

Prevalence of Comorbid Psychiatric Conditions and Chronic Pain in Patients Seeking Peripheral Nerve Surgery

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Background: In peripheral nerve surgery, the presence of psychiatric diagnoses and medications may affect outcomes and perioperative neuropathic pain management. The purpose of this study was to determine the prevalence of psychiatric diagnoses and chronic pain in patients referred to a peripheral nerve surgery clinic.

Methods: This is a retrospective review of patients seen at a peripheral nerve clinic from July 1, 2017 to June 30, 2021. Medical records were reviewed for demographics; peripheral nerve diagnosis; psychiatric diagnoses; psychotropic prescriptions; use of nonneuroleptic/nonnarcotic, neuroleptic, and narcotic medications; and peripheral nerve surgical candidacy and outcome.

Results: Six hundred twenty-two patients were included in this study. The most common reasons for referral were 24.8% lower extremity neuroma, 23.2% lower extremity compressive neuropathy, and 14.0% upper extremity compressive neuropathy. Of the included patients, 37.1% had a psychiatric diagnosis, and 36.3% were taking a psychotropic medication. The percentage of patients taking chronic nonneuroleptic/nonnarcotic pain medications was 34.3%, with 42.8% taking neuroleptic, and 24.9% narcotic medications. Patients with a psychiatric diagnosis were more likely to be taking neuroleptic (48.9% versus 38.9%, $P < 0.001$) and narcotic pain medications (27.3% versus 17.4%, $P = 0.004$) and less likely to have a positive surgical outcome (65.7% versus 83.0%, $P = 0.001$).

Conclusions: Patients referred to a peripheral nerve surgery clinic frequently have psychiatric diagnoses and take chronic psychotropic and chronic pain medications. Knowledge of this will best help the peripheral nerve surgeon evaluate a patient for surgery, optimize perioperative care, and safely and effectively manage expectations. (*Plast Reconstr Surg Glob Open* 2022;10:e4434; doi: 10.1097/GOX.0000000000004434; Published online 15 July 2022.)

INTRODUCTION

Peripheral nerve surgery is a growing field, emerging from plastic surgery, orthopedic surgery, and neurosurgery. Historically, the field dealt mostly with treating compressive peripheral neuropathies, traumatic peripheral nerve injuries, peripheral nerve tumors, etc. More recently, the field of peripheral nerve surgery has made advances in better surgical management of symptomatic neuromas, phantom limb pain following major extremity

amputations, and chronic headaches.¹⁻⁵ The number of dedicated peripheral nerve surgery clinics is rising across the country as the field better defines the scope of clinical conditions that benefit from surgical evaluation and management.

The patient population referred to peripheral nerve surgery clinics is different from other patient populations that plastic surgeons are more commonly trained to manage. Patients are typically referred secondarily by physicians specializing in pain management, physical medicine and rehabilitation, neurology, orthopedic surgery, and neurosurgery. The patients' symptoms have been worked up to varying degrees of accuracy and often given multiple conflicting diagnoses. It is not uncommon for patients to have seen multiple subspecialty providers and tried multiple modalities of treatment before being referred to a peripheral nerve surgeon. In light of this, it is important to perform a thorough history and physical examination

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and order the appropriate diagnostic studies to determine whether the patient's symptoms can benefit from a surgical intervention. If a patient is a surgical candidate, one must discuss what the realistic outcomes following surgery will be and to manage expectations appropriately since outcomes following peripheral nerve surgery, very similar to those in aesthetic surgery, are somewhat unpredictable and subject to the patient's preoperative expectations.

Potentially complicating this perioperative discussion is the presence of certain psychosocial circumstances. In hand surgery, orthopedic surgery, and other surgical disciplines, it has been reported that the presence of psychiatric comorbidities, substance use, chronic pain, and active litigation impacts surgical outcomes.⁶⁻¹⁴ The interplay between psychiatric diagnoses and peripheral nerve symptoms is especially important, as in some patients, the symptoms may be psychosomatic or the pain may have a central component.¹⁵ Furthermore, the presence of psychiatric conditions may affect how to manage postoperative pain. Neuropathic pain medications such as gabapentin and pregabalin, which are commonly prescribed after peripheral nerve surgery, can worsen anxiety, depression, and sleep dysfunction and can be fatal when overdosed.¹⁶⁻¹⁸ These medications also may interact with other psychotropic medications commonly used to treat anxiety, depression, posttraumatic stress disorder (PTSD), and schizophrenia.

