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Assessment of outcomes in consecutive patients undergoing dorsal scapular nerve decompression

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OBJECTIVE Periscapular pain has a broad differential diagnosis. Dorsal scapular neuropathy is part of that differential diagnosis but is often forgotten by clinicians, leading to delayed diagnosis, chronic pain, and potentially worse outcomes. The objective of this study was to describe our method for diagnosis, surgical technique, intraoperative findings, and outcomes in consecutive patients undergoing dorsal scapular nerve (DSN) decompression.

METHODS A retrospective cohort study was performed to compile and describe outcomes for consecutive patients (n = 21) who underwent DSN decompression by a single surgeon during the period between August 2018 and February 2021. The primary outcome was change in visual analog scale (VAS) score for periscapular pain between baseline and 6 months postoperatively. Secondary outcomes included change in VAS score for overall pain, change in Disabilities of the Arm, Shoulder, and Hand (DASH) score, and change in the Zung Self-Rating Depression Scale (Zung SDS) between baseline and 6 and 12 months postoperatively.

RESULTS Patients undergoing DSN decompression showed significant improvement in VAS score for periscapular pain between baseline and 6 months postoperatively (mean score 54.0 vs 26.8, respectively; $p < 0.001$). Fifteen of 21 patients (71%) had a good outcome (score improvement ≥ 20). Disability (as determined by DASH scores) was significantly improved at 6 and 12 months postoperatively. The only factor that was predictive of outcome was symptom duration, with longer symptom duration predicting a poor outcome.

CONCLUSIONS Surgical treatment of dorsal scapular neuropathy is associated with significant improvements in pain and disability, and these improvements are durable. Morbidity associated with surgical treatment is low.

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KEYWORDS dorsal scapular nerve; entrapment neuropathy; neurolysis; neurovascular conflict; periscapular pain; peripheral nerve; surgical technique

Periscapular pain has a broad differential diagnosis, and the appropriate diagnosis is often difficult to determine. Despite extensive orthopedic evaluation, many patients have persistent periscapular pain that can be quite debilitating and functionally limiting. One diagnosis that belongs in the differential diagnosis, but is often not considered, is dorsal scapular neuropathy. The dorsal scapular nerve (DSN) arises from the proximal C5 nerve and is classically thought to be a "pure" motor nerve, innervating the levator scapulae and rhomboid muscles. Contrary to some historical teaching, compression or injury to motor nerves can cause neuropathic pain.[1] Although the DSN is being increasingly recognized as a potential cause of periscapular pain, there is a lack of evidence in the literature regarding optimal treatment and the outcomes associated with such treatment.[2,3]

A variety of mechanisms of injury for the DSN have been recognized, including repetitive stretch, forceful stretch, blunt trauma, needle injury, and based on our observations, possibly neurovascular conflict.[4–7] Anatomical variants of the nerve root contributions to the DSN, the relationship to the middle scalene muscle, and the relationship to the dorsal scapular artery (DSA) have been described. Some of these variations may predispose indi-

ABBREVIATIONS DASH = Disabilities of the Arm, Shoulder, and Hand; DSA = dorsal scapular artery; DSN = dorsal scapular nerve; LTN = long thoracic nerve; VAS = visual analog scale; Zung SDS = Zung Self-Rating Depression Scale.

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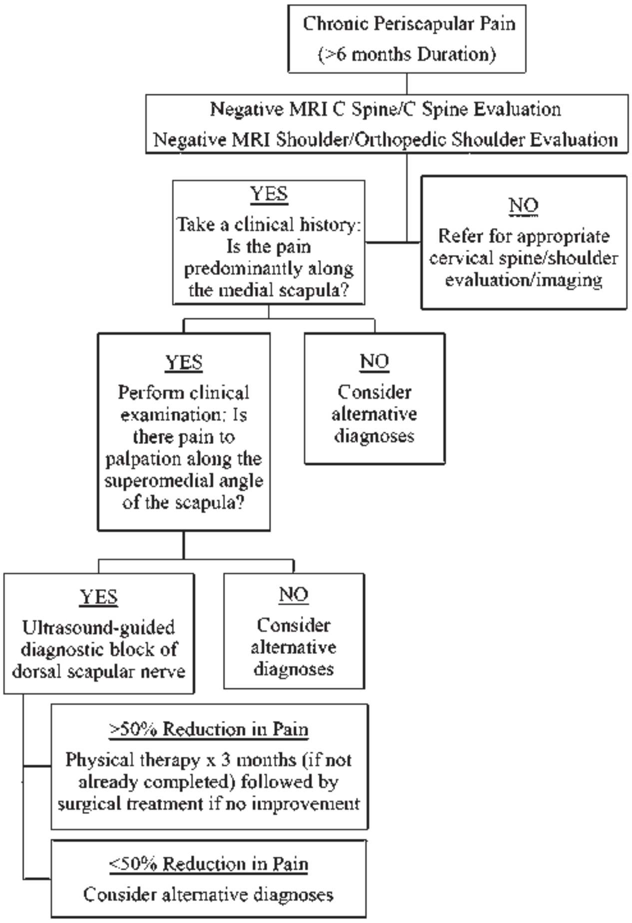

