Ballistic Injuries of the Humerus: A Matched Cohort Analysis

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Purpose: Ballistic fractures of the humerus secondary to gunshot wounds are increasingly common injuries that pose challenges for orthopaedic surgeons. The primary purpose of this study was to examine the rates of neurovascular injury, compartment syndrome, and infection of ballistic humerus fractures relative to blunt, non-penetrating fractures.

Methods: A consecutive cohort of 135 patients with ballistic humerus fractures and 167 patients with blunt humerus fractures treated at a Level I trauma center were identified. Review of patient medical records and radiographic studies was performed to obtain demographic information, injury mechanism, fracture location, choice of treatment, and complications. Statistical analysis was performed using independent sample t-test, chi-squared tests, and odds ratios (ORs) ($P<0.05$ significance).

Results: Compared with blunt fractures, patients in the ballistic fracture cohort were younger, male, African American, tested positive for illicit drug use, and sustained proximal fractures. Ballistic fractures had significantly lower ISS and NISS (New Injury Severity Severity) scores. Ballistic fractures were 3 times as likely to present with neurovascular injury than blunt fractures (OR: 2.927, $P<0.001$). The overall rate of spontaneous recovery of significant motor function for ballistic fractures with neurologic injury was 55%. There were no statistically significant differences in rates of vascular injury, compartment syndrome, infection, nonunion, or the need for soft-tissue reconstruction.

Conclusion: Compared with blunt humeral fractures, ballistic fractures appear to have a significantly higher rate of neurologic injury but no increased risk for compartment syndrome or infection. Surgical treatment of ballistic humeral injuries was not associated with increased neurological recovery compared to nonoperatively managed fractures.