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COMPARATIVE STUDY BETWEEN SURGICAL RELEASE AND LOCAL INJECTION IN TREATMENT OF DE QUERVAIN DISEASE

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ABSTRACT

Background: De Quervain disease is a condition that is known to be the reason of lateral side wrist pain. it is more frequently happens with people that do heavy manual jobs like housewives, butchers. Despite there is a controversy in the management of De Quervain's tenosynovitis, but conservative management, including corticosteroid injections combined with a lidocaine into the first dorsal compartment. and surgical release of the first dorsal compartment. through an oblique incision are considered as beneficial treatment. **Objective:** The aim of this study is to compare between the effectiveness of local corticosteroid injection and open surgical release in treatment of De Quervain disease in terms of symptomatic relief, patient's satisfaction and complications, **Patients and Methods**: The study is prospective Clinical trial study carried out in orthopedic unit in Al-Jumhoori Teaching Hospital in Mosul from April 2020 to October 2021.The total number of patients were Forty four patients with De Quervain disease, were grouped randomly into two groups; the first group consisting of twenty three patients who were treated with local corticosteroid injection and the second group consisting of twenty one patients were treated by surgical decompression. **Results:** in this study, there were Thirty nine(88.63)females and five(11.36) males with a female to male ratio(7.8). Group 1 consisted of Twenty three patients treated with local injection of the first dorsal compartment, Eighteen (78.26 %) treated with this method obtained complete relief without recurrence of symptoms. Five (23.529 %) patients did not respond to treatment and this non response was defined by failure of resolution of symptoms and at least two out of the three diagnostic criteria, Group 2 consisted of twenty one patients treated by surgical Release . nineteen (90.47 %) patients achieved complete resolution. two (9.52 %) patients failed to respond to surgical decompression, The failure of response was defined by development of a painful scar in one and persistence of symptoms in the other. **Conclusion:** Surgical release comes with better outcome with cases having De Quervain tenosynovitis that fail to respond to local injection.

KEYWORDS: Surgical release, local corticosteroid injection, De Quervain's disease.

INTRODUCTION

In 1892, Tiilaux, in time Traite{233}d'Anatoinie Topographique, referred to an inflammation localized in time groove of the tendons of the abductor pollicis longus and the extensor pollicis brevis characterized by a small tumor and intense pain when the patient moved his thumb. He felt that this condition resulted from fatigue and improved after a few days' rest. Tillaux referred to it as tenosynovitis crepitante or d'ai.[1,2] In 1895, Fritz de Quervain published five cases of the new entity, which he called fibrose stenosierende Tendovaginitis. In a new publication in May 1912, de Quervain reported another eight cases; all of them cured by surgical treatment, and offered opinions on the etiology and pathogenesis of the syndrome.[1] In 1930, Finkelstein reviewed the literature and reported twenty-four additional cases. He felt that chronic trauma should be considered the principal cause of the syndrome. From his work, the author derived the well-known Finkelstein sign, which is considered pathognomonic of the disease. In reality, Finkelstein transcribed the test described by Eichoff in 1927.[1] Stenosing tenosynovitis of the first dorsal compartment is caused by attritional forces secondary to friction; the attritional forces produce swelling and thickening of the

