Hypopigmentation and Subcutaneous Fat Atrophy Associated with Corticosteroid Injection: A Case Report and Literature Review

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Hypopigmentation and Subcutaneous Fat Atrophy Associated with Corticosteroid Injection: A Case Report and Literature Review

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Abstract:

Corticosteroid injection has been shown to be an effective treatment modality in musculoskeletal and rheumatological conditions. Yet, the potential adverse effect of corticosteroid injection is has not been given much attention. One of the potential dermal adverse effects which should be considered by clinicians is hypopigmentation and subcutaneous fat atrophy. The aim of this case report is to highlight the importance of providing adequate information to patients regarding these dermal adverse effect of corticosteroid injection. We report a case of 31 year old female who suffered cosmetically unpleasant skin hypopigmentation and subcutaneous fat atrophy after triamcinolone injection given for de Quervain tenosynovitis.

1. Introduction

De Quervain tenosynovitis is the most common overuse injuries of the wrist resulting from repetitive microtrauma and shearing of the first dorsal compartment tendons[1]. The condition was first described by de Quervain, a Swiss surgeon in 1895[2]. Initially, it is managed conservatively with oral nonsteroidal anti-inflammatory drugs (NSAIDs), immobilization, diathermy, splinting, massage, and corticosteroid injection. Operative treatment is reserved after failure of the conservative therapy. Corticosteroid injection is more favorable among other nonoperative treatments and has the highest treatment success rate compared with oral NSAID, splinting, or combination therapy[3,4].

Corticosteroid injections are frequently administered to treat pain associated with rheumatic and musculoskeletal disorders. Corticosteroid injection has been registered as local treatment of varying conditions, such as rheumatoid arthritis, tendinopathy, bursitis, synovitis, epicondylitis, ganglion condition, neuromas, fasciitis, back pain, and entrapment syndrome[5]. Various location of local corticosteroid injections include tendon sheath, bursal, enthesis, intraarticular, soft tissue, and epidural[6]. In spite of its common use in practice, the adverse effects associated to corticosteroid injection is not adequately appreciated.

2. Case report

A 31 year-old right-handed Asian female, presented with 2 weeks history of pain on her right wrist. The pain travelled up her forearm and substantially aggravated with movement. She reported a Numeric Rating Scale (NRS) of about 5–7 (on 11-point scale). There was no history of prior trauma. Her past medical history was noncontributory. On examination, there were swelling and tenderness on the lateral aspect of her right hand. Finkelstein test result was positive. Therefore a clinical diagnosis of de quervain syndrome was made. She was initially treated conservatively with nonsteroidal anti-inflammatory drugs (NSAIDs). After 10 days of this treatment without significant improvement, she subsequently had a single local corticosteroid injection. She received a mixture of 1 mL triamcinolone acetonide 10 mg/mL and 1 mL of 1% lidocaine hydrochloride. Injection was performed using 26 G needle, advanced at an angle of 45° angle toward the peritendinous sheath of the first dorsal compartment. The procedure went uneventful. She was also placed in a thumb spica orthoses. No infection was noted after the injection. Post-injection NRS was 3–4 and the pain resolved completely after 3 weeks. A month following the injection, she noticed a depressed, hypopigmented area around the needle insertion site on her brown toned skin. The lesion measured 1 x 1.6 cm. Neither motor nor sensory impairment were present on her follow up examination. One and a half year later, her hypopigmented skin and subcutaneous fat atrophy resolved gradually without any specific treatment.

3. Discussion

Corticosteroid injection is a well established treatment modality in alleviating symptoms of de quervain syndrome [7]. It is also increasingly used for other musculoskeletal and rheumatic conditions[5]. Yet, the adverse effects of corticosteroid injections has not been given much attention. Possible major adverse effects of corticosteroid injections ranged from minor to major manifestation. Major adverse effects include tendon ruptures, necrotizing fasciitis, severe soft tissue atrophy, osteomyelitis, severe soft tissue atrophy, and hypopigmentation. Whereas minor adverse effects that could occur include disturbance in menstruation, steroid flare, milder soft tissues alteration, and skin rash[8].

Frequently used corticosteroids are, methylprednisolone, triamcinolone, dexamethasone, and betamethasone. Each preparation differs in their potency, costs, corticosteroid related reactions, and duration of actions[6]. The solubility of a preparation has an inverse relationship with the duration of action. The more soluble a preparation, the shorter duration of action the preparation has, because it is absorbed from the joint faster. Triamcinolone acetonide is the least soluble steroid hence it has a longer duration of action. This long lasting duration of action is the reason why the majority of clinician preferred this compound[9]. However, less soluble steroid may have more deleterious effect on adjacent soft tissues[6,8]. The size of affected area and length of time of such dermal adverse effects is possibly influenced by the concentration and solubility of the corticosteroid preparation [10].

The incidence of skin hypopigmentation is reported ranging from 1.3–4%, whereas subcutaneous fat atrophy is found ranging from 1,5%–40% in 5 studies[5]. Although the incidence of hypopigmentation associated with corticosteroid injection was considered to be low, it could be bothersome for patients once it happens. Moreover, a recent review by Pace et al found that the incidence of soft tissue adverse effect associated with corticosteroid injection in the management of de Quervain tenosynovitis and lateral epicondylitis is reportedly as high as 31% and up to 40%, respectively. Patients with darker skin tone have a greater risk of developing a noticeable hypopigmentation [8,11].

