

Socioeconomic Disparities in the Receipt of Brachial Plexus Surgery: A National Analysis

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Introduction

- Brachial plexus injuries have devastating effects on upper extremity function^{1,2}
- Earlier intervention has been associated with improved outcomes³
- Previous research has identified disparities in treatment of upper limb injuries⁴
- Objectives:
 - To ascertain whether there are disparities in the receipt of brachial plexus repair in the emergent vs. elective setting
 - To investigate how brachial plexus repair in the emergency setting influences discharge disposition

Methods

- Healthcare Cost and Utilization Project National Inpatient Sample Database (NIS), 2009-2014⁵
- Inclusion criteria: adults with a diagnosis of brachial plexus injury (ICD-9 code 9534)
- A multivariable binary logistic regression model was used to assess the impact of patient and hospital characteristics on the receipt of brachial plexus surgery and discharge disposition

Results

- Emergent brachial plexus injury, n = 6618
 - 153 (2.3%) had nerve repair surgery
- Factors affecting likelihood of supported discharge are described in Table 1
- Emergent repair was associated with an increased need for supported discharge
- Emergent vs. elective brachial plexus repair, n = 660
- Factors associated with elective repair:
 - White ethnicity
 - Male gender
 - Private insurance
- Factors associated with emergency repair:
 - African American ethnicity
 - Lowest income quartile

Figure 1. Schematic of the brachial plexus (Netter's Clinical Anatomy, 2nd ed.)

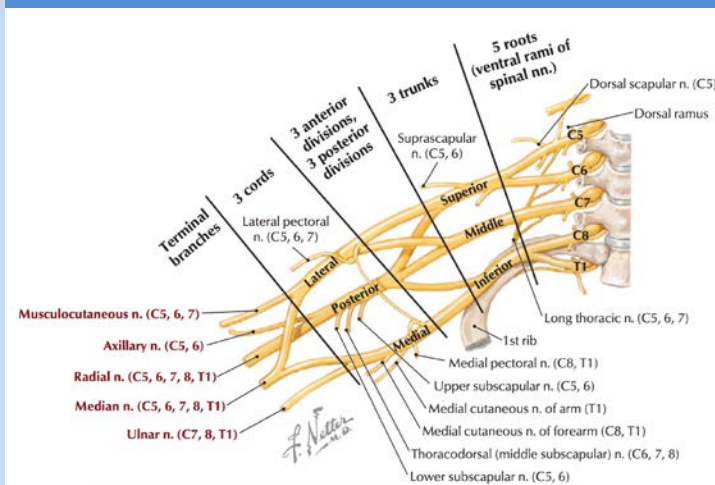


Table 1. Multivariable analysis of factors associated with supported discharge in emergent brachial plexus injury

Outcomes	Odds ratio (95% CI)	P value
Gender		
Male	(Ref.)	
Female	1.351 (1.189)	<0.001
Age		
18-34	(Ref.)	
35-54	1.143 (0.991-1.317)	0.066
55+	2.540 (2.127-3.032)	<0.001
Race		
White	(Ref.)	
African American	1.015 (0.864-1.191)	0.857
Hispanic	0.886 (0.726-1.080)	0.231
Other	0.766 (0.597-0.983)	0.036
Comorbidities		
Anemia	1.300 (1.082-1.563)	0.005
Chronic pulmonary disease	0.962 (0.792-1.168)	0.969
Depression	0.885 (0.709-1.104)	0.28
Diabetes	1.650 (1.355-2.008)	<0.001
Drug abuse	0.981 (0.799-1.205)	0.856
Hypertension	1.441 (1.240-1.675)	<0.001
Hypothyroidism	1.132 (0.889-1.442)	0.316
Obesity	1.614 (1.284-1.568)	<0.001
Paralysis	2.066 (1.634-2.613)	<0.001
Psychoses	2.066 (1.284-2.030)	<0.001
Hospital Bed Size		
Small	(Ref.)	
Medium	0.841 (0.649-1.089)	0.188
Large	0.676 (0.533-0.859)	0.001
Region		
Northeast	(Ref.)	
Midwest	1.101 (0.922-1.316)	0.289
South	0.956 (0.818-1.118)	0.573
West	0.909 (0.765-1.081)	0.282
Median Household Income		
1 (lowest)	(Ref.)	
2	1.035 (0.884-1.212)	0.668
3	1.171 (0.999-1.373)	0.052
4 (highest)	1.354 (1.137-1.613)	0.001
Payer		
Government	(Ref.)	
Private	0.933 (0.814-1.071)	0.325
Other	0.405 (0.343-0.479)	<0.001
Orthopedic injury	1.919 (1.691-2.177)	<0.001
Head injury	2.955 (2.504-3.487)	<0.001
Brachial plexus surgery	1.804 (1.225-2.657)	0.003

Conclusions

- Patients undergoing brachial plexus repair in the emergent setting are more likely to require supported discharge
- Patients undergoing emergent brachial plexus repair are more socioeconomically disadvantaged compared to those undergoing elective repair
- Further research evaluating injury severity and long-term outcomes may help to shed light on this topic

Acknowledgements

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References

1. Loudon E, Allgier A, Overton M, Welge J, Mehlman CT. The impact of pediatric brachial plexus injury on families. *J Hand Surg Am.* 2015;40(6):1190-1195. doi:10.1016/j.jhssa.2015.03.020.
2. Rasulić L, Savić A, Živković B, et al. Outcome after brachial plexus injury surgery and impact on quality of life. *Acta Neurochir (Wien).* 2017;159(7):1257-1264. doi:10.1007/s00701-017-3205-1.
3. Terzis JK, Vekris MD, Soucacos PN. Brachial plexus root avulsions. *World J Surg.* 2001;25(8):1049-1061.
4. Slover J, Gibson J, Tosteson T, Smith B, Koval K. Racial and economic disparity and the treatment of pediatric fractures. *J Pediatr Orthop.* 2005;25(6):717-721. doi:10.1097/01.bpo.0000184835.79345.0e.
5. Healthcare Cost and Utilization Project (HCUP). HCUP National Inpatient Sample (NIS). 2012.