Section: Orthopaedic

Original Research Article

COMPARATIVE STUDY OF EFFICACY OF ULTRASOUND-GUIDED STEROID INJECTION VERSUS SURGICAL RELEASE FOR THE TREATMENT OF DE-QUERVAIN'S TENOSYNOVITIS - A RANDOMIZED CONTROLLED TRIAL

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ABSTRAC

Background: De-Quervain's commonly understood as stenosing tenosynovitis but appears as degeneration along with fibro-cartilaginous, myeloid & mucopolysaccharides deposition microscopically. The aim and objective is to compare the success of treatment between Ultrasound guided steroid injection versus surgical release for De-Quervain's Tenosynovitis.

Materials and Methods: The research study has been conducted from April 2021 to March 2024 which is a Randomized controlled trial with a probability sampling technique at the Orthopaedic Unit, Maheshwara Medical College & Hospital, Chitkul, Patancheruvu, Telangana state. A total of 120 patients of both genders of ages 32 to 62 had come to the OPD with complaints of wrist pain & were diagnosed with de-Quervain's Tenosynovitis and are all part of our research study. The computer allocation method was used, and participants were randomly separated into two groups 1 & 2. Group-1 patients were surgically treated with the release of the first extensor compartment while Group-2 patients were treated with Ultrasound-guided methylprednisolone acetate and xylocaine injection.

Results: Male participants were 32 (26.6 %) and female participants were 88 (73.3%) in our research study with a female to male ratio of 2.75:1. The VAS scores for Group 1 at baseline and 24th week vary by 39.59 and for Group 2 vary by 4.87. The DASH scores for Group 1 at baseline and 24th week vary by 4.78 and for Group 2 vary by 4.87. The Mean Quick DASH score & Visual Analogue Scale in Group 1 & Group 2 before and after treatment had been significant with p-value less than 0.001.

Conclusion: Based on our clinical research, we concluded that the effectiveness of treating patients with de-Quervain's Tenosynovitis was far better with surgical release rather than ultrasound-guided methylprednisolone injections in terms of immediate pain relief, outcomes and complication rates.

Keywords: Ultrasound-guided, De-Quervain's tenosynovitis, Methylprednisolone Acetate, Surgical release.

INTRODUCTION

De-Quervain's tenosynovitis commonly presents as Wrist joint pain and if left untreated can lead to impaired function of the involved hand, commonly seen in the age group of 31 years to 50 years. De-Quervain's tenosynovitis is 0.5% reported in males and females as 1.3% to date. The First extensor compartment includes extensor policis brevis and abductor policis longus tendons. Impaired gliding within the tendon sheath of extensor policis brevis and abductor policis longus can lead to De

Quervain's. Mostly it occurs due to the thick structures of ligaments covering the tendons extensor policis brevis and abductor policis longus.[1-3]

De-Quervain's commonly understood as stenosing tenosynovitis but appears as degeneration along with fibro-cartilaginous, myeloid & mucopolysaccharides deposition microscopically. Diagnosis of De-Quervain's is possible with good history taking & proper clinical evaluation. The patient presents with complaints of pain near the radial styloid process along with radiating pain proximal to the forearm & distal to the thumb. However, on clinical evaluation, local tenderness was present at the radial styloid process. Swelling & crepitations were seen in a few patients.[4-6]

Finkelstein's test will be positive in affected patients. Finkelstein's test is performed on patient's hands by clenching the fist, putting the thumb inside and deviating the hand towards the ulnar side of the wrist. The patient experiences pain during this manoeuvre. In most cases, conservative management with massage, adequate rest, NSAIDS, heat & cold applications, or splint has not been successful. Other methods like corticosteroid injection, thumb Spica cast, bracing, and physical therapy are accepted and have been useful in the treatment of De Quervain's as an alternative to surgery.[7-9]

Surgical treatment is done by the release of the first extensor compartment and has reported a 92% cure rate in De Quervain's disease. However, there is a risk of surgical complications along with high cost and hospital stay problems. There has been no clear-cut demarcation for different treatment modalities between conservative, local steroid injection and surgery for best results. We have done a study to look for the efficacy of Ultrasound-guided methylprednisolone injection and surgical release in De-Quervain's Tenosynovitis so that it will guide patients to go for the better treatment which they fit into.[10-15]

MATERIALS AND METHODS

The research study was conducted from April 2021 to March 2024 using a probability sampling technique in a randomized controlled trial at the Orthopaedic Unit, Maheshwara Medical College & Hospital, Chitkul, Patancheruvu, Telangana state. Among the 120 patients, the computer randomly allocated 2 groups - Group 1 & Group 2 respectively with 60 patients each. The age group of 30 years to 60 years of both genders, pain in the radial side of the wrist, restriction of thumb movements, and positive Finkelstein test are all included in the research.

