Mid-Axial Injection of Steroid into the Flexor Sheath for Trigger Fingers

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Introduction

The description of the disease called trigger finger was done by Notta, a French physician as early as 1850 [1]. Histological studies have shown metaplasia of cartilage like cells within the A1 pulley area of the flexor tendon sheath with no real evidence of inflammation [2]. It is a common hand condition seen in patients with diabetes and they are sub group known to develop recurrences after primary treatment.

Howard et al. [3] in 1953 described the first use of a locally injected steroid into the tendon sheath as treatment, while in 1958 Lorthinor et al. described the first surgical decompression of the constriction [4]. Both forms of management are still practiced as primary management of the trigger finger.

Numerous studies [5] have been done showing the obvious benefits of steroid injections in trigger finger treatment. The most commonly employed technique is to give a mixed solution of lignocaine and methyl prednisolone or triamcinolone administered through a palmar route directly into the palpable nodule at the A1 pulley area, withdrawing the needle from the tendon to infiltrate the tendon sheath [6]. Some techniques describe a similar approach, but with the drug administered on the far side of the tendon [5], between the tendon and the metacarpal bone. One of the obvious disadvantages of the procedure is pain. As the palmar skin has a high density of sensory receptors, some authors describe the use of a local anaesthetic injection first followed by the steroid injection through the same needle to minimize pain during the procedure.

Carlson CS & Curtis RM described a technique of infiltration of the flexor sheath by a mid axial route in 1984 [7] for

flexor tenosynovitis. This technique has been used in all patients requiring steroid injection for trigger finger.

Materials and Methods

Technique

All patients were screened for diabetes prior to the injection. Diabetic patients with a random blood sugar over 200 were not administered the drug.

The forearm and hand are scrubbed and painted for disinfection. The limb is then draped. One ml of lignocaine (lidocaine) is added to the 1 ml of methyl prednisolone in the dispensing vial. The vial is then thoroughly shaken to emulsify the mixture and the 2 ml of drug is withdrawn into a syringe. The needle is changed prior to injection. A 24 gauge needle is usually used for administering the drug. The needle is inserted perpendicular to the finger at the mid axial line (Fig. 1) till it just touches the proximal phalanx just dorsal to the A2 pulley. The needle is gently walked volarly till it enters the flexor sheath (Fig. 2) with some resistance. The drug may be directly administered at this point and the ease of injection and the palpable filling up of the sheath distal to the point of the injection usually confirms the correct location of the needle. If there is resistance to the flow of the drug, the needle is withdrawn keeping gentle pressure on the plunger till the drug begins to flow easily. Resistance to flow denotes that the needle is in the flexor tendon and that it needs to be withdrawn. One ml of the mixture is usually sufficient for the procedure. The needle is then withdrawn and the needle tract sealed with tincture benzoin and covered with an adhesive plaster.

The patient is advised to actively flex the finger to dissipate the drug throughout the sheath. He or she is also advised to keep the injection site dry for one night. No antibiotics are prescribed. Some patients may have a dull aching pain at the

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Fig. 1 Insertion of the needle perpendicular to the mid axial line of the finger till it touches the proximal phalanx

injection site few hours after the procedure and they are advised to take a paracetamol if the need arises. All patients are further instructed to review in the out-patient department (OPD) if the symptoms do not disappear in 3 weeks time. They are also told that some of them will have recurrence of symptoms over the succeeding year and those who develop the same will require a surgery to relieve the symptoms.

Study

All patients who were treated with a local steroid injection through the mid axial route at least 12 months prior to the study were initially included. The patients were contacted by telephone and requested for a follow up visit to the hospital. The responders who met the inclusion criteria formed the cohort of this study.

For the purpose of the study; recurrence of triggering within 3 months of the injection or non-relief of symptoms were considered as treatment failures [8]. A recurrence was defined as development of pain, nodularity, locking or triggering in the treated digit after 3 months of the injection. A cure was defined as absence of the above said symptoms for a minimum period of 12 months. The outcome measures that were studied included, failure of treatment, recurrence of symptoms

Fig. 2 The needle is gently walked volarly till it enters the flexor sheath with a give. The drug is administered into the sheath and confirmed by palpable filling of the distal portion of the finger

within 1 year, requirement of surgery, presence of complications, compliance with the procedure.

As a rule recurrence or failure was advised surgery. Patients were questioned regarding the injection, compliance for a second injection in another digit, presence of pain during the procedure and whether they would suggest injection to someone else as a primary treatment for trigger finger.

Any complication that occurred post injection was duly noted.

Results

One hundred fifty-two patients were treated with a primary steroid injection for trigger finger at the hand unit of the hospital at least 1 year prior to study. It was attempted to contact all patients by phone as per the existing records. Due to address changes, patient data errors and non availability, only 126 patients could be contacted. Of the responders who consented for the study only 99 patients came for a review and of these only 94 patients fulfilled the inclusion criteria of the study since 5 patients had prior treatment for the same condition before the injection.

