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Hair Therapy and Transplanatation

Case Report

# Scalp Psoriasis Onset as Koebner Phenomenon After Hair Transplantation

**Graziella Babino***

*Department of Dermatology, University of Campania Luigi Vanvitelli, Naples, Italy*

## ABSTRACT

Surgical incision might cause Koebner phenomenon in patients with cutaneous disease as well as in people without a pre-existing dermatosis. Scalp psoriasis is considered a difficult-to-treat area in psoriasis patients, since its management may be challenging given to the common resistance to topical and systemic agents. We present a 44-year-old man without any prior history of psoriasis, who reported the onset of scalp psoriasis after hair transplantation for the treatment of his androgenetic alopecia. Furthermore, the patient developed psoriatic arthritis and was successfully treated with the anti-TNF-alpha agent adalimumab, being the efficacy maintained on 1 year of follow-up.

**Keywords:** Psoriasis; Hair transplantation; Koebner phenomenon; Adalimumab; Anti-TNF-alpha agent

## INTRODUCTION

Psoriasis is an inflammatory skin disease that is mainly associated with immune-mediated pathogenesis, and affects approximately 3% of the general population [1]. Scalp Psoriasis (SP) represents a difficult-to-treat area in psoriasis patients and manifests a significant burden on quality of life given the location in visible areas and the related symptoms of scaling and pruritus [2].

The Koebner Phenomenon (KP) is defined as the development of isomorphic pathologic skin lesions on the uninvolved skin as a consequence of traumatic attacks in patients with cutaneous diseases (psoriasis, lichen planus, vitiligo) or even in people without a pre-existing dermatosis [3]. KP occurs in about 25% of psoriatic patients after various traumatic injuries, including physical trauma, friction, surgical incision, burns, radiations, medications, needle acupuncture and tattooing [4]. Herein, we present a case of novel SP onset after hair transplantation for the treatment of androgenetic alopecia, and to our knowledge, no similar description has been reported before.

## CASE PRESENTATION

A 44-year-old man presented with small, erythematosus, scaly plaques concentrated on the scalp, with dotted vessels and white scales on a reddish background seen at dermoscopy (Figure 1). These lesions occurred at the age of 38, three weeks after hair transplantation through robotic Follicular Unit Extraction (FUE) for his androgenetic alopecia treatment. No other lesions were observed elsewhere on the skin surface. Prior to our visit, the patient was firstly diagnosed with seborrheic dermatitis and treated with topical corticosteroids and antifungal preparations without any clinical improvement. An incisional punch biopsy was performed in our department and histological examination showed marked hyperkeratosis, parakeratosis with neutrophils, elongated rete ridges and lack of granular layer. Based on clinical and histopathological findings a diagnosis of SP was made. Tracing his history, the patient referred a family history for Psoriatic Arthritis (PsA). After unsuccessful treatment with a calcipotriene/betamethasone dipropionate foam, cyclosporine 3.5 mg/kg/day was administered for 6 months, experiencing unsatisfactory disease control. Furthermore, the patient developed intense joint symptoms symmetrically localized at proximal interphalangeal joints (subjective pain Visual Analogue Scale (pain-VAS) of 70 and Disease Activity Score (DAS) 28CRP4, DAS28-CRP4, of 3.75) and was referred to our consultant reumathologist to confirm the suspected diagnosis of PsA. Hence, adalimumab was administered at the recommended PsA dose. Three months following the start of adalimumab, both SP and PsA (pain-VAS 10, DAS28-CRP4 1.88) have improved considerably (Figure 2). On 1 year of follow-up, the patient had no recurrence of SP and PsA and no side effects under adalimumab treatment.

**Correspondence to:** Graziella Babino, Department of Dermatology, University of Campania Luigi Vanvitelli, Naples, Italy, E-mail: graziella.babino@hotmail.it

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**Figure 1:** A) Clinical presentation of the scalp psoriasis; B) Dermoscopy characterized by typical dotted vessels and white scales on reddish background.

