Variability in Treatment of Upper Extremity Peripheral Nerve Injuries Across 17 US Trauma Centers

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Purpose: Peripheral nerve injuries result in devastating loss of sensory and motor function. Surgical intervention and early treatment can significantly improve outcomes. However, evidence-based treatment guidelines are lacking and studies characterizing treatment, which varies by injury type and mechanism, are limited. The purpose of this study was to characterize variability in treatment of nerve injury resulting from upper extremity trauma. We hypothesized that time from injury and mechanism would be associated with treatment type.

Methods: Patients aged 18-64 years with axillary, radial, median, ulnar, or musculocutaneous nerve injuries treated within 6 months of injury were enrolled across 17 US trauma centers. Treatment was prospectively recorded and included repair, reconstruction, use of wrap/tubes on primary repairs, use of tubes to span gaps, allograft, autograft, and replant and vascular repair procedures. Student t-tests and chi-squared tests were used to compare injury characteristics by treatment type.

Results: The study included 242 patients (75% male, average age: 34 years). There were a total of 292 injured nerves. Most were ulnar (n = 124, 42%) or median (n = 101, 35%). Over half of all nerves were completely severed (n = 182, 62%), and the average time between injury and treatment was 15 days. Nerve injuries undergoing reconstruction had a longer duration between injury and treatment compared with injuries that were primarily repaired (22 days vs 3 days, P<0.001). A higher proportion of injuries treated with primary repair were injured by sharp/laceration mechanism compared with injuries treated with reconstruction (92% vs 62%, P<0.001). Over half of primary repairs used a wrap/tube to supplement/protect the primary repair (53% of sharp/laceration, 67% of gunshot, and 50% of avulsion/blast/stretch or crush injuries). Use of a wrap/tube was similar among reconstructed injuries. Among nerves that were operatively reconstructed, allograft was used in 69% of median, 85% of radial, and 77% of ulnar injuries.

Conclusion: This is the first large, prospective multicenter study of major peripheral nerve injury. Results supported our hypothesis that treatment type was associated with time of nerve treatment as well as injury type. However, there were several unexpected findings including the high frequency use of a nerve tube/nerve wrap to supplement or protect primary repairs, and higher rate of allograft compared with autograft-based reconstruction.