No studies to date have reported the prevalence of psychiatric conditions in peripheral nerve surgery patients and whether or not psychiatric conditions affect surgical outcomes. The purpose of this study was to determine the prevalence of psychiatric diagnoses and chronic pain in patients referred to a peripheral nerve surgery clinic.

METHODS

This is a retrospective review of all patients seen by a single surgeon (G.M.K.) at our institution from July 1, 2017 to June 30, 2021. All patients seen for acute traumatic nerve injuries, compressive neuropathies, nerve tumors, symptomatic neuromas, postamputation pain, and neuropathies and neuropathic pain of indeterminate etiology were included in this study. Patients seen by the senior author for plastic surgery consultations unrelated to peripheral nerve symptoms were not included in this study.

The initial consultation notes were reviewed for patient demographics, chief complaint, a history of relevant surgery or trauma to their chief complaint, diagnosis from the peripheral nerve surgeon, and whether or not they were deemed to be a surgical candidate. The medical records were reviewed to determine whether the patients had previously been formally diagnosed by a physician with a psychiatric condition and whether or not they were actively taking psychotropic medications. The same pharmacy records were reviewed to determine what neurotropic, narcotic, and other pain medications the patients were actively taking at the time of initial consultation. The most recent clinic visit was reviewed to see whether the patient underwent surgery and whether they subjectively reported a positive or neutral/negative outcome following surgery. No robust outcome metrics were used preoperatively or

Takeaways

Question: What is the prevalence of psychiatric diagnoses and chronic pain in patients referred for peripheral nerve surgery?

Findings: Of the patients presenting for evaluation for peripheral nerve surgery, 37.1% had a formal psychiatric diagnosis, 42.8% were taking chronic neuroleptic pain medications, and 24.9% were taking chronic narcotic pain medications.

Meaning: Patients presenting for peripheral nerve surgery should be screened for psychiatric diagnoses and chronic pain to best set proper expectations after surgery and to prevent negative polypharmacy interactions from multiple psychotropic medications.

postoperatively. A positive outcome, for example, would be reduced pain after surgery for symptomatic neuroma, improved sensation or decreased paresthesias after a nerve decompression, improved motor or nerve function after nerve repair, etc. No formal preoperative or postoperative patient-reported outcome metrics were administered. The number of phone calls made to the clinic was recorded.

For comparative statistics, the patients were divided into two groups: those with a formal psychiatric diagnosis and those without. Formal psychiatric diagnoses included major depressive disorder, generalized anxiety disorder, bipolar disorder type I and type II, other mood disorder, schizophrenia and schizoaffective disorder, panic disorder, personality disorder, attention deficit hyperactive disorder, eating disorder, PTSD, and any other formal psychiatric diagnosis given by a psychiatrist or primary care provider. Use of nonprescription substances and sleeping difficulty or disorders were considered separately. Sleeping difficulty due to obstructive sleep apnea or other mechanical reasons was not included in this study. Patients were also divided into whether or not they were actively taking prescription neuroleptic or narcotic pain medications.

Statistical analyses were performed using the software programs Microsoft Excel and JMP. Comparison and regression analyses were performed using *t* tests and analysis of variance, with a *P* value less than 0.05 considered to be statistically significant.

RESULTS

Patient Demographics and Peripheral Nerve Diagnoses

Six-hundred twenty-two unique patients were evaluated for an initial consultation at the peripheral nerve institute and included in this study. Of these patients, 46.0% were men and 54.0% were women. The average age was 51.0 years. In the upper extremity, 2.1% of patients were evaluated for upper extremity symptomatic neuroma, 14.0% for upper extremity compressive neuropathy, 7.7% for upper extremity traumatic neuropathy, and 1.8% for non-specific upper extremity pain or weakness (Fig. 1). In the lower extremity, 24.8% of patients were evaluated for lower extremity symptomatic neuroma, 23.2% for lower extremity

