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Sarcoidal Granulomatous Reaction on a Scar Post-Microneedling: A Case Report

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Abstract

Microneedling is a popular dermatologic procedure for improving skin texture, scars, and overall rejuvenation through controlled dermal micro-injuries. While generally safe, rare complications such as granulomatous reactions have been reported.

We present a case of a 51-year-old Filipino female who developed a sarcoidal granulomatous reaction after unsupervised use of an 8-in-1 microneedling home device. The patient, with no history of allergies or prior cosmeceutical use, developed a tender, reddish-brown nodule over a scar on her right medial eyebrow two weeks after completing two microneedling sessions spaced one week apart. A biopsy of the lesion revealed circumscribed epithelioid histiocyte aggregates consistent with sarcoidal granuloma, with negative stains for fungi and mycobacteria and normal systemic workup for sarcoidosis.

The reaction was attributed to hypersensitivity to nickel from the dermaroller needles combined with trauma-induced immune activation in the scar tissue. The patient was treated with two sessions of intralesional triamcinolone acetonide injections (10 mg/ml), administered two weeks apart, resulting in 90% resolution of the lesion with residual hyperpigmentation after one month. No recurrence was noted after one year of follow-up.

This case highlights a rare complication of microneedling, especially when performed on scar tissue with altered immune function. Nickel hypersensitivity and trauma appear to play pivotal roles in the pathogenesis, triggering a Th1-mediated immune response that leads to granuloma formation. Early recognition and treatment with intralesional corticosteroids demonstrated favorable outcomes.

The report underscores the importance of patient education on the risks of unsupervised microneedling, particularly on scar tissue, and emphasizes sterile technique and professional supervision. Further studies are needed to understand the mechanisms and risk factors for granulomatous reactions to develop effective preventive measures.

Keywords: adverse events, granulomas, microneedling, sarcoidal granuloma

Introduction

Microneedling is a widely used dermatological procedure designed to enhance skin texture, reduce the appearance of scars, and promote skin rejuvenation through controlled micro-injuries to the dermis. This procedure stimulates the production of collagen and elastin is considered safe and minimally invasive.[1]

Facial granulomatous reaction to microneedling is a rare complication with 12 cases reported in the English language literature.[1,2] Previously reported cases showed foreign body-type granulomas while a recent case demonstrated sarcoidal-type granuloma on biopsy. Vitamin C and nickel from the needles have been postulated to act as antigen which triggered the granulomatous reaction.[1,2,3] This case report aims to raise awareness that certain ingredients, metals, and immune function can actually trigger appearance of sarcoidal granulomatous reaction.

Case Report

A 51-year-old Filipino female with no history of drug or cosmetic allergies presented with a red nodule overlying a scar on the right medial eyebrow that developed two weeks after using an 8-in-1 microneedling home device without medical supervision. No serum, cream, or other chemicals were applied to the treated area at any point before, during, or after the procedure. Following two microneedling sessions spaced one week apart, she noticed the emergence of a tender, red nodular plaque which progressively increased in size. No systemic symptoms were noted.

During her initial consultation, cutaneous examination revealed a 1.4 cm x 0.5 cm reddish-brown nodule on the right medial eyebrow (Figure 1A). Polarized dermoscopic examination showed a central linear white area, orange transluscent areas, fine white scaling and linear and branching vessels (Figure 1B). A 3-mm punch biopsy was performed, which revealed circumscribed nodular collections of epithelioid histiocytes surrounded by few lymphocytes in the dermis, reminiscent of a sarcoidal-type granulomatous reaction (Figure 2). Tissue stains for fungi and mycobacteria were negative. No polarizable material was observed. A systemic work-up to rule out sarcoidosis was all within normal limits.

The patient received two sessions of intralesional triamcinolone acetonide injections, administered two weeks apart. Each injection consisted of 0.2 ml of Triamcinolone acetonide (10 mg/ml) diluted equally with lidocaine and injected 45 degrees along the sides of the plaque using a gauge 32 needle. There was 50% flattening of the nodular plaque 2 weeks after injection (Figure 3A) and 90% improvement with hyperpigmentation 1 month after (Figure 3B). The patient did not experience any recurrence after 1 year of follow up (Figure 3C).

Figure 1: Baseline clinical photo (A) and dermoscopy (B) showing orange translucent areas (black arrows), fine white scaling (white stars), linear and branching vessels (white arrows), and central linear white structures (black stars).