extensor retinaculum covering the first dorsal compartment. The functional impairment is secondary to resisted gliding of the APL and the EPB within the narrowed fibro-osseous canal, resulting in pain and decreased motion.[3] Several theories exist regarding the cause of de Quervain disease. Possible etiologies include trauma, increased frictional forces, anatomic abnormality, biomechanical compression, repetitive micro trauma, inflammatory disease, and increased volume states, such as occurs during pregnancy.[3,4] Variations include septation of the first dorsal compartment and the presence of multiple slips of the APL and, occasionally, of the EPB tendon. Bahm et al. found division of the first dorsal compartment by an additional septum in 60% of patients with symptomatic de Quervain disease; the APL consisted of multiple tendons in 76%. These anatomic variations may have an effect on the underlying pathophysiology of de Quervain tenosynovitis. Kutsumi et al.[4] Nonsurgical treatment should be the first course of action for de Quervain disease. The patient presenting with mild to moderate pain that does not limit activities of daily living should be treated with rest, splinting, non-steroidal anti-inflammatory drugs (NSAIDs) and or corticosteroid injection of the first dorsal compartment.[5] Splinting is an effective method for resting the APL and EPB tendons by immobilizing the thumb and wrist in a single position and reducing or preventing the friction that may exacerbate swelling and pain. Custom or prefabricated splints should be forearm-based; one such splint is a radial thumb spica extension that holds the wrist in neutral and the thumb in 30° of flexion and 30° of abduction. Although symptoms may improve with splinting, on removal of the splint, symptoms quickly return in some patients when the inciting activity is resumed.[6] Non-steroidal anti-inflammatory drugs Determining the efficacy of NSAIDs is difficult because they are often combined with other treatment modalities in most series examining their use for de Quervain's tenosynovitis. Jirarattanaphochai et al. found no benefit to adding nimesulide, a selective cyclooxygenase- 2 inhibitor, to corticosteroid injection in a randomized, double-blinded prospective study.[6] Corticosteroid injection for de Quervain disease consists of 1mL of corticosteroid with 0.5 to 1 mL of a local anesthetic. Success has been reported with a variety of corticosteroids (eg, betamethasone, triamcinolone, dexamethasone, methylprednisolone) combined with any of several local anesthetics (eg, bupivacaine, lidocaine).[5] Operative treatment of De Quervain syndrome-release of the first dorsal compartment by incision of the extensor retinaculum at the ulnar border of the first dorsal compartment and exploration of the first dorsal compartment for the presence of a septum-is carried out as an outpatient procedure.[7]

PATIENTS AND METHODS

The study is prospective Clinical trial study carried out in orthopedic unit in Al-Jumhoori Teaching Hospital in Mosul from April 2020 to October 2021. A total of Forty four patients were diagnosed for having De Quervain disease, thirty nine patients were females (88.36 %) while five were males (11. 36 %). The inclusion criteria include EPB entrapment test positive, lateral wrist pain Tenderness at first dorsal compartment, Finkelstein's test positive and history of pain that lasts for more than 6 weeks. Patients were assumed to have the disease when they have 2 symptoms and positive results for 2 tests. We exclude Patients who cannot comply for a 3 months follow up period and patient with connective tissue disease. The Forty four patients were grouped randomly into two groups; group 1 consisting of twenty three patients who were treated with local corticosteroid injection and group 2 consisting of twenty one patients were treated by surgical decompression. In Group 1 consisted of twenty (86. 90) females and three (13.04) males, patients of this group had local injection of 2 ml of methyl prednisolone 40 mg in combination with 1 ml of lidocaine 2% injected into the first dorsal compartment. the Injection procedure the wrist is positioned in slight ulnar deviation. Sterilization of injection site. The borders of the first dorsal compartment are straddled with the examiner's opposite thumb and index finger. A needle is introduced into the tendon sheath at the level of the styloid, parallel to the tendons. The injectable medication should flow smoothly and easily, with both visual and palpable inflation of the compartment .Patients were checked immediately after injection to identify the immediate adverse reaction to the injected material, after six weeks of injection, at two and three months interval from time of injection. The patient is considered to be improved when there is relief of pain and tenderness , at least 2 out of the 3 diagnostic test and have no recurrence, While in Group 2 consisted of 21 patients, 19(90.47 %) were females and 2(9.53%) were males; this group was treated by surgery. Patient is given general anaesthesia. exsanguination is done with Esmarch tourniquet then an upper arm pneumatic tourniquet is used (inflated to 70 mm Hg above systolic blood pressure). a skin incision is made that is directed from dorsal to volar in a transverse-to-oblique direction, parallel with the skin creases over the area of tenderness in the first dorsal compartment over the center of the radial styloid starting from a point two and a half cm proximal and volar to the center of the radial styloid and ending two and a half cm dorsal and distal to it (Figure 1 A,B,C).