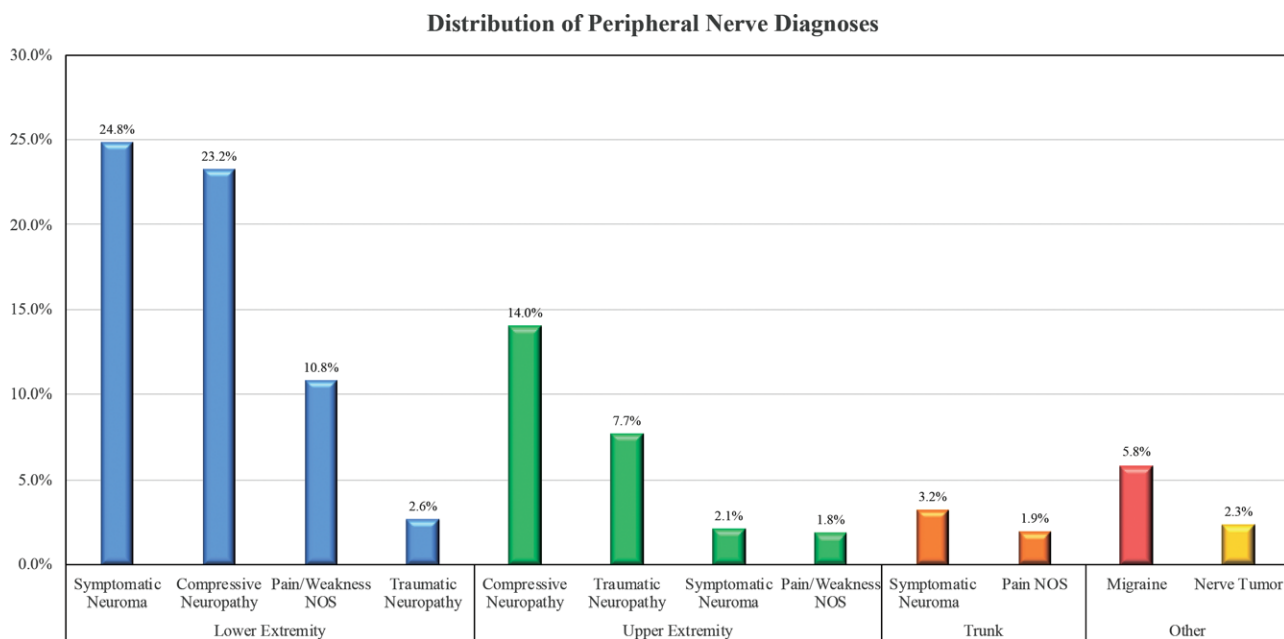


Fig. 1. Distribution of patients' peripheral nerve diagnoses.

compressive neuropathy, 2.6% for lower extremity traumatic neuropathy, and 10.8% for nonspecific lower extremity pain or weakness. Additionally, 5.8% of patients were seen for migraines, 3.2% for trunk symptomatic neuromas, 1.9% for nonspecific trunk pain, and 2.3% for peripheral nerve tumors. The percentage of patients who had a prior surgery at the site of their chief complaint was 63.0%, and 35.5% of patients had a documented or reported prior trauma at the site of their chief complaint.

Psychiatric Diagnoses and Psychiatric Medication Prescriptions

The percentage of patients formally given a psychiatric diagnosis was 37.1%. Of these, 26.5% had major depressive disorder, 18.3% had generalized anxiety disorder, 2.7% had bipolar disorder, 1.6% had schizophrenia or schizoaffective disorder, and 2.3% had PTSD (Table 1). One percent of patients reported prior suicide attempt, suicide ideation, or other forms of self-harm. Nine percent had documented illicit drug use: 5.8% used tetrahydrocannabinol-containing products, 1.4% used nonprescription stimulants or psychedelics, and 1.4% used nonprescription depressants. It was also noted that 2.6% of patients reported excessive alcohol use, 1.3% used multiple nonprescription substances, and 7.9% reported sleeping difficulty or sleeping disorder.

The percentage of patients actively taking a prescription psychotropic medication was 36.3%, and 14.8% were taking multiple such medications. Nine point five percent of patients were taking Selective Serotonin Reuptake Inhibitors (SSRIs), 10.0% generalized sedatives, 9.6% benzodiazepines, 6.8% atypical antidepressants or anxiolytics, 6.6% serotonin and norepinephrine reuptake inhibitors, 5.5% tricyclic antidepressants (TCAs), and 4.0% antipsychotics (Table 1). The percentage of patients taking multiple psychotropic medications was 14.8%.

