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STUDY OF PALMAR ANGLES AND THEIR SIGNIFICANCE IN DIABETES MELLITUS

Anatomy

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ABSTRACT

Introduction: Study of the patterns of the epidermal ridges (Dermatoglyphics) can serve as an aid to the diagnosis of many diseases, particularly those caused by chromosomal abnormalities. It has been presumed that any alteration in epidermal ridges of an individual prone to diabetes may have a distinct Dermatoglyphics pattern, which remains unchanged throughout life. Dermatoglyphics can be used to find out possibility of occurring of disease in future.

Aims and objectives To compare the palmar angles- angles atd, angle adt and angle dat, in cases of Diabetes mellitus with that of controls of same age and sex.

Material & Method: The dermatoglyphic patterns of 100 patients (cases) and100 normal healthy individuals of the same age group were included in the study as controls. The dermatoglyphic prints in present study were taken by Ink method. Palmar angles were measured in cases and controls and the statiscally analyzed using independent t test

Results: Results showed a significant difference in mean values of palmar angles-angle atd, angle adt and angle dat, in cases than those of controls.

Conclusion: From the present study, it can be concluded that there is significant difference in palmar angles between patients and normal individuals.

KEYWORDS

Dermatoglyphics, Angle atd, Angle adt and Angle dat, Diabetes mellitus

Introduction

Dermatoglyphics is a scientific study of papillary ridges in the palms of the hand and soles of the feet (Purkinje, 1823). Sir Francis Galton (1889), a British Anthropologist, began his observation of finger prints as a means of identification.[1]The term dermatoglyphics was coined by Cummins and Mildo in 1926[2]. It is derived from Greek words 'derma' means skin and 'glyphics' means carvings.[2]. Each dermatoglyphic configuration is unique and stable marker of identity. They are genetically determined and influenced by physical, topographical and environmental factors. No two persons, not even uniovular twins, show exactly similar dermatoglyphic features. Known from the antiquity as a mysterious disease given by alimentation; Diabetes mellitus (DM) can be defined as a heterogeneous etiological syndrome, characterized by a profound and complex turbulence of the energetic metabolism.[3] Diabetes mellitus is the leading cause of morbidity and mortality across the world. India leads the world with largest number of diabetic subjects (40.9 million) and is expected to rise to 69.9 million by 2025.[4] Early diagnosis and treatment are essential in preventing long term complications such as retinopathy, neuropathy and nephropathy. Most sufferers are asymptomatic and hence early diagnosis is a problem.

Sherke et al[5], Mandasescu et al[6], Ravindranath et al[7] and Vaddgaonkar et al[8] gave the opinion concerning efficacy of Dermatoglyphics in the prediction of diabetes mellitus. On this foundation, it has been presumed that any alteration in epidermal ridges of an individual prone to diabetes may have a distinct Dermatoglyphics pattern, which remains unchanged throughout life.

Aims and objectives

To study the palmar angles-angle atd, angle adt and angle dat, in cases of Diabetes mellitus and compare them with those of controls of same age and sex.

Material and Methods

The present study was an observational, descriptive and hospital based case-control study. A total 200 subjects were used for the study. Out of 200 subjects, 100 were cases and 100 controls. The cases were further divided into two groups depending upon the type of diabetes, Type 1 and Type 2 diabetics. The Type 1 diabetics consisted of 15 males and 13 females. Similarly Type 2 diabetics consisted of 35 males and 37 females. The control group consisted of 52 males and 48 females. Dermatoglyphic prints were taken by the 'Ink Method'. [9] Participants were informed about the procedure in detail and written informed consent was taken from the participant.

Observations & Results

The data obtained from each of 100 cases and 100 controls were thoroughly studied for various palmar angles. The observations were tabulated (Table1, 2, 3) and subjected to statistical test (independent "t" test) to calculate the "p" value. It was found that in cases angle atd, angle adt and angle tad showed difference in mean values and the "p" value was statistically significant. So, angles atd, adt and atd can be used as a reliable data for assessing the diabetic cases by Dermatoglyphics.

Table 1 shows the relationship between the atd angle in the diabetes mellitus group and the control group. The atd angle was wider on both right and left hands in type 1 diabetes group (fig 1) than the control group. The difference was statistically highly significant ($p < 0.001$). The table also shows a wider atd angle on both right and left hands in type 2 diabetes (fig 2) than the control group and the difference was found to be statistically highly significant ($p<0.001$).

Table 2 shows the relationship between the adt angle in the diabetes mellitus group and the control group. The adt angle was narrower on both right and left hands in type 1 diabetes group than the control group (fig 3). The difference was statistically highly significant ($p<0.001$). The table also shows a narrower adt angle on both right and left hands in type 2 diabetes than the control group ($p<0.001$).