FIG. 1. Schema utilized in this study for evaluation and management of patients presenting with chronic periscapular pain. C Spine = cervical spine.

viduals to dorsal scapular neuropathy, but these associations are not clear.

We report here our method for diagnosis, surgical technique, intraoperative findings, and outcomes in consecutive patients undergoing DSN decompression.

Methods

Study Cohort

Consecutive patients undergoing DSN decompression performed by a single surgeon at a single quaternary care center between August 2018 and February 2021 were included in this retrospective cohort study. This study was approved by the institutional review board. No consent was sought or required for this retrospective study.

Variables of Interest and Assessment Metrics

Recorded variables included age at surgery, sex, coexisting pain conditions, presence of rhomboid weakness and/or scapular winging on clinical examination, and intraoperative findings.

Patients were assessed preoperatively and at 6 ± 1 months and 12 ± 1 months postoperatively. Assessments administered to each patient included the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire, a visual analog scale (VAS) pain assessment for overall pain, a VAS pain assessment for periscapular pain, and the Zung Self-Rating Depression Scale (Zung SDS) questionnaire. Physical examination was performed at each assessment. Complications including wound infections requiring antibiotic therapy and/or surgical incision and drainage and new weakness were recorded.

Patient Selection

Patients who presented with predominantly medial periscapular pain without an identified musculoskeletal cause despite an adequate cervical spine and shoulder evaluation, including MRI of both the cervical spine and shoulder, were considered candidates for further evaluation. Patients who met these criteria and had pain to palpation around the superomedial angle of the scapula were referred for an ultrasound-guided diagnostic block of the DSN. Patients who had at least a 50% reduction in their VAS pain score after the block were considered for surgery. All patients received a 3-month course of physical therapy prior to surgery (Fig. 1).

Diagnostic Block Technique

The ultrasound probe was initially placed over the anterolateral neck to identify the anterior and middle scalene muscles, with the brachial plexus between them. Dynamic scanning was then performed to identify a small (approximately 1 mm) nerve, close to the C5 and C6 spinal nerves, that travels through the middle scalene and then tracks posterolaterally under the trapezius toward the scapula. A second (usually larger) nerve was also often seen that tracks directly caudad to the clavicle. This is the long thoracic nerve (LTN), which can be easily confused for the DSN if the nerve trajectory is not traced (Fig. 2A). The DSN can be blocked as it exits the middle scalene muscle, in order to avoid spreading local anesthetic to the brachial plexus. The DSN is challenging to trace from the middle scalene to the scapula but can generally be identified inferomedial to the levator scapulae muscle insertion as it travels with the DSA (Fig. 2B). If the nerve can be identified at the medial scapula, the nerve can be blocked in this location with less concern about medication spreading to other nerves (Fig. 2C). Nerve stimulation was also frequently used and has been useful to confirm rhomboid contraction prior to the nerve block. We used 0.5–1 mL of local anesthetic to selectively block the DSN.