Inclusion Criteria

Patients who were diagnosed with De Quervain's and had taken conservative treatment for more than 6 weeks with NSAIDs and did not respond well are considered for the study

Exclusion Criteria

The participants who had acute or recent trauma and neoplasm in the wrist joint, who had taken steroid injections previously, and had surgeries involving distal radius in the past 6 months were all excluded from our research study.

Based on history, clinical examination & conventional radiographs, we had confirmed absolute contraindication for steroids in participants and were further excluded from the study. Participants presenting with wrist pain were assessed by VAS score [from no pain (0) to severe pain (10)] & functional DASH score in beginning & at the end of treatment and are followed up to study period.

Participants of Groups 1 & 2 were treated accordingly in our study. Postoperatively participants were followed up at 2 weeks after an ultrasound-guided steroid injection and surgical release and were evaluated clinically to look for clinical improvement and continued follow up at two-week intervals up to six weeks i.e. at baseline, 4th week, 12th week & 24th week.

To evaluate the success of the treatment of Ultrasound-guided steroid injection versus surgical release for the treatment of De-Quervain's Tenosynovitis the paired t-test was done between the two groups 1 & 2 taking $p < 0.05$ as significant.

For study group 1, with the use of Lidocaine local anaesthesia, all surgeries were done by taking a 1-2 cm long skin incision over the first extensor compartment of the wrist, then the retinaculum was dissected, abductor pollicis longus & extensor pollicis brevis were released, haemostasis was achieved and wound was closed with skin sutures.

Patients were assessed before and after surgery by Finkelstein test, VAS score and DASH score. For study group 2, an Ultrasound-guided steroid injection containing 1ml triamcinolone acetonide and 1 ml of 1% lidocaine hydrochloride, mixed in 5 ml syringe was given in first extensor compartment directed towards radial styloid process.

Merits and demirits of both treatment plans:

- Ultrasound-guided steroid injections are preferred for De Quervain's tenosynovitis in cases where conservative treatments fail: If NSAIDs, splinting, and physical therapy do not provide sufficient relief, injections can be considered. However, precise targeting is needed: Ultrasound guidance ensures accurate placement of the steroid into the affected tendon sheath, improving efficacy and reducing complications.
- Minimizing side effects: Ultrasound reduces the risk of skin thinning, depigmentation, infection, and tendon damage by preventing steroid leakage into surrounding tissues.
- Avoiding surgery: For patients who prefer a non-surgical approach, injections offer a viable alternative with high success rates (67–93% in studies).
- Early-stage disease: Injections are most effective when administered before significant tendon thickening or fibrosis occurs but most commonly,

patients present to us in the late stage of the disease.

RESULTS

In our research, 120 patients were considered aged between 32 to 62 years with a mean of 36.23±6.24 yrs. Most of the participants were between the age group of 34 to 45 years (67.7%) followed by 46 to 56 years (32.3%). Male participants were 32 (26.6 %) and female participants were 88 (73.3%) in our research study with a female to male ratio of 2.75:1.

Table 1: VAS and DASH Scores recorded at baseline, 4th, 12th,24th weeks respectively

Time line	VAS Score for GROUP 1	VAS Score for GROUP 2	DASH Score for GROUP 1	DASH Score for GROUP 2
Day 0	59.59	57.8	6.48	6.7
4th week	30.7	46.3	3.9	5.2
12th week	25.5	33.6	2.0	2.9
24th week	20	20.25	1.7	1.83

The VAS scores for Group 1 at baseline and 24th week vary by 39.59 and for Group 2 vary by 4.87
The DASH scores for Group 1 at baseline and 24th week vary by 4.78 and for Group 2 vary by 4.87
The Mean Quick DASH score & Visual Analogue Scale in Group 1 & Group 2 before and after treatment had been significant with p-value less than 0.001.