According to other case reports, hypopigmentation may develop 1–4 months later following single or multiple injection. However, late manifestation of up to 10 months have been reported. It then resolves after 6–30 months in the majority of cases. A few cases may

be irreversible [8,12]. Similar to our experience, our patient developed skin hypopigmentation and soft tissue atrophy after 3 months following a single injection with triamcinolone acetonide and resolved spontaneously within one and a half year later. There is no specific treatment for hypopigmentation. Fat grafting, serial normal saline infiltration, and temporal fascial implantation are a few of treatment options that may be considered with regard to refractory soft tissue atrophy[12].

Subcutaneous fat atrophy and skin hypopigmentation associated with triamcinolone injection have been reported to affect several injection site, depends on where it previously has been injected. Dhawan et al reported such dermal adverse effect after intralesional injection in 2 patients for ganglion over wrist and a patient for lichen planus on the foot[13]. Salvatierra et al described such lesion after triamcinolone injection for tennis elbow[9]. Other author reported atrophic and hypopigmented lesion in the postauricular region following multiple intralesional triamcinolone acetonide for treatment of a keloid on the left ear[14]. Other report of such lesion is observed after intralesional injection on the eyelid of a 2-year-old girl with chalazion[15].

The pathophysiology of soft tissue atrophy and skin hypopigmentation associated with corticosteroid injection has not been clearly elucidated. The number of melanocytes are not affected in corticosteroid-induced hypopigmentation. However, their function was impaired. A histopathological study by Gu et al revealed reduced melanin[16]. Concerning soft tissue atrophy, it has been suggested that corticosteroid has antiproliferative effects on keratinocytes and fibroblasts. In addition, it also known that corticosteroid alters the metabolism of extracellular matrix proteins and the synthesis of lipids in the skin[17]. The adipocytes were reduced in number and size and in some case, lipophages which is macrophages engulfing adipose tissue is found[18].

There are some precaution to minimize the risk of subcutaneous fat atrophy and skin hypopigmentation. The needle should be changed after drawing up the corticosteroid preparation and subsequently, local anesthetic is used to dilute it[19]. Moreover, applying pressure using a sterile dressing at the injection site while the needle is withdrawn could avoid leakage of corticosteroid preparation into the subcutaneous tissue[11]. Superficially injecting

corticosteroid may also cause leakage along the needle track and subsequently put the injection site at risk. The type of injected corticosteroid also may contribute to the risk of developing subcutaneous fat atrophy and skin hypopigmentation. Compared to methylprednisolone, the risk of dermal changes is higher with triamcinolone injection because of its increased crystal size. Accordingly, triamcinolone acetonide is preferably injected into deep soft tissue targets or large joints[6]. Dexamethasone and soluble betamethasone can be considered as a more appropriate option when soft tissue atrophy and skin hypopigmentation are issues of concern[8]. Milani et al reported a case of skin hypopigmentation and atrophy following ultrasonography-guided triamcinolone injection for de Quervain's tenosynovitis which may suggest these dermal adverse effects could still occur even under imaging modality for guidance[17]. This finding is corroborated by a prospective study conducted by Shin YH et al which comparing ultrasonography-guided and blind triamcinolone injection for de Quervain's tenosynovitis and demonstrated that both groups were not significantly different in the incidence of subcutaneous fat atrophy or skin hypopigmentation[20]. In fact, although every preventive measures have been taken, adverse effects may still emerge.

This report represents an uncommon dermal adverse effect that may occur following corticosteroid injection. It is prudent to initially provide patients with adequate information about these dermal adverse effect before performing the procedure, particularly in dark skinned patient. Although it may resolved spontaneously without any specific treatment, it should not be belittled. Some patients may find it bothersome and may lose confidence due to it's cosmetically unpleasant effect. Ultimately, clinician should promptly recognize these dermal adverse effects associated with corticosteroid injection to avoid misdiagnosis and unnecessary ancillary tests.

Informed consent : obtained

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CONFLICT OF INTEREST
The authors have no conflict of interest to disclose

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FIGURE LEGENDS

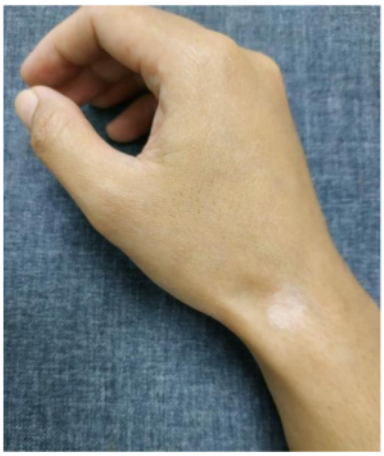

Figure 1. Skin hypopigmentation and soft tissue atrophy associated with corticosteroid injection around the injection site.

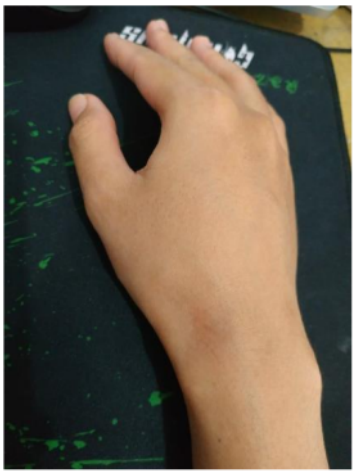

Figure 2. Resolved skin hypopigmentation and soft tissue atrophy after one and a half year later

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