Surgical Technique

The patients were positioned prone on the operating table under general anesthesia. The medial border of the scapula was marked, including the superomedial angle of the scapula. A longitudinal incision was planned 1.5 cm medial to the medial scapular border, centered at the superomedial angle and extending approximately 4–5 cm (Fig. 3A). After the skin incision, dissection was carried down to the posterior trapezius fascia. The posterior trapezius fascia was opened longitudinally. The fibers of the trapezius muscle were then split to expose the anterior trapezius fascia (Fig. 3B). A nerve stimulator was used to stimulate along the anterior trapezius fascia while observing the rhomboids for contraction to identify the location of the DSN. The anterior trapezius fascia was then opened in the area of stimulation, and the DSN was identified (Fig. 3C). The nerve was circumferentially isolated and placed in a vessel loop. The nerve was then circumferentially dissected proximally toward the levator scapulae and middle scalene muscles. Any fibrous arches or scarring were divided. The nerve was then dissected distally toward the rostral edge of the rhomboid muscles. Any compressive structures, including fascial bands, fibrous arches, scarring, and crossing vessels were divided. The nerve was followed distally to approximately halfway along the rhomboid muscles, with the surgeon being careful to preserve any motor branches (Fig. 3D). The trapezius fibers were then allowed to fall back into their native location. The posterior trapezius fascia was closed. The wound was then closed in layers in standard fashion.

Primary Outcome

The primary outcome measure was the VAS pain score for periscapular pain 6 months postoperatively compared with the preoperative score.

Secondary Outcomes

Secondary outcome measures utilized in the study included the following: 1) VAS pain score for periscapular pain, comparing the preoperative score to the 12-month postoperative score; 2) DASH score, comparing the preoperative score to the 6-month postoperative score; 3) DASH score, comparing the preoperative score to the 12-month postoperative score; 4) VAS pain score for overall pain, comparing the preoperative score to the 6-month postoperative score; 5) VAS pain score for overall pain, comparing the preoperative score to the 12-month postoperative score; 6) Zung SDS, comparing the preoperative score to the 6-month postoperative score; and 7) Zung SDS, comparing the preoperative score to the 12-month postoperative score.

Definition of Terms

A significant change in VAS score was defined as a change of ≥ 20 units. The SDS was categorized according to the original description: 25–49 normal, 50–59 mildly depressed, 60–69 moderately depressed, and ≥ 70 severely depressed.[8]

Statistical Methods

All statistical analyses were performed using Stata/SE 17.0 (StataCorp). Univariate comparisons of continuous variables were assessed using two-sample t-tests. All categorical data were assessed with a chi-square test or Fisher exact test, as appropriate. For dichotomous outcomes, univariate logistic regression was performed to assess the ability of the independent variables to predict our primary outcome. Only a single variable was significant in univariate analysis, so multivariate analysis was not performed. A p value < 0.05 was considered statistically significant for all analyses.

