

Brachioradial Pruritus Case Misdiagnosed for a Decade: Cervical Nerve Compression and New Hypotheses for Seasonality, Capsaicin Response, and Icing

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Abstract

Idiopathic itching of the upper extremities or scapula is a seemingly dermatological condition confounded by an unexplained connection to ultraviolet (UV) exposure that together conspire to mask a frequent etiology in cervical nerve compression. This underlying cause is not commonly recognized outside of certain specialties, nor is it included in skin-related screening algorithms for general practitioners, resulting, together with frustratingly nonspecific diagnostic tools, in protracted suffering of patients. A case study reported here suggests synergistic diagnostic and treatment approaches that reflect the role of cervical nerve compression, including radiography, capsaicin response, and physical therapy. The patient experience supports an alternative hypothesis, occupational seasonality, to account for the apparent UV connection that should be evaluated in new epidemiological research that better isolates brachioradial pruritus from conditions with superficially similar presentations.

Keywords: occupational hygiene, capsaicin, seasonality, 'ice-pack sign', skin biopsy, cervical spine X-ray, CT scan

1. Introduction

Idiopathic itching of the upper extremities or scapula is a seemingly dermatological condition [for recent review see Mashoudy et al. (1)] that, although not altogether common, is more frequent in women of middle age and older. Patients typically report serious quality-of-life concerns associated with intense itching that can persist for years and for which no internal or topical treatments offer relief. Many report an itch-like sensation that is not satisfied by scratching (2,3), which suggests an origin deeper than the dermis. Many patients also report apparent seasonal patterns of the symptoms or their intensity, as well as day-to-day and/or year-to-year variation (4,5). The seasonality patterns have reinforced the original view that sun exposure may be an etiological factor (4), despite the absence of plausible mechanisms involving surfaces, such as the anterior forearms, that are frequently affected but seldom sun-exposed.

Typical treatment approaches following initial presentation [for recent review see Zakaria & Amerson (6)] include 1) over-the-counter moisturizers escalating to prescription moisturizers, 2) over-the-counter topical anesthetics escalating to prescription topical anesthetics, 3) intradermal testing for internal and topical allergenic agents, and 4) skin biopsy. These approaches rarely bring insights or resolution of symptoms, leading often to the advice, 'learn to live with it.' Definitive diagnostics are elusive; the most commonly cited diagnostic is the 'ice-pack sign' of relief upon icing (7), which is frustratingly nonspecific. Furthermore, the mechanism of icing is mysterious as it provides relief only during contact, unlike icing for sprains or strains. Popular reports suggest that some patients find idiosyncratic treatments that offer limited relief on a case-by-case, temporary, or intermittent basis (3). However, the more general failure of treatments causes anxiety and other psychological sequelae (8), and the protracted intense scratching can lead to abrasion, laceration, or bruising injury. The unexplained seasonality and skin-crawling sensations might reflect features of the condition that, if understood, could lead to more definitive diagnostics and/or more effective treatments.

This report aims to highlight cervical nerve compression (CNC) as an underlying cause of idiopathic itching, or brachioradial pruritus (BRP), as this mechanism has been implicated previously. This etiology is well-known enough among

specialist practitioners, but it deserves to be much better known among general practitioners because it may be responsible for a large yet unrecognized fraction of cases. As recently as November 2024, BRP was featured as a 'Medical Mystery' in the New York Times (3), supporting a rationale for making the condition more widely known. Despite this recent and very public attention, BRP remains generally underdiagnosed even by specialists. In a 2025 survey of 545 patients reported by Coscarella et al. (9), 38% of patients were diagnosed with BRP by dermatologists, 5% by neurologists, and 12% by general practitioners, but 36% of patients had no confirmed diagnosis. Furthermore, the most frequent first treatment strategies remain topical, although it has long been known that these treatments are poorly effective (9).

Idiopathic itch was described by Waisman in 1968 (4) as directly caused by sun exposure, which has greatly influenced research and practice and has led to skewed occurrence statistics that impede etiological understanding (10). Cohen et al. (10) reported that 57% of patients have some form of cervical radiculopathy, whereas prior studies reported as few as 13%. Mashoudy et al. (1) indicate that the 8% overall attribution of idiopathic itch to neuropathy is likely underestimated, and they report that as of 2025, few epidemiological studies linking itch to neuropathy are found in the literature. Alarming, also in 2025, Coscarella et al. (9) found that 85% of their respondents report exacerbated symptoms under heat or sun exposure, signaling that skewed basis sets might dominate prior analysis and that entirely new research that segregates these variables is required. A confirmed role for sun exposure would encourage future studies aimed at its mechanism, which might reveal that it is convolved with CNC through its controversial relationship to changes in blood pressure (11).

