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# Serpiginous hypopigmentation secondary to intra-articular corticosteroid injection

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## Abstract

Corticosteroids have been a mainstay of therapy for the treatment of many inflammatory diseases for well over 50 years. Cutaneous side effects of local corticosteroid therapy include striae, thinning of the skin, hypopigmentation, and atrophy, which are well-known complications of this treatment modality. Herein, we present an unusual cutaneous adverse side effect rarely seen in intra-articular corticosteroid injections.

*Keywords: corticosteroids; serpiginous hypopigmentation*

## Introduction

A 49-year-old woman with skin type V was referred to our clinic with irregular hypopigmentation of the knees. She reported new onset of a hypopigmented patch over her left knee approximately 3 months prior to evaluation, which gradually spread in a serpiginous fashion to involve her lateral leg, above and below the knee. She also noticed a smaller area of linear hypopigmentation on the lateral right knee. She denied any associated symptoms such as itching, pain, or discomfort. She denied any previous redness or irritation of the involved. She also denied any problems with her leg veins in the past (i.e. thrombophlebitis).

Her past history was significant for osteoarthritis of the knees. She had been followed by physical therapy for her knee pain for several months. Her therapy had consisted of stretching, strengthening,



**Figure 1.** Left knee, 3cm hypopigmented patch with serpiginous hypopigmentation and atrophy.

and application of local heat. In addition, she had undergone intra-articular corticosteroid injections consisting of 3 mL of triamcinalone 40mg/mL in both knees approximately two months prior to noticing the hypopigmentation.

On examination, the patient had a 3cm hypopigmented patch over the left knee with serpiginous hypopigmentation and subtle atrophy, apparently coursing over superficial veins involving an area of approximately 10 x 20cm (**Figure 1**). She also had a 2-3cm linear area of faint hypopigmentation over the right lateral knee as well. She had no other similar hypopigmented areas over her face, back, arms, hands, or feet.

Eighteen months later hypopigmentation of the right knee had resolved and some peripheral areas

of hypopigmentation on the left knee had improved, but the majority of the lesion persisted.

## Case Discussion

Corticosteroids are an important treatment modality in the treatment of inflammatory disease. Systemic cortisol was used in the early 1950s to treat inflammatory dermatoses and in 1952 hydrocortisone was first effectively used in a topical formulation [1]. Intra-articular corticosteroids were shown to be beneficial for rheumatoid arthritis patients in 1951 [2]. The first clinical reports of atrophy after topical application or local injection of corticosteroid compounds appeared soon after their initial use as local agents in 1952 [3]. Cutaneous side effects such as striae, thinning of the skin, hypopigmentation, and atrophy are well-known complications of topically applied corticosteroids. The risk of developing these adverse effects is increased if the medication used is of high potency, used for prolonged duration, or is used in high risk areas [1].

A more unusual adverse effect seen with local corticosteroid treatment is linear or arborizing hypopigmentation and/or atrophy, which can be seen rarely after intralesional or intra-articular injections [4]. This distinctive pattern is hypothesized to result from perivascular spread, passage along the venous adventitia, or by lymphatogenous spread [4]. Cases of linear hypopigmentation after intralesional or intra-articular corticosteroid injection of the Achilles tendon, hand, ankle, forehead, metatarsalphalangeal joint, knee, thumb, sternum, and calf have been reported [3, 5-7]. Potential contributing factors may include high potency corticosteroid, increased number of injections at a given site, high dosage, injection technique (i.e. inadvertent extra-articular injection), excessive leakage from the joint space, and aberrant lymphatic drainage [8]. In the 1960s, case series reported subcutaneous atrophy and altered pigmentation in 3% of patients treated with local triamcinolone injections [3]. One study of 48 patients undergoing local corticosteroid injections reported 4 patients with subcutaneous atrophy and two with leukoderma [3]. In more recent years, the incidence of cutaneous adverse effects related to corticosteroid injections has been very infrequently reported. This is likely owing to a better understanding of the risk factors mentioned above and subsequently

improved technique and treatment protocols.

The clinical presentation of linear hypopigmentation related to corticosteroid injection often includes hypopigmentation near the injection site that slowly progresses outward [9]. Patients can present with hypopigmentation only, atrophy only, or both simultaneously [7]. The initial symptoms of hypopigmentation and/or atrophy, may be delayed by one to four months after the injection [3]. The hypopigmentation and atrophy may gradually resolve over several months, but there have been cases of lesions that did not resolve [3, 5, 9].

The mechanism of this linear hypopigmentation is not well-elucidated, but it has been proposed that corticosteroid injection may cause reduced numbers or activities of melanocytes [5]. In 2009, Venkatesan presented a patient who developed linear hypopigmentation after intra-articular injection of corticosteroid for De Quervain's tenosynovitis. A biopsy of the hypopigmented area was performed, including MART-1 immunostaining, which showed intact melanocytes at the dermal-epidermal junction, suggesting that the underlying mechanism of hypopigmentation involves a decrease in function, rather than number of melanocytes [10].

## Conclusion

Linear hypopigmentation and/or atrophy are rare, but known potential side effects of intralesional or intra-articular corticosteroid injection should be discussed with patients accordingly. The risk of hypopigmentation or other cutaneous adverse effects may be minimized by appropriate selection of corticosteroid potency, dosage, frequency of injections, and proper injection technique. It is important for medical providers utilizing corticosteroid injections to be aware of, and recognize, this potential complication of a commonly used treatment modality.

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