

Surgical Complications Involving Upper Limb in Diabetic patients at Allama Iqbal Memorial Teaching Hospital Sialkot; A Cohort Study

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ABSTRACT

Aim: To analyze the management of surgical complications encountered in upper limb in diabetic patients; being treated in surgical department at Allama Iqbal Memorial Teaching Hospital, Sialkot.

Study design: Prospective Study

Place and duration of study: Department of Surgery, Khawaja Muhammad Safdar Medical college, Sialkot from June 2016 to December 2020.

Methodology: All diabetic patients treated in surgical outpatients' department as well as admitted patients were included in the study. The written informed consent for inclusion in the study was obtained. The patients having involvement of upper limb were followed from the time of presentation until 3 months after the treatment is over or their associated complications are managed. Both type 1 and Type 2 diabetes patients were included. The data including history, examination investigations including metabolic profile and blood glucose monitoring, diagnosis and treatment record was entered on a proforma.

Results: Out of 296 Group I patients, 46 patients have hand involvement, 115 patients have shoulder problems, 11 patients have fingers involvement, 6 patients have Dupuytren's contracture, 16 patients have Carpal Tunnel Syndrome and 102 patients have Tendonitis at any level. Out of 126 Group II patients, 32 patients have hand involvement, 27 patients have shoulder problems, 7 patients have Dupuytren's contracture, 29 patients have Carpal. Out of 141 Group III patients, 29 patients were managed with release of median nerve with 27 patients manipulation under anesthesia, 32 patients with debridements, 15 patients with intralesional steroid injection, 23 patients with physiotherapy/splints and 15 patients with TENS.

Conclusion: Additional research is needed to understand the unique reasons for upper extremity problems in patients with diabetes, and to identify preventative treatments.

Keywords: Type 2 Diabètes mellitus, Adhesive capsulitis, Carpal tunnel syndrome, Dupuytren's contracture,

INTRODUCTION

Diabetes mellitus is a condition that is prevalent in the contemporary era. Micro and macro vascular complications result in an increasing number of deaths. But, its effects are not solely restricted to the network of blood vessels. With the passage of time, it has evolved and now also damages the body muscles and skeletons resulting in physical disorders. As a result, the overall quality of life is affected^{1,2}.

Diabetes mellitus (DM) is considered as the epidemic of the century. Morbidity and mortality rate due to this disease is significantly high. Microvascular complications have a huge impact in morbidity and mortality due to this disease and is a burden on public health system especially in Sub-continent nations. There are multiple diabetic complications in lower extremities. These complications result from complex interactions between peripheral vasculopathy, peripheral neuropathy, structural deformity and decreased immunity. An early and accurate recognition of these abnormalities is crucial which initiates prompt

treatment, therefore avoiding or minimizing life-long deformity, dysfunction and amputation in worst case scenarios. Radiological investigations after a thorough clinical assessment are most important in prompt diagnosis and treatment of the patient³.

This diabetes causes problems in the upper limb and creates a sense of inconvenience for the patient. Patients that are diagnosed with diabetes, constantly suffer from pain in the upper limb. It also results in restricting the movement of joint, frozen shoulder, tendonitis and dupuytren's contracture. There are also some severe ramifications such as permanent pain and disability⁴.

Standard approach and methods have been used to gauge the shoulder ROM. During the measurement phase, the subject is made to sit on a stool without any back cushion. The arm and shoulder is kept close to the body for the measurement of external rotation mobility. In the case of passive ROM, the subject is placed in a spine position. For the arm rotation, the arm is kept at an angle of 90 degree; whereas, the elbow is placed in 90 degrees flexion. It was possible to lose the joint due to active ROM measurement. On the other hand, the passive ROM measurement gave an overview of whether the problems in joint were the cause of restriction in the mobility⁵.

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There has been some extensive research on the effects of DM on the human hand but we are still unsure about its occurrences. The medical professional suggest these effects are not only common amongst the diabetic patients, but also in the ones that have poor metabolism and suffer from blood vessels complications.

