Rib Fracture Fixation in a Major Trauma Center:
Outcomes Following Fixation with the MatrixRIB Contoured Plate System

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Purpose: Thoracic injury accounts for 25% of all trauma deaths, with rib fractures being the most common thoracic injury. There is growing evidence in support of managing these injuries operatively to achieve anatomical correction and fixation of the chest wall, but there are few reports of the outcomes in patients managed using the MatrixRIB system. We aimed to assess the survival and clinical outcomes following surgical rib fixation using the MatrixRIB system.

Methods: We conducted a retrospective analysis of prospectively collected national audit data and patient records from our institution, a major trauma center. Consecutive patients who had undergone surgical rib fixation using the MatrixRIB system over a 3-year period (September 2012-August 2015) were identified and verified using hospital information systems and imaging software to review pre- and postoperative chest imaging. These were matched to patients who had sustained similar injuries, and were managed nonoperatively. Matching was performed on the basis of Abbreviated Injury Scale (AIS) for Chest, ISS, gender, age, and date of admission. Injuries were verified to include rib fractures using hospital information systems. The primary outcome measure was 30-day mortality. Secondary outcomes collected during latest follow-up included quality of life (EuroQol 5 Dimensions 5 Levels [EQ-5D-5L]), pain (visual analog scale [VAS]), functional capacity (UCLA Activity Score), return to work, and satisfaction.

Results: 56 patients had undergone rib fixation at our institution during the time period. These were matched to 89 patients managed nonoperatively. There was a significant difference in 30-day mortality in the fixed patients (1/56) compared to the nonfixed patients (11/89) ($P = 0.0253$). Questionnaire data were available for 33 patients in the fixed group, with a mean follow-up time of 16.7 months (range, 3-39 months). The EQ-5D-5L responses for quality of life showed that 69.7% of patients had "none/slight" difficulties with mobility, and no patients reported extreme pain or being unable to mobilize. In terms of ability to self-care, 84.85% reported none/slight difficulties and only one patient (3.03%) reported being unable to self-care. In terms of pain experienced, 69.70% of patients reported none/slight pain or discomfort on EQ-5D-5L. On the VAS, 45.16% of patients reported no/mild pain (VAS pain score of 0-3), while only 16.13% of patients reported severe pain (VAS score of 7-10).

Conclusion: Mortality was significantly lower in patients who underwent rib fixation sur-

gery using the MatrixRIB system. Quality of life was sustained and most patients were free from major discomfort at the time of follow-up, indicating acceptable outcomes for patients following this procedure.

See pages 49 - 106 for financial disclosure information.