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Role and efficacy of corticosteroid (40 Mg Methyl prednisolone acetate) injection for non-surgical treatment of de-quervains tenosynovitis, and incidence of complications of the procedure in 55 limbs: A retrospective study

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Abstract
Background: Open surgical release of the 1st extensor compartment is the gold standard of treatment for De Quervain's tenosynovitis, with reliable symptomatic relief. The purpose of this retrospective study is to determine the effectiveness of corticosteroid injections for non-surgical treatment of this condition, and the incidence of side effects of this procedure.
Methods: A retrospective study was done in evaluating the use of CPT code 20550 (Injection(s); tendon sheath, ligament) used as intervention for the diagnosis of M65.4 (Radial styloid tenosynovitis [de Quervain]). Success of the intervention was defined as clinical resolution of pain to the extent that the patient did not seek further intervention after 1 or 2 injections. Failure was defined as a subsequent surgical release or need for a third injection. Side effects of the procedure were documented on the basis of documentation in subsequent visits as per the records.
Results: The treatment outcome of 55 limbs from 45 patients was studied. Of the 55 limbs, 80% (44/55) experienced treatment success within 2 injections, and 61.82% (34/55) experienced success after 1 injection. Predominantly 3 side effects were documented which were 1. Whitening of the skin at site of injection 14.55% (8/55) 2. Transient increase in pain which responded well to analgesics 10.91% (6/55) 3. Numbness over the anatomical snuffbox persisting > 1 day 1.82% (1/55).
Conclusions: This study indicates that corticosteroid injections are a useful and safe treatment for de Quervain's tenosynovitis, leading to treatment success 80% of the time within 2 injections. This study also documents possible side effects of this procedure.

Keywords: De Quervain's tenosynovitis, first dorsal compartment tenosynovitis, nonsurgical treatment, corticosteroid injection, side effects of intralesional steroid injection

Introduction
De Quervain's tenosynovitis is inflammatory stenosing tenosynovitis of 1st extensor compartment of the wrist [1]. Nonoperative treatments include splinting, NSAIDs, therapy exercises, and corticosteroid injections [2, 3]. Using a splint after the steroid injection has also shown conflicting results in literature with Weiss *et al.* [4] reported that the use of a splint did not provide added benefit in addition to an injection, whereas a randomized prospective study by Mardani-Kivi *et al.* [5] demonstrated that the combination of thumb spica splinting with corticosteroid injection yielded more satisfactory results when compared with injection alone. Surgical release is considered when non-operative treatments fail. However as the surgical intervention has its own potential complications along with prolonged recovery time, hence alternative of intralesional steroid injection needs to be evaluated more. This retrospective study investigates the effectiveness of corticosteroid injections, aiming to determine whether they can be reliably used as a treatment option as well as mentioning the incidence of side effects of this procedure.
We hypothesize that intralesional corticosteroid injection may be an effective treatment for de Quervain's tenosynovitis.

The purpose of our study was to evaluate the effectiveness of corticosteroid injections and to mention the complications of this procedure, which happened post procedure.

Material and Methods

A retrospective study was conducted using a patient list obtained from SAP software using International Classification of Disease, version 10 (ICD-10) codes for de Quervain's tenosynovitis based on clinical exam. All patients in the collected cohort had at least 1 injection. At this first injection, the ages of the patients ranged from 22 to 68 years. Treatment success was measured as clinical relief from symptoms (of pain and restriction of range of motion) as reported by the patient after 1 or 2 injections. Relief from symptoms is defined as resolution or improvement to the extent that the patient did not seek further intervention. Failure was defined as inadequate relief with patient undergoing surgical release or a 3rd injection. Standard procedure of using methyl prednisolone Depomedrol (40 mg) 1 ml diluted in 1 ml of plain lidocaine 2% injected in antegrade manner in region of 1st extensor compartment was utilised while giving the injection by the author (Image 1 and Image 2). Pre injection, the patient was explained the possibility of infection, depigmentation of skin, transient increase in pain, tendon injury, and a written informed consent was taken for the same. The data was evaluated in records, from 1st Jan 2020 to 1st Jan 2023. The follow-up of the patient, the documented relief in symptoms, the documented complications, and the subsequent need for surgery or a 3rd injection were evaluated in the data. The patients were divided into success and failure with success of the intervention defined as clinical resolution of pain and symptoms to the extent that the patient did not seek further intervention after 1 or 2 injections and failure defined as patient needing surgical release or a 3rd injection for his condition. Coexisting morbidities like diabetes, thyroid, rheumatoid arthritis were not taken into account when evaluating the patient data. A total of 55 limbs in 44 patients were evaluated in retrospective manner with regards to relief, need for surgery or 3rd injection, and any documented complications.

