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Outcome of Surgical Release of 1st Dorsal Compartment of the Wrist for De Quervain's Tenosynovitis

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Research Article

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Abstract

Objectives: The objective of this study was to evaluate the clinical outcomes of surgical release of 1st dorsal compartment of the wrist for treatment of de Quervain's disease.

Methods: In this prospective case series, all the patients with resistant de Quervain's tenosynovitis, who had surgical release of 1st dorsal compartment from January 2008 to December 2019, were included in this study. Surgery was done under local anesthesia. The first dorsal compartment of the wrist was approached through longitudinal incision and the tendons of abductor pollicis longus and extensor pollicis brevis were released. Patients were followed for at least three months and the primary outcome measure was Visual analogue score (VAS) for relief of pain and secondary outcome measures were any immediate or delayed complications.

Results: A total of 80 patients were included in the study with a female to male ration of 8:1. The mean age for the cohort was 41 years (Range 25-75). Most were housewives exposed to manual work with involvement of dominant hand, 7 (9%) were doctors and office workers. There were no major complications besides wound issues and transient paresthesia in few patients. Most patients (96%) had complete relief of pain (VAS 0).

Conclusions: Surgical release is excellent option to treat resistant de Quervain's tenosynovitis patients.

Keywords: De Quervain's disease; Tenosynovitis; Extensor pollicis brevis; Abductor pollicis longus; Surgical release

Introduction

De Quervain tenosynovitis was first mentioned in literature by the Swiss surgeon, Fritz de Quervain, in 1895. It is a condition which involves tendonopathy involving the first dorsal compartment of the wrist. There is thickening of the tendon sheaths of the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) in the fibro-osseous tunnel located along the distal radius at the wrist [1-3]. Patients present with wrist pain which is aggravated by thumb motion. There is tenderness over the radial styloid process, and fusiform swelling in this region may also be noticed. There is characteristic pain which is exacerbated by thumb movement, radial and ulnar deviation of the wrist [2,4,5].

The exact cause of de Quervain tenosynovitis is not known, however, myxoid degeneration with fibrous tissue deposits and increased inflammation of the synovium has been considered to be a causative factor. There is marked thickening of the tendon sheath, resulting in painful entrapment of the tendons. It is associated with repetitive

wrist motion, specifically motion requiring thumb radial abduction and extension and radial deviation [6,7]. The is the basis for the classical Finkelstein's test. The typical patients are mothers of young infants or other manual workers. The diagnosis of de Quervain's tenosynovitis is clinical and radiographs are usually performed to exclude other pathologies such as arthritis or scaphoid nonunion and infection or tumours in rare instances [5,8,9].

The community prevalence of de Quervain's tenosynovitis ranges from 0.5% in males and 1.3% in females with more cases presenting in fourth and fifth decades of life [3,10]. More recently use of mobile phones with repeated use of thumb for texting has been reported to be associated with this disease. Common association is with other work-related musculoskeletal disorders of upper limb like, tennis elbow and golfer's elbow [11-13]. Bilateral involvement is often reported in new mothers or childcare providers [10].

Mild cases of de Quervain's get better with modification of activities [9]. However, most need splintage, systemic NSAIDs and corticosteroid injections depending on severity and response. Corticosteroid injection has proved to be very effective by various researchers [1,5,14,15]. Injection is performed into the tendon sheath about 1 cm proximal to the radial styloid where the tendons are palpable. An attempt should be made to palpably infiltrate both the abductor pollicis longus and extensor pollicis brevis sheaths. Injection should avoid the tendon itself otherwise it may result in rupture of the tendon itself. So it needs a bit of training and experience. Some experts use ultrasound guided injection to avoid this complication. The response to single steroid injection is around 50%. Similarly the response to a second injection improves this to more than 85%. The systemic side effects of steroid injection are rare but local fat necrosis and hypo pigmentation can occur [5,14,15]. Tendon rupture is rare but can occur if the drug is accidently injected into the substance of the tendon.