Pain Medication Prescriptions

For their peripheral nerve symptoms, 34.2% of patients were actively taking over-the-counter or prescription acetaminophen, non-steroidal anti-inflammatory drugs, and/or tramadol or other nonnarcotic/nonneuroleptic pain medications. The percentage of patients taking neuroleptic medications such as gabapentin or pregabalin was 42.8%, excluding psychotropic medications taken for a psychiatric condition. At the time of initial consultation, 24.9% of patients had an active narcotic prescription.

Surgical Candidacy and Outcome

Seventy-seven point eight percent of patients were considered peripheral nerve surgical candidates based on their history and physical examination findings; diagnostic imaging, anesthetic blocks, and/or electrodiagnostics; and willingness to proceed following an informed conversation while setting reasonable expectations. Of those patients, 61.8% underwent peripheral nerve surgery. This does not include patients who are scheduled for surgery. Following surgery at the most recent postoperative clinic visit, 76.6% reported a positive outcome after surgery compared with 23.4% with a neutral or negative outcome.

Effect of Psychiatric Diagnosis and Chronic Pain on Surgical Candidacy and Outcome

Over the study period, 231 patients with a psychiatric diagnosis and 391 patients without a psychiatric diagnosis were evaluated in the peripheral nerve surgery clinic. Patients with a psychiatric diagnosis were significantly more likely to be taking neuroleptic (48.9% versus 38.9%, $P = 0.015$) and narcotic pain medications (27.3% versus 17.4%, $P = 0.004$) for their peripheral nerve complaint, compared with patients without a psychiatric diagnosis (Fig. 2). There was no significant difference in surgical

Table 1. Prevalence of Psychiatric Conditions, Illicit Substance Use, Psychiatric Medications, and Pain Medications in Patients Evaluated in the Peripheral Nerve Surgery Clinic

Condition	Prevalence
Psychiatric conditions	
Depression	26.5%
Anxiety	18.3%
Bipolar disorder	2.7%
Schizophrenia	1.6%
PTSD	2.3%
Self-harm	1.0%
Other mood disorder	0.8%
ADHD	1.6%
Personality disorder	0.3%
Eating disorder	0.5%
Adjustment disorder	0.6%
Other psychiatric condition	0.8%
Any psychiatric condition	37.1%
Sleeping difficulty	7.9%
Substance use	
Alcohol	2.6%
Marijuana	5.8%
Opioids	1.4%
Stimulants	1.4%
Multiple	1.3%
Any	9.0%
Psychiatric medications	
SSRI	9.5%
SNRI	6.6%
TCA	5.5%
Atypical antidepressant/ anxiolytic	6.8%
Antipsychotic	4.0%
Benzodiazepine	9.6%
Other sedative	10.0%
Antiepileptic	3.9%
Stimulant	3.1%
Multiple	14.8%
Any	36.3%
Pain medications	
Nonnarcotic	34.2%
Neuroleptic	42.8%
Narcotic	24.9%

candidacy (77.5% versus 77.7%, $P = 0.894$) or in decision to proceed with surgery (61.8.5% versus 60.3%, $P = 0.960$) between patients with and without psychiatric diagnoses. Patients with a psychiatric diagnosis were significantly less likely to have a positive surgical outcome, compared with patients without a psychiatric diagnosis (65.7% versus 83.0%, $P = 0.001$) (Fig. 3).

Two hundred sixty-six patients were taking neuroleptic medications at the time of initial consultation, and 356 patients were not. The patients taking neuroleptic medications were more likely to be considered surgical candidates (83.1% versus 73.6%, $P = 0.004$) but were significantly less likely to have a positive surgical outcome (70.3% versus 83.0%, $P = 0.016$).

One hundred fifty-five patients were taking narcotic medications at the time of initial consultation, and 467 patients were not. The patients taking narcotic medications were more likely to be considered surgical candidates (84.5% versus 75.4%, $P = 0.022$) but were significantly less likely to have a positive surgical outcome (67.5% versus 80.5%, $P = 0.016$).

