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Platelet-Rich Plasma as Long-Term Therapy for Refractory Pain in an Atypical Case of Morton's Neuroma: A Case Report

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Background: Morton's neuroma is a painful entrapment neuropathy typically affecting the third intermetatarsal space. Conventional therapies, including orthotics, corticosteroids, or surgery, often yield inconsistent outcomes.

Case Report: We describe a 26-year-old woman with chronic, persistent neuropathic pain due to an atypical Morton's neuroma located in the fourth intermetatarsal space. After failure of multiple conservative and infiltrative treatments, she received 2 injections of leukocyte-poor platelet-rich plasma (PRP). Pain severity (Visual Analog Scale) improved from 9/10 to 1/10, and the Foot Function Index improved by 75% at 12 months.

Conclusions: PRP provided durable analgesia and functional recovery in this rare neuroma presentation, underscoring its regenerative and neuromodulatory potential. Our case highlights the effectiveness of PRP as a promising, minimally invasive alternative when conventional treatments fail.

Key words: Platelet-rich plasma, Morton's neuroma, neuropathic pain, case report

BACKGROUND

Morton's neuroma is a chronic entrapment neuropathy characterized by perineural fibrosis, demyelination, and axonal degeneration of the interdigital nerve due to repetitive irritation or pressure, leading to pain, burning sensations, and numbness (1). It frequently affects the third intermetatarsal space (between the third and fourth toes) and less commonly the second intermetatarsal space (1,2). It also affects middle-aged women predominantly, with a prevalence of about 28% to 33% in the general population, including asymptomatic individuals (1). Treatment modalities like conservative, infiltrative, and surgical, including nonsteroidal anti-inflammatory drugs (NSAIDs), footwear modification, corticosteroid injection, and surgical neurectomy, often yield unpredictable outcomes and recurrence or incomplete relief (3). Therefore, we present a unique case of an atypical Morton's neuroma located in the fourth intermetatarsal space of a young woman, successfully treated with platelet-rich plasma (PRP) following the failure of standard conservative approaches.

CASE PRESENTATION

A 26-year-old physically active woman, with no prior medical comorbidities, presented to the pain clinic with a 3-year history of severe, burning pain localized to the plantar aspect of the left forefoot. She was referred from the orthopedic team due to unresolved pain. The pain, described as lancinating and radiating, was localized to the fourth intermetatarsal space and radiated distally to the fourth and fifth toes. Symptoms were exacerbated by ambulation, prolonged standing,

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and tight footwear and were associated with intermittent numbness and electric shock-like sensations. She reported progressive symptom severity with a baseline Visual Analog Scale (VAS) score of 9/10, significantly impairing her ability to walk or wear closed footwear. The patient had undergone multiple conservative interventions, including wide-toe footwear, NSAIDs, anti-neuropathic and opioid medication, physiotherapy, and several injections of botulinum toxin type A, prolotherapy using dextrose 5%, and a corticosteroid, all of which yielded only transient relief. She reported no history of trauma, systemic illness, or previous foot surgeries. Despite transient relief, her pain recurred and progressed in intensity (VAS 9/10), impairing her quality of life and daily activities.

Palpation over the fourth intermetatarsal space elicited sharp, lancinating pain, causing the patient to be in pain. Neurological examination was unremarkable for motor deficits. Ultrasound evaluation demonstrated a not specifically defined hypoechoic mass consistent with a neuroma in the fourth intermetatarsal space. After obtaining informed consent, the patient underwent a PRP injection. Blood (10 mL) was drawn, centrifuged to isolate 3 mL of leukocyte-poor PRP, and injected under aseptic technique using an 18G needle into the affected fourth intermetatarsal space (Figs. 1 and 2). Postprocedure, the patient was advised to rest for 48 hours, followed by a graduated return to normal activity. No adverse events or complications were reported. We administered a second PRP injection one month after the first, resulting in a total of 2 PRP injections given to the patient.

The patient was followed up at 1-, 3-, 6-, and 12-months postinjection. VAS scores steadily improved from 9/10 at baseline to 4/10 (1 month), 2/10 (3 months), and 1/10 (6 and 12 months). The Foot Function Index showed a 75% improvement at 12 months. She reported a complete return to normal ambulation, resumed physical activity, and remained asymptomatic at one-year follow-up.

