

Effect of Clavicle Osteosynthesis on Pulmonary Outcomes in Polytraumatized Patients With Concomitant Clavicle and Rib Fractures

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Purpose: In the polytraumatized population with chest wall trauma, clavicle and rib fractures are commonly sustained concomitantly. The intimate structural relationship of these injuries is still not well understood as it relates to their individual and combined effect on pulmonary function. To address this gap of knowledge, this study aimed to investigate if isolated osteosynthesis of the clavicle influences pulmonary function as the treatment for these concomitant injuries.

Methods: This was a retrospective cohort analysis of patients sustaining concomitant clavicle and rib fractures at a single Level I trauma center. Operative and nonoperative clavicle treatment groups were compared as a function of ISS: (1) mild (ISS<9), (2) moderate (ISS = 9-15), (3) severe (ISS = 16-25), and (4) profound (ISS>25). Primary outcome measures were ICU length of stay (LOS), total days on room air, pulmonary complications, and hospital LOS. Groups were compared on the primary outcome variables while controlling for subjects' sex, race, age, body mass index, and comorbidities using generalized negative binomial models.

Results: Total of 186 patients were included—33 in the operative clavicle group and 153 in the nonoperative clavicle treatment group. When controlling covariates, no differences between operative and nonoperative groups were found. However, when the 2 groups were compared as a function of ISS stratification while controlling for covariates, patients in the profound ISS group who underwent clavicle osteosynthesis had significantly shorter ICU and hospital LOS ($P<0.05$). Moderate and severely injured patients in the operative group had significantly more days on room air during their admission compared to the respective nonoperative groups ($P<0.05$). No significant differences were found in incidence of pulmonary complications between the 2 groups except atelectasis, which was more common in the operative group ($P<0.05$).

Conclusion: Consistent with the limited literature available, there were no significant differences between the operative and nonoperative clavicle groups overall. However, after stratifying for injury severity, clavicle fixation may improve the respiratory function and overall outcome of higher acuity polytraumatized patients with an $ISS\geq 9$ sustaining concomitant clavicle and rib fractures.