Exercise, Manipulative Therapy, and Physical Modalities in the Treatment of Notalgia Paresthetica: A Case Report

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ABSTRACT

Objective: The purpose of this case report is to describe the care of a patient with notalgia paresthetica (NP).
Clinical Features: A 61-year-old man presented with a 7-year history of upper back pain, concentrated in the right periscapular region. Physical examination revealed a hyperpigmented area in the right dorsal paravertebral and infrascapular region with local paraesthesia. After investigations, a diagnosis of NP was made.
Intervention and Outcome: An exercise program including back and shoulder stretching and shoulder strengthening exercises, and transcutaneous electrical nerve stimulation resulting in a reduction of symptoms.
Conclusion: In the case described here, the patient's symptoms regressed when treated conservatively with exercise and physical therapy modalities. (J Chiropr Med 2021;20:224-228)
Key Indexing Terms: *Back Pain; Neuropathic Pain; Physical Therapy Modalities; Exercise Therapy; Case Reports*

INTRODUCTION

Notalgia paresthetica (NP) is a sensory neuropathy of the posterior branches of the T2-T6 spinal nerves that is characterized by chronic pruritus and/or pain and paresthesia in the infrascapular paravertebral region often identifiable by the presence of an irregular hyperpigmented patch.[1,2] Notalgia paresthetica was first described by the Russian Neurologist Astwazaturow in 1934; its name is derived from the ancient Greek words of *noton* meaning back and *algia* meaning pain.[3]

The life time incidence of NP is over 20%.[4] The exact etiology of NP remains unknown although factors such as genetic predisposition, exposure to neurotoxic chemicals, T2-T6 spinal nerve injury due to chronic trauma, or entrapment by degenerative vertebral changes/muscle fibers as they pass en route to the epidermis are thought to play a role in its pathogenesis.[5]

The differential diagnosis of NP includes other musculoskeletal pathologies that can cause pain in the thoracic vertebral region, such as osteoarthritis, cervical disc disease, cervical stenosis, osteoarthritis, vertebral fracture, malignancies, and dermatological pruritic diseases such as contact dermatitis, parapsoriasis, and neurodermatitis.[6] Therefore, owing to the nonspecific history and clinical findings of NP, it is often a diagnosis of exclusion.

Treatment of NP remains a challenge, as the neuropathic nature of the pruritus means it is not treatable using medications such as antihistamines and topical steroids used in the treatment of inflammatory dermatosis.[7] Equally, the often relapsing and remitting nature of symptoms, and the lack of clarity regarding etiopathogenesis, adds to the ambiguity of best treatment options. As a result, even though to date clinicians have used a wide variety of dermatological and neuromuscular therapeutic modalities ranging from topical agents (corticosteroids, capsaicin) and oral medications (antiepileptics, tricyclic antidepressants) to physical therapy (PT) modalities such as transcutaneous electrical nerve stimulation (TENS) and exercise, no first-line treatment has been identified.[4,6,8] The recent algorithm set out by Ansari et al.[9] based on a review of the literature suggests that exercise, manipulative therapy (MT), and PT modalities should be considered as the first line of treatment, combined with other treatment options where necessary, or sustained treatment response.

The purpose of this report is to present a case of NP treated with an exercise regimen and TENS and the positive response to treatment regarding symptom control.

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Case Report

A 61-year-old retired man presented to the physical medicine and rehabilitation outpatient clinic with a 7-year history of upper back pain that had become progressively worse. The patient described generalized upper back pain, which became concentrated in the right periscapular region over time. The pain was initially a pricking sensation, which had become an intolerable itch. The patient described the urge to itch as 8 of 10 on a numeric pain scale (NPS). There was no pain in the neck or upper limbs, nor weakness of the arms. There was no specific event that triggered the onset of symptoms. The generalized back pain was worse in cold weather. The patient had a past medical history of diabetes mellitus, hypertension, and benign prostatic hypertrophy and a drug history that included oral hypoglycemics, a thiazide diuretic and an alpha receptor blocker. He had been taking all medications for a considerable period without any side effects.

