



TREATMENT OUTCOME OF DE QUERVAIN'S TENOSYNOVITIS TREATED BY SURGICAL DEROOFFING- A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT De Quervain's tenosynovitis is a common crippling ailment, which hampers the individual's ability to use the thumb in one's activities of daily living and work due to stenosing tenosynovitis of the Abductor Pollicis Longus(APL) and the Extensor Pollicis Brevis(EPB) within the first extensor compartment sheath. The condition inflicts women more common than men, especially in the age group of 30 to 50 years. The condition is diagnosed clinically by the provocative Finkelstein's test and the disability quantified, making use of the QuickDASH Questionnaire and calculating a symptom severity score. The higher the score, the higher, the disability and vice versa. Surgical deroofting becomes the remedy when initial conservative methods and regimens fail and the treatment outcome can be assessed and quantified by the postoperative QuickDASH score. The purpose of this prospective observational study is meant to evaluate the treatment outcome of surgical deroofting done for De Quervain's tenosynovitis in 40 patients, who met the inclusion criteria. The pre operative and post operative statuses were assessed and quantified using the QuickDASH Questionnaire. Following surgical deroofting , the same tool was used to quantify the severity at definite time intervals during follow up (Day7,1month &3months after surgery) . The post operative outcomes- intermediate and final, were assessed and analysed for statistical significance using Microsoft Word, Microsoft Excel and statistical software IBM-SPSS (International Business Machines- Statistical Product and Service Solutions) ver18, using appropriate statistical tests.

KEYWORDS : De Quervain's tenosynovitis (DQTS); Finkelstein's test; Abductor Pollicis Longus(APL); Extensor Pollicis Brevis(EPB); Surgical deroofting; QuickDASH Questionnaire.

INTRODUCTION

De Quervain's disease was first recognized and described in 1895 by the Swiss physician and surgeon Fritz De Quervain as a stenosing tenosynovitis of the Abductor Pollicis Longus (APL) and the Extensor Pollicis Brevis (EPB) within the first extensor compartment of the wrist, formed by the radius and dorsal carpal ligaments.^{1,2,3,4}

As pathology specimens demonstrate collagen disorientation and mucoid change,^{5,6} it may be more appropriate to regard De Quervain's disease as tendinosis (stenosing tenosynovitis/tenovaginitis) rather than tendinitis (inflammation)⁴.

De Quervain's disease is typically observed in adults between 30 and 50 years of age especially women of childbearing age with pain and tenderness on radial aspect of wrist near radial styloid. . The cause is almost always related to overuse, either in the home or at work (eg. Repetitive ulnar deviation required in newborn care) or is associated with systemic inflammatory arthropathies like Rheumatoid Arthritis and Reactive Arthritis. Sometimes a thickening of the fibrous sheath is palpable at the site of pain and tenderness. The Finkelstein's test, which elicits excruciating pain over the radial styloid tip by grasping the patient's thumb and quickly abducting the hand ulnarward, is usually positive and is diagnostic'. When usual conservative regimens like splint immobilization, physiotherapy, and rehabilitation fail to resolve the symptoms, the disease might be treated by steroid injections into the tendon sheath. But these usually fail to address the already established stenosis. However, time to symptom resolution after corticosteroid injection⁸ may take upto 18 months. Further, repeated steroid injections may cause potential complications such as susceptibility to infections, atrophy of the subcutaneous tissue, depigmentation of skin, atrophy of subcutaneous tissue, suppurative tenosynovitis and even tendon rupture¹¹. Animal studies have also reported increased risk of peritendinous adhesions with steroid injection.

Thus, referral for surgery such as decompression and deroofting of the first dorsal compartment is recommended for patients who do not respond to repeated steroid injections⁹ or who have symptoms persisting for longer than 6 months after the usual nonsurgical, conservative treatment regimens¹⁰. Treatment outcome of releasing the first extensor compartment for the treatment of De Quervain's disease can be done using the Disabilities of the arm, shoulder and hand (DASH or QuickDASH) score in a group of patients with refractory De Quervain's disease and comparing the preoperative and postoperative scores¹¹. In this study, along with the primary objective of evaluating

treatment outcome, the association of the disease with age, gender, occupation, socioeconomic status, coexisting comorbidities and the complication rates, following surgery were also analysed.