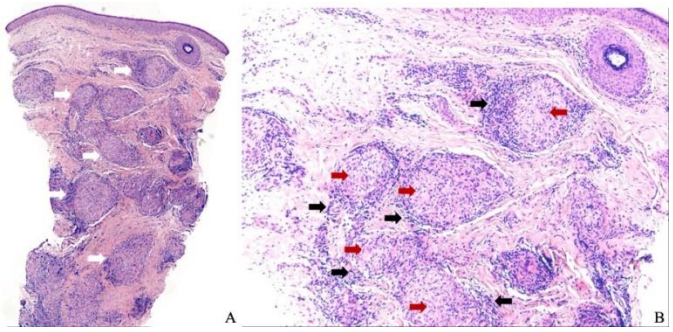

Figure 2: Hematoxylin and eosin stain, ×4 magnification (A) shows circumscribed sarcoidal granulomas in the dermis (white arrows), composed of epithelioid histiocytes (red arrow) and lymphocytes (black arrow), highlighted at ×10 magnification (B).

Figure 3: Follow-up photos during intralesional triamcinolone acetonide (TA) treatment: 2 weeks after the 1st TA injection (A), 2 weeks after the 2nd TA injection (B), 1 year after the initial consult (C), and dermoscopy after 1 year (D) showing a linear white area (black stars) with no visible blood vessels.

Discussion

Microneedling is a common dermatologic procedure that involves creating controlled micro-injuries to the skin to stimulate collagen and elastin production, enhancing skin texture and reducing scars.[1] Although generally safe and minimally invasive, microneedling can sometimes lead to rare complications such as granulomatous reactions.[1,2] This case contributes to the limited literature on granulomatous reactions following microneedling, specifically highlighting a sarcoidal-type granuloma that developed after the unsupervised use of a microneedling home device.

Sarcoidal granulomatous reactions are characterized by aggregates of epithelioid histiocytes and are often triggered by infections and foreign bodies.[3] In the context of microneedling, they may arise due to the introduction of foreign antigens or materials into the skin, such as Vitamin C or nickel from the needles, which have been reported as potential triggers in previous cases.[1,2,4,5] In a publication by Yadav and Dogra, a case of a cutaneous reaction to microneedling for post-acne scarring caused by nickel hypersensitivity, confirmed by a patch test and attributed to nickel exposure from the microneedling device.[4] The patient was treated with oral prednisolone 30mg daily for 5 days, followed by mild topical corticosteroids, resulting in lesion clearance. In another study by Heck and Traboulsi[1], a case of a granulomatous reaction following microneedling combined with the application of a vitamin C serum. Patient was initially treated with clobetasol 0.1% ointment twice daily for 6 weeks and intralesional triamcinolone acetonide 5mg/ml. A similar case of a sarcoidal granulomatous reaction following

microneedling and topical Vitamin C application was reported by Handal et al.[2] Patient was initially managed with triamcinolone 0.1% ointment and was offered intralesional triamcinolone injections. Both patients were eventually lost to follow-up. The authors suggested that the introduction of vitamin C serum through microneedling may have triggered an immune response, leading to this rare type of granulomatous reaction.

In our patient, no cosmeceuticals were used, and the sarcoidal granulomatous reaction is attributed solely to microneedling, likely due to hypersensitivity to nickel from the dermaroller needles or trauma-induced immune activation. Microneedling with nickel on a scar can trigger such a reaction through a combination of these mechanisms. Nickel, a known antigen, is processed by macrophages and presented to CD4+ Th1 lymphocytes via HLA class II molecules, initiating a Th1-mediated immune response. This cascade involves cytokines like IL-12, IFN-γ, TNF-α, and IL-2, which activate macrophages, transform them into giant cells, and recruit additional immune cells, resulting in granuloma formation.[3] Scar tissue's altered immune function and heightened inflammatory state further amplify this response, with both trauma and nickel exposure acting as key triggers.

The patient was successfully treated with intralesional corticosteroids, a common therapeutic approach for cutaneous sarcoidosis. Triamcinolone acetonide, administered at two-week intervals, led to a significant reduction in the size of the nodule with 50% improvement after two weeks and 90% improvement with residual hyperpigmentation after one month. No recurrence was observed after one year of follow-up, indicating a favorable outcome and reinforcing the efficacy of intralesional corticosteroid therapy for this rare complication.

Conclusion

This case report highlights a rare sarcoidal granulomatous reaction following the unsupervised use of a microneedling home device, likely triggered by hypersensitivity to nickel from the dermaroller needles or trauma-induced immune activation. The microneedling was performed on a scar, an area with altered immune function that may have amplified the reaction. The patient's response contributes valuable insight into the literature on microneedling complications. Early recognition and intervention with intralesional corticosteroids demonstrates the effectiveness of this approach in managing these sarcoidal granulomatous reactions. This case emphasizes the need to consider rare complications in microneedling, especially in scar tissue. It also underscores the importance of patient education on the risks of at-home microneedling, emphasizing sterile technique and professional supervision. Further research is needed to better understand the pathogenesis of these reactions and identify preventive measures in patients undergoing microneedling procedures.

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