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RESEARCH ARTICLE

DELINEATION OF DE QUERVAIN TENOSYNOVITIS IN SAUDI ARABIA AND LITERATURE REVIEW

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Abstract

Background: De Quervain Tenosynovitis was first reported in the literature in 1895 by Fritz De Quervain, describing entrapment tendinitis of the first dorsal compartment of the wrist. This study conducted to evaluate our institution's experience with De Quervain Tenosynovitis patients

Methods : Retrospective cross-sectional hospital based study conducted at King Abdul-Aziz Medical City; a tertiary care center in Riyadh.The study included all De Quervain Tenosynovitis cases treated in our institution between January 2008 and December 2014.

Results: The study included 29 patients. Mean (Interquartile range) age was 42 (24-78) years and 19/29 (66%) were female. Mean (Interquartile range) BMI at the diagnosis was 30 (21-42). The most common radiological finding was distal radius cortical ridging17/29 (59%). Conservative treatment was initiated in 17/29 patients (59%), yet no clinical improvement noted and all the cases required surgical intervention 29/29 (100%). The intraoperative septum was observed in all cases 29/29 (100%).

Conclusion: Routine wrist X-rays in DeQuervain Tenosynovitis is cost-effective and should be considered to guide the treatment course with low threshold for surgical intervention might be warranted particularly in obese female patient.

Introduction:-

De Quervain Tenosynovitis was first reported in the literature in 1895 by Fritz De Quervain, a swiss surgeon, describing entrapment tendinitis of the first dorsal compartment of the wrist[1].The content of the first dorsal compartment are the tendons of Abductor Pollicis Longus (APL) and Extensor Pollicis Brevis (EPB). Anatomical variations in the first dorsal compartemnt exist in the form of septation and number of tendon slips. The presence of such variations contributes to the stenosing tenosynovitis charachteristic of De Quervain tenosynovitis[2].As the first compartement is enclosed by a synovial sheath to separate the tendons of APL and EPB as they pass over the radial styloid and underneath extensor retinaculum, the tendons are subjected to entrapment especially in workers with repetitive minute trauma to the wrist[3]. The estimated global prevalence of this condition was found to be higher in women 1.3% compared to men 0.5%[4]. Nevertheless, the only country in the middle east that reported the prevalence of De Quervain Tenosynovitis is Iran with a prevalence of 0.24%[5].Local data on the prevalence of this stenosingtenosynivitis was measured in a specific population i.e medical students showing prevalence of 64% [6].

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The exact etiology of such condition remains unidentified and different mechanisms have been proposed. The most applaused mechanism has been described as thickening of the tendons as a result of mucopolysaccharide deposition rather than an acute inflammatory process [7].The risk factors to such degenerative process include: being female, in fourth to fifth decade, pregnancy, occupational exposure to repetitive microtrauma to the wrist, floroquinolone use, and rheumatoid disease[3,8]. Although the diagnosis of this condition is made upon clinical judgment and testing (Finkelstein's and Eichhoff's tests); Different imaging modalities have been compared in the literature. A systemic review on the diagnostic accuracy of Magnetic Resonance Imaging (MRI), Ultrasound (US), X-ray, and scintigraphy showed that ultrasound was the most frequently used modality in clinical setting. The study failed to conclude the accuracy of abovementioned modalities due to the quality of papers sudied. Nevertheless, tendon thickening was the most commonly reported finding in studies where US was utilized [9].

Different management approaches are classified into conservative medical and definitive surgical. Conservative management includes: thumb splinting, non-steroidal anti-inflammatory drugs (NSAID), therapeutic exercise, and corticosteroid injections into the tendon sheath [6].A study was conducted to examine the effectiveness of corticosteroid injections defined treatment success as symptomatic relief wihin 1 to 2 injections, concluded that corticosteroid injection is an effective choice with a success rate of 73.4%. Treatment failure, however, was defined as the need for subsequent surgical release or a third injection. Female gender and a Body Mass Index (BMI) of more that 30 kg/m^2 were associated with treatment failure. Furthermore, confounders such as: hypothyroidism and carpal tunnel syndrome hold higher odds of failure [10].A prospective study compared the difference in outcome when incorporating immobalization following corticosteroid injection reported that the use of splints does not influence the outcome of non-surgical intervention, was limiting of daily activities, and is not of a cost-effective value [11].On the other hand, another prospective study reported a significant improvement with the use of thumb spica following corticosteroid injections with a success rate of 93% (defined as: resolution of pain and temderness in conjungtion with a negative Finkelstein test) [12].The use of Platelet Rich Plasma (PRP) was compared to corticosteroid injections in a recent prospective study. The results favored PRP as it induced self-healing at 6 months post treatment. Patients reported pain relief, improved hand function and reduced tendon thickness that was evident on US. In addition, patients were free of the known local side effects of corticosteoid injection such as: adhesions, skin atrophy and hypopigmentation [13].

In cases of recurrance or failure to induce symptomatic relief by non-surgical methods, surgical release of dorsal compartemnt is the next treatment option. The classical surgical technique comprises a transverse insicion to the extensor retinaculum covering the first dorsal compartment to liberate the tendons and relieve the entrapment. Although a simple procedure with high success rate; volar tendon subluxation can occur as a complication. In order to minimize the risk of tendon subluxation; several surgical techniques have been suggested in the literature[14]. A prospective study looked into the functional outcomes following longitudinal incision in surgically treated patients. The study reported that longitudinal incision allowed for better identification of compartment, management of adhesions, and reduced risk of volar tendon subluxation [15].On the other hand, a surgical technique referred to as Omega pulley plasty was suggested in another prospective study. The technique is based on increasing the internal volume of pulley by releasing its anterior attachment to the radial styloid process aligning with the physiological gliding mechansim of tendons. Nevertheless, omegaplasty results in less adhesions and lower risk of subluxation[16].

A retrospective cohort study was conducted to investigate whether or not routine wrist X-ray findings would alter the management plan or favor one treatment option over the other. The findings of this study denied any contributory role of routine wrist X-ray in decision making. In addition to the authors' belief that it is not cost-effective and would result in subjecting patients to unnecessary radiation[17].

The aim of this study to report our observational finding of distal radius cortical ridging on wrist X-ray and failure of conservative treatment in De Quervain Tenosynovitis patient with intra-operative finding of septum in the 1st extensor compartment.

Methods:-

This hospital based retrospective cross-sectional study was carried out over one 2 months period at King Abdul-Aziz Medical City, a tertiary care center in eastern region of Riyadh. The study included all De Quervain Tenosynovitis cases treated in our institution throughout 5-year period from January 2015 to December 2020. Ethical approval for the study was obtained from the ethics committee of King Abdullah International Medical Research Center (KAIMRC) with research protocol NRC21R/290/0702 August 2021.

A total of 29 patients were managed in our institution during 5-year period and form the basis of the present study. Data collection included the age and BMI of the patient, sex, presence of associated co-morbidities, presence of radiological findings, and management plan.

To reflect the most possible precise outcome of the present study, the patient's hospital electronic records (Best Care) of clinical examinations, investigations, and surgery were the only source for data collection.

Statistical methods:
The Statistical Package for Social Sciences (SPSS) V.21 was used for data management and analysis. Data were summarized as proportions.

Results:-

The study included 29 patients. The mean age was 42 yearswith youngest patient was 24 year-old and the oldest was 78 year-oldwith female predominance19/29 (66%). The Mean BMI at the diagnosis was 30 kg/m^2 with lowest BMI was 21 kg/m^2 and the highest was 42 kg/m^2.Themean BMI was higher among female compared to male 31 $kg/m^2$and 29 kg/m^2 respectively.The most common radiological finding was distal radius cortical ridging 17/29 (59%) Table1, Fig1.

The most common associated comorbidities was hypertension 8/29 (26%) followed by Diabetes Mellitus type2and Hypothyroidism 5/29 (17%) . Other co-morbidities included Dyslipidemia 4/29 (14%), Epilepsy 1/29 (4%),Obstructive Sleep Apnea (OSA) 1/29 (4%), Depression and Coronary Artery Disease 2/29 (7%)Fig2.

The surgical history was remarkable especially for previous hand surgery 6/29 (20%) including Ligament reconstruction with tendon interposition (LRTI) 1/29 (4%), scaphoidectomy with four-corner arthrodesis 2/29 (7%) , carpal tunnel release 2/29 (7%) and 1st extensor compartment release on other hand 1/29 (4%). Other non-hand surgeries including laparoscopic cholecystectomy, cardiac catheterization and cesarean section.

Conservative treatment was initiated in 17/29 patients (59%), yet no clinical improvement noted and all the cases required surgical intervention 29/29 (100%). The intraoperative septum was observed in all cases 29/29 (100%).

Table 1:- Baseline Characteristics of De Quervian patients.

Characteristics	N (%)
Age at diagnosis, Mean (IQR)	42years (24-78)
Male	10 (34)
Female	19 (66)
BMI at diagnosis, Mean (IQR)	30 kg/m^2(21-42)
Conservative Treatment	17 (59)
Surgical Intervention	29 (100)
Previous Hand Surgery	6 (20)
Distal Radius Cortical Ridging	17 (59)

Fig1:- Hand X-ray of two of the cases showing the distal radius cortical ridging (arrows-head).A, B and C depicted the PA view, Oblique view and Lateral view respectively.