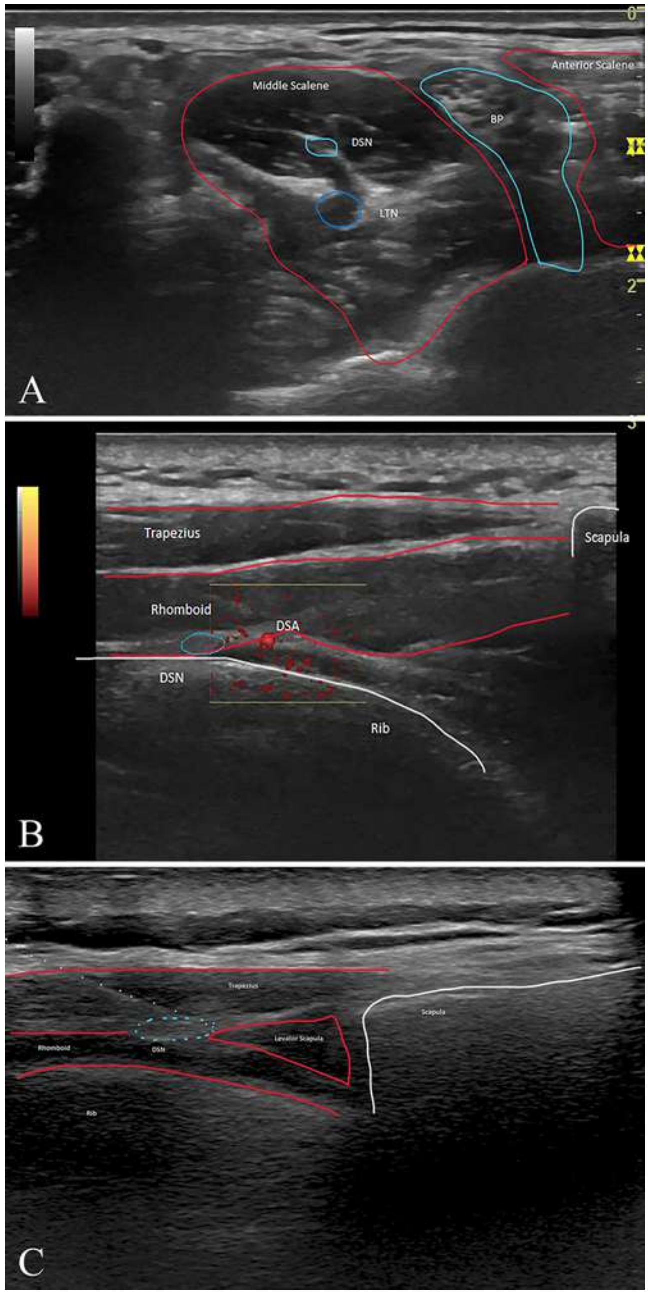

FIG. 2. Technique for diagnostic block of the DSN. **A:** The DSN and LTN are identified piercing the middle scalene muscle. The elements of the brachial plexus (BP) can be identified emerging from between the anterior and middle scalene muscles. **B:** The DSN can be identified running with the DSA deep to the rhomboid muscle. **C:** The DSN can be identified at the edge of the rhomboid muscles. A stimulating needle (*white dotted line*) can be inserted next to the DSN (*blue dotted line*) for stimulation (while observing for contraction of the rhomboid muscles) and diagnostic block with local anesthetic. Figure is available in color online only.

Results

Study Cohort

During the study period, 21 patients underwent DSN decompression. The cohort was predominantly male (n =

