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Skin Depigmentation After Particulate Steroid Injection for de Quervain's Tenosynovitis

Simon Yang, MD, Vinh Nguyen, MD, and Ratan K. Banik, MD, PhD

Background: Corticosteroid injections are an effective treatment for several medical conditions, including de Quervain's tenosynovitis. Depigmentation of the skin after steroid injection is rarely reported.

Case Report: We present a case of a 43-year-old man who has no significant past medical history and came to us with an 8-week history of left wrist pain consistent with de Quervain's tenosynovitis. He underwent injections of triamcinolone and bupivacaine into the tendon sheath of the extensor pollicis brevis and abductor pollicis longus. Shortly after 3-5 days posttreatment, he had 100% pain relief, which continued for 12 months. However, one week after injection, he developed depigmentation at the injection site, measuring 2 cm x 3 cm. Depigmentation spontaneously resolved after 9 months.

Discussion: The exact etiology of steroid-induced depigmentation is unknown, but it can have a profound impact on the patient. Interventional pain physicians should counsel patients about this adverse outcome and be aware of how to minimize its likelihood.

Key words: Skin depigmentaion, steroid injection

BACKGROUND

de Quervain's tenosynovitis is an inflammatory disease of the radial compartment of the wrist, most notably involving pain at the radial aspect of the wrist and the proximal thumb. Its prevalence is estimated to be 0.5% in men and 1.3% in women (1). While treatment involves various methods to reduce inflammation, one of the most effective methods involves intraarticular corticosteroid injections. Corticosteroids decrease inflammation by decreasing the expression of cytokines and altering mRNA production of protein annexin-1 (2). Although corticosteroid injections are effective in de Quervain's tenosynovitis (3), it has various side effects, which include septic joint, tendon rupture, soft tissue, and fat atrophy. Cutaneous side effects after steroid injections are rarely reported. We present a case of linear depigmentation in a patient following corticosteroid injections for de Quervain's tenosynovitis.

CASE PRESENTATION

Informed consent was obtained from the patient. A 43-year-old man with no significant past medical history presented at an outpatient pain clinic with an 8-week history of left wrist pain. His history was notable for frequent lifting of his child into a car seat and marked tenderness at the thumb base. His physical exam was notable for positive Finkelstein's sign and was subsequently diagnosed with de Quervain's tenosynovitis. His initial therapy included applying heat or ice to the affected area, nonsteroidal anti-inflammatory drugs, avoiding repetitive hand and wrist motions, and wearing a splint. After no improvement with initial therapies, he underwent injections of triamcinolone 20 mg and 0.5 mL 0.25% bupivacaine into the anatomic snuffbox at the base of the thumb between tendons of abductor pollicis longus and extensor pollicis brevis. Shortly after 3-5 days posttreatment, he had 100% pain relief,

From: Department of Anesthesiology, University of Minnesota, Minneapolis, MN

Corresponding Author: Ratan K. Banik MD, PhD, E-mail: rkbanik@umn.edu
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which continued for 12 months. However, one week after injection, he developed depigmentation at the injection site, measuring 2 cm x 3 cm (Fig. 1). Depigmentation spontaneously resolved after 9 months. No sensory deficit, itching or hyperalgesia, or skin atrophy was observed in the injection site.

DISCUSSION

The rate of complications of local steroid injection is < 1% (4). These complications include infection, high blood sugar, tendon rupture, soft tissue and fat atrophy, nerve damage, and hypersensitivity reactions (2,5). In this case study, our patient had skin depigmentation after the particulate steroid injection for de Quervain's tenosynovitis. While there are few other case reports (6-8) published in dermatology and rheumatology journals that had identical case presentations, most interventional pain medicine practitioners do not frequently access these journals. Given the widespread use of corticosteroid use in pain specialty, we hope our case presentation in a pain specialty journal will increase understanding and instigate further discussion on corticosteroid adverse effects. It is important that pain physicians counsel patients about this adverse outcome prior to injection. This may be especially important in patients with darker pigmentation since it is more apparent in dark-skinned individuals or when an injection occurs in a routinely exposed area (9).

The exact pathogenesis of corticosteroid-induced hypopigmentation is not fully elucidated. It is likely that corticosteroids may inhibit prostaglandin or cytokine production in melanocytes, thereby altering their function. Histologic findings of hypopigmented areas (10.11) showed intact melanocytes but with lower amounts of melanin. Injection at the low intradermal site correlated with pigmentary changes and the onset times and duration varied based on anatomical site of injection (10).

While all steroid injections have the potential to cause side effects, there are several factors to consider minimizing hypopigmentation risks. Superficial rather than deep injections are more likely to cause depigmentation (5). Also, considering the solubility of particulate vs nonparticulate steroid formulations may mitigate the risk of hypopigmentation. For superficial injections, using nonparticulate steroids, such as triamcinolone, rather than particulate steroids, such as dexamethasone or betamethasone, may be more likely to cause depigmentation. Triamcinolone has a greater risk for dermal changes compared to other steroids due to lower solubility, increased crystal size, and a higher tendency to aggregate locally (2,5). Aggregation of corticosteroid crystals can potentially cause cellular damage and subsequent effects in connective tissues (12). Other methods to decrease hypopigmentation include minimizing needle-track steroid leakage in the subcutaneous and intradermal layers by putting pressure on the injection site while withdrawing or flushing steroids before withdrawing. Factors that may increase the rate of hypopigmentation include repeated steroid use or longer-acting steroid formulations (2). Due to these risk factors, avoidance of particulate steroids can be considered for superficial joint or tendon injection. Of interest, alternate local injections, such as nonsteroid medication - namely ketorolac, have been compared to triamcinolone but showed inferior efficacy (13).

