

Incidence of Nerve Transection in Upper Extremity Gunshot Wounds

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BACKGROUND

Reported rates of nerve injury after upper extremity gunshot wounds (GSWs) are 15-45%.

Many surgeons prefer initial observation; however, this may delay diagnosis of neurotmesis and surgical treatment

Aim: to determine the incidence of nerve transection in adults after upper extremity GSW.

METHODS

Patients

- Design: Retrospective Cohort Study
- Population: Adult patients who underwent surgical exploration for a neurologic deficit after upper extremity GSW
 - Inclusion criteria: (1) Age >18 at the time of injury; (2) MOI: gunshot; (3) Neurologic deficit on presentation; (4) Surgical exploration of nerve
 - Exclusion criteria: (1) proximal ipsilateral injury; (2) pre-existing neurovascular deficit; (3) inadequate documentation or imaging
- Site: Einstein Medical Center, Philadelphia, PA
- Time frame: 2014 - 2019

Variables

- **Predictor Variables:** age, sex, ethnicity, BMI, smoking status, pre-operative neurovascular exam, fractures, compartment syndrome, surgical indication, surgical procedure, nerve conduit, vascular repair, fracture fixation, wound coverage, tendon transfers, and removal of foreign bodies
- **Outcome Variables:**
 - **Primary:** incidence of nerve lacerations **Secondary:** post-operative complications and rate of reoperation

Statistics

- Primary: chi-squared goodness of fit
- Predictors of nerve laceration: univariate logistic regression

RESULTS

Figure 1. Patient characteristics

Characteristic	N = 17
Age - yr (range)	33.6 (20-57)
Male - no.	17
RHD* - no.	17
BMI - avg (range)	25.4 (20-32.5)
Active tobacco use	6

*RHD = right hand dominant

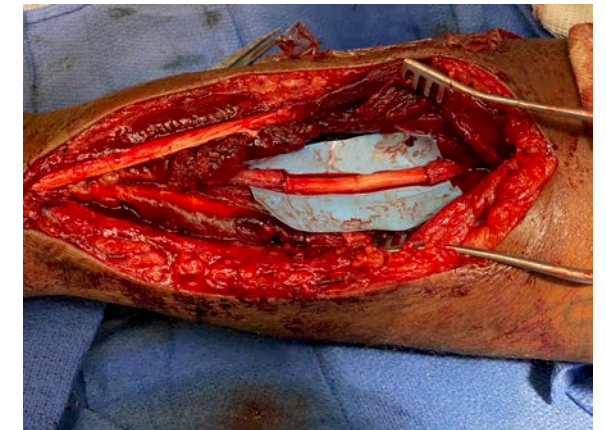
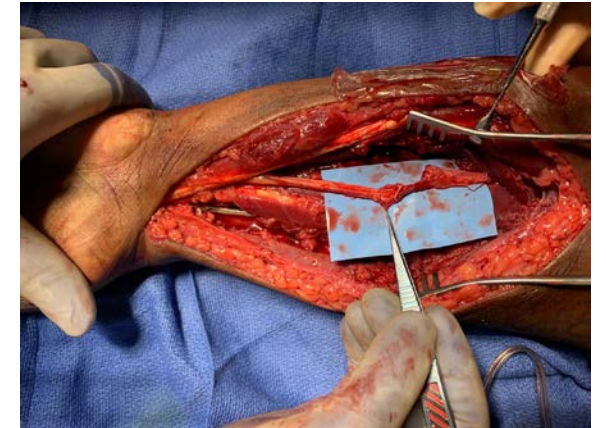
Figure 2. Injury characteristics

Characteristic	N = 17
Location of gunshot wound	
Arm	3
Forearm	5
Hand	6
Finger	3
Fractured bone	
None	4
Humerus	3
Ulna and/or Radius	4
Carpal bone and/or metacarpal	2
Phalanx	4
Nerve injuries	14
transection	11
partial transection	1
contusion	2

Figure 3. Univariate logistic regression for nerve laceration

Characteristic	Nerve Laceration		
	OR	95% CI	p
Location of gunshot wound			
Arm	Ref		
Forearm	2	0.08 - 51.6	0.68
Hand	1	0.05 - 18.9	1
Finger	1	0.03 - 29.8	1
Fractured bone			
None	Ref		
Humerus	0.67	0.02 - 18.1	0.81
Ulna and/or Radius	1	0.04 - 24.5	1
Carpal bone and/or metacarpal*	1		
Phalanx	0.33	0.02 - 6.7	0.47

*Insufficient data to include 95% CI and p value.



DISCUSSION

Incidence of complete nerve transection was 64.7%. Predictors of nerve transection are GSW to the hand and associated fracture.

The true rate of nerve laceration from a gunshot to the upper extremity is likely under-reported in the urban hospital setting