As of today, 240 million people across the globe have been affected by the DM. The research also delineates that this number is likely to surge up to 380 million by the year 2025. Those suffering from poverty and having low income are most affected because of the lack of resources. Pakistan is at the 7th spot in the list of countries with most diabetic patients. Data suggests that there are around 6.9 million patients and the figures are likely to intensify in 2025 and Pakistan may move up to the 4th spot. It is vital to know the occurrence of Diabetes in our population to determine the cause behind such higher ratio in the region. The relevant factors associated with this surge in diabetic patients can also be uncovered by establishing the relationship of DM with regards to our population^{6,7}.

To measure the dexterity by adopting standard procedures, the nine-hole peg test was first used in USA by Sammons Preston and Cedarburg. Pegs were inserted inside the 9 holes through the use of one hand at a single period. And later on, swiftly removed them from one hand. The time for the completion of each test was documented and then studied. Prayer sign helped to measure the restricted mobility of hand joint. Positive prayer sign was given when the participants were unable to close their palms totally without leaving any space between the fingers⁸.

According to international data, Dupuytren's contracture is the most frequently (13–63%) seen abnormality among all the upper limb musculoskeletal complications. However, we encountered a significantly low percentage of patients (1%) with DCT. It may be because that we have excluded diabetic subjects with chronic liver disease or alcoholism which are known confounding factors in the pathogenesis of DCT^{9,10,11}. No study has been conducted at our hospital; so we wanted to collect and analyze the data of diabetic patients presenting with complications in upper limb.

PATIENTS AND METHODOLOGY

All diabetic patients treated in surgical outpatients' department as well as admitted patients were included in the study. The written informed consent for inclusion in the study was obtained. The patients having involvement of upper limb were followed from the time of presentation until 3 months after the treatment is over or their associated complications are managed. Both type 1 and Type 2 diabetes patients were included. The data including history, examination investigations including metabolic profile and blood glucose monitoring, diagnosis and treatment record was entered on a proforma. The patients were distributed in two groups : Group I- OPD and Group II- indoor . the symptoms of the patients for which they presented were thoroughly assessed and diagnosis made. The patients treated as OPD patients were followed up in OPD for their treatment and thereafter. The patients required admissions were grouped as II were treated in surgical wards and

appropriate surgical procedures done and then followed up in the opd. All patients having upper limb symptoms and complications were included. All co morbid conditions alongside diabetes were also recorded and managed concomitantly with the assistance of department of medicine. The patients of acute trauma received in emergency department requiring immediate management were not included in the study.

The patients not giving consent, not completing follow up for 3 months were excluded from the data. Data was entered and analyzed using SPSS v 22.0.

RESULTS

The involvement of hand included infections like abscesses, tendinitis, deformities and arthritis of varying degrees. The tendonitis included tendons around shoulder , elbow and wrist. The shoulder problems were mainly adhesive capsulitis or frozen shoulder.

Table I: Demographic data

Total patients enrolled	467	
Lost to follow up	45	
Patients in study	422	
Age	18-69 years	39+9.22 years
Gender (M:F)	159: 263	(1 : 1.65)
Duration of diabetes	5- 20 years	(+ SD 4.23)
Group I-(Opd patients)	296	70.14%
Group II-(Admitted patients)	126	29.85 %

Out of 467 patients enrolled 45 patients were lost to follow up.

Table II: Presentation in two groups

	Group I OPD patients n=296 (Group II Admitted pts n=126
Hand involvement	46(15.54%)	32(25.39%)
Shoulder problems	115(38.85%)	27(21.42%)
Finger involved	11(3.71%)	-
Dupuytren's contracture	6(2.02%)	7(4.32%)
Carpal Tunnel Syndrome	16(5.40%)	29(23.01%)
Tendonitis at any level	102(34.45%)	31(24.60%)

Table III- Spectrum of Management

	Group I OPD pts n=188	Group II Admitted pts n=141
Release of median nerve	8(4.25%)	29(20.56%)
Manipulation under anaesthesia	-	27(19.14%)
Debridements	46(24.46%)	32(22.69%)
Intralesional steroid injections	69(36.70%)	15(10.63%)
Physiotherapy / splints	42(22.34%)	23(16.31%)
TENS	23(12.23%)	15(10.63%)

DISCUSSION

Out of 467 patients enrolled 45 patients were lost to follow up. Out of 296 Group I patients, 46 patients have hand involvement, 115 patients have shoulder problems, 11 patients have fingers involvement, 6 patients have Dupuytren's contracture, 16 patients have Carpal Tunnel Syndrome and 102 patients have Tendonitis at any level. Out of 126 Group II patients, 32 patients have hand

involvement, 27 patients have shoulder problems, 7 patients have Dupuytren's contracture, 29 patients have Carpal Tunnel Syndrome and 31 patients have Tendonitis at any level.

Out of 188 Group I patients, 8 patients were managed with release of median nerve, 46 patients with debridements, 69 patients with intralesional steroid injections, 42 patients with physiotherapy/splints and 23 patients with TENS. Out of 141 Group II patients, 29 patients were managed with release of median nerve with 27 patients manipulation under anesthesia, 32 patients with debridements, 15 patients with intralesional steroid injection, 23 patients with physiotherapy/splints and 15 patients with TENS.

Our study presents data of adhesive capsulitis as 115(38.85%) and 27(21.42%), while Ramchurn et al¹² 25%, Smith et al¹³ 11-30%, Cagliero et al¹⁴ 12%, Sarkar et al¹⁵ 23.7%, Ardic et al¹⁶ 12.8% and Saera et al¹⁷ 11%. Tendonitis encountered in 102(34.45%) patients and 31(24.60%) while in other studies by Ramchurn et al¹² 5%, and Saera et al¹⁷ 9.5%.

Trigger finger presented in 11(3.71%) patients while other studies presented Ramchurn et al¹² 25%, Smith et al¹³ 11-30%, Cagliero et al¹⁴ 12%, Sarkar et al¹⁵ 23.7%, Ardic et al¹⁶ 12.8% and Saera et al¹⁷ 11%.

We present Carpal Tunnel Syndrome in 16(5.40%) and 29(23.01%) ; the same problem presented in other studies are Ramchurn et al¹² 25%, Smith et al¹³ 11-30%, Cagliero et al¹⁴ 12%, Sarkar et al¹⁵ 23.7%, Ardic et al¹⁶ 12.8

Dupuytren's contracture in 6(2.02%) patients and 7(4.32%) other studies present as follows; Ramchurn et al¹² 25%. In this study, we have observed a significant association of hand and shoulder involvement with Type 2 diabetes. We found a weak but positive relationship between advancing age and duration of diabetes with upper limb musculoskeletal abnormalities in our diabetic subjects in accordance with international data. No association was found between upper limb musculoskeletal abnormalities and degree of hyperglycemia. However, considering the complications of diabetes, presence of any one of these was only established with CTS and/or adhesive capsulitis. This is an interesting observation since many studies found a strong correlation between these variables while it is refuted by others.

Another important observation was that the frequencies of upper limb musculoskeletal abnormalities in our diabetic subjects were found to be significantly comparative than the international or regional data . It may depend on the duration of DM, which was less than ten years in most of our patients. Furthermore, the most frequently found abnormality in the upper limb was adhesive capsulitis involving the shoulder, which is in contrast to the existing data depicting hand involvement as the commonest.

CONCLUSION

Additional research is needed to understand the unique reasons for upper extremity problems in patients with diabetes, and to identify preventative treatments.

Authors' contributions: All authors conceived the study, collected the data and drafted the manuscript, read and approved the final manuscript.

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