

## **Flail Chest Injuries: A Review of Outcomes and Treatment Practices from the National Trauma Databank**

**Background:** Flail chest injuries are associated with severe pulmonary restriction, the requirement for intubation and mechanical ventilation, and high rates of morbidity and mortality. Our goals were to investigate the prevalence, current treatment practices, and outcomes of flail chest injuries in poly trauma patients.

**Methods:** The National Trauma Databank was used for a retrospective analysis of the injury patterns, management, and clinical outcomes associated with flail chest injuries. Patients with a flail chest injury admitted from 2007-2009 were included for analysis. Outcomes included number of days on mechanical ventilation; days in ICU; days in hospital, and rates of pneumonia, sepsis, tracheostomy, chest tube placement, and death.

**Results:** Flail chest injury was identified in 3,467 patients across 199 trauma centres in the US and Canada. The mean age was 52.5 years, and 77% of patients were male. Significant head injury was present in 15%, while 54% had lung contusions. Treatment practices included epidural catheters in 8%, and surgical fixation of the chest wall in 0.7% of patients. Mechanical ventilation was required in 59%, for a mean of 12.1 days. ICU admission was required in 82%, for a mean of 11.7 days. Chest tubes were utilized in 44%, and 21% required a tracheostomy. Complications included pneumonia: 21%, ARDS: 14%, sepsis: 7%, and death in 16%. Patients with concurrent severe head injury had higher rates of ventilatory support and ICU stay, and had worse outcomes in every category compared to those without a head injury.

**Conclusion:** Patients who have sustained a flail chest have significant morbidity and mortality. Over 99% of these patients were treated non-operatively, and only a small proportion (8%) received aggressive pain management with epidural catheters. Given the high rates of morbidity and mortality in patients with a flail chest injury, alternate methods of treatment including more consistent use of epidural catheters for pain or surgical fixation need to be investigated with large randomized controlled trials.