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**Title: Pain management in trauma associated with rib fractures**

**Background**

Rib fractures are associated with increased mortality and morbidity. The development of pneumonia has a huge impact on mortality, especially in the elderly.1 The key goal of management is to prevent respiratory complications through adequate analgesia and pulmonary volume expansion. In our level 1 trauma centre, patients are triaged for appropriate treatment based on Rib fracture scores (RFS) which is a recognised scoring system based on severity of fractures adjusted for age.2 The utility of RFS is however unclear.

**Aims and Objectives**

The purpose of this review was to describe the patient profile, outcomes in terms of respiratory morbidity and 30 day mortality and the utility of the scoring system.

**Methods**

A review of prospectively collected data from November 2015 to November 2016 was undertaken including treatment methods, RFS, fracture profile, comorbidities and respiratory. The Trauma Audit and Research Network (TARN) database was interrogated to determine 30 day mortality and predicted survival. ROC c-statistic was used to determine utility of RFS in predicting outcomes.

**Main Results**

Data was available for 137 patient admitted with trauma associated with rib fractures in the audit period. 19.5% of patients had ≥6 rib fractures, all of whom had flail segments, indicating the severity of trauma. 9.5% had bilateral rib fractures.

Although RTA was the predominant mechanism of injury overall (64%), older patients (age>65) were more likely to be injured following a fall (77% vs 53%). This is in keeping with the changing demographics of trauma.**2**

78% of patients were assessed by the pain team within 24 hours. 18% received epidural analgesia, 63% PCA, 26% NSAID, 96% paracetamol and 38% received gabapentin.

The mortality rate was 7.3%. Case note review of these patients suggested these deaths were not preventable. The mortality rate in a similar group of patients over the previous 5 years was 12.9%.

About 16% developed respiratory complications. Elderly patients developed respiratory complications in spite of lower RFS scores as compared to younger patients. Younger patients who developed respiratory complications had higher scores, possibly related to high impact injuries from RTA.

ROC curves for RFS scores showed poor discrimination for respiratory morbidity (sensitivity 55%, specificity 61.6%, fitted ROC Area 0.66). Elderly patients who developed respiratory complications often had pre-existing respiratory disease.

**Conclusions**

* Mortality from trauma associated with rib fractures has reduced significantly (12.9 to 7.3%) since November 2015, possibly due to improved multidisciplinary working.
* RFS alone does not predict outcomes or analgesia requirements but can assist in early identification of patients with significant trauma.
* Elderly patients have increased morbidity despite lower RFS, especially in presence of pre-existing respiratory disease. Aggressive pain management and early critical care involvement may improve outcomes.

**References**

1. Ho S, Teng Y, Yang S, et al Risk of pneumonia in patients with isolated minor rib fractures: a nationwide cohort study BMJ Open 2017;7:e013029
2. Easter A. Management of patients with multiple rib fractures. Am J Crit Care 2001; 10: 320–9