical Fractures from 2005-2013

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Introduction

- Recent local and national efforts towards improving public health have facilitated an increased awareness towards traumatic injury prevention\textsuperscript{1,2}
- Traumatic fractures of the Cervical Spine are rare, but often result in significant morbidity and mortality.
- Spinal cord injury (SCI) is also a threat with cervical fracture. Patients with SCIs are reported to have increased length of stay, charges, and adverse outcomes in comparison to fractures without SCIs.\textsuperscript{3}

**Objective:** To describe the annual incidence of the diagnosis of cervical fracture, quantify etiology, and describe resulting cord and concurrent injuries.
Materials & Methods


• Inclusion Criteria:
  – Patients diagnosed with a traumatic injury (ICD-9-CM External Source of Injury (E-Code))
  – Patients diagnosed with fracture of any cervical vertebra (ICD-9-CM Codes)

• Statistical Analysis
  – National estimates for the annual incidence of traumatic cervical fracture were determined using hospital- and year-adjusted trend weights.
    • The frequency of cervical fractures was divided by the overall number of trauma cases occurring that year.\(^5\)
  – Cause of injury (Falls, Motor Vehicle, Assault, etc) were isolated using respective E-Codes, and quantified utilizing descriptive analyses.
  – Chi-Square analysis determined significant yearly variation of categorical variables.
  – Student T-Tests and One way ANOVA determined significant yearly variation for continuous variables.
Results: Yearly Cervical Fracture Cases from 2005-2013

- 463,631 patients (average age: 58.1, 60% male) traumatic cervical fracture in the NIS from 2005-2013. Incidence increased from 4.4% (2005) to 5.8% (2013), P<0.001
Results: Trends in Etiology

• There was an observed steady decline in MVAs (Motor Vehicle Accident - Car Crash) victims from 34% in 2005 to 25.5% in 2013, p<0.001.

• There was an observed increase in “Falls” victims from 19% in 2005 to 27% in 2013, P<0.001

• There was an observed increase in “Struck Pedestrian” victims from 13.5% in 2005 to 18% in 2013, P<0.001
Results: Fracture Levels and Spinal Cord Injury

- Closed fracture at the C2 (32.0%) and C7 (20.9%) levels were most common.
- Incidence was 4.99% in the upper cervical spine (levels 1-4) for cervical fractures.
- Incidence was 6.83% in the lower cervical spine (levels 5-7) for cervical fractures.
Results: Concurrent Injuries

- Overall concurrent injury rates have increased from 62.3% in 2005 to 67.6% in 2013, P<0.001

- The most common were:
  - 19.91% fracture or rib, sternum, larynx, or trachea
  - 8.89% skull
  - 5.38% fracture of radius or ulna
Discussion

• Current and future trends of traumatic cervical spine fractures, may indicate improving medical services and management strategies.

• Trends should continue to be monitored in order to elucidate a complete understanding of traumatic cervical fracture, improve management strategies, and guide future research.
Summary Points

• Incidence of cervical fracture and concurrent injury rates have all significantly increased from 2005 to 2013.

• MVAs have decreased, while falls and pedestrian accidents have increased from 2005 to 2013.

• Spinal Cord Injuries were prevalent in the lower cervical spine, and have significantly decreased from 2005 to 2013.