Thoracic trauma severity contributes to differences in intensive care therapy and mortality of severely injured patients: analysis based on the TraumaRegister DGU®

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Abstract

Background: Thoracic trauma is a relevant source of comorbidity throughout multiply-injured patient care. We aim to determine a measurable influence of chest trauma's severity on early resuscitation, intensive care therapy, and mortality in severely injured patients.

Methods: Patients documented between 2002 and 2012 in the TraumaRegister DGU®, aged ≥ 16 years, injury severity score (ISS) ≥ 16 are analyzed. Isolated brain injury and severe head injury led to exclusion. Subgroups are formed using the Abbreviated Injury Scale® Thorax.

Results: Twenty-two thousand five hundred sixty-five patients were predominantly male (74%) with mean age of 45.7 years (SD 19.3), blunt trauma (95%), mean ISS 25.6 (SD 9.6). Overall mean intubation period was 5.6 days (SD 10.7). Surviving patients were discharged from the ICU after a mean of about 5 days following extubation. Thoracic trauma severity (AISThorax ≥ 4) and fractures to the thoracic cage significantly prolonged the ventilation period. Additionally, fractures extended the ICU stay significantly. Suffering from more than one thoracic injury was associated with a mean of 1–2 days longer intubation period and longer ICU stay. Highest rates of sepsis, respiratory, and multiple organ failure occurred in patients with critical compared to lesser thoracic trauma severity.

Conclusion: Thoracic trauma severity in multiply-injured patients has a measurable impact on rates of respiratory and multiple organ failure, sepsis, mortality, time of mechanical ventilation, and ICU stay.

Keywords: Severely injured, Polytrauma, Thoracic trauma, Chest injury, Organ failure, Mortality

Background

Chest trauma ranks as the most important injury in severely injured patients, and about 50% of those with multiple trauma suffer from an associated chest injury [1, 2]. Injury to the thorax may affect the thoracic wall (e.g., rib, sternum fracture) as well as thoracic organs (e.g., lung, heart, vessels) to a different extent. Only a minority of patients with thoracic trauma tends to develop respiratory failure requiring intubation and ventilator support to correct hypoxia and hypercapnia [3]. On the other hand, 35 to 58% of severely injured patients require prehospital intubation, depending on the severity of concomitant chest injury [4, 5]. While severely injured patients usually require intensive care therapy irrespective of accompanying thoracic injuries, organ dysfunction and multiple organ failure (MOF) are known to develop more often in patients with severe thoracic trauma [6]. In severely injured patients, including