Surgical release of first dorsal compartment is needed if conservative treatment fails [4,15]. Surgery can easily be done as day case [16-19]. The procedure is done under local anesthesia, and tourniquet is applied to get a dry field. This procedure is performed through an approximately 2-3 cm transverse or vertical skin incision over the first dorsal compartment. Care should be taken to avoid injury to the branches of the superficial radial sensory nerve. The ligament over the first dorsal compartment is exposed. The margin of the sheath is then vertically incised. Sub compartments, if present, are identified and released. Once all compartments are released, the skin is closed, a bulky dressing is applied. The patient is advised to do early finger exercises and encouraged to use the hand.

At 10 day the sutures are removed, patients are allowed to start normal activities [9,16,18,20-22]. The Patients may complain of some swelling and pain for few months but it resolves permanently after some time. Usually there are few major post-operative complications associated with this surgery [17,23]. Infection of surgical site, wound breakdown or necrosis are very uncommon. The superficial branch of radial nerve may be injured due to direct sharp instruments or traction pressure related to scarring. The signs of this nerve injury present as pain and paresthesia in this area.

One other complication is bowstringing of the tendons with wrist flexion and extension [1,9,24]. This may be very annoying for the patient if the tendons rub or subluxes over the radial styloid process. This usually occurs due to over release of tendon sheath during surgery. The purpose of this study was to evaluate the results of surgical treatment of resistant de Quervain tenosynovitis, where either injection had failed to completely resolve the symptoms or symptoms recurred after injection therapy or patient's who wished to have surgery for this condition [24-27].

Patients and Methods

Data for this prospective single surgeon case series was collected retrospectively from 2 different hospitals of Peshawar on Microsoft Excel sheets (2013 Microsoft Ltd.).Simple numeric calculations were done for most of the results and P value was calculated to check for statistically significant difference in pre and post op VAS scores. All consecutive patients undergoing surgical release of 1st dorsal compartment from January 2008 to December 2019 were included in the study. All adult patients who were able undergo an informed consent procedure, who had failed non-operative treatment including injection therapy and who had a minimum of 3 months follow up were included in the study. All other patients were excluded from the study. All patients undergoing surgery in our hospitals undertake an institutional approved consent form which includes the use of patient data in confidentiality for educational and research purposes and serves as a blanket approval from the local ethical review board.

A total of Eighty (n= 80) patients were found eligible for inclusion in this study. Their Pre and Post op VAS score at 3 months follow up was recorded, which was the primary outcome measure and any surgical complications (secondary outcome measures) were also recorded.

All the patients were operated by a single surgeon as a day case procedure under local anesthesia (2% Xylocaine) and a pneumatic tourniquet using a longitudinal incision over the first dorsal compartment of the wrist. The tendons

of APL and EPB were identified also looking for any anatomical variants e.g.: sub compartments, and release was done accordingly. Skin was closed with non-absorbable interrupted sutures and a non-adherent dressing along with a pressure dressing was applied. Patients were prescribed oral antibiotics and analgesics for 3days only. Patients were reviewed at 2 week, 6 weeks and 3 months post-operative period and a VAS score at final follow up was recorded and patients were discharged if there were no complications and all symptoms had resolved.

Results

A total of 80 patients were available for final analysis of the study, including 71 females and 9 males (female to male ratio, 8:1). Th mean age for the whole cohort was 41 years (range 25- 75 years) with the most common age group being 40-50 years (Figure 1). Most of the patients were female housewives or new mothers and those exposed to domestic work from either gender. Seven patients were doctors and office workers. Seventy-one patients had involvement of the right side (88.7%) and6 (7.5%) had bilateral involvement (Table 1). On exploration 12 (15%) patients had sub compartments which were released and one patient had duplication of abductor pollicis longus tendon. Marked thickening of the tendon sheath was noted in all cases.

Patients operated (n)	80
Females	71(88.7%)
Males	9 (11.3%)
Mean age	41 years (Range: 25-75)
Bilateral	6 (7.5%)
Right side	71 (88.7%)

Table 1: Demographic data of patients.