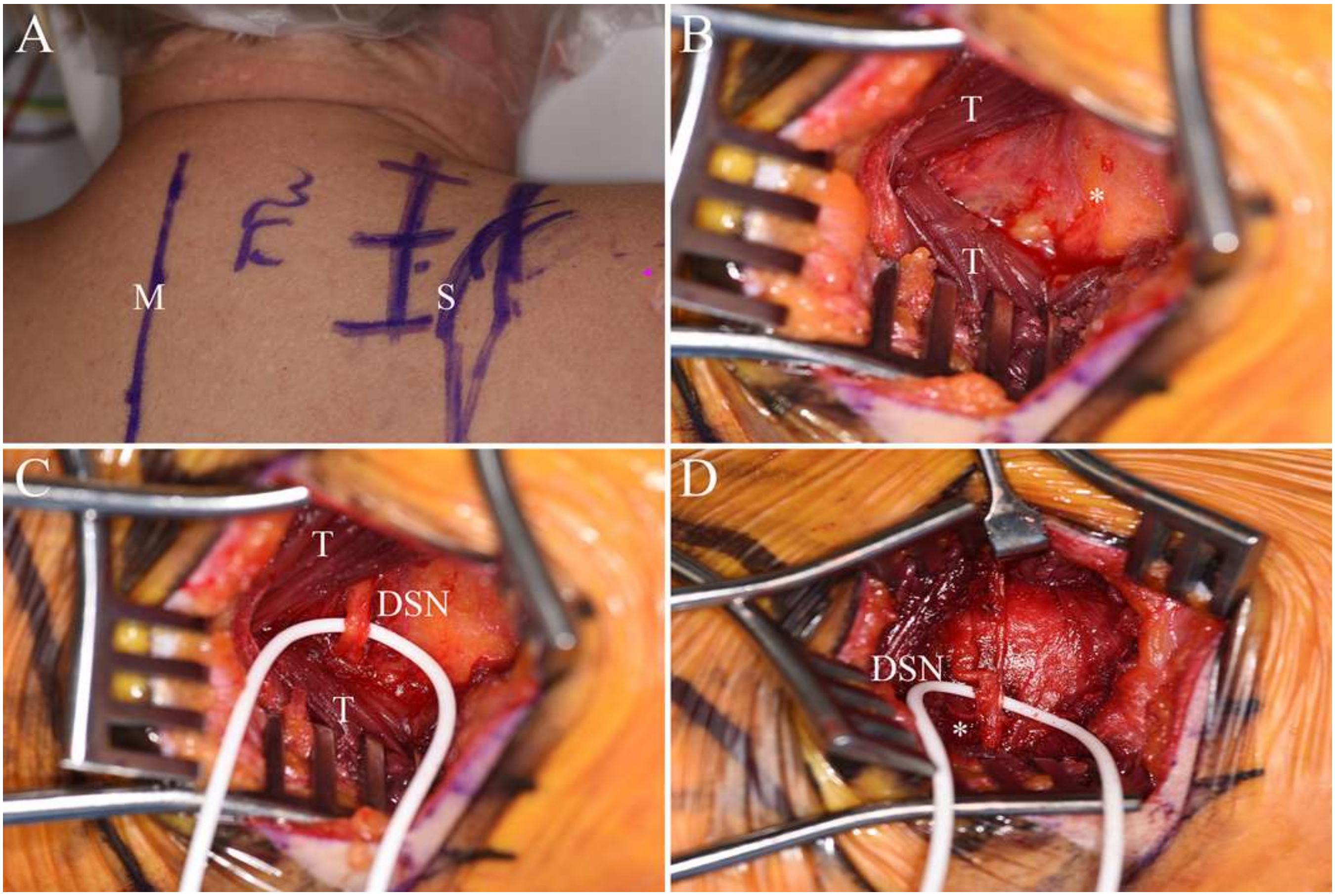

FIG. 3. Intraoperative photographs demonstrating the steps of a DSN decompression. **A:** The incision is planned 1.5 cm medial to the medial scapular border (S), centered at the level of the superomedial scapular angle. M = midline. **B:** The trapezius fibers (T) are split to expose the anterior trapezius fascia (*asterisk*). A handheld nerve stimulator is used to identify the approximate location of the DSN. **C:** The anterior trapezius fascia is opened to identify and circumferentially isolate the DSN. **D:** The DSN is decompressed circumferentially proximally and distally. The rhomboid is elevated and retracted to remove any fascial bands present at the leading edge of the rhomboids. Muscular branches (*asterisk*) to the rhomboids were preserved. Figure is available in color online only.

13; 62%). The average age was 40.6 ± 14.0 years (range 24–79 years). The average duration of symptoms prior to surgery was 28.5 ± 19.8 months (range 9–72 months). The symptomatic side was the right in 14 patients (67%) and the left in 7 patients (33%). The dominant side was affected in 12 patients (57%) versus the nondominant side in 9 patients (43%). A coexisting pain condition was present in 9 patients (43%). Migraine headaches (n = 3) and fibromyalgia (n = 3) were the most common coexisting pain conditions. None of the patients had pending litigation or workers' compensation cases.

Primary Outcome: VAS for Periscapular Pain Score at 6 Months Postoperatively

Demographics, assessment results, and intraoperative findings are shown in Table 1. The mean preoperative VAS for periscapular pain score was 54.0 ± 16.7. The mean 6-month postoperative score was 26.8 ± 21.6, which represents a significant difference ($p < 0.001$). Among the cohort, 15 of 21 patients (71%) had a good outcome (≥ 20-point VAS score improvement). Among the 6 patients who did not have a significant improvement, no patient was significantly worse. One patient rated their pain 8 points higher on the VAS scale, which represented the worst outcome in the cohort.

Analysis of Factors Associated With a Good Outcome

Table 2 shows univariate logistic regression analysis of factors analyzed for their ability to predict a good outcome. The only predictive factor was duration of symptoms prior to surgery. The average duration of symptoms among the subset of patients who had a good outcome was 19.2 months, whereas the average duration of symptoms among the subset of patients who had a poor outcome was 51.8 months.

Analysis of Intraoperative Findings and Relationship to Outcome

There were 4 patients with no obvious intraoperative abnormalities. Only 1 of the 4 patients (25%) had a good outcome. Proximal abnormalities around the levator scap-

