Treatment of Distal Interphalangeal Ganglion Cysts by Volar Corticosteroid Injection

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Abstract

Background: Various options exist for operative and nonoperative treatment of symptomatic distal interphalangeal (DIP) ganglion cysts. We describe the technique and efficacy of a novel treatment of DIP ganglion cysts using a volar, transtendon, intra-articular injection of corticosteroid. **Methods:** This was a single center, retrospective study (2010-2015) of 21 patients who received a volar, intra-articular corticosteroid injection for treatment of DIP ganglion cysts. The patients were contacted via mailing with a short survey. For those potential study participants who did not respond to the mailing or were not seen in follow-up, contact was made via telephone. The primary study outcome was resolution of the cyst; secondary outcomes included pain and postinjection complications. **Results:** A total of 21 patients (14 female; 7 male) with 23 DIP ganglion cysts were treated in this study. The dominant hand was involved in 56.5% cases. Twelve (52.2%) resolved or had near complete resolution following injection at an average follow-up of 20 months. **Conclusions:** For patients with DIP ganglion cysts, this newly described technique of volar, transtendon, intra-articular injection of corticosteroid provides a safe and effective treatment. This technique allows for ease and consistency of needle placement for intra-articular corticosteroid delivery while minimizing the potential soft tissue and infection concerns described with other techniques.

Keywords: digital mucous cyst, corticosteroid injection, distal interphalangeal joint, DIP ganglion cyst

Introduction

Distal interphalangeal (DIP) ganglion cysts (sometimes referred to as digital mucous cysts, though no mucous exists in the hand) are common, benign lesions of the DIP joint. Provided their association with osteoarthritis, DIP ganglion cysts generally occur between the fifth and seventh decades.¹⁰ Longitudinal grooving of the nail without a visible mass may be the earliest clinical sign secondary to pressure on the nail matrix.¹ The typical presentation, however, is an enlarged cyst arising from one side of the extensor tendon between the dorsal distal joint crease and eponychium, often attenuating the overlying skin.¹ Depending on the severity of the underlying osteoarthritis, pain and/or joint stiffness may also be present.^{4,12,14} Histologically, DIP ganglion cysts resemble ganglion cysts and could represent a herniation in the synovial capsule.¹⁰

Treatment of DIP ganglion cysts is not required but is often pursued for pain or aesthetic reasons. Both surgical and nonsurgical options have been described, and a wide range of outcomes, particularly in regard to recurrence, have been reported. The only treatment option that will ensure that a DIP ganglion cyst will not recur is arthrodesis

of the DIP joint, as this is the only way to fully address the underlying osteoarthritis.^{1,4,7,12,14} Historically, the treatment of choice has been cyst excision with removal of adjacent osteophyte. In these cases, the cyst may be approached with an “L-shaped” or a “T-shaped” incision and is often excised in bulk with the overlying skin. Because of the potential need for a rotational flap or skin grafting secondary to deficits in soft tissue, as well as other potential complications including scar formation, joint stiffness, infection, extensor tendon injury, and irreversible deformation of the nail, non-surgical options have been considered.⁷ Described nonsurgical options include local aspiration and intralesional injection of corticosteroid or phenol, multiple punctures, and carbon dioxide laser.^{5,6,9}

This study describes a novel, nonsurgical technique in the treatment of DIP ganglion cysts—using a volar, transtendon,

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intra-articular injection of corticosteroid. In addition, we will retrospectively review the effectiveness, recurrence rate, and complications of this technique as performed by a single surgeon.