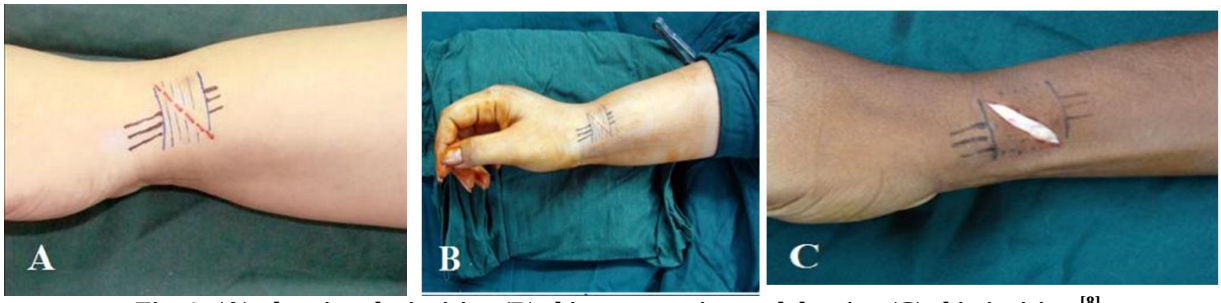


Fig. 1: (A) planning the incision (B) skin preparation and draping (C) skin incision.[8]

Carry sharp dissection just through the dermis and not into the subcutaneous fat, avoiding the branches of the superficial radial nerve. After retracting the skin edges, use blunt dissection in the subcutaneous fat. Find and protect the sensory branches of the superficial radial nerve, usually located deep to the superficial veins (Figure 2).

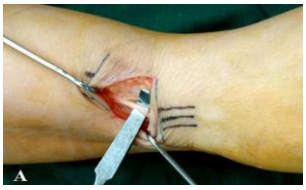


Fig. 2: superficial radial nerve.[7]

The thumb is passively ranged while the extensor retinaculum is inspected through the open wound. This allows the first dorsal compartment and its junction with the second dorsal compartment to be clearly ascertained. This also allows the extent of the retinaculum (from distal to proximal) to be determined and the possibility of incomplete release to be eliminated. Identify the tendons proximal to the stenosing dorsal ligament and sheath, and open the first dorsal compartment on its dorso-ulnar side (Figure 3 A and B).

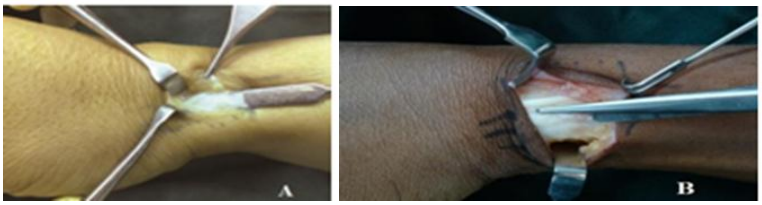


Fig. 3: (A) proximal part of the canal entered (B) dorso-ulnar release of the first dorsal compartment.[8]

With the thumb abducted and the wrist flexed, lift the abductor pollicis longus and the extensor pollicis brevis tendons from their groove. If they cannot be easily freed, look for additional "aberrant" tendons and separate compartments. The tourniquet is then deflated and the skin incision is closed, and apply a small pressure dressing (Figure 4).

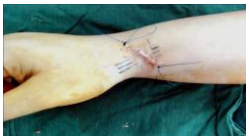


Figure 4: wound closure.[8]

Prophylactic antibiotics were used in the form of cefotaxime 1 gram intravenously at time of skin incision and another gram intravenously 6 hours post-operatively .The estimated time of the procedure is about twenty minutes. After treatment active exercise of the thumb and hand is immediately encouraged and is increased as tolerated. The limb is placed in an arm sling for one week to prevent edema of the operative site. Criteria for improvement by surgery: Disappearance of diagnostic criteria (both diagnostic symptoms and at least 2 out of the three diagnostic physical signs. No recurrence. No long term complications (after 3 months).

RESULTS

In this study, there were Thirty nine(86.63)females and five(11.36) males with a female to male ratio(7.8).(table 1).

Table 1. Male to female distribution in the whole sample.

SEX	No.	PERCENTAGE
MALE	5	11. 36%
FEMALE	39	86. 63%
TOTAL	44	100%

In group 1 there were twenty (86. 95 %) females and three (13.04 %) males (table 2) while in group 2 there were nineteen(90.47 %) females and two (9.53 %) males (table 3).

Table 2: Male to female distribution in group 1.

SEX	No.	PERCENTAGE
MALE	3	13.04%
FEMALE	20	86.95%
TOTAL	23	100%

Table 3: male to female distribution in group 2.