MATERIALS AND METHODS

This is a prospective observational study among 40 patients of either sex, aged 18 to 70 years for a period of 6 months from June 2020 to December 2020 who attended the outpatient clinic of department of Orthopaedics at Government medical college hospital, Thrissur, Kerala. The study population included only those patients, in whom the initial, usual conservative methods of management for the ailment failed. Using a proforma, the socio- demographic details were collected and the pre operative disability assessed and quantified using the QuickDASH^{12,16} Questionnaire. Following surgical deroofting , the same tool was used to quantify the severity at definite time intervals during follow up

Day7,1month &3months after surgery. The patients were taken up for surgery after history taking, clinical examination, informed written consent, routine haematological work up and pre operative assessment using "Quick DASH Outcome Measure". The surgery was done by the he guide and assisted by the principal investigator.

All surgeries were performed on an elective basis using standard aseptic precautions, under local anesthesia (2% Lignocaine) after giving test dose of the local anaesthetic and intravenous fluids. With patient supine on the operating table and abducted arm kept on the arm trolley, a standard oblique incision over the first extensor compartment was used. Sensory branches of the radial nerve and vascular structures were identified and protected. The exposed extensor retinaculum over the first dorsal compartment was sharply incised along the dorsal margin , and APL and EPB tendons were identified and fully released. Particular attention was made so as to see if there was any anatomic variation or septation within the first compartment. The skin was closed using 2-0 monofilament non- absorbable suture and then a sterile dressing applied. Post operatively, wound dressings were opened on the 3rd day and fresh dressings given. Following that, on day 7, suture removal was done and thence the patients were followed up at 1 month and 3 months. Treatment outcome on each visit was assessed using "The QuickDASH Outcome Measure" tool tabulated as Postoperative QuickDASH score. The collected data was entered in Microsoft Excel & Microsoft Word and was analysed with the help of statistical software IBM-SPSS (International Business Machines- Statistical Product and Service Solutions) ver18.

RESULTS

The participants included 30 females(75%) and 10 males(25%). 60% of the patients belonged to the age group of 31 to 40 years, followed by 15% belonging to the age group of 20 to 30 years.

TABLE 1-GENDER DISTRIBUTION

GENDER	Frequency	Percentage
MALE	10	25%
FEMALE	30	75%
Total	40	100%

In the study, maximum repeated value of age (Mode) was 34 years, with a frequency of 5, accounting for 12.5% of the study population. Majority of cases (80%) were with right hand dominance and right side affection(65%). Home-makers made the majority of the patients, accounting for 50% of cases. Majority of the cases were from lower socio- economic status, making up 75% of the total cases. 70% had Hypothyroidism, 35% had Dyslipidemia., 32.5% of cases had Diabetes Mellitus and 17.5% had Systemic Hypertension. In the study, Hypothyroidism was the most prevalent comorbidity associated with De Quervain's Tenosynovitis, followed by Dyslipidemia, Diabetes Mellitus and Systemic Hypertension in that order.

Since the Quick DASH Scores do not have grading of scores, and the decrease in Quick DASH Scores meant that the quantified disability decreased, statistical analytical tools had to be employed for assessing whether the scores recorded at different points of time after surgery ,were of statistical significance, and to ascertain if the decrease in score, actually meant a "Successful Treatment Outcome".

Since the p value was less than 0.005, it was inferred that the values did not follow normal distribution and hence the usual tests for a normal distribution could not be applied. Hence non parametric tests like the Wilcoxon Matched-Pair Signed Rank test and the Repeated Measures Analysis Of Variation (RM-ANOVA) test using Wilks' Lambda were employed to analyse significance between the Pre operative and Post operative Quick DASH Scores.

TABLE 2-POST OPERATIVE COMPLICATION (WOUND INFECTION)

WOUND INFECTION	Frequency	Percentage
YES	1	2.5%
NO	39	97.5%
Total	40	100%

TABLE 3-POST OPERATIVE COMPLICATION (NUMBNESS)

NUMBNESS	Frequency	Percentage
YES	1	2.5%
NO	39	97.5%
Total	40	100%

TABLE 4-POST OPEARTIVE COMPLICATION (RECURRENCE)

RECURRENCE	Frequency	Percentage
YES	2	5%
NO	38	95%
Total	40	100%

Among the 40 cases, majority did not have complications,post operatively.

DISCUSSION

As already discussed, De Quervain's Tensynovitis, is a disease capable of disabling the patient to the extent that he or she will be unable to perform, even the activities of daily living, particularly, if, the dominant hand is involved and is left untreated.

In the current study population of 40 patients, there were 10 males and 30 females, accounting for 25% and 75% respectively, of the total.

*Wolf JM et al*¹³ observed that women had a significantly higher rate of De Quervain's tenosynovitis at 2.8 cases per 1000 person-years, compared to men at 0.6 per 1000 person-years.

