Mechanism of Injury Impacts the Incidence and Time to Recovery of Nerve Injuries Associated with Humeral Shaft Fractures

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INTRODUCTION:
Within this study we sought to 1) determine the incidence of pre- and post-operative nerve injuries associated with humeral shaft fractures, 2) evaluate the status of nerve injury based on injury mechanism, and 3) to identify risk factors of pre-operative nerve injury.
METHODS:
The study retrospectively reviewed 308 humeral shaft fractures (OTA/AO 12) that underwent operative treatment at a single, urban level 1 trauma center from 2009-2020. Information regarding demographics, injury, treatment, and medical history were collected. The presence of nerve injury was identified by motor or sensory deficits documented within the physical exam. The patients were grouped based on mechanism of injury including gunshot wound (GSW), high energy mechanism, and low energy mechanism.
RESULTS:
Within the 308 patients, 54 pre-operative and 14 post-operative nerve injuries were identified. Of the 24 GSWs, there were 8(33%) pre-operative and 1(4%) post-operative nerve injuries. Of the 73 high energy injuries, there were 20(29%) pre-operative and 0 post-operative nerve injuries. Of the low energy injuries, there were 26(13%) pre-operative and 13(7%) post-operative nerve injuries. Pre-operative nerve injuries from GSWs and high energy mechanisms trended towards requiring more time for nerve recovery (6.8 vs. 5.2 vs. 4.0 months). Regression analysis showed that GSW (OR=4.79, p=0.003, CI=1.79-13.53,) high energy mechanisms (OR=2.34, p=0.026, CI=1.11–4.95), alcohol abuse (OR=2.28, p=0.096, CI= 0.86–6.04), and BMI (OR=1.03, p=0.123, CI=0.99–1.07), were associated with pre-operative nerve injury. There was no difference in nerve recovery following pre-operative injury with nerve exploration (p=0.27).
DISCUSSION AND CONCLUSION:
GSWs and high energy injury mechanisms have a higher incidence of nerve injury associated with humeral shaft fractures and may require more time to recover. There was no correlation between early nerve exploration and nerve recovery rate.