SEX	No.	PERCENTAGE
MALE	2	9.53%
FEMALE	19	90.47%
TOTAL	21	100%

thirty eight (86.36%) of the patients were right handed while six (13.63%) were left handed. Of the forty four patients thirty eight patients had the disease on the same side of the dominant hand while only six had the condition on the side opposite to the dominant hand. Thirty four(89. 47 %) of the thirty eight right handed patients had affection of the right (dominant) hand , while only four patients (10.52 %) of them had affection of the left (non dominant) hand. While of the six left handed patients only two (33.33 %) patient had affection of the opposite non dominant hand and four (66.66%) had affection of the same left dominant hand (table 4).

Table 4: Number and percentage of right and left handed patient with respect to affected side in relation to dominant side.

	Right handed patient	Left handed patients	Affected dominant side	Affected non dominant side
Number	38	6	38	6
Percent	86.36 %	13.63 %	86.36 %	13.63 %

Group 1 consisted of Twenty three paients treated with local injection of the first dorsal compartment .Eighteen (78.26 %) out of the twenty three patients treated with this method obtained complete relief without recurrence of symptoms. Of these Eighteen patients, 15 were females and three were males five (23.529 %) out of the thirty four patients did not respond to treatment and this non response was defined by failure of resolution of symptoms and at least two out of the three diagnostic criteria (table 5) (chart 1).

Table 5.responce to local injection.

RESULT OF INJECTION	No. OF PATIENTS	PERCENAGE	FEMALE No.	MALE No.
RESPONSE	18	78.26%	15	3
NO RESPONSE	5	21.73%	5	0

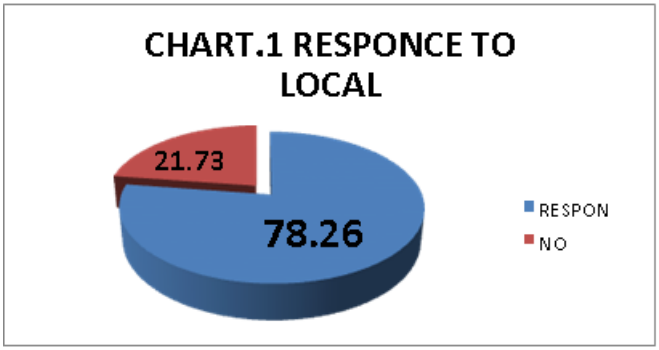


Chart 1: Response to local corticosteroid injection.

Sixteen (69.56%) of the twenty three patients developed complications (either immediate or late) Immediate complications twelve (52.17%) patients developed complications: Eight (34.78 %) patients had pain at the injection site. Four (17.39%) patients developed temporary radial nerve parasthesia. Late complications, four (17.39 %) patients had hypopigmentation of skin (figure 4)(table6).

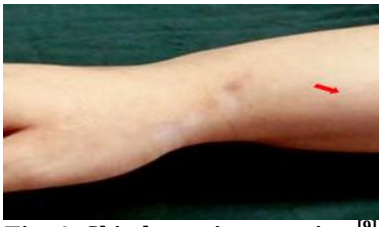


Fig. 4: Skin hypopigmentation.[9]

Table 6: immediate and late complications of local steroid injection.

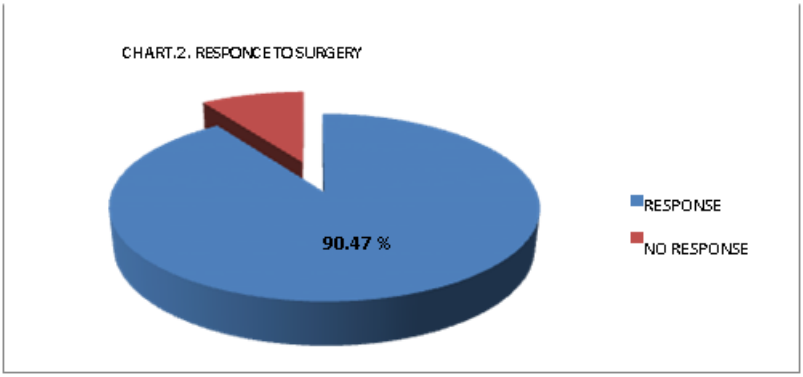
IMMEDIATE COMPLICATION	No. of patients	Percentage
PAIN AT INJECTION SITE	8	34.78%
TEMPORARY RADIALNERVE PARAESTHESIA	4	17.39%
TOTAL(IMMEDIATE)	**12**	**52.17%**
LATE COMPLICATION	**No. of patients**	**Percentage**
SKIN HYPOPIGMENTATION	4	17.39%
TOTAL(LATE)	**4**	17.39**%**
TOTAL(IMMEDIATE & LATE)	**16**	**69.56%**

Group 2

This group consisted of twenty one patients treated by surgical Release. nineteen (90.47 %) out of the twenty one patients achieved complete resolusion. eighteen of those patients were females and only one male. two (9.52 %) out of twenty one patients failed to respond to surgical decompression, one female and one male patient. The failure of response was defined by development of a painful scar in one male and persistence of symptoms in the other female.(table 7).