Physical examination revealed reduced, nonpainful active range of motion of the neck in all directions at the end of the normal range and a hyperpigmented area in the right dorsal paravertebral and infrascapular region with local paraesthesia (Fig. 1A and 1B). Neurologic examination of the extremities was unremarkable. Routine blood tests were normal and HbA1c was 6.0%. Magnetic resonance imaging of the cervical and thoracic spine was performed to rule out nerve root compression and revealed cervicothoracic spondylosis, disc protrusion at the level of C3-C4 with local narrowing of the spinal canal, minimal right paracentral disc protrusion at the level of T5-T6 and minimal left paracentral disc protrusion at the level of T6-T7. Hemangiomas were present in the vertebral bodies of T9 and T11. Electroneuromyography of the upper and lower extremities were performed due to the patient's longstanding history of diabetes mellitus and revealed an axonal sensorimotor polyneuropathy of the lower extremities. The patient was referred to a dermatologist where a dermatologic pathology was ruled out prior to a diagnosis of NP being made.

The patient was educated regarding the diagnosis and various treatment options available. He was not keen on taking anymore medications and preferred the idea of conservative treatment. A combination of PT, including treatment with physical modalities, on an outpatient basis was offered, which he also declined because of the distance between his home and the physical medicine and rehabilitation center. Finally, the patient agreed to comply with a home exercise program of thoracic paraspinal stretching and shoulder stretching and strengthening exercises. To stretch the thoracic paraspinals, the patient was directed to cross his arms at the mid forearm level and slowly roll forward until he felt the stretch in his upper back and to hold this position for 15 seconds. This exercise was to be repeated 5 times in 2 sets twice daily. Shoulder stretching involved standing with the feet slightly apart, using one arm to hold the other arm across and

Fig. 1. *A and B, Hyperpigmentation of the skin in the right infrascapular and paravertebral region in notalgia paresthetica.*

tightly against the body and rotating the upper body in the same direction as the cradled arm until the stretch in the area of the shoulder was felt; this position was to be maintained for 10 seconds. This stretch was repeated on both sides 3 times twice daily. Shoulder strengthening entailed forward and backward shoulder shrugging with the arms by the sides and straight arm forward and backward rotation through 360°. These exercises were to be repeated 10 times in 2 sets, twice daily. The patient was also advised to use his home TENS machine applied to the paresthetic area of the back at a frequency of 100 Hz for 15 minutes per day for the following 10 days.

The patient was reviewed 1 month later. He said he had complied with the treatments given and reported that the pruritus was now tolerable at 4 of 10 on an NPS. The patient did not report any side effects of treatment. Available treatment options were reviewed; once again, the patient opted to continue with the same home exercise program and further follow-up in a month's time was planned. The patient gave consent for this case report to be published.

Discussion

In the case described here, the patient's symptoms regressed when treated with exercise and PT modalities. Even though NP is a rarely reported entity, this may not be due to its rarity in clinical practice, but due to it being under-recognized and under-/misdiagnosed.[10] As NP can be considered a diagnosis of exclusion, in this case a dermatologist was consulted to rule out dermatologic disease and an electroneuromyography performed to rule out peripheral neuromuscular disease before the patient was finally diagnosed. It is believed that the NP was a result of thoracic spondylosis causing nerve entrapment, hence the gradual onset of symptoms and exacerbation of back pain in cold weather conditions. The following is a discussion of information in the literature on NP.

One case report focused on the positive effects of exercise in the treatment of NP.[11] The exercises used were based on stretching and strengthening of the muscles traversed by the dorsal spinal nerves as they make their way to the cutaneous tissue. Namely, daily strengthening of the rhomboids and latissimus dorsi and stretching of the pectoral muscles to correct a posture of protracted elevated scapulae and flexed upper spine was performed.

In a pilot study of a 12-week home exercise program consisting of daily stretching and strengthening exercises of the upper back and shoulder muscles and once weekly massage,[12] 11 of the 12 study participants' symptoms were satisfactorily ameliorated. However, the study was not conducted blindly and there was no control group; the selection bias, which may have resulted as a consequence of the methodology, was acknowledged by the authors of the study.

Another case report described the successful treatment of NP with postural corrective exercises, scapular and pectoral muscle strengthening, alongside the daily application of a lidocaine patch.[13] Although the patient's symptoms recurred on discontinued use of the lidocaine patch acutely, at the 3- and 7-month follow up the patient remained complaint free with exercise alone.