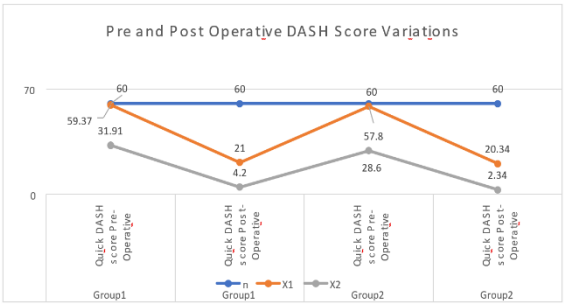

Figure 1: Graph depicting comparison of pre and post operative DASH score variations.

Table 2: Paired t-Test of both Group-1 (surgical release) & Group-2 (ultrasound guided steroid injection) with Visual Analogue scale & Quick DASH score Pre & Post-Operative treatment

Variable	n	MEAN ± SD	t=Test	p-value
Group-1			19.56	<0.001
Quick DASH score Pre-Operative	60	45.64 ±13.73		
Quick DASH score post-operative	60	12.6 ± 8.4		
Group-2			17.67	<0.001
Quick DASH score Pre-Operative	60	43.2 ± 14.6		
Quick DASH score post-operative	60	11.34 ± 9		
Group-1			20.8	<0.001
Visual Analogue Scale Pre-Operative	60	5.77 ± 0.65		
Visual Analogue Scale Post-Operative	60	1.69 ± 2.10		
Group-2			18.6	<0.001
Visual Analogue Scale Pre-Operative	60	5.5 ± 0. 03		
Visual Analogue Scale Post-Operative	60	0.71 ± 2.12		

DISCUSSION

De Quervain's stenosing tenosynovitis involves radial styloid pain, restricted extension or abduction of the thumb and requires treatment.
Conservative management involves methylprednisolone injections because of its beneficial anti-inflammatory effects even though the exact mechanism of action is not known. In our research study, we found patients of the adult age group with a mean of 41.44 ± 8.5 years in group-1 with surgical release and 40.73 ± 9.20 in group-2 with ultrasound guided methylprednisolone injections.
We considered the patients aged between 30 years to 40 years (81%) and then 41-50 years (19%). Mean VAS and DASH scores in Group 1 & Group 2 had P values less than 0.001 both, pre-operatively and postoperatively which was noted in [Table 1], since it was statistically significant.

Our database had numerical variables like age and pain score, which at presentation are specified in numbers and noted by mean ±SD. Categorical variables in our database including gender and successful treatment were noted by frequency and percentage. Based on various study literature, a Disabilities-of-arm-shoulder-hand score of at least 27.7 points was significant statistically at the confidence interval of 95%.
Data Variables were entered into SPSS 21.0 software for Data analysis.
Success Rate in Group 1 & Group 2 was very evident by reduced pain severity on the Visual Analogue Scale & DASH score with no clinical sign of tenderness on the radial side of the affected wrist.
The Finkelstein test was negative on every follow-up on the 4th, 12th & 24th week respectively till the last follow up of our study. From the study group of participants in our research, based on DASH/VAS

scores, there is an improvement from 59.59/6.48 to 20/1.7 in participants with surgical release in group 1 and 57.8/6.7 to 20.25/1.83 in participants undergoing ultrasound guided steroid injection in group 2.
This statistical improvement in both groups ($p < 0.05$) was comparable to each other. Recurrence was seen in 2 patients in group 2 who came back with radial styloid pain in 8 and 10 months respectively and 2 reported occasional pain on heavy work. 3 patients had tenderness and 2 had numbness in group 1 at the surgical scar site.
From the study, we have noticed wrist joint stiffness in participants from both groups requiring physiotherapy for better rehabilitation.
Physiotherapy should be inculcated as routine practice with future studies.

CONCLUSION

Concerning pain relief, complications & functional outcomes the participants from Group 1 (surgical release) have better results when compared to Group 2 (ultrasound-guided steroid injection). In terms of cosmetic benefits, we advise ultrasound-guided steroid injections and Surgical release in patients where steroids are contraindicated.

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