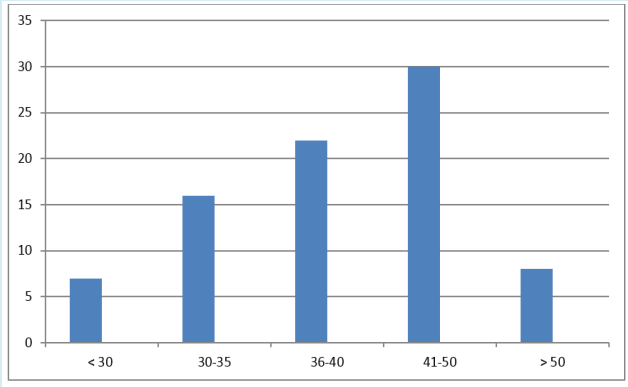

Figure 1: Age distribution of operated patients (n=80).

The mean pre-op VAS score for the whole cohort was approximately 7 which improved to a VAS score of 0 in 77 (96%) patients at the 3 months follow up period and was found to be statistically significant (P Value <0.05). Out of the remaining patients, 2 improved from a pre-op VAS score of 7 to 3 and one continued to report similar pain to the pre-operative status and was put down to chronic regional pain syndrome. All 3 were lost to follow up following the 3 months checkup. Two patients had superficial wound infection which recovered with wound care and antibiotics (Figure 2). One the patients with wound problem had hypertrophic scar requiring scar excision for cosmetic reasons.

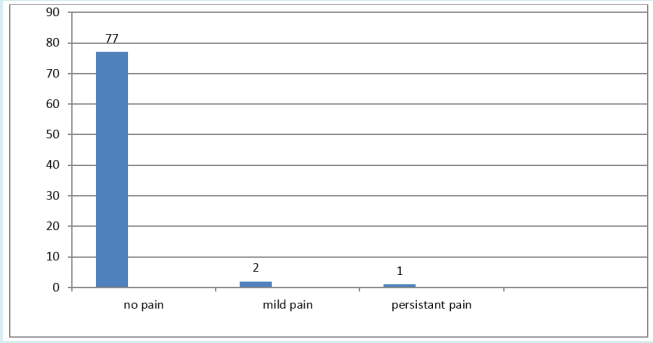

Figure 2: Clinical outcome of surgery (n=80).

Five patients had paresthesia and numbness in the distribution of the superficial radial nerve. Two of them had complete recovery, 2 had partial recovery, while one patient had persistent symptoms.

Discussion

The established treatment for de Quervain's tenosynovitis when conservative treatment fails is surgical release of 1st dorsal compartment. The results of surgical treatment have been excellent as reported by most authors. The procedure is simple and can be performed as day care surgery, and the complications are negligible in experienced hand and is one of the common procedures performed by orthopaedic and hand surgeons.

Female to male ratio in our series was 8:1 which is slightly lower than the previous studies [16,18,15,23]. In our own study published in 2003 the ratio was 9:1 [17,20]. Although the trend is changing in recent past due to use of smart phones and more males being affected [16]. In a recent study in Karachi, Pakistan, the ratio was almost 2:1 but they included mild cases also [12]. The average age of our patients was 41 which is slightly higher than our previous study [13]. But comparable with most other studies [1,5,16].

We used vertical incision in all cases. Although most surgeons prefer transverse incision to avoid crossing skin creases. The complication rate is far less with vertical

incisions. We did not encounter any scar problems with use of longitudinal incision [22]. The most common finding was thickening of the tendon sheaths. There was presence of sub compartments or duplication of tendon sheaths in 12(15%) cases. In our previous study the prevalence of sub compartments was less but the data size was too small at that time, so we can conclude that this may be more representative of our community [16].

In the follow up period, though short, there were no major complications. Few patients had transient paresthesia which relieved mostly with time. Two patients had superficial wound problems which resolved with wound care and antibiotics. One patient needed scar revision due to formation of ugly scar after wound infection. There was complete relief of pain with negative Fenkeistein's test in 96% of patients at 3 months follow up. These results are comparable to most of the published literature. We accept that this is a case series only, with a short term follow up, but with satisfactory outcome [16,18,27]. In order to investigate this further we would suggest sufficiently powered randomized control trials comparing injections with surgical release for permanent treatment of de Quervains disease and also comparing the different surgical incision.

Conclusions

We can conclude that:

1. The results of surgical release of Ist dorsal compartment for treatment of resistant or recurrent de Quervain's tenosynovitis are satisfactory, in short term.
2. The use of longitudinal incision has fewer complications in our series.
3. Long term studies including randomized control trials comparing different surgical incisions and treatments are suggested.

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