



Epidemiology and predictors of traumatic spine injury in severely injured patients: implications for emergency procedures

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Abstract

Purpose This study aimed to identify the prevalence and predictors of spinal injuries that are suitable for immobilization. **Methods** Retrospective cohort study drawing from the multi-center database of the TraumaRegister DGU[®], spinal injury patients ≥ 16 years of age who scored ≥ 3 on the Abbreviated Injury Scale (AIS) between 2009 and 2016 were enrolled. **Results** The mean age of the 145,833 patients enrolled was 52.7 ± 21.1 years. The hospital mortality rate was 13.9%, and the mean injury severity score (ISS) was 21.8 ± 11.8 . Seventy percent of patients had no spine injury, 25.9% scored 2–3 on the AIS, and 4.1% scored 4–6 on the AIS. Among patients with isolated traumatic brain injury (TBI), 26.8% had spinal injuries with an AIS score of 4–6. Among patients with multi-system trauma and TBI, 44.7% had spinal injuries that scored 4–6 on the AIS. Regression analysis predicted a serious spine injury (SI; AIS 3–6) with a prevalence of 10.6% and cervical spine injury (CSI; AIS 3–6) with a prevalence of 5.1%. Blunt trauma was a predictor for SI and CSI (OR 4.066 and OR 3.640, respectively; both $p < 0.001$) and fall > 3 m for SI (OR 2.243; $p < 0.001$) but not CSI (OR 0.636; $p < 0.001$). Pre-hospital shock was predictive for SI and CSI (OR 1.87 and OR 2.342, respectively; both $p < 0.001$), and diminished or absent motor response was also predictive for SI (OR 3.171) and CSI (OR 7.462; both $p < 0.001$). Patients over 65 years of age were more frequently affected by CSI. **Conclusions** In addition to the clinical symptoms of pain, we identify ‘4S’ [spill (fall) > 3 m, seniority (age > 65 years), seriously injured, skull/traumatic brain injury] as an indication for increased attention for CSIs or indication for spinal motion restriction.

Keywords Immobilization · Prehospital · Risk · Trauma

Abbreviations

AIS Abbreviated Injury Scale
CSI Cervical spine injury
ECS Eppendorf–Cologne Scale
ISS Injury severity score

SCI Spinal cord injuries
TBI Traumatic brain injury

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