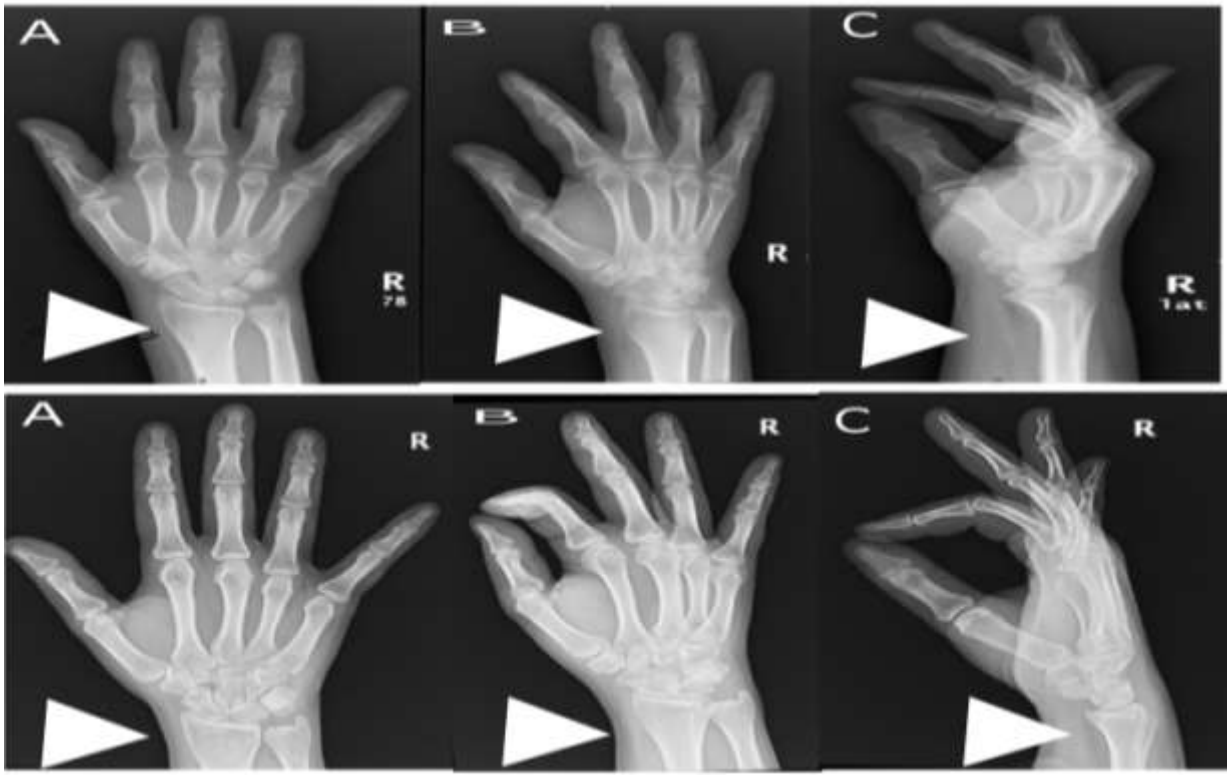
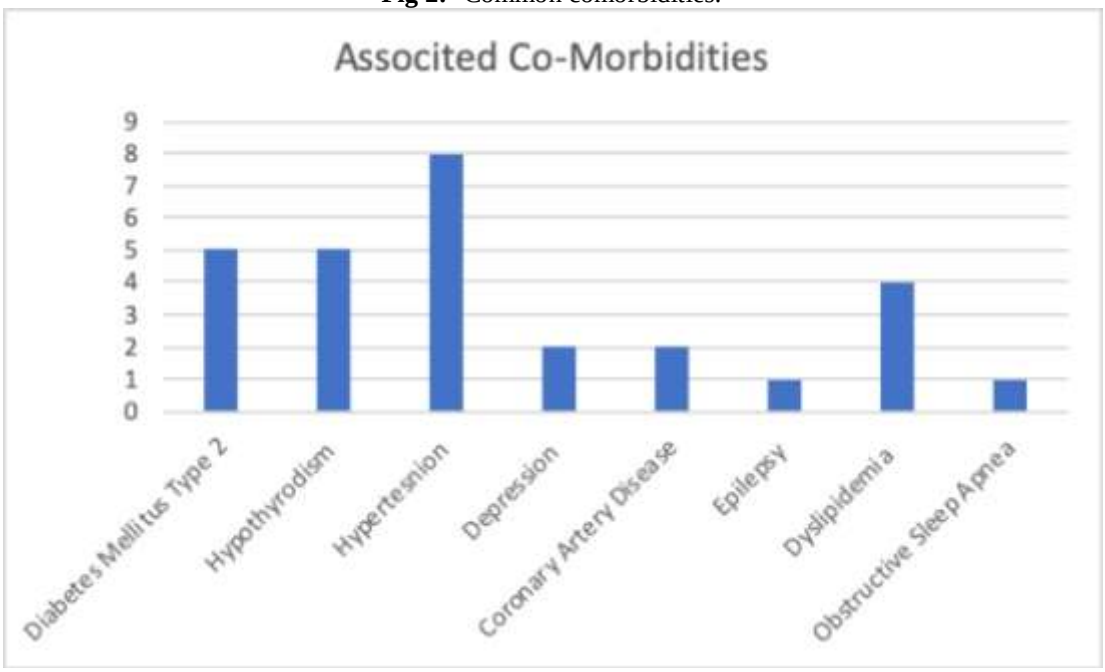


