Original Article

CASE CONTROL STUDY: A COMPARISON OF FINGER PRINT PATTERN OF DIABETETES MELLITUS PATIENTS WITH NORMAL INDIVIDUAL

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Abstract

Aim: To compare the differences in the finger tips patterns and a-b ridge count in patients with type II diabetes mellitus as case with non-diabetic as control group.

Materials and methods: The study is conducted in 100 type II diabetic patients and 100 non-diabetic persons as a control group. For collection of palmar prints 'Cumins and midlo' method has been used. Non diabetic patients were carefully selected to be free from any disease which can influence the dermatoglyphic pattern.

Observations: Observations were tabulated to find out distribution of finger-tip patterns like loop, whorl and arch and a-b ridge count from palm.

Result and Conclusion: Statistical differences in fingertip patterns were found. This inference may be widely applied clinically for the early diagnosis of type II diabetes mellitus mainly in a mass screening of a population as an additional diagnostic tool.

Keywords: Dermatoglyphics, Type II Diabetes Mellitus.

INTRODUCTION

The scientific study of the pattern of epidermal ridges is known as Dermatoglyphics, which is derived from the Greek word, 'Derma' – skin and 'Glyphics' – meaning curved. Sir Francis Galton (1892)1is considered to be the "Inventor of Dermatoglyphics" and Cummins (1936)2 is considered to be the "Father of Dermatoglyphics". J CA Mayer (1788)3 was the first to write about basic tenets of finger print analysis and concluded that the dermatoglyphic pattern is never duplicated in 2 individuals.

Galton1 classified the patterns into 3 groups, namely, the arches, loops and whorls.

Dermatoglyphics is a scientific method of reading lines and ridges of finger, palm and sole. The term dermatoglyphics was first introduced in 1926 by Cummin and Midlo, though Bid low was first to give descriptions of ridges in detail in 17th century. The precise patterns and minutiae are determined at a very early embryonic period that is about 10 weeks, well developed by 16th week and complete by 24th week of gestation.

Since many genes take part in the formation of dermatoglyphic characters, it is possible that genes which predispose to familial disease may, by pleiotropic, also influence the ridge pattern so that particular constellation of dermatoglyphic features may be characteristic of a particular disease.8 Abnormal dermatoglyphic patterns have been observed in several non-chromosomal genetic disorders and other diseases whose aetiology may be influenced directly or indirectly, by genetic inheritance.9,10

Various dermatoglyphic studies of patients suffering from different congenital disorders and disease such as diabetes, Leukemia, Leprosy, Bronchial asthma and various cancers etc. have been conducted, completed and contrasted. A significant link has been found between dermatoglyphic pattern and the disease. Type 2 Diabetes is currently thought to occur in genetically

predisposed individuals who are exposed to a series of environmental influences that precipitates the onset of disease.11 It is unanimously recognized that diabetes generally and Type-2 diabetes especially, represents a major threat to the public health worldwide.

MATERIALS AND METHOD

Sample for the present study comprises palmar prints of 100 clinically diagnosed Type II Diabetic patients of age group between 30-60 years with same age group of 100 non- diabetic persons as control group. The study was carried out in LM Medical College and Hospital, Bhopal M.P. Informed consent was obtained from the participants and ethical clearance was obtained from the institutional ethics committee prior to this study.

MATERIAL

1. Quick drying duplicating ink,
2. Cotton puffs,
3. White paper,
4. Magnifying hand lens.

EXCLUSION CRITERIA:

- Damaged or burnt fingers
- Skin disorders
- Chromosomal abnormalities

RESULTS

The present comparative case control study was established to collect dermatoglyphic pattern in patients with diabetes mellitus type 2 and control and to compare same parameters in control group in the Department of Anatomy/Department of Medicine, LN Medical College& Hospital, Bhopal. A total 200 adult group patients of both sex were enrolled in this study; in which 100 patients were clinically diagnosed type II diabetic patients compared with the same sex and age group of 100 normal blood sugar level patients as control group.

Observations were compared between controls and diabetics.

The highest pattern of distribution of the whorl was present in all fingers of left hand in patients of diabetes mellitus, whereas loop was present in all fingers and whorl -were present in thumb in the control group. Similarly highest pattern of distribution of the loop was present in the 1st, 2nd and 4th fingers, whorl in 3rd and arch in 5th finger in diabetes group in right hand, whereas whorl was present in the 1st and 4th fingers, and loop was present in 2nd, 3rd and 5th fingers in the control group. The association of a-b Ridge Count and MLI of right and left among DM and control groups; where it was observed that mean a-b Ridge Count right hand in DM group was significantly higher than control group ($P<0.001$), while in left hand mean a-b Ridge Count in DM group was significantly lower than the control group ($p<0.001$). But MLI in both hand in DM group was significantly lower than control group ($P<0.001$).

These differences between the two groups were statistically significant.

Table 1: Both hand Ridge Pattern distribution in both study group

Ridge Pattern			Total No. of Patients (n=200)	Group		P value
				DM (n=100)	Normal (n=100)	
Right	Thumb	Loop	108 (54.0%)	66 (66.0%)	42 (42.0%)	0.003
		Whorl	75 (37.5%)	28 (28.0%)	47 (47.0%)	
		Arch	17 (8.5%)	6 (6.0%)	11 (11.0%)	
	Index	Loop	123 (61.5%)	72 (72.0%)	51 (51.0%)	<0.001
		Whorl	40 (20.0%)	6 (6.0%)	34 (34.0%)	
		Arch	37 (18.5%)	22 (22.0%)	15 (15.0%)	
	Middle	Loop	109 (54.5%)	41 (41.0%)	68 (68.0%)	<0.001
		Whorl	64 (32.0%)	43 (43.0%)	21 (21.0%)	
		Arch	27 (13.5%)	16 (16.0%)	11 (11.0%)	
	Ring	Loop	125 (62.5%)	78 (78.0%)	47 (47.0%)	<0.001
		Whorl	65 (32.5%)	16 (16.0%)	49 (49.0%)	
		Arch	10 (5.0%)	6 (6.0%)	4 (4.0%)	
	Littlie	Loop	132 (66.0%)	60 (60.0%)	72 (72.0%)	<0.001
		Whorl	36 (18.0%)	14 (14.0%)	22 (22.0%)	
		Arch	32 (16.0%)	26 (26.0%)	6 (6.0%)	
Left	Thumb	Loop	75 (37.5%)	31 (31.0%)	44 (44.0%)	0.022
		Whorl	107 (53.5%)	63 (63.0%)	44 (44.0%)	
		Arch	18 (9.0%)	6 (6.0%)	12 (12.0%)	
	Index	Loop	72 (36.0%)	29 (29.0%)	43 (43.0%)	0.002
		Whorl	95 (47.5%)	60 (60.0%)	35 (35.0%)	
		Arch	33 (16.5%)	11 (11.0%)	22 (22.0%)	
	Middle	Loop	114 (57.0%)	47 (47.0%)	67 (67.0%)	0.016
		Whorl	72 (36.0%)	45 (45.0%)	27 (27.0%)	
		Arch	14 (7.0%)	8 (8.0%)	6 (6.0%)	
	Ring	Loop	77 (38.5%)	29 (29.0%)	48 (48.0%)	0.018
		Whorl	111 (55.5%)	63 (63.0%)	48 (48.0%)	
		Arch	12 (6.0%)	8 (8.0%)	4 (4.0%)	
	Littlie	Loop	122 (61.0%)	53 (53.0%)	69 (69.0%)	0.007
		Whorl	75 (37.5%)	47 (47.0%)	28 (28.0%)	
		Arch	3 (1.5%)	0 (0.0%)	3 (3.0%)	

Table no 1 shows, The highest pattern of distribution of the whorl was present in all fingers of left hand in patients of diabetes mellitus, whereas loop was present in all fingers and whorl -were present in thumb in the control group. Similarly highest pattern of distribution of the loop was present in the 1st, 2nd and 4th fingers, whorl in 3rd and arch in 5th finger in diabetes group in right hand, whereas whorl was present in the 1st and 4th fingers, and loop was present in 2nd, 3rd and 5th fingers in the control group. These differences between the two groups were statistically significant.