TABLE 1. Baseline data and intraoperative findings for the entire cohort

Good Outcome	Age (yrs)	Sex	Symptom Duration (mos)	Preop VAS Score: Periscapular Pain	Coexistent Pain Condition	Preop Rhomboid Motor Exam Score	Intraop Findings
Y	54	F	12	75	Migraine headaches, history of RUE electrical injury	5/5	Fibrous arch at rhomboid edge
N	79	F	72	74	None	4+/5, wing	Fascial band at rhomboid edge
N	49	M	48	40	Migraine headaches	4/5, wing	No obvious abnormality
Y	28	M	23	20	None	4/5, wing	Nerve kink at rhomboid edge
N	24	M	16	75	None	4+/5, wing	Compression w/in levator scapulae & kink by fascial edge at rhomboid
Y	60	M	47	68	None	5/5	Tight fascial chute at levator scapulae
Y	33	M	14	50	None	5/5	Artery crossing nerve, neurovascular conflict
Y	27	F	18	20	None	5/5	Sharp fascial edge w/ compression at rhomboid edge
Y	32	M	21	45	None	5/5	Large vascular complex perpendicular to nerve, neurovascular conflict
N	28	F	60	30	Fibromyalgia	5/5	No obvious abnormality
Y	57	F	23	75	CRPS type 2 LLE	5/5	Sharp fascial edge w/ compression at rhomboid edge
Y	37	M	19	69	Migraine headaches	4+/5, wing	Proximal compression in fibrous chute, adherent to levator scapulae
Y	36	M	22	60	Fibromyalgia	4+/5, no wing	Artery crossing nerve, neurovascular conflict
N	42	M	45	57	Occipital neuralgia	5/5	Mild fascial edge at rhomboid
Y	28	M	9	52	None	5/5	Artery crossing nerve, neurovascular conflict
Y	37	M	14	62	None	5/5	Proximal compression in fibrous chute
Y	54	F	20	51	CRPS type 2 RLE	5/5	Fascial band at rhomboid edge
Y	25	M	11	62	None	4+/5, wing	Artery crossing nerve, neurovascular conflict
N	43	F	70	50	Fibromyalgia	5/5	No obvious abnormality
Y	39	F	12	46	None	5/5	Nerve adherent to rhomboid edge
Y	42	M	23	52	Occipital neuralgia	5/5	No obvious abnormality

CRPS = complex regional pain syndrome; LLE = left lower extremity; RLE = right lower extremity; RUE = right upper extremity; wing = scapular winging on clinical examination.

ulae were observed in 3 patients. All 3 of these patients (100%) had a good outcome. Distal abnormalities around the rhomboid muscles were observed in 9 patients. Among these, 6 of the 9 patients (67%) had a good outcome. Neurovascular conflict was observed in 5 patients. All 5 of these patients (100%) had a good outcome.

Secondary Outcomes

Table 3 shows the secondary outcomes and comparisons. There was a statistically significant difference between the preoperative and 12-month postoperative VAS scores for periscapular pain ($p < 0.001$). There was also a significant difference in the VAS scores for overall pain between baseline and 6 months postoperatively ($p < 0.001$) and between baseline and 12 months postoperatively ($p = 0.002$). For the DASH score there was also a significant improvement between the baseline score and the scores at 6 months ($p = 0.006$) and 12 months ($p = 0.023$) postoperatively. There were no differences between Zung SDS scores at baseline and the scores at 6 months ($p = 0.442$) and 12 months ($p = 0.247$) postoperatively.

Complications

No patient had worsening of motor function. No patient had significant (> 20 points on the VAS) worsening of pain. There was one postoperative wound infection that required oral antibiotics only.

Discussion

Periscapular pain can be difficult to diagnose and carries a broad differential diagnosis, including periscapular muscle strain, posterior rib fractures, cervical radiculopathy, cervical facetogenic pain, thoracoscapular bursitis, and scapular dyskinesis. From a peripheral nerve standpoint, suprascapular neuropathy can cause periscapular pain, with the pain tending to be lateral or radiating toward the shoulder. Dorsal scapular neuropathy belongs in the differential diagnosis but is often forgotten. The mean duration of symptoms before surgery in this study was 28.5 months, demonstrating the difficulty in making the diagnosis. Raising awareness of the diagnosis should help. We demonstrate here that surgical decompression can be

TABLE 2. Univariate logistic regression assessing variables for the ability to predict a good outcome at 6 months postoperatively

Variable	OR (95% CI)	p Value
Age	0.975 (0.911–1.043)	0.466
Sex	0.500 (0.073–3.435)	0.481
Preop VAS overall pain	0.975 (0.903–1.052)	0.512
Preop VAS periscapular pain	0.998 (0.942–1.058)	0.946
Preop DASH	0.988 (0.933–1.046)	0.674
Preop Zung SDS	0.939 (0.833–1.058)	0.299
Pain condition	0.333 (0.046–2.431)	0.279
Postblock VAS	0.958 (0.885–1.037)	0.292
Symptom duration	0.888 (0.809–0.974)	0.012

TABLE 3. Results of secondary outcomes analyzed in this study

Comparison	Preop Score	Postop Score		p Value
		6 Mos	12 Mos	
VAS periscapular pain, 12 mos	54.0 ± 16.7		24.8 ± 19.2	<0.001
DASH, 6 mos	31.1 ± 16.8	16.8 ± 15.0		0.006
DASH, 12 mos	31.1 ± 16.8		18.7 ± 17.0	0.023
VAS overall pain, 6 mos	54.0 ± 13.4	34.4 ± 20.9		<0.001
VAS overall pain, 12 mos	54.0 ± 13.4		34.8 ± 23.0	0.002
Zung SDS, 6 mos	43.9 ± 8.8	41.6 ± 9.9		0.442
Zung SDS, 12 mos	43.9 ± 8.8		40.2 ± 11.0	0.247

Values are presented as the mean ± SD unless otherwise indicated.

an effective treatment for dorsal scapular neuropathy in appropriately selected patients.