Methods

Institutional review board permission was obtained prior to the study. A total of 24 patients were retrospectively identified in the orthopedic and hospital billing database at our institution via a query for Current Procedural Terminology (CPT) code 20600 (arthrocentesis, aspiration, and/or injection; small joint, bursa, or ganglion cyst) and *International Classification of Diseases, Ninth Revision (ICD-9)* code 721.41 (digital mucous cyst) that had been seen by our primary investigator. The electronic medical records of the identified patients were then reviewed by the authors. Male and female patients older than the age of 18 patients who received a volar, intra-articular corticosteroid injection for treatment by the primary author during the study period (August 2010 through July 2015) were included. Exclusion criteria included age less than 18 years, death in the interim, alternative injection technique, or inability to contact or follow-up. Of the 24 patients initially identified, 1 patient was excluded as an alternative injection method had been utilized (dorsal aspiration with subsequent intralesional injection), 1 patient was excluded due to death in the interim, and 1 patient had no contact information in the electronic medical record (EMR). The 21 patients who met both the inclusion and exclusion criteria were then contacted via mailing consisting of a cover letter, summary explanation of the research, and a short survey to evaluate the effectiveness of the injection, including whether or not any further treatment was obtained. For those potential study participants who did not respond to the mailing or were not seen in follow-up (2 patients), contact was made via telephone. The patients were then classified as complete resolution, near complete resolution (minor residual skin changes, but asymptomatic and not painful), or failure of injection. Failure of injection was then divided between patients requiring further intervention and patients who were pain free but did not pursue additional interventions for cyst resolution. The primary study outcome was resolution of the cyst; secondary outcomes included pain, and postinjection complications such as hypopigmentation, and cyst recurrence.

Injection Technique

Upon completion of verbal consent to confirm the involved digit, the patient washed his or her hands and wrists with antibacterial soap. The skin overlying the volar aspect of the DIP joint of the finger was cleaned with alcohol, anesthetized

Table 1. Demographics.

Parameter	Value
Average age (range) at time of injection	60 years (48-76)
Sex	66.7% female
Laterality	10 (43.5%) right 13 (56.5%) left
Dominant hand	13 (56.5%) dominant
Digit involved	9 index fingers (39.1%) 5 long fingers (21.7%) 3 thumbs (13%) 3 ring fingers (13%) 3 small fingers (13%)

with ethyl chloride, and cleaned with alcohol again. The flexion crease overlying the DIP joint was then identified and a 25-gauge needle was inserted through the flexor tendon and advanced distally into the DIP joint; 1 mL of a 50:50 ratio dexamethasone 4 mg/mL and 1% lidocaine was then injected. Insufflation of the cyst with fluid was used to confirm appropriate positioning of the injection. An adhesive bandage was then applied to the injection site. No activity restrictions were required.

Results

Twenty-one patients (14 female; 7 male) (mean age: 60 ± 8.2 years) with a total of 23 DIP ganglion cysts were treated with a volar, intra-articular corticosteroid injection from August 2010 through July 2015. The dominant hand was involved in 13 (56.5%) cases. The index finger was the most commonly affected digit and was involved in 9 (39.1%) cases (Table 1). Average clinical follow-up was 20 months (range, 0-42 months). Follow-up survey was obtained at an average of 48 months (range, 14-75 months). Twelve (52.2%) DIP ganglion cysts resolved or had near complete resolution following injection. The remaining 11 (47.8%) failed initial injection therapy. Two (8.7%) of these patients had a persistent cyst with only cosmetic symptoms and were pain free, and underwent no further intervention. Three underwent surgical excision after failing to improve with the initial injection. Six of the patients underwent a repeat injection, with almost complete resolution in 1 patient (16.7%). After unsuccessful repeat injection, 3 patients underwent surgical excision, and 2 elected to not pursue further intervention (see Table 2). With regard to postinjection complications, there were neither infections nor wound complications; no reported drainage; and no hypopigmentation.

Discussion

The success of treatment for mucous cysts has been widely variable. A more radical surgical treatment, which typically

Table 2. Results.