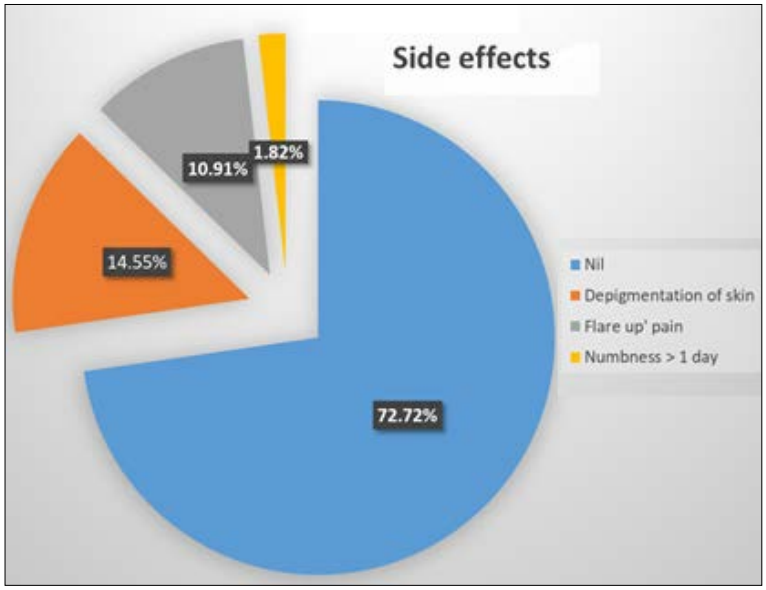
Image 1: Depemderol 40 mg, Lidocaine 2% used for injection

Image 2: Standard technique of injection in 1st extensor compartment

Results

The treatment outcomes of 55 limbs from 44 patients were analyzed. Of the 44 patients, 30 patients were female and 314 patients were male. At the first injection, the median age of the treatment success group was 44 years (SD, ±14.03) and 49 years (SD, ±12.72) in the treatment failure group (Table 1). Of the reviewed cases, sufficient relief (ie, treatment success) was reached in 80% of the interventions within 2 injections. With a single injection, the estimated rate of treatment success was 61.82. A second injection, where indicated, was given on average 4-52 weeks after the first injection. In terms of side effects, 3 side effects were documented (Graph 1) which were

1. Whitening of the skin at site of injection 14.55% (8/55)
2. transient increase in pain which responded well to analgesics 10.91% (6/55)
3. Numbness over the anatomical snuffbox persisting > 1 day 1.82% (1/55) and lasting till 3 weeks but resolved after that by itself.



Graph 1: There was no documentation of infection, tendon injury, or any other major complications.

Discussion

Our study had results comparable with other retrospective and prospective studies done for efficacy of intralesional steroid injection for de-quervans tenosynovitis. Zingas *et al.* [6] evaluated outcomes of steroid injection into the tendon sheath of the extensor pollicis brevis and/or the abductor pollicis longus through a double-blind prospective study and demonstrated that injecting both tendon compartments might lead to the most desirable outcome, with injection accuracy potentially playing a critical role in treatment outcome.[6] However, the author has noticed that injecting in the vicinity of the 1st extensor compartment without confirming on ultrasound is equally effective, while cost saving, and less painful for the patient. This observation has been also been mentioned by a study by Taras *et al.* [7] In contrast, a more recent study by Kume *et al.* [8] reported a greater decrease in pain at follow-up in the ultrasound- guided group compared with the traditional injection group as measured by the visual analog scale. This supports that injection into this exact anatomical location, made more precise by technology, is an efficacious treatment for de Quervain's tenosynovitis. Furthermore, Lane *et al.* [9] reviewed their treatment of 300 patients (319 limbs) with de Quervain's tenosynovitis, comparing custom orthosis, naproxen 500 mg, and corticosteroid injections with 4-mg betamethasone. They grouped patients based on severity as assessed by the authors, classifying as minimal, mild, and moderate to severe [9]. There were 249 patients in the moder- ate to severe group who received injections, with 53 requiring 2 injections and 17 requiring 3 injections. Complete relief was reported in 76% with 7% improved, and 4% not improved [9].

Corticosteroid injections have potential side effects. Stepan *et al.* [10] reported that type I diabetics and insulin-dependent diabetics experienced elevated blood glucose levels for 2 days following an injection. Goldfarb *et al.* [11] determined in a double-blind randomized study that despite 33% of patients experiencing a flare reaction, patients responded to extra-articular injections for trigger digits and de Quervain's tenosynovitis with no difference between standard or pH-balanced injections. This 125-patient study included 37 patients with de Quervain's tenosynovitis and 88 patients with trigger finger [11]. For patients who received more than 1 injection within the study period, the time between the first and second injections is variable. Earp *et al.*, [3] in a prospective study of 50 patients, showed that 82% of enrolled patients experi- enced a decrease in symptoms after 1 injection. Of these patients, more than half did not experience recurring pain for 12 months. Upon analysis of our study, there was not an apparent pattern concerning duration between injections and treatment success or failure.

As with all retrospective studies, out study has its limitation. 55 limb data appear to be on the lower side. Our study relies on the documentation which was though personally done by the author himself. In addition, the 44 patients were chosen randomly, and comorobidities were not taken into account. Similarly, BMI, hand dominance, profession were also not taken into account, which could potentially affect the quality of the study. A single preparation of methylprednisolone 40 mg was used, although good results have been reported with different preparations [12]. In addition, some patients opted to use wrist brace, while others were reluctant to do the same. Furthermore, resolution of symptoms is completely subjective, and patient stating clinical resolution of pain and symptoms was taken on its face value. We do not have a definitive time point for the criteria of success or failure, but patients were always instructed to return for follow-up within 6 to 8 weeks, or if needed. All the patients included in the study had a follow-up visit after 6-8 weeks for review, and hence the relief in symptoms or lack of the same were clearly documented.

Our study demonstrates that corticosteroid injections are an effective clinical treatment for de Quervain's tenosynovitis with a short-term success rate following 2 or fewer injections is almost 80 percent with 4 out of 5 patients able to avoid surgery due to this intervention. Further investigation is needed to better evaluate other potential predictors of treatment success and whether symptoms recur in the long term. (After more than 1 year)

Conflict of Interest
Not available

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Not available

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