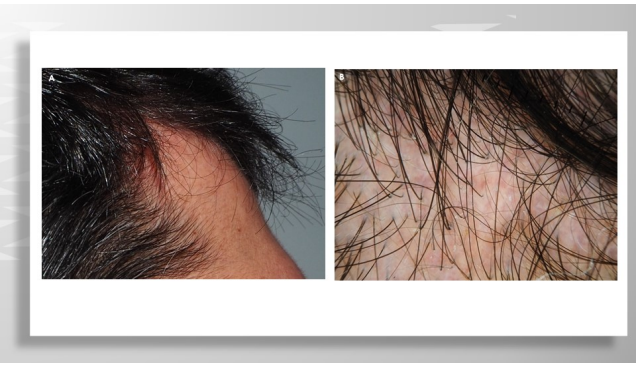

**Figure 2:** A) Clinical remission of the scalp psoriasis; B) Dermoscopic remission of scalp psoriasis following adalimumab treatment.

## RESULTS AND DISCUSSION

The pathogenesis of KP has not been completely understood, since it may involve nonspecific inflammatory elements, including cytokines, stress proteins, adhesion molecules or autoantigens [4]. Above all nerve growth factor, substance P, Tumour Necrosis Factor (TNF)-α and interleukin-1 could play important roles in the pathomechanism of KP in psoriasis [5].

Psoriatic lesions affecting scalp are considered difficult-to-treat and require specific management, since its treatment may be challenging given to the common resistance to topical and systemic agents. In patients with difficult-to-treat psoriasis, adalimumab, a fully human monoclonal antibody against TNF-α, has been shown to significantly improve SP and the correlated quality of life of affected patients [2].

Although reports of KP caused by surgery incision are limited, KP has been shown to develop after orthopaedic procedures. Firstly, Higuchi et al., have been described the onset of psoriasis on both lower extremities in a 55-year-old woman after an implanted ceramic-on-ceramic total hip arthroplasty, and the subsequently complete remission of the psoriatic lesions after revision surgery [6].

In another case report, a 22-year-old man without a history of psoriasis has been reported KP, induced by failed revisional orthopaedic surgery for non-union of the left femoral shaft fracture. Two months after the second revision surgery, KP was noted by psoriasis presented at the surgical scar, left thigh, scalp and trunk. Although phototherapy and topical treatments have been prescribed with limited effects, psoriasis remitted gradually with bone union after the third revision surgery which successfully corrected the implant failure [7].

Furthermore, a 67-year-old woman with multiple myeloma who developed pityriasis amiantacea following a bone marrow transplant has been described. Pityriasis amiantacea is a hair disorder characterized by scaling of the scalp and temporary alopecia, and may represent psoriasis, seborrheic dermatitis, atopic dermatitis, bacterial infection or fungal infection. During the 4 months following the bone marrow transplant, the patient developed multiple lesions of pityriasis amiantacea that rapidly responded to topical therapies, including mineral oil under occlusion and daily shampoos with alternating coal tar, salicylic acid and ketoconazole [8].

On the other hand, remission of psoriasis after bone marrow transplantation have been reported in a 40-year-old-man, with acute myelocytic leukemia, in a 36-year-old-man and a 12-years-old-child both affected by aplastic anaemia, and in a 49-year-old man with chronic myelogenous leukaemia [9-12]. The authors have been established that the alteration of the host's immune system cells may have been involved in the remission of the psoriasis.

To date, there are no studies reporting SP induced by hair surgery. In our case, the patient did not have any prior history of cutaneous disease and, three weeks after hair transplantation through robotic FUE for his androgenetic alopecia treatment, developed KP noted by small, erythematosus, scaly plaques located on the scalp, diagnosed as psoriasis following an incisional punch biopsy. Clearly, Koebner lesions should be treated in the same way as the associated dermatosis, as our present patient did. After initial ineffective treatment with a calcipotriene/betamethasone dipropionate foam and oral cyclosporine, our patient experienced notable improvement of both SP and PsA with the anti-TNF-α adalimumab and the efficacy was maintained after 1 year of follow-up.

## CONCLUSION

In conclusion, our case reported for the first time the novel onset of SP, induced by hair transplantation for the treatment of androgenetic alopecia, in a patient without any prior history of psoriasis. Furthermore, the patient developed PsA and was successfully treated with adalimumab, without psoriasis recurrence and side effects. Studies that are more extensive are needed to support the significance of these data.

## CONFLICT OF INTERESTS

There is no conflict of interest between the authors.

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