DISCUSSION

Peripheral nerve surgery is a fascinating and expanding field of plastic surgery. The number of dedicated peripheral nerve surgery clinics in both academic and community settings will continue to grow. Just as it is important to know a breast reconstruction patient's cancer diagnosis, need for chemotherapy and/or radiation, and medical comorbidities, it is critical that a peripheral nerve surgeon is aware of any central neurologic or psychiatric factors

Distribution of Chronic Pain Medications

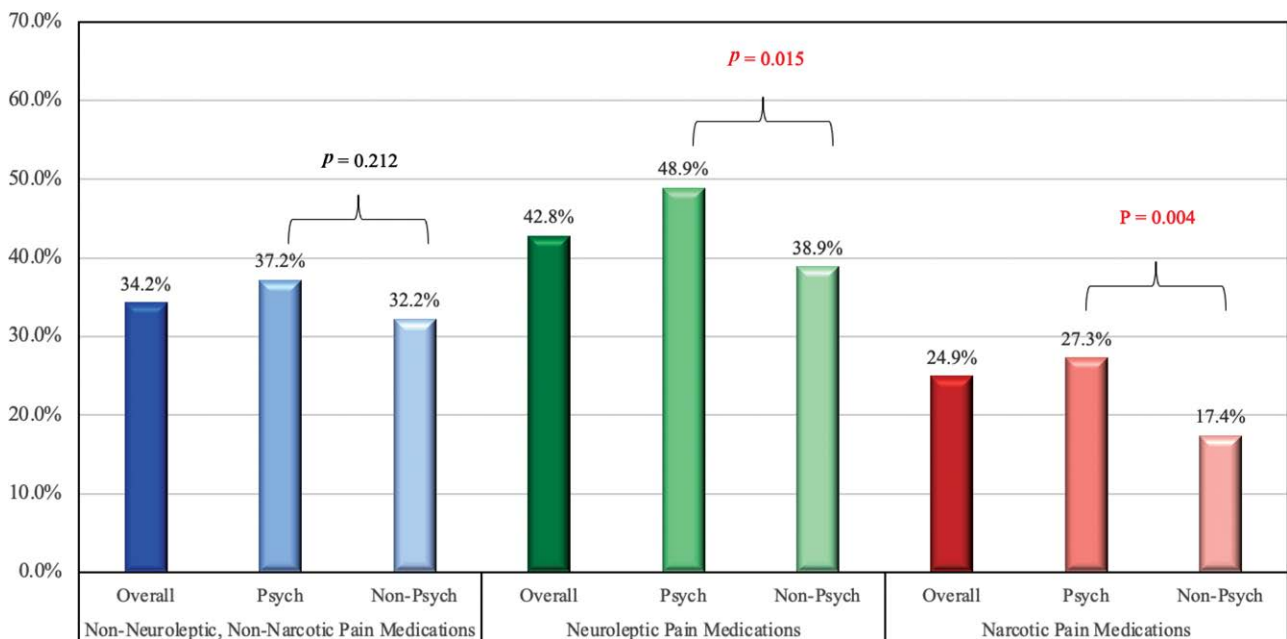


Fig. 2. Distribution of chronic nonneuroleptic/nonnarcotic, neuroleptic, and narcotic pain medication usage by the presence or absence of a psychiatric condition.