Table 7: Rerponse to surgery.

RESULT OF SURGERY	No. OF PATIENTS	PERCENTAGE	FEMALE No.	MALE No.
RESPONSE	19	90.47%	18	1
NO RESPONSE	2	9. 52%	1	1



Complications of surgery

Three (14.28 %) patients developed complications, one (4.76 %) of them developed surgical site scar. The other two (9.52 %) of the 3 patients developed superficial wound infection those were managd with oral antibiotics and local dressing Table .8.

Table 8: complications of surgery.

COMPLICATION	No. OF PATIENTS	PERCENAGE
PAINFUL SCAR	1	4.76%
SUPERFICIAL WOUND INFECTION	2	9. 52%
TOTAL	**3**	**14.28 %**

DISCUSSION

In the study we used surgical release of the first dorsal compartment and local injection of steroid. To compare the results of these two procedures. A total of forty four patients were having stenosing tenosynovitis at the radial styloid, with the following sex distribution, thirty nine females (88.68 %) and five males (11. 36%). Twenty three patients received local injection of steroid(group 1), we used methyl prednisolone 40 mg(2ml) (combined

with lidocaine 2 % 1 ml). Twenty one patients had surgical release of the first dorsal compartment, which was done under general anaesthesia in the operating room. the results of male: female ratio was (7.8: 1) was comparable to the results in Witt et al[10] that was 8: 1 .In our study thirty eight (86.36%) patients had the disease in the dominant hand and six (13.63 %) had affection of the non dominant hand which was higher than the results of Lane et al[11] that was 68 % of patients developed the symptoms in the dominant hand which might be due to high percentage of right handed (and dominant) patients (86.36 %) included in the study. concerning group 1 (treated with local injection), eighteen patients (87.26 %) had full relief of symptoms with no recurrence , these patients were returned to normal activity this result seems to be comparable with the results of Anderson et al [12] study in which there were improvement percentage of of 81 %. Results in our study might be slightly less might be attributed to the difference in the accuracy of injection and compartments separation. Five patients (21.73 %) did not respond to treatment as they suffered from persistenc of symptoms and signs, and this can be explained either by inappropriate site of the injection or presence of anatomical variation. Complications of local injection occurred as follows in group 1 Immediate complications, twelve (52.17 %) patients have had immediate complications, Eight patients (34.78 %) suffered from pain at the injection site; the result seems to be close to Anderson et al[11] in which 35 % of patients had pain at the injection site[12] four patients (17.39 %) had transient radial nerve paresthesia this is usually doesn't last for more than a month from time of injection. This result is higher than those found by Anderson et al[12] in which there was only 4 % of patients who developed temporary radial nerve paresthesias, this might be due to extrusion of the injected material and pressure on the sensory branch of the radial nerve. Late complications, four (17.39 %) cases had skin hypopigmentation at the injection site; this is lower than the results of Anderson et al in which the percentage of this complication was 35 %. concerning group 2 (treated surgically), nineteen (90.47 %) out of the twenty one patients had full relief; these results seems to be close to Finkelstein et al[3] and Kent et al[13] whose results were 95 %, 93 % respectively. These patients had full satisfaction with the results of surgery and they returned to their daily activities. while two patients (9.52 %) had failure to respond to surgical release as one developed painful surgical site scar and the other had superficial wound infection. The complication rate of our study was (9.52) %(2 patients) this is comparable with the results of Kent et al[13] (9 %).

CONCLUSIONS

De Quervain disease is one of the common painful wrist condition occurs more commonly in females. Local steroid injection is one of the treatment modality with success rate of (78.26%) with mild complications, whereas surgery give success rate of (90.47%) when indicated. Surgical release is safe and can be done in a day clinic.

RECOMMENDATIONS

We recommend using local steroid injection for early cases of De Quervain disease and recommend surgical decompression for more chronic resistant cases that fails to respond to conservative treatment.

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