

Dermatoglyphics Pattern in Patients with Ischemic Heart Disease

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Abstract

Objective: To study the association of Dermatoglyphics with Ischemic Heart Disease and it can be also helpful in identification of persons in court of law. **Study design:** Descriptive study **Place and duration of study:** Data was collected for the study which was conducted at Al-Ameen Medical College & Hospital, Bijapur, Karnataka from April 2017 to June 2017. **Materials and methods:** Finger prints were collected from the subjects after obtaining their informed consent in the month of 1 April, 2017 to 15 June, 2017. A total of 100 IHD diagnosed patients were selected from the OPD of Al-Ameen Medical College & Hospital and data were analyzed. The finger prints of both the hands were recorded on a plain white paper with a stamp ink pad by rolling method and each finger print was assigned by their Name, Age, and Sex. **Results:** A total of one hundred patients were selected for this study which were all known case of Coronary Heart disease patients. Out of these one hundred patients the majority of the patients were belonging to whorl pattern of finger prints i.e., 90 (57%) where as the number of patients belonging to Loop pattern was 40 (29%) pattern of Arch and composite was same i.e., 10 (7%) each, and so these various types of fingerprint patterns can be used for genetic correlation and screening. **Conclusion:** Majority of the patients was belonging to whorl pattern of finger prints followed by patients belonging to Loop pattern and the least patterns were Arch and composite. Each fingerprint is unique hence it can also be very effectively used as an evidence for identification in the court of law.

Keywords: Dermatoglyphics; Ischemic Heart Disease; Whorl; Loop; Arch; Court of Laws; Identification.

Introduction

The term dermatoglyphics was first coined by Cummins and Midlo in 1926 and was derived from Greek words "derma" means skin and "glyphic" means carvings. So dermatoglyphics is the scientific study of epidermal ridges their configurations on the palmar region of foot and toes. The type of fingerprint is unique based on the genetical characteristics of each individual. In the recent decades, a considerable improvement has been achieved in the concept of relation between the types of pattern of lines on the fingers

and some individual disorders [1,2,3]. Genetic predisposition is one of the known risk factors, and studies have been previously done to establish the relation between dermatoglyphic pattern and cardiovascular diseases. Some studies also reports medical literature regarding the relation between dermatoglyphic pattern as an indication of genetic susceptibility in the incidence of Myocardial Infarction [5,6]. Ischemic Heart Disease (IHD) is the most common, serious, chronic, life-threatening illness in the developed world. High fat and energy rich diet, smoking, and a sedentary life-style are associated with its emergence. Obesity, insulin resistance, and type 2 Diabetes Mellitus are powerful risk factors for Ischemic Heart Disease [20]. A substantial increase in Ischemic Heart Disease is projected worldwide, and Ischemic Heart Disease is likely to become the most common cause of death worldwide [5]. IHD is the leading cause of mortality and morbidity worldwide with more than 4.5 million deaths occurring in the developing world. In the United States only, 1.5 million people are suffering from myocardial infarction annually out of which 45% of them are under 65 years [6].

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Epidermal ridges are formed between 11th and 24th week of gestation; after this period epidermal ridges do not change [8]. The critical growth of the brain is also occurring during this period. Since the skin and brain develop from the same ectoderm, dermatoglyphic variations are informative for early developmental brain disturbances [9]. There are three basic patterns of finger prints named Arch, Loop, and Whorl [10]. The arch type is divided to two subgroups: simple and tented and the loop type is divided to two subgroups: radial and ulnar [7]. The whorl type is divided to five subgroups as simple, central packed loop, twinned loop, lateral packed loop, and accidental [7]. The pattern area is the part of a loop or whorl which contains the core delta and ridges. Total finger ridges count is the most inheritable feature in dermatoglyphics. The most common pattern, a simple Loop (60-70%) is characterized by single triradius, is not advantageous for tactile perception and precession group. Whorl has two tri radi yielding two central, while simple arches have no true triradi, resulting in zero count [11,13,15] the dermatoglyphics are having some distinguishing features i.e. they are unique, permanent, universal, inimitable and classifiable.

Materials and Methods

Finger prints were collected from the patients after obtaining their informed consent in the month of 1 April, 2017 to 15 June, 2017. A total of 100 known cases of coronary heart disease patients were selected from the OPD and data were analyzed at Al-Ameen Medical College Bijapur. The finger prints were obtained by the method suggested by Cummins and Midlo. Finger prints were recorded on a plain white paper with a stamp Ink pad by rolling method and each finger print was labeled on the proforma by their Name, Age and Sex. Ethical clearance was obtained from the Institutional Ethical Committee. The study design was descriptive one. Patients of both sexes were diagnosed as a case of Coronary artery disease and belonging to and any ridge pattern of finger prints were included in the study. All those individual patients with history or family history of any disease like diabetes, mental illness, chronic skin diseases eczema, leprosy and chronic dermatitis, having scars, congenital or acquired anomalies due to trauma on fingers were excluded in this study.

Both the hands were thoroughly washed with soap and dried before taking the finger prints.

