

General Health Outcomes for Operative Versus Nonoperative Treatment of Acute, Unstable Chest Wall Injuries: Results from a Previous Randomized Controlled Trial

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Purpose: The purpose of this study was to analyze general health outcomes in patients who were randomized to surgical fixation or nonoperative management for acute, unstable chest wall injuries.

Methods: The Short Form 36 (SF-36) scores from a previous randomized controlled trial were analyzed. Patients who had sustained a flail chest injury (defined as 3 or more consecutive, segmental, displaced rib fractures) or a severe deformity of the chest wall were randomized to either (1) open reduction and plate fixation or (2) nonoperative management. The SF-36 questionnaire was completed at 1 week, 2 weeks, 6 weeks, 3 months, 6 months, and 12 months. The Physical Component Summary (PCS) and Mental Component Summary (MCS) were both calculated from the SF-36 questionnaire. A linear mixed model analyzed the scores over time between the 2 groups. A multiple linear regression analysis was performed to determine if any baseline or injury factors were predictive of SF-36 scores at 1 year. The variables included in the regression analysis were treatment, age, sex, smoking status, ISS, Glasgow Coma Scale (GCS), if a tracheostomy was performed, if a chest tube was inserted, days in the ICU, intubation status at time of randomization, total number of broken ribs, and presence of a hemothorax, pulmonary contusion, or head injury.

Results: 207 patients were randomized: 99 patients to nonoperative management and 108 to operative intervention. Patients were similar between the 2 groups with regard to baseline and injury characteristics. At the 12-month follow-up, 6 patients were deceased (all 6 patients had been randomized to the nonoperative group). Analysis of the PCS scores demonstrated there was no difference between the operatively and nonoperatively treated groups at any time point ($P = 0.25$). At 12 months, the mean PCS score was 42.1 in the operative group and 41.3 in the nonoperative group. Similarly, there were no differences between the 2 groups with regard to the MCS scores at any time point ($P = 0.98$). At 12 months, the mean MCS score was 46.3 in the operative group and 46.8 in the nonoperative group. Results of the regression analysis demonstrated that patients who smoked ($P = 0.008$), patients who sustained a hemothorax ($P = 0.041$), and patients who spent longer in the ICU ($P = 0.002$) had worse PCS scores at 1 year. Smoking was the only significant predictor of worse MCS scores at 1 year ($P = 0.0001$).

Conclusion: The results of this study demonstrated that there was no difference in general health outcomes at 1 year for patients treated operatively or nonoperatively for acute, unstable chest wall injuries. The treating surgeons should use their discretion to choose the treatment option they feel will best optimize their patient's outcome following this injury.