Outcomes following injection	Number of distal interphalangeal ganglion cysts (%)
Complete resolution after 1 injection	7 (30)
Almost complete resolution	5 (21.7)
No resolution after first injection	11 (total)
• No subsequent procedures	2 (8.7)
• Underwent second injection	6 (26)
○ Almost complete resolution	1 (16.7)
○ Surgery	3 (50)
○ No improvement, but no further procedure	2 (33.3)
• Surgery	3 (13)
Postinjection complications	
None reported	

involves complete ganglion excision and its associated stalk, partial capsulectomy, and osteophyte excision, is favored by many authors due to lower rates of recurrence.^{3,12,15} Complications following surgical treatment, however, are not benign and include decreased range of motion, persistent pain and swelling, infection, and nail deformity.¹ Therefore, nonsurgical options that offer a lower risk of complications and an acceptable rate of recurrence should be explored. In addition, these options provide the convenient advantage of being able to be performed in the office setting, potentially at a lower cost to the patient.

Goldman et al treated 41 DIP ganglion cysts with aspiration and intralesional injection of triamcinolone and reported a recurrence rate of 68%.⁸ Dodge et al reported a 36% recurrence rate at an average follow-up of 6.2 years with aspiration of the cyst and corticosteroid injection.⁵ Rizzo's study of 80 cysts treated with multiple punctures with a 25-gauge needle without aspiration, followed by an injection of lidocaine and betamethasone had a 40% recurrence rate at 2-year follow-up, with infection occurring in 2 out of the 80 patients.¹² In all of these studies, aspiration or puncturing of the DIP ganglion cysts was performed and injections were introduced dorsally, often in an intralesional fashion, thus differing from our reported technique.

Volar, transtendon, intra-articular corticosteroid injections for management of DIP ganglion cysts have not been previously described in the literature. This technique allows for more consistent needle placement in the DIP joint space provided its location in reference to the volar flexion crease (Figure 1). The radiographic markers of the volar flexion creases are marked with a radiopaque marker. To inject into the DIP joint, the needle must be aimed distally to enter the joint, as the skin crease is proximal to the

Figure 1. Radiograph identifying the location of the distal flexion creases in relation to the distal interphalangeal joint.

joint itself (Figure 2). The additional soft tissue encountered via a volar approach avoids the thin skin dorsally and also potentially offers a decreased risk of skin and/or soft tissue complication associated with disruption of the DIP ganglion cyst and with use of corticosteroid injections in general. The risk of infection is also potentially minimized in that multiple punctures as have been described in previous techniques are not necessary. Because our described technique does not directly violate or enter the cyst, there is a decrease in chance of drainage from the injection site, and subsequently a decrease in risk of infection. Prior to the current study period, the senior author had a patient experience significant hypopigmentation of the finger following an injection of triamcinolone acetonide, which has previously been reported with corticosteroid injections^{2,11,13} (Figure 3). Following this complication, the senior author has exclusively utilized dexamethasone for injection of DIP ganglion cysts; all patients in this study received dexamethasone for their injection. Reported here is a success rate of 52.2% (60.9% if including patients with improved pain without cosmetic resolution), which is consistent with the literature (32%-66%).

Conclusion

This newly described technique of a volar, transtendon, intra-articular corticosteroid injection for DIP ganglion cysts may prove to be advantageous provided the ease and consistency of needle placement for intra-articular corticosteroid delivery, as well as the potential soft tissue and infection concerns described with other techniques.

Figure 2. To inject into the distal interphalangeal joint, the needle must be angled distally from the flexion crease: (a) clinical photograph; (b) radiographic image.

Figure 3. Hypopigmentation following intra-articular injection of the distal interphalangeal joint from a volar approach. Note. In this patient, triamcinolone acetate was utilized. Since this patient, the senior author has utilized dexamethasone for this injection, including all patients in the currently reported series. No further hypopigmentation has been encountered since this change.

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Ethical Approval

This retrospective study was conducted under the approval of the Institutional Review Board (STUDY00004321).

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent

Informed consent was obtained from all individual participants included in the study.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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