As presented in this work, attribution to CNC offers 1) more effective treatments, 2) simple functional diagnostic tests more specific than response to icing, and 3) an alternative interpretation of the peculiar seasonality that suggests strategies for new research.

2. Case study

The patient was an active 62-year-old woman in otherwise excellent health and fitness and with no previous reports of allergic dermatitis or other skin afflictions; she has consented fully to publication of her case in this report. She presented with

extreme bilateral itching of the anterior forearm surfaces, where her scratching routinely caused excoriations and light bruising. The symptoms began in the autumn and persisted through the winter, abating during spring. She reported the itching as extremely intense, coming on suddenly at any time of day or night without any apparent initiator, lasting up to many hours, and interfering with activities including sleep. She conveyed that the itching was different from that of insect bites or wound-healing, seeming to arise from a place deeper than the skin itself and with a sensation of skin crawling. A wide range of topical preparations offered no relief: moisturizers, astringents, chemical or mechanical exfoliants, clay masks, peel-off gel masks, or anesthetics; topical and internal antihistamines and analgesics were also ineffective.

These symptoms and annual patterns were consistent for seven years and were recorded by her dermatologist and primary care physician at each annual visit. Due to Covid-19, the patient switched to a primary care physician and dermatology group at a research university hospital near where she was isolating. The physicians she saw there for over two years offered neither a diagnosis nor relief. At that time,

she insisted upon a skin biopsy, which proved unremarkable. Around that time the patient herself discovered that one topical treatment, capsaicin, offered considerable symptomatic relief. In the ninth autumn the patient's independent literature research brought up BRP for the first time as a possible cause of idiopathic arm itching; innumerable continual prior searches over all the years had never led to this connection. For the rationale of the present report, the patient is a highly trained Ph.D. research scientist who routinely conducts productive literature searches on a wide range of biochemical and biomedical topics.

The patient requested her primary care physician to order an X-ray of the cervical spine, which confirmed moderate retro- and anterolisthesis and narrowing of the intervertebral spaces at C5-6 and C6-7. The patient then requested referral to a physical therapist, who suggested cervical retraction and a standard program of neck-strengthening exercises. A single movement, neck retraction, brought significant symptomatic relief within approximately three weeks' time. Thereafter, the neck-strengthening recommendations were abandoned as unnecessary additions to the patient's regular