In the study, the age of the patients ranged from 27 years to 63 years. The mean age was 37.05 years. The maximum number of patients were

in the age group from 31years to 40 years, with a frequency of 24 and accounting for 60% of the study population while the minimum number of patients were in the age group of 61 years to 70 years, having a frequency of 2 and accounting for 5% of the study population. Persons having 34 years of age, were the maximum number, accounting for 12.5% of the study population.

*Mangukiya H J et al*¹¹ conducted a study on 40 patients of De Quervain's disease and they were in the age group from 28 to 62 years of age.

In the present study, majority of the patients had right hand dominance (80%) and hence the majority of operated hands were also right hand. Among the 10 bilateral hand affection, 6 had right hand dominance and 4 had left hand dominance and in them the dominant hand was operated for early recovery and return to activity.

*Lutsky k et al*¹⁷ in their study assessed, how frequently patients presented for evaluation of common hand disorders in relation to hand dominance and evaluated the effect of hand dominance on function in patients with these conditions. The study group comprised 1029 patients (379 men and 650 women) with a mean age of 59.5 years. 90% were right- hand dominant. They found that the dominant and non-dominant hands were affected with relatively equal frequency in De Quervain's disease.

In the study, majority of patients were females and that too, home-makers, accounting for 50% of the study population, which substantiates the theory of frequent overuse of the thumb and hand, in the pathogenesis of the disease.

*Ma Tianxiao et al*¹⁴ in a study, proved a high rate of Finkelstein's test positivity and increased risk of development of De Quervain's tenosynovitis in those who use are frequent mobile-gamers.

In the study, 75% of the patients in the study population, were from the lower socio- economic strata, who either had to look after their household by doing manual work or rely on manual labour to earn their livelihood, thus again proving the classical theory of overuse of hand, in the causation of the disease.

*Rodarte RR et al*¹⁸ conducted a study in Brazil to assess the association between social and economic status of occupations, consolidated in the form of the socio-economic index of occupational status and the occurrence of musculoskeletal diseases. They observed that the highest socio-economic status presented the higher odds ratio for tenosynovitis (OR 2.93; 2.66-3.22), while the lowest status presented the highest odds ratio for lower back problems (OR 1.31; 1.26-1.37).

In the study, it was observed that Hypothyroidism was the most prevalent comorbidity amongst the study population, standing at 70%, followed by Dyslipidemia, Diabetes Mellitus and Systemic Hypertension in that order. Systemic Hypertension would have been an incidental finding and as a part of metabolic syndrome.

*Oh JK et al*¹⁵ in their study to evaluate patient characteristics and comorbidities as predictors of treatment outcome in De Quervain's disease managed by local steroid injection, observed that female sex, obesity,African American race, *hypothyroidism*, and carpal tunnel syndrome suggested increased odds of failure of treatment.

The mean Quick DASH Scores had a decreasing trend over time which suggested improvement and on analysis using Non-parametric tests, the values were found to be statistically significant (p<0.005;not due to chance).

The multivariate analysis (Repeated Measures-ANOVA) of scores at different time periods (Pre-operative, Post operative at Day 7, 1month and 3months) showed that the difference in scores at various time intervals was due to a significant intervention (Surgical deroofting) and it was statistically significant.

Successful outcome was defined as decreased Quick DASH Scores on follow up.

Overall, open surgical deroofting using oblique incision had a success rate of 95%, with 38 people having improved Quick DASH Scores on follow up, and 2 persons having recurrence of symptoms, accounting for a failure rate of 5%.

One person had post operative numbness over the dorsal first webspace, on follow up, caused by injury to the superficial branch of radial nerve, despite meticulous dissection.

Another person, who had Diabetes Mellitus, had post operative wound infection, despite best asepsis at the time of surgery and optimum wound care. This could be due to the systemic immunosuppressive effect of Diabetes Mellitus.

Both of them had initial post operative reduction of Quick DASH Scores as compared to the initial pre operative score, but not to the extend as in the remaining cases.

CONCLUSION

The following conclusions are drawn from this study:

- De Quervain's disease is more commonly seen in females.
- The disease is more common in the age group of 31 years to 40 years, with a mean age of 37.05 years.
- Dominant side has a predilection for the disease.
- Those from the lower socio-economic strata and who are home-makers are the most commonly affected group.
- Hypothyroidism is the most common associated comorbidity with De Quervain's tenosynovitis, followed by Diabetes Mellitus and Dyslipidemia.
- The success rate of open surgical deroofing, using oblique incision is 95%, as defined by no recurrence of symptoms on follow up.
- The surgery has low recurrence rates, if adequate release is done and minimal rates of complication.

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