

Dermatoglyphics of Fingers and Its Clinical Correlation with Type II Diabetes Mellitus



Medical Science

KEYWORDS : Dermatoglyphic patterns, Arches, Ulnar Loops, spiral Diabetes Mellitus.

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ABSTRACT

The dermatoglyphics is the study of epidermal ridges on the palm and sole. The epidermal ridges form well defined patterns that characterize individuals. It can be used for the clinical diagnosis of hereditary diseases. The present study is important in the evolution of the relationship between dermatoglyphic patterns and type II diabetes mellitus. If there is any significant correlation between diabetes and palmar ridges, the person at high risk for the development of diabetes can be identified in the early stage by a simple method. The present study was conducted in the general medicine outpatient department of Sri Ramachandra Medical College and Research Institute during the year (2014-2015). This study was conducted in 200 samples (100 cases and 100 controls). The finger print pattern was studied in detail by using scanning method. Results were compared with the previous study reports and were statistically analysed.

INTRODUCTION

Epidermal ridges are genetically determined and the study of these ridges on palm and sole is used in the clinical diagnosis. They form characteristic well defined patterns. If there is a significant correlation early clinical diagnosis is possible ^(1,2,3). This study was aimed to find out whether there is any significant correlation between diabetes and palmar ridges by identifying the type of epidermal creases on finger tips in type II diabetes mellitus cases and non diabetic controls. The gender and digital differences in dermatoglyphic patterns of type II diabetes mellitus were also analysed.

MATERIALS

The present study was done in 200 samples [100cases (50 males and females) and 100controls (50 males and females)] at the age group of 35-75years. It was conducted in the general medicine outpatient department Sri Ramachandra Medical College and Research Institute during the year (2014-2015).

Selection criteria

Control

- Non diabetic
- Non hypertensive
- No major hormonal imbalances
- No major syndromes
- No hand injuries
- No congenital heart diseases
- No mental retardation.

Sample

Only type 2 diabetic mellitus at the age group (35-75 years)

METHOD

The finger print for the present study was taken by scanning method.

Procedure

The scanner was connected with the laptop .We selected the cases and controls under above mentioned selection criteria. Hand sterilizer was used to wipe patient's hand for clearing the dust particles and asked them to place the palm on the glass of scanner. The scanner was operated carefully. The image of the hand print was saved in the laptop. Using the picture all the parameters were measured. The qualitative analysis was done with the laptop. The quantitative analysis was done with auto cad software.

OBSERVATIONS AND RESULTS

Finger patterns were grouped under three categories,

1. Loops -It is the most frequent pattern on finger tip. In this configuration, series of ridges enter and leave the pattern area on same side.
 - a) Radial loops -In radial loop, ridges open on the radial side.
 - b) Ulnar loops - In ulnar loop, ridges open on the ulnar side .
2. Arches - An arch is the simplest pattern. It consists of more or less parallel ridges. The ridges curve in the pattern area. The curve is proximally concave. The curve is gentle in low arch and sharp in high arch.
3. Whorls (spiral) - Whorl is a ridge configuration in which ridges actually encircle core and more complex patterns are called as 'Composites'.

Table no 1: Shows the number and percentage of the finger tip pattern of both hands in cases and controls.

Type	Cases (right side)		Control(right side)		Case(left side)		Control(left side)	
	Numbers	%	Number	%	Number	%	Number	%
Arch	151	30.2	148	29.6	87	17.5	85	17
Spiral	186	37.2	135	27	194	38.8	241	48.2
Ul	163	32.6	180	32	219	43.8	174	34.8
Rl	0	0	37	7.4	0	0	0	0

DISCUSSION

The epidermal ridges are genetically determined and they appear in the third to fifth month of fetal development and the patterns once formed never change in the life of an individual. Dermatoglyphic abnormalities due to genetic or other factors express their effect before the end of fifth month of fetal development ^(4,5). The recent evidences have proved the basis for genetic contributions in diabetes mellitus and in various medical disorders. Hence dermatoglyphic variation is an essential investigation for its early diagnosis ^(1,6).

The present study was carried out in 200 samples. As compared with the controls, the frequency of whorls was significantly more and the frequency of ulnar loops and arches were significantly less in both hand of male and female cases. These findings are similar to the findings of Pathanferozhan.J et al.(2007) ⁽⁷⁾. Dr. Nassemabeegum (2013)⁽⁸⁾observed that diabetics showed a significant increase in whorls than controls and arch patterns were found to be significantly decreased in diabetics when compared to controls. The Manoj Kumar Sharma et al., (2012)⁽⁹⁾ and Bandana Sachdev (2012)⁽¹⁰⁾ reported that the diabetics had

significantly lower arches than controls. Both male and female diabetics showed a significant increase in frequency of loops and arches and a decreased frequency of whorls especially in middle finger. Dr. Pushpa brute et al., (2013)⁽¹¹⁾ revealed that percentage of arches was more in diabetic group than in the controls . They reported that the frequency of arches was more in diabetic males and females and the difference observed in male group was not statistically significant. In that study the difference was more marked in diabetic females; difference was more on the left side.

Chart 1: Comparisons between the frequencies of fingertip patterns of the present study with the previous studies.

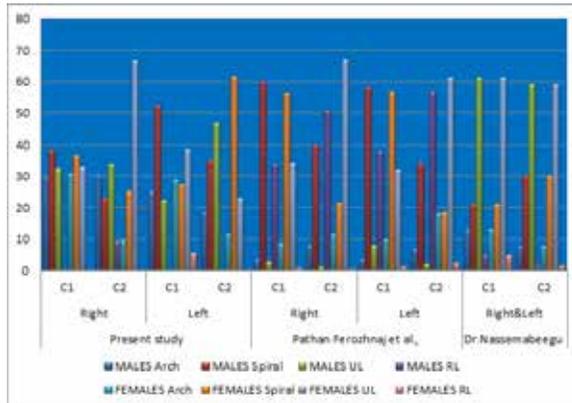


Table no 2: The table shows the statistical report and results of finger tip patterns in males and females (cases and controls).

Type	Male						Female					
	Right			Left			Right			Left		
	C1	C2	p-value	C1	C2	p-value	C1	C2	p-value	C1	C2	P-value
Arch	29.6	30.4	0.0001	25.2	18.4	0.002	30.8	9.6	0.0001	28.8	11.6	0.0001
Spiral	38	22.8	0.001	52.4	34.8	0.001	36.4	25.2	0.0160	27.2	61.6	0.0214
UL	32.4	33.6	0.1472	22.4	46.8	0.0291	32.8	66.4	0.0001	38.4	22.8	0.0316
RL	0	9.2	1.000	0	0	1.000	0	0	0.0141	5.6	0	1.000

(C1-cases, C2-controls)

According to this study analysis diabetics show more spiral pattern which is significant statistically. In diabetics frequency of ulnar loop and arch pattern shows a significant reduction.

CONCLUSION

The epidermal ridges form well defined patterns that characterize genetic predisposition of individuals and can be used in the clinical diagnosis of diseases. The epidermal ridges are genetically determined. Dermatoglyphic features due to genetic or other factors express their effect before the end of fifth month of fetal development. The recent studies have proved the genetic basis of diabetes mellitus. The present study was conducted in 200 samples at the age group of 35-75 years. A simple scanning method was used for this study. The present study analysis shows the frequency of spiral pattern is more in diabetics while the frequency of arch and ulnar loop is less. These are statistically significant. So it is possible to predict the type II diabetes in a much earlier stage by using a simple technique. This will be much useful clinically as the type II diabetes mellitus is a very common endocrine disorder with lot of complications.

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