

Associations between clinical diagnostic criteria and pretreatment patient-reported outcomes measures in a prospective observational cohort of patients with neurogenic thoracic outlet syndrome



Joshua Balderman, MD,^a Katherine Holzem, BS,^a Beverly J. Field, PhD,^{b,c} Michael M. Bottros, MD,^b Ahmmad A. Abuirqeba, BA,^a Chandu Vemuri, MD,^a and Robert W. Thompson, MD,^a St. Louis, Mo

ABSTRACT

Objective: Neurogenic thoracic outlet syndrome (NTOS) is caused by dynamic compression of the brachial plexus at the level of the supraclavicular scalene triangle or the subcoracoid (pectoralis minor) space, or both. The purpose of this study was to characterize relationships between 14 clinical diagnostic criteria (CDC) and seven pretreatment patient-reported outcomes measures (PROMs) in a prospective cohort of patients with NTOS.

Methods: There were 183 new patient referrals between July 1 and December 31, 2015, with 150 (82%) meeting an established set of predefined CDC for NTOS. PROMs were evaluated across five domains: pain severity, functional disability, depression, quality of life, and pain catastrophizing. Linear regression and Pearson correlation statistics were used to analyze associations between CDC and PROMs.

Results: Mean \pm standard error patient age was 37.1 ± 1.1 years (range, 12-66 years), and 107 (71%) were women. Five (3%) had a cervical rib, and 15 (10%) had recurrent NTOS. The most frequently positive CDC were neck or upper extremity pain (99%), upper extremity or hand paresthesia (94%), symptom exacerbation by arm elevation (97%), localized supraclavicular or subcoracoid tenderness to palpation (96%), and a positive 3-minute elevated arm stress test (94%; mean duration, 102.0 ± 5.1 seconds). The number of positive CDC (mean, 9.6 ± 0.1) correlated with the degree of tenderness to palpation and the duration of elevated arm stress test, as well as with PROMs for pain severity, functional disability, depression, physical quality of life, and pain catastrophizing (all $P < .0001$). PROMs across multiple domains were also strongly correlated with each other. Patients with clinically significant pain catastrophizing exhibited a greater level of functional disability than noncatastrophizing patients ($P < .0001$).

Conclusions: This study illustrates the relative strengths of 14 CDC and seven PROMs to evaluate patients with NTOS, helping validate the selected CDC and highlighting the potential role of pain catastrophizing in functional disability. This cohort will provide valuable information on the utility of different CDC and PROMs to predict treatment outcomes. (J Vasc Surg 2017;66:533-44.)

From the Department of Surgery, Center for Thoracic Outlet Syndrome and the Section of Vascular Surgery,^a Division of Pain Management, Department of Anesthesiology,^b and Department of Psychiatry,^c Washington University School of Medicine in St. Louis.

This work was partly supported by the Thoracic Outlet Syndrome Research and Education Fund of the Barnes-Jewish Hospital Foundation, St. Louis, Mo.

Author conflict of interest: none.

Presented at the Fortieth Annual Meeting of the Midwestern Vascular Surgical Society, Columbus, Ohio, September 8-10, 2016.

Additional material for this article may be found online at www.jvascsurg.org.

Correspondence: Robert W. Thompson, MD, Center for Thoracic Outlet Syndrome, Section of Vascular Surgery, Washington University School of Medicine in St. Louis, 5101 Queeny Tower, One Barnes-Jewish Hospital Plaza, Campus Box 8109, St. Louis, MO 63110 (e-mail: thompson@wudosis.wustl.edu).

The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

0741-5214

Copyright © 2017 The Authors. Published by Elsevier Inc. on behalf of the Society for Vascular Surgery. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<http://dx.doi.org/10.1016/j.jvs.2017.03.419>

Neurogenic thoracic outlet syndrome (NTOS) is caused by dynamic compression of the brachial plexus at the level of the supraclavicular scalene triangle or the subcoracoid (pectoralis minor) space, or both.¹ NTOS is considered to be the result of predisposing variations in anatomy combined with local responses to tissue injury, with symptoms ranging from numbness and paresthesia in the fingers to disabling pain in the neck and affected arm, potentially leading to pronounced functional disability.²⁻⁴ Establishing the diagnosis of NTOS is challenging, because it is a relatively rare condition outside the training or experience of many specialists, it requires the exclusion of diverse conditions that might cause similar or overlapping symptoms, physical examination maneuvers are often nonspecific, and there are no laboratory or radiographic testing approaches with sufficient accuracy to establish or exclude the condition.⁴⁻⁶