There were 84 females (mean age 48.9 yrs, SD 8.07) and 10 males (mean age 47.0 yrs, SD 6.68) in the study. The right hand was involved in 60(63.8 %) patients and the left hand in 34(36.17 %) patients. The dominant hand was involved in 62(65.95 %) patients. The thumb was involved in 35 digits, three of which had an additional involvement of the ring finger and one with the middle finger. The ring finger was involved in 32 digits, the middle finger in 25 digits. A total of six patients had multiple digit involvement with two patients presenting with bilateral symptoms. Five patients had an open carpal tunnel release surgery in the same limb prior to the onset of trigger finger and all patients developed symptoms within 8 weeks of the surgery.

Of the associated disorders, 20 patients were diabetics on treatment and 5 of these were on insulin. Seventeen patients had associated features of osteoarthritis, 14 patients had features of carpal tunnel syndrome, 5 of who had already undergone decompression for the same. Six patients were on treatment for ischaemic heart disease and one patient had hyperuricemia and another was on treatment for hypothyroidism.

Forty-one patients had symptoms for less than 2 months at the time of presentation, while 42 patients presented with symptoms between 2 and 4 months. Nine patients had symptoms for more than 4 months at presentation.

On analysing the outcomes, all patients had symptom relief after the injection. There were no instances of primary treatment failure. Thirteen patients developed a recurrence of symptoms within the first 6 months of the injection, 2 of them within the first 3 months of the injection. These 2 patients constituted the treatment failure group. Twenty-two patients

developed recurrence of symptoms after the first 6 months. Thus a total of 33(35.10 %) patients were deemed as recurrences and 2 patients as failures. A total of 59 (62.7 %) patients remained symptom free at the end of 1 year. 13(65 %) diabetics developed recurrences within 1 year of injection (relative risk 2.18 and $p=0.0079$, considered significant). Among diabetics 7 diabetics were symptomatic within 6 months and 6 after 6 months of the injection. All 5 insulin dependent diabetics had recurrences (relative risk of 1.875, $P=0.1137$).

Of the 35 patients with recurrence, 9 patients had significant locking and 4 patients had recurrence of pain. The remaining 21 patients had recurrence of triggering but felt the symptoms were milder than the first time and had not sought any treatment for the same. All 4 patients who had pain as the foremost symptom after the recurrence had voluntarily sought treatment and all had undergone A1 pulley release by the time this study was done. Of the 9 patients with locking as the predominant symptom 4 patients had surgery; 3 others insisted on a second injection, citing financial, logistic or fear as reasons against surgery. The remaining 2 patients did not want any other treatment. Of the remaining 21 patients no one was ready for surgery and only promised to follow up in case of worsening of symptoms.

Discussion

Steroid injection as a treatment for stenosing tenosynovitis has been popular over the latter half of the 20th century. Since then numerous articles have studied recurrence rates [5], compared outcomes with that of surgery [8] and compared use of triamcinolone with dexamethasone [9]. A cost analysis study done [10] showed that idiopathic trigger finger can be treated with up to two steroid injections prior to surgery.

Carlson and Curtis described the lateral route or mid axial injection of the steroid for treatment of flexor tenosynovitis in 1984. Most surgeons and physicians however are comfortable with the direct route of administration, through the palmar skin at the level of the A1 pulley. Studies have indeed shown infiltration of the drug even in the subcutaneous tissue around the A1 pulley would provide the same benefit [11]. The drawback of the direct injection route is that it is relatively painful in the palmar skin and infiltration of the sheath not certain. The Curtis technique in contrast ensures direct infiltration of the sheath. Since the approach is from the lateral, non glabrous skin it is presumed to be relatively pain free. As a procedure it is also quick and reproducible.

Studies have shown the efficacy of steroid injection at about 57 % at 1 year. 65 % of the patients in this study were symptom free at the end of 1 year. Of the 35 patients with recurrence only 8 patients opted for surgery. Among the remainder two thirds of the patients had symptom reduction

compared to the first episode and deferred surgery till they got worse. The overall acceptance of the injection was high, with most patients opting for such an injection if the need rose again. No patient remembered any significant pain associated with the procedure.

Complications described in literature include flexor tendon rupture [12], pulley rupture [13], deep or superficial infection and flare reactions. None of these complications were noted in this study. Most patients on questioning were happy to have a second injection in another finger if it ever developed trigger.

Other strategies to decrease pain during local injections include alkalization of the lidocaine using special mixing pens or use of Vapocoolant sprays (Ethyl chloride) prior to injections. Both of these were not used in the study.

Conclusion

The retrospective study design of the study could not include all patients who had the injections at the hospital. Skewing of sample data is possible since only patients who could be contacted by phone (i.e. own a phone) could be included. The study also relies on a questionnaire more than 1 year after the procedure. Time of recurrence, duration of symptom free interval and symptoms are at best approximations by the patient. Since the study is a descriptive case series without a control arm, a comparison of pain during the procedure with a conventional palmar route injection is lacking. However it was noted that; there was high compliance for an injection through the mid-axial route if triggering occurred in another finger and patients would recommend the same treatment to another patient with a similar problem. In this study three out of five patients could be cured with a single injection of methyl prednisolone through the mid axial route of administration. This route is a dependable site for infiltration of the drug into the flexor sheath and devoid of complications if meticulous care is given during the procedure.

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