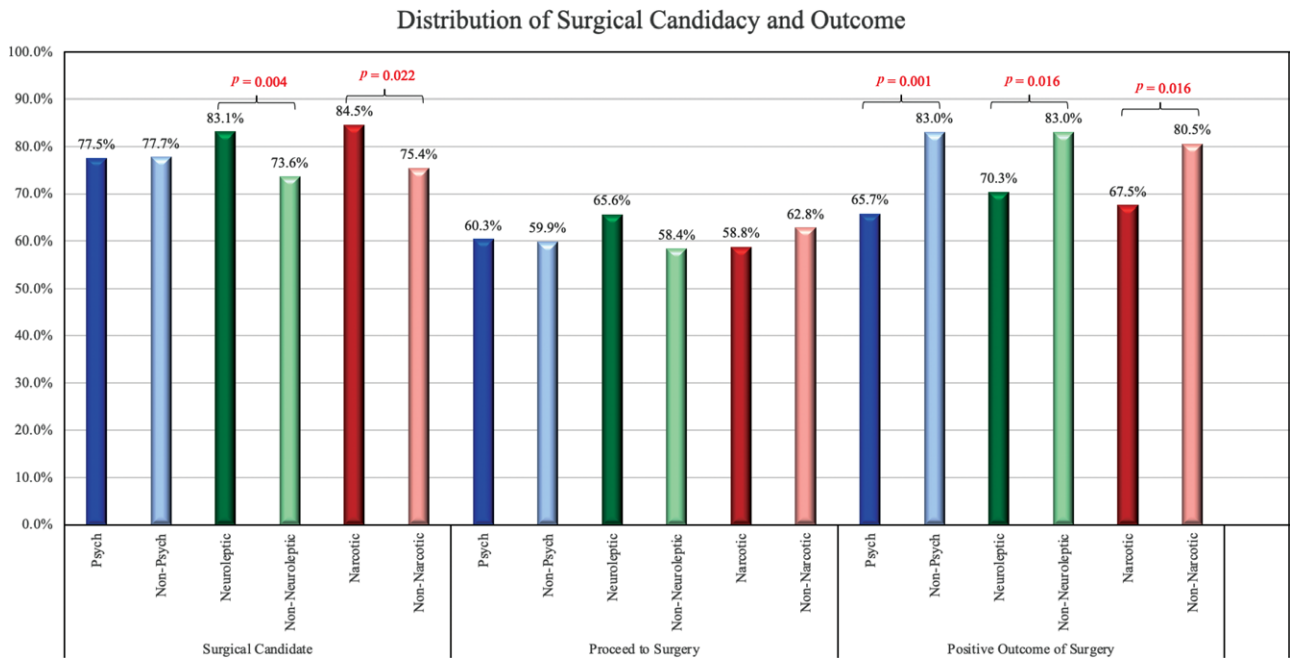


Fig. 3. Distribution of surgical candidacy, rate of proceeding to surgery, and rate of positive surgical outcome by the presence or absence of a psychiatric condition and chronic pain medication usage.

that may impact a patient’s presentation of a peripheral nerve complaint.

It is important to recognize the bidirectional relationship between psychiatric disorders and chronic pain. A patient’s psychiatric condition may impact how they perceive and experience pain, and their ability to personally manage and cope with their pain. Psychiatric medications may impact medical management of chronic pain. Conversely, chronic pain may also have a significant impact on patients with psychiatric disorders, exacerbating depression or anxiety and leading to a decline in social function.

Our institution’s peripheral nerve surgery clinic is high-volume and comprehensive, covering upper extremity, lower extremity, head and neck, and trunk peripheral nerve injuries, neuropathies, and symptomatic neuromas.^{1,19–21} With this broad peripheral nerve practice, we found that a significant proportion of patients (37.1%) have a formal psychiatric diagnosis. In comparison, an average 20.3% of the general population is actively being treated for a mental health diagnosis, and 16.5% are actively taking psychiatric medications.²² Peripheral nerve surgeons should understand that the presence of a psychiatric condition may impact a patient’s response to therapy, something that was also observed in this study.^{6–14} Patients with psychiatric diagnoses should be counseled extensively on what to expect in the perioperative setting and explicitly described what reasonable outcomes they should expect following surgery. Given the high prevalence of psychiatric diagnoses in the peripheral nerve patient population, providers should actively screen for these conditions, inquire about active prescription or nonprescription medications being taken for the psychiatric condition, and whether they continue to actively

follow-up with their psychiatrist or primary care physician. If a patient with an extensive psychiatric history has not recently been seen by their psychiatrist, it is reasonable to have them reevaluated and optimized before proceeding with surgery.

Peripheral nerve patients take prescription psychotropic medications at a high rate of 36.3%. In some patients, polypharmacy with psychotropic medications and neuroleptic and/or narcotic pain medications can cause significant adverse effects. Initiating gabapentin or pregabalin can acutely worsen anxiety, depression, and sleep disorders.^{16–18} One should perform a thorough review of a patient’s active medications and consult with a pharmacist or their psychiatrist before starting a neuroleptic medication in select patients with extensive medication lists or multiple psychiatric conditions. Furthermore, gabapentin and pregabalin are contraindicated in patients with prior suicide attempts or ideation because of the risk of triggering suicidality. One percent of patients seen in our clinic had a reported history of attempted suicide or self-harm. Finally, one should screen for excessive alcohol and any nonprescription substance use before initiating neuroleptic or narcotic pain medications. Although each component separately may not illicit a significant depressant effect, the combination of chronic depressant medications, alcohol, or illicit substance use, and newly prescribed neuroleptic or narcotic pain medications can have a significant and potentially detrimental effect.