The clinical evaluation for NTOS can thereby vary widely between different medical centers and individual practitioners, and the need for more consistent diagnostic

standards has been repeatedly emphasized.^{7,8} Toward this goal, we and other investigators in the Consortium for Research and Education on Thoracic Outlet Syndrome (CORE-TOS) have used a consensus-based Delphi approach to develop a consistent set of clinical diagnostic criteria (CDC) for NTOS, and we have implemented these criteria in our center during the past several years.⁹⁻¹²

Physical therapy and symptom management are the first lines of treatment once a diagnosis of NTOS has been established.^{3,4} Surgical treatment for NTOS is reserved for patients who have substantial levels of disability and have failed to obtain sufficient improvement with conservative measures. Several approaches to thoracic outlet decompression can clearly produce excellent results.¹¹⁻¹⁷ However, there remain patients who do not improve to the extent predicted after surgical treatment, despite attempts to identify various risk factors that may be associated with unsatisfactory outcomes.

To better quantify the level of physical and mental disability experienced by patients with NTOS and to predict treatment outcomes more accurately, a number of patient-reported outcomes measures (PROMs) have been applied to this population.^{11,12,15,16,18,19} This has included PROMs responsive across several different but related domains such as pain, functional disability, depression, and physical and mental quality of life (QOL). Pain catastrophizing is an additional domain that has attracted increasing attention in recent years, representing a long-standing concept in psychologic research defined as "an exaggerated negative mental set brought to bear during actual or anticipated painful experience."²⁰⁻²² Despite its potential relevance to assessing disability, improving predictions of treatment outcomes, and potentially guiding targeted intervention, pain catastrophizing has not been previously examined in patients with NTOS.

The purpose of this study was to characterize a prospective observational cohort of patients with NTOS with regard to the prevalence of 14 CDC and results for a broad series of PROMs, including pain catastrophizing, and to evaluate potential associations between these diagnostic and outcomes assessment measures.

METHODS

Study population. All patients in this study gave informed consent for the publication of their medical data, through a protocol approved by the Human Research Protection Office at Washington University in St. Louis, St. Louis, Mo. The study population consisted of new patients referred to the Washington University Center for Thoracic Outlet Syndrome at Barnes Jewish Hospital (St. Louis, Mo) from July 1 to December 31, 2015, who met the predefined CORE-TOS CDC for NTOS. Data collected from office notes, hospital records, imaging studies, and records from treating physicians

ARTICLE HIGHLIGHTS

- **Type of Research:** Retrospective analysis of prospectively collected single center data
- **Take Home Message:** Pain at the base of the neck, upper extremity paresthesias, symptom exacerbation by arm elevation, tenderness at the scalene triangle or pectoralis minor, and positive 3-minute elevated arm stress test maneuvers were most predictive of neurogenic thoracic outlet syndrome.
- **Recommendation:** The presence of the above criteria suggests that neurogenic thoracic outlet syndrome is present.

and therapists were entered into a prospectively maintained database.

Clinical diagnosis. A standardized set of 14 individual CDC were used throughout the study period, which were previously developed by CORE-TOS investigators through a consensus-based approach to guide more consistent diagnosis of NTOS.^{9,10} In accord with these criteria, to reach a sound clinical diagnosis of NTOS, a patient must have upper extremity symptoms present for at least 12 weeks, which extend beyond the distribution of a single cervical nerve root or peripheral nerve, have not been satisfactorily explained by another condition, and meet at least one criterion in at least four of five categories that include (1) principal symptoms, (2) symptom characteristics, (3) clinical history, (4) physical examination, and (5) provocative maneuvers (Table I). The specific CDC and total number of positive CDC met by each patient were recorded. As part of this assessment, the degree of focal tenderness to palpation was graded on a 4-point scale (0, 1+, 2+, and 3+) by the examining physician and the duration of time the patient was able to perform the 3-minute elevated arm stress test (EAST) measured in seconds.

Results of imaging studies and electrophysiological tests (nerve conduction velocities and electromyography) were not considered necessary to establish a clinical diagnosis of NTOS but were used in selected patients to help assess or exclude other conditions (eg, degenerative cervical spine disease, peripheral nerve compression disorders). Anterior scalene and pectoralis minor muscle blocks were used selectively as an adjunct to provide prognostic information but were not considered necessary for a clinical diagnosis of NTOS. A clinical worksheet using the CORE-TOS diagnostic criteria for NTOS is provided in the [Supplementary Material \(Form A\)](#), online only.

Patient-reported outcomes measures. All patients were asked to complete the 11-item version of the Disabilities of the Arm, Shoulder and Hand (QuickDASH) survey instrument, the Cervical-Brachial Symptom Questionnaire (CBSQ), the McGill Pain Questionnaire (McGill), the Brief Pain Inventory (BPI), the Zung Self-Rating

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات