



Digital Dermatoglyphics Patterns in Diabetes with Hypertension Patients

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| ABSTRACT | The distribution of fingerprints patterns has been found to be varying amongst the different population groups across the globe. Dermatoglyphics patterns form on the finger pad and palm parentally and remain unchanged throughout life; these features may serve as markers for fetal origin of adult disease like diabetes and hypertension. Fingerprints were collected from 150 diabetes with hypertension patients (75 males and 75 females) and 150 controls (75 males and 75 females) in the age group of 21-80 years. Fingerprints were taken by using Ink Method and recorded on a plain white paper by plain and rolled method. In the present study, Ulnar loops were the predominant pattern in case group followed by whorls, arch and radial loops. This inference may be widely applied clinically for the early diagnosis of genetic disease mainly in a mass screening of a population as an additional diagnostic tool. |
| KEYWORDS | Population, Variations, Fingerprints, Diagnosis |

Introduction:
Dermatoglyphics is the scientific method of reading lines and ridges of finger, palm and sole. The term dermatoglyphics was first introduced in 1926 by Cummins and Mildo, though Bidlow was first to give descriptions of ridges in detail in 17th century.¹ Since many genes take part in the formation of dermatoglyphics characters, it is possible that genes which predispose to familial disease may, also influence the ridge pattern so that particular constellation of dermatoglyphics features may be characteristic of a particular disease.²

Diabetes mellitus type II and Hypertension are common diseases that coexist at a greater frequency than chance alone would predict. Diabetes mellitus type-II and hypertension are not only one of the major risk factor for various diseases; they are also condition with their own risk factors like stroke, heart attack, atherosclerosis etc. The prevalence of hypertension in diabetic patients is more frequent in men than in women before the fifth decade and more frequent in women thereafter and both diseases are more common among the socioeconomically disadvantaged. In addition to race, age and sex, greater body mass, a longer duration of diabetes and the presence of persistant proteinuria are major determinants of elevated blood pressure in the diabetic population.³

Abnormal dermatoglyphics patterns have been observed in several non-chromosomal genetic disorders and other diseases whose aetiology may be influenced directly or indirectly, by genetic inheritance.⁴ Various dermatoglyphics studies of patients suffering from different congenital disorders and dis-

ease such as diabetes mellitus, leukemia, hypertension, bronchial asthma and various cancers etc. have been conducted, completed and contrasted. A significant link has been found between dermatoglyphics pattern and the disease. Therefore, 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.^{5,6}

Materials and methods:
The present study was a case-control study. Fingerprints were collected from 150 diabetes with hypertension patients (75 males and 75 females) in the age group of 21 to 80 years and equal numbers of healthy individuals were selected within the same age group. All subjects were informed about the purpose of the study. Patients attending out-door and in-door patients in medicine department from SMIMS, Gangtok, Sikkim were included in the present study. The ethical clearance was obtained from the institutional ethics committee prior to this study and informed consent was informed from the participants.

Materials used:
Duplicating ink, white paper, Ink pad, magnifying hand lens, Needle with a sharp point- for ridge counting, cotton puffs, scale, pencil pen, protractor- to measure 'atd' angle.

Method:
Dermatoglyphics prints were taken by the 'Ink Method' described by Cummins and Mildo (1961).⁷ Patients were in-

formed about the procedure in detail and written informed consent was taken from the patients. Subjects were asked to wash their hands with soap water and dried with a soft cotton cloth, so as to remove any oil or dirt. Distal phalanges were inked over the stamp pad by firm pressure starting from thumb. Prints were taken on the white paper by rolling method. The thumb was placed with ulnar edge downward and rolled toward the body and other digits were placed with radial edge downward and rolled away from the body. Each sheet was labeled with serial numbers for digits: I - thumb, II - index, III - middle, IV- ring, V-little finger. The printed sheets were coded with name, age, sex and for case group (diabetes with hypertensive patients) and control group. The prints were then subjected to dermatoglyphic analysis with the help of magnifying hand lens.

Results:

Ulnar loops: The frequency of ulnar loops was increased in the right hands of males and females of diabetes with hypertension patients while in left hands of both males and females, the frequency of ulnar loops was decreased in case group as comparison to control group. (Table 1, 2)

Whorls: The frequency of whorls was decreased in both males and females case group than control group except in right hands of females of diabetes with hypertension. (Table 1, 2)

Arch and Radial Loop Patterns: The frequency of arch and radial loops were increased in both males and females of diabetes with hypertension as comparison to controls. (Table 1, 2)

Overall, the ulnar loop was the most predominant pattern in the present study which was followed by whorls, arch and radial loops patterns.

Table: 1 Comparison of fingertip patterns in males diabetes with hypertension (DM+HTN) and control groups.

| Patterns | DM+HTN | Control | DM+HTN | Control |
|-------------|----------------|----------------|----------------|----------------|
| | Rt. Hand n (%) | Lt. Hand n (%) | Rt. Hand n (%) | Lt. Hand n (%) |
| Arch | 13 (3.46) | 9 (2.40) | 24 (6.40) | 6 (1.60) |
| Radial Loop | 10 (2.66) | 7 (1.86) | 5 (1.33) | 4 (1.06) |
| Ulnar Loop | 187 (49.86) | 180 (48.00) | 196 (52.26) | 208 (55.46) |
| Whorl | 165 (44.00) | 178 (47.46) | 150 (40.00) | 167 (44.53) |

Table: 2 Comparison of fingertip patterns in females diabetes with hypertension (DM+HTN) and control groups.

| Patterns | DM+HTN | Control | DM+HTN | Control |
|-------------|----------------|----------------|----------------|----------------|
| | Rt. Hand n (%) | Rt. Hand n (%) | Lt. Hand n (%) | Lt. Hand n (%) |
| Arch | 8 (2.13) | 13 (3.46) | 21 (5.60) | 14 (3.73) |
| Radial Loop | 8 (2.13) | 7 (1.86) | 3 (0.80) | 1 (0.26) |
| Ulnar Loop | 198 (52.80) | 196 (52.26) | 196 (52.26) | 197 (52.53) |
| Whorl | 161 (42.93) | 159 (42.40) | 155 (41.33) | 163 (43.46) |

Discussion:

In the present study, the most predominant pattern was ulnar loops in both male and females of diabetes with hypertension patients similar to the findings of Sumathi S et al and Igbigbi PS et al.^{8,9} in the present study, the ulnar loop was the most predominant pattern which was followed by whorls, arch and radial loops patterns similar to the study of Sumathi S et al, unlike the Igbigbi PS et al.^{8,9}

Conclusion:

Dermatoglyphics studies may be used as an additional diagnostic tool for genetic disease in medicine. As the dermatoglyphics techniques are rapid and inexpensive, so it can be used as screening tool to identify the people who are at high risk of disease and allows to adopt more preventive measures for future generation.

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