Impression of all fingers and thumbs of both hands were taken by rolling the fingertips from medial side to laterally on a stamp ink pad and then on plain white paper. A proforma was designed in which data including name, age, and sex were entered. Screening of finger prints were done by using magnifying lens and scanner. Based on this data, the case had been diagnosed by direct supervision of a cardiologist. The dermatoglyphic pattern in patients with myocardial infarction is an interesting matter and little information is available about this relationship. The main objective of this study is to investigate the relation between the dermatoglyphic patterns with IHD and can also be effectively used as an evidence for identification in the court of law.

Results

The present study recorded the finger print patterns of all 10 fingers of 100 persons of age group 35-70 years. Analysis in this study was descriptive. A total of one hundred patients participated in this study which were all known case of coronary heart disease. Out of these one hundred patients the majority of the patients were belonging to whorl pattern of finger prints i.e. Ninety 57% where as the number of patients belonging to Loop pattern was Forty 29% pattern of Arch and composite was same i.e., Ten 7% each. There is need to develop a detailed and vast study to explore the association of finger print pattern with Ischemic Heart disease. This study offered sensible weighting on distribution of finger print pattern among the Ischemic heart disease patients. This study was only limited to Al-Ameen Medical College Hospital OPD patients and limited only to ischemic Heart disease patients. The study was considered on small and selected area, and if it will be conducted on Nationwide on larger scale we can find out the expected morbidity and mortality (Table 1-3).

Table 1: Distribution of finger print patterns viz-à-viz digits

Digit	Whorl	Loop	Arch
Thumb Finger	64	29	7
Index Finger	61	29	7
Middle Finger	61	33	7
Ring Finger	73	25	3
Little Finger	78	18	5
Total	337	134	29

Table 2: Distributions of primary finger print patterns in all fingers of both hands

Pattern of Finger Prints	Numbers	Percentage (%)
Whorl	337	67.40 %
Loop	134	26.80 %
Arch	29	5.80 %
Total	500	100 %

Table 3: Distribution of whorls, loops and arches among males & females

Digit	Sex	Whorls	Loops	Arches
Thumb (N=50)	Male	30	11	03
	Female	34	18	04
Index Finger (N=50)	Male	24	13	04
	Female	37	16	03
Middle Finger (N=50)	Male	27	12	06
	Female	34	21	01
Ring Finger (N=50)	Male	32	13	01
	Female	41	12	02
Little Finger (N=50)	Male	36	10	02
	Female	42	08	03

Discussion

The role of finger printing should not be underestimated and the patterns of finger prints are unique to each and every individual due to their uniqueness, they can be used to identify the culprits at crime scene and blast injuries and in mass disaster injuries and as well as for national identification 12. Identification is a set of individual physical characteristics, functional or psychic, normal or pathological that defines an individual 17. Dermatoglyphic is a scientific method for anthropological, medico legal and genetic studies 12. A number of studies have indicated dermatoglyphic correlation in a large number of genetic disorders, which include diabetes mellitus 16, Schizophrenia 14, Congenital heart disease 18, and down syndrome 20. Coronary artery disease is the most important cause of mortality and morbidity in the world 7. In our study we found Out of the one hundred and forty patients the majority of the patients were belonging to whorl pattern of finger prints i.e., 90 (57%) where as the number of patients belonging to Loop pattern was 40 (29%) pattern of Arch and composite was same i.e., 10 (7%) each. The reason for such type of result might be due to sampling fluctuation, or the sample size is not adequate, sampling error or these two

variables are independent and do not effect each other. Similar studies should be conducted on a larger sample at the National level so as to increase the accuracy of prediction [22]. A study by Rashad M.N on Japanese subjects, showed individuals with which shows significantly higher frequency of true whorls and correspondingly lower frequency of Ulnar Loop than the control may be supported the same [21]. Whereas another study done in Karachi, whorl pattern is predominant 48% followed by Loops 42.5% and than Arches 4.8% which is similar to the done in India [17]. Finger print patterns are related to genetic predisposition to various disorders [22]. Bhatt [23] in 1996 presented data showing significant higher incidence of whorl and lower incidence of loops in patients with MI.

Conclusion

According to the observations made by this present study add support to these earlier observations. It is apparent that there do exists a relation between dermatoglyphic patterns and IHD.

So it can be concluded that at present the IHD is most important cause of mortality and morbidity in the world and causes more death and disability with huge economic cost than any other illness in both developing and developed countries, the prevalence of risk factors for IHD is increasing everywhere especially in India. Majority of the patients was belonging to whorl pattern of finger prints followed by patients belonging to Loop pattern. With regard to high incidence of Myocardial infarction the knowledge of dermatoglyphics can be utilized to find out the genetic correlation. Each fingerprint is unique hence it can also be very effectively used as an evidence for identification in the court of law.

Recommendations

1. With the help of fingerprint pattern it might be helpful for screening of persons for IHD in rural areas where there are lack of diagnostic facilities.
2. Similar studies should be conducted on a larger sample at a National level so as to increase the accuracy of prediction.
3. There is a need to evaluate the finger printing in genetical diseases along with familial diseases.
4. There is a need to establish Finger printing bank for research purpose.

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