

The Operative Management of Flail Chest Injuries with Concomitant Sternal Fracture

Stefan Schulz-Drost^{1,2}, Sebastian Krinner¹, Andreas Langenbach¹, David Mersch², Sina Grupp¹, Friedrich. F. Hennig¹, Axel Ekkernkamp², Andreas Mauere³

¹University Hospital Erlangen, Department of Trauma and Orthopedic Surgery, Erlangen, Germany

²Department of Trauma and Orthopedic Surgery, BG Hospital Unfallkrankenhaus Berlin gGmbH, Berlin, Germany

³Department of Orthopedic and Trauma Surgery, St. Theresien Krankenhaus, Nürnberg, Germany

Abstract

Background: Flail Chest Injuries (FCI) are one of the most severe thoracic injuries. Moreover, an additional sternal fracture (SF) even worsens the outcome, such as the duration of mechanical ventilation, therefore an surgical fixation of the fractures could be considered in certain cases to improve the weaning from the ventilator. This paper aims to emphasize on the management of different types of SF in FCI.

Methods: All surgically treated cases (2012-2016) that showed the combination of FCI and SF have been evaluated for their clinical details, the morphology of the fractures and the technical aspects of the surgical procedure in a retrospective investigation.

Results: All of the SF (n=15) had been fixed by locked plate osteosynthesis through a median approach in a supine position. Three main regions of the sternum showed the need for different fixation strategies: the upper manubrium, central and lower corpus sterni. Concomitant rib fractures were addressed either through the same approach or through additional limited incisions.

Conclusions: Combinations of SF and FCI are high risk injuries with high demand on surgical skills. They can be properly fixed with a locking plate osteosynthesis through a combination of limited incisions employing different types of plates depending on the type of SF.

Key words: Flail Chest, sternum fracture, sternal fracture, ribfracture, locking plate osteosynthesis, Matrix Rib