A study investigating the efficacy of physical modalities evaluated the efficacy of TENS (50-100 Hz, 20 minutes, 10 sessions over 2 weeks) in treating pruritus. They investigated 15 patients with NP who had a "relevant spinal pathology" in accordance with the NP dermatome.[14] The authors of the study hypothesized that TENS of large diameter fibers, as per the gate control theory, would inhibit nociceptive pain and pruritus being conducted to the dorsal horn via the C-fiber afferents. The patients were followed up for 2 weeks post treatment and showed a significant improvement in symptoms of pruritus at each of the weekly evaluations. No side effects of treatment were reported.

In a case report, a patient with NP secondary to spinal nerve entrapment following a car accident 2 years previously was treated with a single 20-minute session of osteopathic manipulative treatment.[15] In this case, suboccipital decompression to normalize parasympathetic nerves, muscle energy, and other soft tissue techniques such as stretching and kneading were used. Two weeks post treatment, the patient's symptoms of pruritus and neck and upper back pain had markedly reduced. In contrast, in the previously mentioned study, 5 of the 15 patients included in the study who had an NP lesion in the cervical dermatomes received vertebral manipulation in the form of cervical traction with no added therapeutic benefits.[14]

A research letter shared the outcomes of a retrospective telephone survey of patients with a clinical diagnosis of NP who underwent manipulative physiotherapy including targeted pressure and manipulation to release muscular spasm and improve thoracic facet and costovertebral joint mobility over a 6-week period.[16] Twenty of the 42 patients who had undergone treatment were contactable and of these, 65% reported a significant improvement in symptoms. The authors acknowledged the possible selection bias of the outcomes.

In one study, local intradermal botulinum toxin A (BTX A) injections were performed in 5 patients with NP who had previously received other pharmacologic treatments (topical corticosteroids, oral antihistamines, antiepileptics) without success.[1] The study followed 2 previous studies in which pruritus in a small number of NP patients had been successfully treated with BTX A.[17,18] Another study followed patients for 18 months; the study concluded that variable changes in pruritus made it difficult to draw any firm conclusions on the symptomatic benefits of BTX A in the treatment of NP. No side effects of treatment were reported for these studies.

In the case described here, the patient's symptoms regressed when treated with a home exercise program and PT modalities. This is in keeping with previous studies and emphasizes that even though NP can be a difficult diagnosis to make and treat, and patients may present to a whole

array of specialists, conservative treatments can be effective and maybe used as first-line treatments.

Limitations

This is a singular case report, so the patient's response cannot necessarily be extrapolated to other patients. In addition, it is not clear if the patient improvement was a direct result of treatment or the natural progression of disease. Moreover, the patient's compliance to treatment could not be determined objectively.

Future Studies

The primary goal of therapeutic treatment of NP is to minimize patient symptoms and improve quality of life. In this study, exercise and PT modalities reduced the patient's symptoms. In recent years, case reports and small studies on the efficacy of using exercise, MT, and PT modalities in the treatment of NP have yielded promising results. However, larger double-blind randomized controlled trials are necessary to consolidate these findings. Based on the findings of the studies conducted to date, and the widely accepted etiology of the sensory neuropathy of NP being nerve entrapment, exercise in the form of muscle stretching and strengthening and MTs used to relieve nerve entrapment may be considered a benign, conservative first-line treatment option. We suggest that it is important to provide patients with up-to-date medical information regarding the efficacy of both conservative and medical options available in the treatment of NP.

Conclusion

In the case described here, the patient's symptoms regressed when treated conservatively with exercise and PT modalities.

Funding Sources And Conflicts Of Interest

No funding sources or conflicts of interest were reported for this study.

Contributorship Information

Concept development (provided idea for the research): S.O., S.N.S.C., S.S.
Design (planned the methods to generate the results): S.O., S.N.S.C.
Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): S.O., S.N.S.C., S.S.
Data collection/processing (responsible for experiments, patient management, organization, or reporting data): S.S.
Analysis/interpretation (responsible for statistical analysis, evaluation, and presentation of the results): S.O., S.N.S.C.
Literature search (performed the literature search): S.O., S.N.S.C.
Writing (responsible for writing a substantive part of the manuscript): S.O.
Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): S.O., S.N.S.C., S.S.

Practical Applications

- This report describes the role of physical and manipulative therapy in the treatment of NP.
- We described what treatment options may be available to therapists when presented with a patient with NP.
- The evidence to date implies that PT and MT can be offered as a conservative care for patients with NP.

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