

Patient Satisfaction and Self-Reported Outcomes After Complete Brachial Plexus Avulsion Injury

Lauren E. Franzblau, BS, Melissa J. Shauver, MPH, Kevin C. Chung, MD, MS

Purpose Reconstructive surgery for complete brachial plexus avulsion injuries only partially restores function, and many patients are dissatisfied with results that surgeons consider good. Preoperative expectations have been shown to influence postoperative satisfaction but are poorly understood in patients with complete brachial plexus avulsion injuries. Qualitative methodology can elucidate patient beliefs and attitudes, which are difficult to quantify. The purpose of this study was to examine patient-reported outcomes, including satisfaction, and to understand the patient perspective.

Methods We used qualitative interviews and questionnaires to assess patient-reported outcomes. Two members of the research team analyzed interview data using Grounded Theory methodology. Data from participants who had and did not have reconstructive surgery were compared.

Results Twelve patients participated in this study. Of the 7 participants who had reconstructive surgery, 4 felt their expectations had been met and 5 were satisfied with their outcomes. Reconstruction did not produce statistically significant improvements in upper extremity function, pain, or work ability. All patients reported dissatisfaction with upper extremity ability, and 9 expressed hope for innovative treatments (eg, stem cell therapy, nerve reinsertion) that could potentially provide better outcomes than existing procedures and enable return to work.

Conclusions Satisfaction with surgical outcomes after complete avulsion brachial plexus injury depends heavily on whether preoperative expectations are met, but patients are unfamiliar with nerve avulsion and do not always know what to expect. Low satisfaction with upper extremity ability and the lack of statistically significant differences produced by reconstruction suggest that current treatments may not be meeting patients' needs. Physicians must provide robust preoperative education to encourage realistic expectations and direct patients toward resources for pain management to facilitate comprehensive rehabilitation. (*J Hand Surg Am.* 2014;39(5):948–955. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)

Type of study/level of evidence Therapeutic III.

Key words Brachial plexus, qualitative, nerve avulsion, patient-reported outcomes.



From the Department of Surgery, Section of Plastic Surgery, University of Michigan Medical School, Ann Arbor, MI.

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Corresponding author: Kevin C. Chung, MD, MS, Section of Plastic Surgery, University of Michigan Health System, 2130 Taubman Center, SPC 5340, 1500 E. Medical Center Drive, Ann Arbor, MI 48109-5340; e-mail: kechung@med.umich.edu.

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COMPLETE AVULSION BRACHIAL plexus injuries (BPIs) are life-changing traumatic events that typically affect young men during their prime working years.^{1–6} They can be treated by applying nerve transfer (NT) or functioning free muscle transfer (FFMT) procedures. Both NT and FFMT can provide limited function and are most effective when undertaken within 3 to 6 months and 9 to 12 months after injury, respectively.⁷ Amputation is also available to patients who do not wish to pursue reconstruction, or for whom other routes have failed; it serves to relieve patients of the burden of a flail arm.⁸ Although surgical reconstruction has many merits, it cannot restore all lost functions, improve neuropathic pain, or, in many cases, facilitate return to work.^{1,9,10} Pain management and employment appear to be primary concerns of patients; yet, the surgical literature has almost exclusively evaluated outcomes using functional measures (eg, elbow flexion). Assessing isolated functional gains can misrepresent outcomes and their value to patients.¹¹ Results that are objectively good do not always satisfy patients, who may still experience chronic pain and be unable to work.^{1,3,10,11} It is necessary to identify and understand factors that are most important to patients, in order to assess outcomes in a meaningful way and improve rates of satisfaction.

Patient satisfaction is a complex yet important construct. Higher satisfaction is associated with greater compliance with and continuity of care.^{12,13} Many fixed (eg, patient age) and changeable (eg, preoperative expectations) factors affect whether patients are satisfied with surgical results.^{12,13} Previous work has shown that patient and physician perspectives are often disparate, and many severe BPI patients are dissatisfied with surgical outcomes.^{3,14} The factors that contribute to this dissatisfaction are poorly understood. Such complex experiential and emotional phenomena are difficult to assess using a purely quantitative approach.^{15–17} A questionnaire can evaluate the severity of known sequelae, such as upper extremity disability, but cannot reveal how patients feel about their surgical outcomes or identify more appropriate constructs to measure. Hence, qualitative techniques can be pertinent to explore areas deficient in prior research and provide insight into patient beliefs and experiences.^{15,16,18}

We present the results of a mixed-method cohort study using qualitative interviews and questionnaires to examine patients' overall experiences, self-reported outcomes, and factors influencing satisfaction. We also compared results of patients who did and did not undergo reconstructive surgery, to determine how

current treatments affect self-reported outcomes. This knowledge may enhance physicians' understanding of the patient perspective and enable more effective preoperative counseling.

MATERIALS AND METHODS

Between 2002 and 2012, 163 patients with BPIs were seen at 1 academic medical center. Patients were screened for the following inclusion criteria: at least 18 years of age, complete C5–T1 BPI, normal upper extremity function before injury, and a minimum of 1 year after surgery (or injury for patients not undergoing surgery). Exclusion criteria were confounding neuropathies, nerve palsies, and congenital abnormalities affecting the upper extremity. A total of 23 eligible patients were contacted by mail, of whom 12 chose to participate (52%). Four patients explicitly declined to participate owing to travel distance or lack of interest, 2 missed study appointments for health reasons, and 5 did not respond to the letter or our 5 attempts to reach them via phone. [Appendix A](#) (available on the *Journal's* Web site at <http://www.jhandsurg.org>) compares nonparticipant and participant characteristics. Participants received \$100 gift cards as compensation for their time. Our local institutional review board approved all aspects of this protocol.

Data collection

We chose to use a mixed-method (quantitative and qualitative) approach to gain a more complete understanding of patients' experiences and perspectives. In the absence of a standard patient-reported outcome assessment tool, we chose instruments validated in other patient populations that measure constructs relevant to complete avulsion BPI.⁶ All participants completed 3 questionnaires: the Michigan Hand Outcomes Questionnaire (MHQ), the Medical Outcomes Study 36-item Short Form (SF-36), and a modified satisfaction with appearance scale (shown in [Appendix B](#), available on the *Journal's* Web site at <http://www.jhandsurg.org>). The MHQ is a widely used instrument that has proven to be a valid, reliable, and responsive measure of functional, aesthetic, and pain-related outcomes in patients with acute and chronic diseases of the hand and wrist.^{19–21} Likewise, the SF-36 has been validated in patients with numerous health conditions; it assesses mental and physical health and also has normative data, which facilitate more accurate score interpretation.^{22,23} The satisfaction with appearance scale, which evaluates social-behavioral effects of non-weight-related body image, has been validated in patients with burn

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