DISCUSSION

Morton's neuroma remains an enigmatic and often misunderstood entrapment neuropathy, with a significant portion of patients experiencing persistent symptoms despite standard interventions. It is primarily characterized by perineural fibrosis, neural edema, and axonal degeneration, typically affecting the third intermetatarsal space (1,2). However, involvement of the fourth intermetatarsal space, as presented in ou case, is atypical and diagnostically elusive, often resulting in delays in targeted treatment and increased patient morbidity. The pathophysiology involves chronic mechanical compression leading to nerve degeneration, perineural fibrosis, and a cascade of neuroinflammatory responses (1,2).

Conservative management strategies include footwear modifications, orthotics, NSAIDs, corticosteroid or alcohol injections, and physical therapy (3). Surgical intervention, often a last resort, is associated with variable success rates and a significant risk of incomplete relief (3). Given these limitations, PRP therapy has emerged as a regenerative treatment for a range of chronic musculoskeletal and neuropathic disorders. PRP, as an autologous concentrate of platelets suspended in plasma, has gained traction as a biological therapy for musculoskeletal and peripheral nerve disorders. Enriched with growth factors, such as platelet-derived growth factor, transforming growth factor-beta, and nerve growth factor, PRP may accelerate angiogenesis, modulate neuroinflammation, and support axonal regeneration (4).

Our case illustrates the potential of PRP as a durable and minimally invasive treatment option in cases of atypical Morton's neuroma resistant to conventional therapy. While corticosteroid injections offer transient relief by modulating local inflammation, they do not address the underlying fibrotic and degenerative changes. In contrast, PRP introduces a milieu of growth factors that promote angiogenesis, modulate neuropathic pathways, and stimulate neuroregeneration (3,4). To date, limited literature exists on the application of PRP in Morton's neuroma, particularly in atypical anatomical variants. The unique aspect of this case lies not only in the anatomical rarity of the neuroma, but also in the sustained pain resolution with a single PRP injection, highlighting its potential to modulate chronic neuropathic processes beyond mere analgesia. The successful outcome after PRP injection reflects its emerging utility as a minimally invasive and durable alternative to surgery in patients with atypical neuropathies.

Recent studies have demonstrated PRP's efficacy in various musculoskeletal and neuropathic conditions. For instance, a systematic review and meta-analysis by Pretorius et al (5) highlighted level I evidence of PRP's efficacy in the treatment of osteoarthritis, epicondylitis, bursitis, compressive neuropathy, plantar fasciitis, muscular injuries, and osteochondral lesions. Although direct studies on PRP for Morton's neuroma are limited, the shared pathophysiological features with plantar

Fig. 1. Leukocyte PRP prepared and obtained from the patient's own blood.

Fig. 2. PRP injected into the affected fourth intermetatarsal space under aseptic conditions.

fasciitis suggest potential applicability. In the presented case, the patient exhibited significant and sustained pain relief following a PRP injection, with a reduction in the VAS score from 9/10 to 1/10 over a 12-month period. This outcome aligns with the regenerative and anti-inflammatory properties of PRP, suggesting its efficacy in treating refractory Morton's neuroma, particularly in atypical anatomical locations.

Despite these promising results, it is imperative to acknowledge the need for standardized protocols in PRP preparation and administration. Variations in platelet concentration, activation methods, and injection techniques can influence clinical outcomes. Therefore, further randomized controlled trials are warranted to establish optimal PRP protocols and validate its efficacy in Morton's neuroma management.

Limitations

As a single-patient report, generalizability remains limited. Standardization of PRP preparation (i.e., platelet concentration, leukocyte content, activation method) is required to ensure reproducibility. Future randomized controlled trials should compare PRP with corticosteroid and surgical modalities in refractory neuroma management.

CONCLUSIONS

PRP therapy offers a minimally invasive, biologically plausible, and potentially effective alternative for patients with refractory Morton's neuroma, especially in atypical presentations. In our patient, PRP led to marked and sustained pain relief, restored function, and eliminated the need for invasive surgical intervention. Its regenerative capabilities, coupled with a favorable safety profile, position PRP as a valuable addition to the therapeutic armamentarium for peripheral nerve entrapment syndromes. Further randomized trials are warranted to establish optimal protocols, injection frequencies, and long-term efficacy in broader patient populations.

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