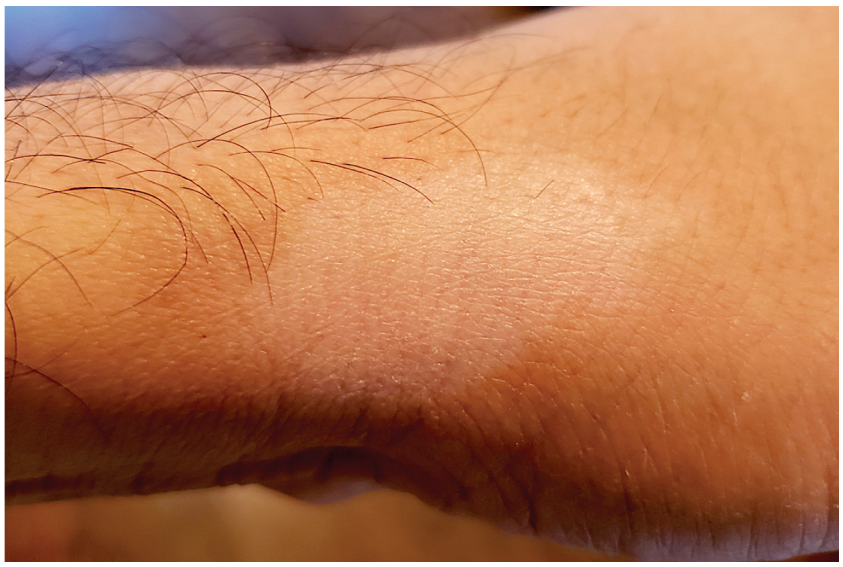

Fig. 1. A 43-year-old man with dark skin experienced cutaneous depigmentation following a particulate steroid injection for de Quervain's tenosynovitis. The patient received 20 mg of triamcinolone and 0.5 mL of 0.25% bupivacaine into the anatomic snuffbox at the base of the thumb, located between the tendons of the abductor pollicis longus and the extensor pollicis brevis. He achieved complete pain relief, which lasted for 12 months. However, one-week postinjection, he developed depigmentation at the injection site, which measured 2 cm x 3 cm.

The patient developed hypopigmentation one week after injection and resolved after 9 months from injection. Brinks et al's (14) systematic review of adverse effects of extraarticular corticosteroid injections noted that hypopigmentation likely occurred 1-4 months after injection and resolved approximately 6-30 months after the injection. Hypopigmentation is likely to resolve spontaneously, but may also benefit from additional interventions especially when accompanied by cutaneous atrophy (15). Dhinsa et al (11) showed a case of cutaneous atrophy and depigmentation after corticosteroid injection for keloid treatment that showed improvement after intralesional saline injections.

While our case's hypopigmentation occurred earlier compared to other studies, this did not lead to particularly early recovery. While several case studies and few randomized controlled studies have described hypopigmentation, it is yet to be shown that earlier hypopigmentation presentation correlates with the degree of hypopigmentation or speed of recovery. It is also unclear whether quicker or larger onset of hypopigmentation correlates with a higher likelihood of sensory nerve side effects. Future meta-analysis and systematic reviews may elucidate potential patterns of hypopigmentation side effects.

Clinical Pearls

- Skin depigmentation may be seen a few days after a corticosteroid injection for de Quervain's tenosynovitis.
- Skin depigmentation after corticosteroid injection usually resolves after a few months and warrants no specific therapy.
- Skin depigmentation is more apparent in dark-skinned individuals.
- Skin depigmentation is more common in superficial than deeper injection.
- Triamcinolone has a greater risk for skin depigmentation compared to other steroids.

Multiple Choice Questions

Q1 Which corticosteroid preparation is most likely to cause particle aggregation and least soluble, thus having the highest risk of hypopigmentation?

A. Methylprednisolone (Solu-Medrol)
B. Triamcinolone Acetonide (Kenalog)
C. Betamethasone Acetate of Betamethasone Sodium Phosphate (Celestone Soluspan)
D. Dexamethasone Sodium Phosphate (Decadron)

Answer: B

Explanation: The particle size and solubility must be considered in the context that the maximum size of red blood cells flowing through vasculature is 10 μM. While both methylprednisolone and triamcinolone have maximum particle sizes > 500 μM, triamcinolone has much lower solubility than methylprednisolone and has a greater likelihood of aggregation (16).

Q2 Which of the following is NOT an identified risk factor for skin hypopigmentation following corticosteroid injection?

A. Intradermal Tissue or Tendon Injection
B. Race
C. Particulate Corticosteroid Use
D. Lower Solubility of Corticosteroid

Answer: B

Explanation: While the effect of hypopigmentation is more apparent in patients with darker pigmentations, there is a lack of evidence to suggest that increased melanin correlates with an increased likelihood of hypopigmentation. Direct injection to the tendon or intradermal injections, as well as lower solubility, all increase the risk of hypopigmentation. Particulate corticosteroids have a higher chance of aggregation and causing tissue damage and immune response (5).

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