A large proportion of peripheral nerve patients take chronic pain medications: 34.2% nonneuroleptic/nonnarcotic, 42.8% neuroleptic, and 24.9% narcotic. In comparison, 2.3% of the general population has been reported to take chronic narcotic medications.²³ Patients should be asked what pain medications they are currently taking and

what providers are prescribing their medications. Patients with prescriptions from multiple providers should be advised to see a chronic pain specialist. Furthermore, one of the goals of surgery should be to decrease the dosage or need altogether of chronic pain medications needed for their chief complaint. Patients should be informed of this, and a plan should be set in place with a chronic pain specialist to help manage postoperative pain. The high rate of chronic pain medication use should make the peripheral nerve surgeon cognizant of potential centralization of a patient's pain. Diagnostic peripheral nerve blocks can help identify which patients may benefit from surgery.

The primary focus of this study was to identify the prevalence of psychiatric conditions and chronic pain in patients seen at a peripheral nerve clinic. The study was not designed to compare surgical outcomes between patients with and without psychiatric diagnoses and with and without chronic pain, but this was included as secondary outcomes. Patients with psychiatric conditions were determined to be surgical candidates at the same rate as patients without psychiatric conditions, but they had worse surgical outcomes. This finding is limited significantly by the outcome metric and retrospective nature of the study, but even on a rudimentary level, it suggests that peripheral nerve surgeons should be more cautious before performing surgery on a patient with a psychiatric condition. Such patients may need more rigorous diagnostics to confirm surgical candidacy, a more in-depth and understated setting of expectations, and/or preoperative evaluation by their psychiatrist. Future studies specifically aimed to assess whether or not chronic psychiatric diagnoses and/or pain impacts patient- or surgeon-reported outcomes following peripheral nerve surgery that could greatly help patient selection for surgery and in preoperative counseling.

Patients taking chronic neuroleptic or narcotic pain medications were more likely to be considered surgical candidates, which suggests that the patients were appropriately being prescribed their medications and/or proper selection of patients with the most severe symptoms was performed. However, patients taking chronic pain medications trended toward having worse surgical outcomes. Again, this finding is limited by the outcome metric and retrospective nature, but it suggests that these patients may be more likely to have centralization of their pain and not respond as well to surgery. Such patients should also be counseled about realistic surgical outcomes and recommended to see chronic pain, physical medicine and rehabilitation, neurology, or other specialties trained in medical or other nonsurgical management of peripheral nerve pain.

This study demonstrated the significant prevalence of psychiatric diagnoses and chronic pain in patients referred to a peripheral nerve surgery clinic. Peripheral nerve surgeons should be cognizant of this, use this knowledge to conduct an appropriately thorough history, and consider involving psychiatrists when indicated to optimize patient outcomes. This study suggested that the presence of a psychiatric condition or use of chronic pain medications may negatively impact surgical outcomes, but more robust prospective studies using patient-reported outcome metrics should be conducted. As of now, the senior author decides

whether or not a patient is a good candidate for peripheral nerve surgery based on clinical history and examination and relevant diagnostics. The presence of a chronic psychiatric condition and/or chronic pain is not surgical exclusion criteria but instead cause the senior author to counsel patients more heavily about the complexity of peripheral nerve diagnoses and the chance of surgery improving their chief concerns. Anecdotally, when patients with psychiatric diagnoses and/or chronic pain present to clinic, if their histories and examinations are not home-run diagnoses that can be managed surgically, there is some caution before jumping straight to surgery. Such patients may be asked to trial additional therapy or see noninterventionalists for a few weeks to months and then reevaluated in clinic or pursue more advanced imaging to support their clinical diagnosis. Furthermore, because of the risk of polypharmacy and the psychiatric complexity of peripheral nerve patients, the senior author will continue to work closely with colleagues in psychiatry, chronic pain, physical medicine and rehabilitation, etc. to optimize patient outcomes.

CONCLUSIONS

Patients referred to a peripheral nerve surgery clinic frequently have psychiatric diagnoses and take chronic psychotropic and chronic pain medications. Knowledge of this will best help the peripheral nerve surgeon evaluate a patient for surgery, optimize their multidisciplinary care perioperatively, and safely and effectively manage postoperative expectations and symptoms. An effective peripheral nerve surgery clinic will likely require collaboration with experts in psychiatry, neurology, rehabilitation, and chronic pain.

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