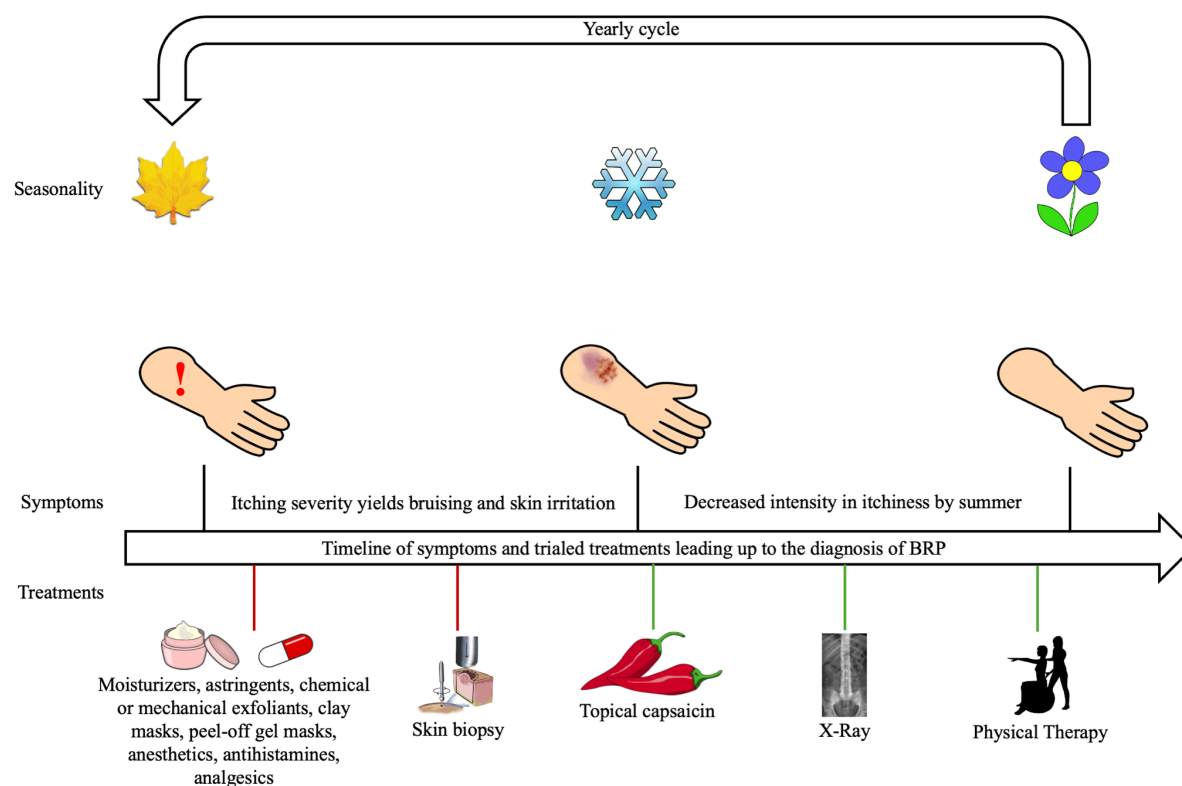


Figure 1. Timelines of the present case. The top line illustrates the repeated cycle of seasonality; the middle line illustrates the corresponding symptoms; the bottom line traces the progression of therapies.

program of strength training. The patient also realized her tendency toward cervical extension and made an effort to develop new habits to avoid it. Complete symptomatic relief has persisted without remission for over three years with occasional self-practice of neck retraction and no other interventions. The unexpected success of the mechanical treatment approach caused the patient to re-evaluate other possible contributing causes, particularly regarding the seasonality of her symptoms. This evaluation led to the realization that her employment had subtle seasonal patterns of physical activity that might be correlated with development of symptoms each autumn and their resolution each spring. Fig. 1 summarizes the overall trajectory of this case: the seasonal pattern of symptoms, trialed treatments, ultimate diagnosis, and successful therapy.

In retrospect, nearly every feature of the patient's itching was more consistent with a mechanical origin than with a dermatological one. The patient had no history of skin allergy. Thorough assessment of the patient's environmental conditions, including soaps and detergents, personal toiletries, fabric composition of clothing or bedding, etc. indicated that no changes were correlated with the annual seasonal development and resolution of itching. The skin biopsy provided no clues, a typical result for BRP (12). The day-to-day and year-to-year variability of itch intensity was better explained by CNC than by any dermatological involvement. The fact that only capsaicin offered symptomatic relief is also strongly suggestive of a neurologic rather than a dermatologic origin, given the known modes of action of capsaicin (13-16).

3. Conclusions and directions for future work

The confirmation of cervical spine compression on X-ray, together with the near-immediate and persistent relief upon physical therapy directed at the vertebrae of the cervical spine, comprise the strongest support for a diagnosis of BRP in this case. The principal clinical lessons from this report include the diagnostic value of considering cervical nerve compression in chronic idiopathic pruritus, the potential diagnostic value of physical therapy response, and the suggestion that neuropathic mechanisms may underlie cases that might otherwise be attributed to dermatologic causes. Certainly, any patient presenting with idiopathic arm itching should be considered a candidate for screening with cervical spine X-ray and/or computed tomography (CT) scan to evaluate nerve

compression. Interim screening that evaluates the response to capsaicin might be considered in analogy to the current nonspecific screening that uses icing, as well as the response to physical therapy. Although prior work suggests that capsaicin response is inconsistent (10), it remains possible that confounding of CNC and dermatologic causes mask an effect of capsaicin that might be revealed in research that better isolates CNC involvement. In addition, the possibility that the effectiveness of icing may reflect mechanisms shared by capsaicin should be investigated.

The confounding of CNC with ultraviolet (UV)-related etiologies has been duly noted in the literature for many years (1). The possibility of occupational seasonality raised here suggests that the apparent role of sun exposure should be tested among patients with idiopathic arm itching across a deep and wide demographic. Seasonality related to recreational activities other than sun exposure can be considered as well. Development of more effective diagnostic tools and algorithms will require sorting out these unrelated factors in new large-scale research efforts to capture variations in symptom presentation and response to therapy among demographic groups and underlying conditions. Future epidemiological work should also address whether CNC sheds light on the apparent gender (2,7) and possible familial (17,18) patterns of idiopathic arm [and scapular (17)] itching. Do gender patterns correlate with any known anatomic/neurologic differences, and do familial patterns suggest commonalities in the mechanical or neurological origins of BRP, or are these apparent correlates the result of confounding? The present report may also prompt recognition of previously neglected lines of evidence that implicate CNC.

Practitioners, including internists, dermatologists, radiologists, and physical therapists, need to be aware of the potential role of CNC in the etiology of idiopathic upper extremity itching. Given the likely high frequency of CNC involvement and the simple, effective, and synergistic diagnostic and treatment protocols reported here, it seems prudent that CNC involvement be elevated in diagnostic algorithms to rule it out prior to pursuing more invasive diagnostic procedures focused on systemic causes (19,20).

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