Fig 2:- Common comorbidities.



Discussion:-

We have investigated the De Quervain Tenosynovitis managed in our institution throughout the five-year period from January 2015 to December 2020. This study aims to retrieve then analyze the prevalence, risk factors and

radiological findings of wrist X-rays in patients diagnosed with De Quervain Tenosynovitis to determine the impact of such findings on treatment algorithms.

Our study revealed a female predominance in De Quervain Tenosynovitis which is concurrent with global prevalence [3,4,8]. The Mean BMI in our study overall was 30 kg/m^2, yet the mean BMI was higher among female 31 kg/m^2 . Moreover, being a female with BMI more than 30 kg/m^2 are risk factors for treatment failure as reported by Jinhee K Oh et.al [10]. Furthermore, considering beforementioned factors, this is could explain that all of our cases required surgical intervention and failure of conservative treatment.

Comorbidities in patient with De Quervain Tenosynovitis should be considered in the treatment algorithm. Hypothyroidism and carpal tunnel syndrome have been reported to associated with conservative treatment failure [10]. In our study, hypothyroidism and carpal tunnel syndrome was 17% and 7% respectively.

In conjunction with the crucial role of imaging in confirming diagnosis; differing imaging findings can propose a challenge to the confirmation of diagnosis and decision making in regards to the suitable intervention. A retrospective cohort study was conducted to investigate whether or not routine wrist X-ray findings would alter the management plan or favor one treatment option over the other. Although several studies have identified certain radiological findings in De Quervain Tenosynovitis such as: radial styloid abnormalities, periosteal reaction, or osteopenia. The findings of this study denied any contributory role of routine wrist X-ray in decision making. In addition to the authors' belief that it is not cost-effective and would result in subjecting patients to unnecessary radiation [17].Nevertheless, skeletal changes have been studied in the literature and radial styloid changes were attributed to cause irritation to the overlying tendons[18].Radial styloid changes comprised cortical erosions, sclerosis, and periosteal bone opposition that suggest the development of De Quervain's Tenosynovitis[19]. In our study, the most common radiological finding was distal radius cortical ridging 17/29 (59%). We observed that De Quervain Tenosynovitis patients with cortical ridging on the distal radius do not respond to conservative treatment and eventually required surgical intervention. To our best knowledge, no report in the literature observed this finding, therefore, considering this observation, early surgical intervention should be offered.

Intraoperative identification of septum in the first extensor compartment was noted in our study. To our best knowledge, this finding was not reported in the literature. We believe this finding indicate severity of the disease and failure of conservative treatment if initiated. The conservative management in our institution are thumb splinting, non-steroidal anti-inflammatory drugs (NSAID) and therapeutic exercise. Corticosteroid injections into the tendon sheath was not given in all of our cases.

The shortcoming of our study stems from being a single institution experience in the capital city of Saudi Arabia, therefore the result might not be representative of all De Quervain's Tenosynovitis patients across Saudi Arabia. Moreover, small sample size limited the statistical significance. Corticosteroid injections into the tendon sheath was not given in all of our cases, which might affect the response to conservative treatment.

In conclusion, routine wrist X-rays in De Quervain Tenosynovitis is cost-effective and should be considered to guide the treatment course. Low threshold for surgical intervention might be warranted particularly in obese female patient if distal radius cortical ridging observed on wrist X-rays. Multicenter study is recommended to correlate the observation of distal radius cortical ridging and intraoperative identification of septum in the first extensor compartment with the severity of the disease and failure of conservative treatment.

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