We consider dorsal scapular neuropathy as a possible diagnosis in patients who present with medial periscapular pain with a trigger point around the superomedial scapular angle and who have had a thorough orthopedic evaluation that was unrevealing. We select these patients to undergo a diagnostic nerve block and consider a 50% reduction in periscapular pain to be a positive response. Over the same study period, 10 other patients were referred for diagnostic nerve blocks who did not have a positive response and were not considered for surgery. Thus, approximately 2 of every 3 patients who meet these criteria will be surgical candidates for treatment of dorsal scapular neuropathy. We acknowledge that this diagnostic schema may not be perfect. In particular, there is a risk of a placebo effect with the injection. However, all of these patients had previous injections with other targets (e.g., trigger point, epidural steroid, suprascapular nerve, shoulder) without reported improvement. Thus, the reported improvement with a diagnostic block of the DSN was thought to represent a real response. However, it would be very reasonable to confirm the findings with a repeat diagnostic block.

From a clinical standpoint, there are several features that suggest dorsal scapular neuropathy over other diagnoses. First, examinations using shoulder maneuvers (e.g., empty can test) are negative. The pain also tends to be vertically oriented, rather than the transversely oriented pain that is typical of radiculopathy in the area. Because the DSN arises from C5, there also tends to be a component of C5 distribution pain, but the vertically oriented periscapular pain is predominant, with a vaguer component of the pain around the shoulder. The pain with dorsal scapular neuropathy tends to be worsened with reaching forward, not with neck movement or overhead activities. Finally, subtle scapular winging can be present that suggests the diagnosis. While all of these features suggest dorsal scapular neuropathy, there is significant overlap with other diagnoses, so we rely on negative cervical spine and shoulder evaluation and imaging (MRI) plus a positive diagnostic block, in addition to these suggestive features.

The pain that is experienced by these patients is nagging and significant but not excruciating, as reflected by the mean preoperative VAS score for periscapular pain of 54 (out of a maximum of 100). This moderate level of pain was associated with moderate disability. The mean preoperative DASH score for the cohort was 31.1. This degree of pain and disability emphasizes the need to better treat this malady.

A number of anatomical variants for the DSN have been described. The DSN arises from the proximal C5 nerve and can either pierce or run anterior to the middle scalene muscle in the neck.[9] Because of the C5 origin of the DSN, patients with dorsal scapular neuropathy may have some referred pain in a C5 distribution along the upper arm, which we observed in some of our patients. The nerve runs between the levator scapulae, posterior scalene, and serratus posterior superior muscles and runs distally along the anterior border of the rhomboid muscles. As it courses toward the rhomboid muscles, the DSN runs with the DSA. Three variants with respect to the artery have been described: 1) nerve and artery parallel, 2) artery crosses the nerve once, and 3) artery and nerve are twisted.[10] Pinto et al. found that the mean distance from the scapular border to the point where the DSN crosses the superior border of the rhomboid muscles was 1.61 cm.[11] Similarly, Tubbs et al. found that the nerve was a mean distance of 1.5 cm from the medial scapular border and 2.5 cm medial to the spinal accessory nerve.[12]

We base our surgical approach on the anatomy reported in these studies, centering a longitudinal incision 1.5 cm medial to the superomedial border of the scapula. A variety of mechanisms of injury for the DSN have been observed, including repetitive stretch, forceful stretch, trauma, and needle injury.[4–7] Based on our intraoperative observations, chronic microtrauma may also be a potential mechanism of entrapment or injury. We also observed a relatively high rate of neurovascular conflict (5 of 21 patients, 24%). It is unclear whether any of the variants of arterial anatomy relative to the nerve may predispose patients to this neurovascular conflict. All of the patients for whom neurovascular conflict was identified had a good outcome. In patients for whom neurovascular conflict was identified, the offending vessel(s) was/were ligated and divided. Neurovascular conflict may be an important feature to look for on ultrasound in the future. Most patients had a large branch of the DSA crossing the DSN in a perpendicular fashion.