Table No. 2: Both hand a-b Ridge Count and MLI distribution in both groups

	DM (N=100)	Normal (N=100)	P value
Ridge Count Right a-b	39.30±6.33	31.36±8.02	<0.001 (S)
Ridge Count Left a-b	39.68±5.54	47.54±6.17	<0.001 (S)
Main Line Index Right	12.20±1.26	13.81±1.54	<0.001 (S)
Main Line Index Left	12.18±1.13	14.07±1.71	<0.001 (S)

Table no 2 shows the association of a-b Ridge Count and MLI of right and left among DM and control groups; where it was observed that mean a-b Ridge Count right hand in DM group was significantly higher than control group (P<0.001), while in left hand mean a-b Ridge Count in DM group was significantly lower than the control group (p<0.001). But MLI in both hand in DM group was significantly lower than control group (P<0.001).

DISCUSSION:

Comparison with the previous studies:

		DM Cases	Control
SatabdiS et al Error! Bookmark not defined.	Case-control study	200 (100 male+100 female)	200(100male+100female)
Trivedi PN et alError! Bookmark not defined.	Case-control study	100 (50 male+50 female)	100 (50 male+50 female)
MK &Sharma HError! Bookmark not defined.	Case-control study	50(25 male+25 female)	50(25 male+25 female)
Present study	Case-control study	100 (60 male+40 female)	100 (60 male+40 female)

Our present study, sample size, sex distribution and type of study were similar to the previous study conducted by Satabdi S et al,1Trivedi PN et al2andMK &Sharma H.3

CONCLUSION:

This inference may be widely applied clinically for the early diagnosis of type II diabetes mellitus mainly in a mass screening of a population as an additional diagnostic tool.

REFERENCES

1. Sir Francis Galton – "Finger Prints". London, Mcmillan Co- 1892.
2. Cummins H – Palmar And Plantar Epidermal Ridge Configuration In Americans And Europeans:Am. J. Phy. Anthrop: 1936; 179: 741- 802.
3. Mayer.J.C.A (1788). Cited by Mark R. Hawthorne. FingerprintsAnalysis and Understanding CRC Press, 2009; 3–13.
4. Soni A, Singh SK, Gupta A. Implications of dermatoglyphics indentistry. J DentofacialSci 2013;2:27-30.
5. Ramani P, Abhilash PR, Sherlin HJ, Anuja N, Premkumar P, Chandrasekar T, et al. Conventional dermatoglyphics- Revived concept: A review. Int J Pharma Bio Sci 2011;2:446-58
6. Henry F – On The Skin Furrows Of The Hand, Nature, 1880.
7. Cummins H and Midlo. Palmar and plantar epidermal congurations (deratoglyphic) in European Americans.Am.J.PhysAnthropol., 1926; 9:471-502.
8. Fuller IC. Dermatoglyphics: A Diagnostic Aid. Journal of Medical Genetics. 1973; 10(165).
9. Bhanu-Simian Crease in man. Some methodological consideration. Journal of human evolution edition-II 1973: 153-160.
10. Schauman and Alter- Dermatoglyphic disorders New York, Springer Verleg. 1st edition,1976; 2 pp-146-172.
11. Fauci B, Kasper, Hauser L, Jameson, Loscalzo. Harrison's Principle of internal medicine. 17th Ed. vol II.2008. pp 2275-2282.