SCIENTIFIC ARTICLE

The Psychological Impact of Adult Traumatic Brachial Plexus Injury

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Purpose There is a high incidence of posttraumatic stress disorder (PTSD), depression, suicide risk, and psychological distress after orthopedic trauma and hand and upper-extremity injury. Although patients with traumatic adult brachial plexus injury are particularly vulnerable to psychologic distress, minimal clinical data exist about this cohort of patients. In this study, we sought to discover the prevalence of depression, PTSD, suicidal ideation, and substance abuse.

Methods Between February, 2013 and July, 2014, during scheduled preoperative and/or postoperative appointments, the social worker at a metropolitan brachial plexus center conducted psychosocial assessments and questionnaire assessments of 21 patients evaluating for PTSD, depression, and substance use using 3 validated scales: PTSD Checklist-Specific, Patient Health Questionnaire-8, and National Institute on Drug Abuse Quick Screen.

Results Brachial plexus injury strongly affected self-reported psychological well-being; 7 of 21 (33.3%) divulged suicidal ideation. *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (DSM-V) diagnosis was supported by PTSD Checklist-Specific and Patient Health Questionnaire-8 results: 4 of 21 (19.0%) met criteria for PTSD and 4 of 21 (19.0%) exhibited clinical depression. Patients reported no changes in social alcohol and tobacco use or substance abuse.

Conclusions Brachial plexus injury significantly influences psychological well-being and daily functioning. As a result, patients experience a high prevalence of PTSD, depression, and suicidal ideation. Patients with brachial plexus injury have a high prevalence of psychological concerns and challenges that require continued attention throughout treatment. *(J Hand Surg Am. 2018;■(■):1.e1-e6. Copyright © 2018 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Prognostic IV.

Key words Brachial plexus, depression, psychology, PTSD.

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THE INCIDENCE OF POSTTRAUMATIC stress disorder (PTSD), depression, and psychological distress is high after orthopedic trauma.[1–5] Previous studies demonstrated that a third of hand-injured patients experience symptomatic PTSD, depression, and signs of mood disorder.[3–17] Similarly, upper-extremity nerve injuries adversely affect daily function, leading to decreased perceived quality of life.[2,4,6,18] Studies assessing quality of life,

functional outcome, and patient satisfaction after brachial plexus injury (BPI) surgery concluded that patients are adversely affected in terms of financial status, employment status, independence with activities of daily living, body image, functional outcomes, subjective well-being, and overall satisfaction despite improvements in motor outcomes.[2,6,7,19,20]

Although the psychological impact of upper-extremity peripheral nerve injury has been investigated, the psychosocial and psychological impact of traumatic BPI in adults has not been fully addressed.[12,13] Frazenblau and Chung[9] noted that complete avulsion traumatic BPI distorted the perception of body image, caused difficulties accepting and adapting to life with BPI, and was associated with a higher incidence of depression. However, the prevalence of PTSD and suicidal intent was not evaluated. Knowing that serious upper-extremity injuries increase risk for psychological distress,[2,3,9,21–23] and to improve on BPI multidisciplinary treatment,[24] we sought to discover the prevalence of depression, PTSD, suicidal ideation, and substance use in patients with BPI.

MATERIALS AND METHODS

Our institutional review board approved this retrospective case study. All patients with BPI were eligible for inclusion in this study; ultimately, 46 patients agreed to participate in the investigation. Between February, 2013 and July, 2014, the social worker at a metropolitan brachial plexus center conducted in-person psychosocial assessment interviews with 46 patients with BPI as a routine part of preoperative and postoperative care. Demographic data were drawn from our comprehensive, Health Insurance Portability and Accountability Act of 1996–compliant, brachial plexus patient registry (Table 1). Sex, ethnicity, time from injury, marital status, work status, place of residence, cause of injury, surgical/nonsurgical status, hand dominance, and rates of suicidal ideation were identified. After we obtained verbal consent, the social worker administered supplementary psychological diagnostic assessments in a final cohort of 21 patients that assessed for PTSD, depression, and substance use using the PTSD Checklist-Specific (PCL-S) questionnaire, Patient Health Questionnaire-8 (PHQ-8), and National Institute on Drug Abuse Quick Screen, respectively.

The PCL-S is a standard 17-item assessment for PTSD, based on the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (DSM-V) criteria, in which respondents rate how much a specific traumatic event has bothered them over the past month, from 1 (not at all) to 5 (extremely).[25–28] The PCL-S may be scored by an ascending total point score ranging from 17 to 85, or by a rubric based on diagnostic criteria. With the rubric, a response of 3 (moderately) or more signifies symptoms diagnostic for PTSD. To meet criteria for PTSD, the respondent must have experienced (in the past month): more than 1 symptom from the reexperiencing symptom cluster (items 1 to 5), 3 from the avoidance symptom cluster (items 6 to 12), and 2 from the hyperarousal symptom cluster (items 13 to 17).[25,26] Because there is controversy regarding the diagnostic threshold in the literature (from 37 to 50),[20,25,26] we used the DSM-V–based rubric to score the PCL-S and reported mean follow-up times and mean PCL-S scores between the preoperative and postoperative groups.

The PHQ-8 is an 8-item depression assessment for how often a specific symptom has bothered the respondent over the preceding 2 weeks; each item is rated from 0 (not at all) to 3 (nearly every day).[29–33] The total possible score is 0 to 24; scores correspond to the severity of depression: none (0 to 4), mild (5 to 9), moderate (10 to 14), moderately severe (15 to 19) or severe (20 to 24). A score of 10 or more suggests clinical depression.[32,33] Mean follow-up times and PHQ-8 scores between the preoperative and postoperative groups are reported.

The National Institute on Drug Abuse Quick Screen gathers information about the frequency of use of alcohol, tobacco products, prescription medication abuse, and illegal drugs. On a chart, respondents indicate substance use frequency (never, yearly, monthly, weekly, and daily). Follow-up questions elicit greater detail about substance type, history of use, and impact of use.[34,35] Patients were evaluated verbally for suicide risk, which includes an assessment of suicidal ideation, whether a suicide plan exists, and if so, the intent to follow through with the suicide plan. Suicidal ideation is defined as having thoughts or a preoccupation with suicide with no intent or plan to act upon those thoughts.

RESULTS

Of the 46 patients, 21 agreed to complete questionnaires. Results of the PCL-S (Fig. 1) and PHQ-8 (Fig. 2) supported clinical assessments and demonstrated the prevalence of diagnostic PTSD (4 of 21; 19.0%) and depression (4 of 21; 19.0%). The mean preoperative PCL-S and PHQ-8 score was 23.50 and