Overall, we believe that our data show that surgical treatment of dorsal scapular neuropathy is a good option. There was a significant decrease in pain and a significant improvement in disability in our cohort. Among the cohort, 15 of 21 patients (71%) had a good outcome. No patient was significantly worse, and the complications were minimal. The improvement in pain was durable to 1 year postoperatively. Although we think that 1 year of follow-up is reasonable, longer-term data are needed to assess the true durability of the treatment effect. The mean VAS score for periscapular pain went from 54.0 preoperatively to 26.8 at 6 months postoperatively and to 24.8 at 12 months postoperatively, showing the durability of the pain decrease. No patient who was in the group who had a good outcome at 6 months postoperatively fell out of the group at 12 months postoperatively, and in fact, 1 patient further improved to meet the threshold for a good outcome. Similarly, the DASH score improved from 31.1 preoperatively to 16.8 at 6 months postoperatively and to 18.7 at 12 months postoperatively, showing the durability of improvement in disability. Franchignoni and colleagues have shown the minimal clinically important difference for the DASH questionnaire to be 10.8 points.[13] Thus, the improvement that we saw was clinically important. We did not observe a significant change in the Zung SDS score. This lack of significant improvement in depression may be attributable to depression not being a major issue facing this cohort of patients, as evidenced by the average preoperative Zung SDS score being in the normal range.

The only factor that we found to be predictive of a good versus poor outcome was symptom duration. Longer symptom duration preoperatively was predictive of a poor outcome. Due to the small number of patients in each category of intraoperative findings, we did not analyze the intraoperative findings statistically for their relationship with outcome. However, we observed that only 1 of the 4 patients without an obvious intraoperative abnormality had a good outcome, whereas 100%, 67%, and 100% of patients with proximal abnormalities around the levator scapulae, distal abnormalities around the rhomboid muscles, and neurovascular conflict, respectively, had a good outcome. The finding of all 5 patients with neurovascular conflict having a good outcome is interesting and warrants closer examination. Conversely, patients without an obvious abnormality, maybe unsurprisingly, seem to do poorly. We hope that this study raises awareness of dorsal scapular neuropathy as part of the differential diagnosis for periscapular pain. We also hope that increased awareness of this condition will allow for more prompt diagnosis and appropriate treatment and ultimately will further improve outcomes.

Study Limitations

There are several limitations to the current study. First, the lack of a comparative group, such as a matched control group, limits the conclusions that can be drawn regarding the success of the surgery. However, the long duration of symptoms for most patients in the group and the improvement in a relatively short period following surgery suggest that the improvement can be attributed to the surgery. Second, the study is retrospective. However, the patients represent consecutive patients from a single surgeon. The data were all collected prospectively and there were no missing data points for the primary and secondary outcomes, which help to reduce some of the limitations of a retrospective study. Third, while we think that a 1-year follow-up is reasonable for analysis, we do not have long-term data to know whether the observed effect is durable. Fourth, the present study represents the experience of a single surgeon and a single pain medicine physician. The results need to be verified for their generalizability. Last, while this study, to our knowledge, represents the largest series of dorsal scapular neuropathy patients treated with surgery, the number of patients included is relatively small. Larger multicenter studies are needed to confirm these results. However, we believe this series will raise awareness for the likely underrecognized problem of dorsal scapular neuropathy and will spur such multicenter studies.

Conclusions

Dorsal scapular neuropathy is often forgotten as part of the differential diagnosis for periscapular pain. To our knowledge, the present study is the first surgical series reporting outcomes for treatment of dorsal scapular neuropathy using a posterior approach. Surgical treatment of dorsal scapular neuropathy is associated with significant improvements in pain and disability, and these improvements are durable to 1 year postoperatively. Morbidity associated with surgical treatment is low. We believe our data support the approach to diagnosis and management of dorsal scapular neuropathy presented here.

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Disclosures

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

Author Contributions

Conception and design: both authors. Acquisition of data: both authors. Analysis and interpretation of data: Wilson. Drafting the article: both authors. Critically revising the article: both authors. Reviewed submitted version of manuscript: both authors. Approved the final version of the manuscript on behalf of both authors: Wilson. Statistical analysis: Wilson. Study supervision: Wilson.

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