Table 3 shows the relationship between the tad angle in the diabetes mellitus group and the control group. The tad angle was narrower on both right and left hands in type 1 diabetes group than the control group. The difference was statistically significant ($p<0.001$). The table also shows a statistically significant narrower tad angle on both right and left hands in type 2 diabetes than the control group. The difference was found to be statistically highly significant ($p<0.05$)

Table 1: Relationship between atd Angle in Diabetes Mellitus group and the Control group (non - diabetics).

Pattern	Diabetes type	Number	Mean	Std. Deviation	P-Value
atd Angle in Right hand	Controls	100	45.25	2.80	*<0.001 **<0.001 ***0.469
	Type 1	28	55.42	5.23	
	Type 2	72	54.58	5.22	
atd Angle in left hand	Controls	100	45.47	2.85	* <0.001 **<0.001 ***0.140
	Type 1	28	57.35	4.48	
	Type 2	72	55.59	5.58	

*p-value between controls and Type 1 diabetics** p-value between controls and Type 2 diabetics*** p-value between type 1 and Type 2 diabetics

Table 2: Relationship between adt Angle in Diabetes Mellitus group Control group (non- diabetics).

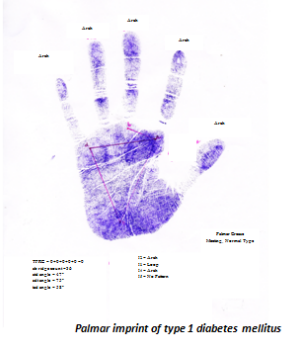
Pattern	Diabetes type	Number	Mean	Std. Deviation	P-Value
adt Angle in Right hand	Controls	100	77.66	3-76	*<0.001 **<0.001 ***0.93
	Type 1	28	70.00	3.97	
	Type 2	72	70.09	5.23	
adt Angle in left hand	Controls	100	77.52	3.73	*<0.001 **<0.001 ***0.987
	Type 1	28	67.96	5.05	
	Type 2	72	67.94	5.70	

*p-value between controls and Type 1 diabetics**, p-value between controls and Type 2 diabetics*** p-value between type 1 and Type 2 diabetics

Table 3: Relationship of tad Angle in Diabetes Mellitus group and Control group (non- diabetics).

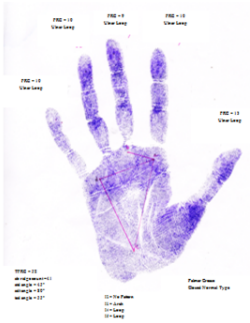
Pattern	Diabetes type	Number	Mean	Std. Deviation	P-Value
tad Angle in Right hand	Controls	100	57.12	3.75	*0.003 **0.01 ***0.45
	Type 1	28	54.57	4.42	
	Type 2	72	55.38	5.03	
tad Angle in left hand	Controls	100	57.01	3.48	* 0.004 **0.024 ***0.17
	Type 1	28	54.67	4.55	
	Type 2	72	56.23	5.23	

*p-value between controls and Type 1 diabetics** p-value between controls and Type 2 diabetics*** p-value between type 1 and Type 2 diabetics



Palmar imprint of type 1 diabetes mellitus

Fig 1



Palmar imprint of type 2 diabetes mellitus

Fig 2

Discussion

Considerable progress has been made in understanding of the associations between Dermatoglyphics and various medical disorders, as a result of which Dermatoglyphics analysis has been established as a useful diagnostic and research tool in medicine, providing important insights into the inheritance and embryologic development of many clinical disorders[8].

The present study showed the statistically significant higher values of atd angle in diabetic group hand as shown in Table 1, fig.1, fig. 2. Similar findings were reported by Ravindranath and Thomas[10], Santet al[11], Platilováet al[12]. and Rajnigandhaet al[13]., Sharma and Sharma[14], and Mittal et[15]

The mean values of dat angle and adt angle showed lower values in the hands of diabetics than control group similar to the findings of Sharma and Sharma[14], and Mittal[15] et al.

Conclusion

- The present study was undertaken to comparatively analyze the dermatoglyphic patterns in Diabetes mellitus patients and normal healthy controls and find a possible association between Dermatoglyphic patterns and diabetes mellitus. The aim was to find out the marker if any, and to study the feasibility of the marker as a screening procedure to predict the possibility of developing diabetes mellitus in otherwise normal subjects. From the present study, it appears that there do exists a variation in the Dermatoglyphic patterns in Diabetics like: wider atd angles, narrower adt angle and narrower tad angles.

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