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Study of co-relation between Ischemic Heart Disease (IHD) and Dermatoglyphics

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ABSTRACT

Ischemic Heart Disease (IHD) is one of the biggest causes for mortality and morbidity in the world. Dermatoglyphic traits have been observed in patients diagnosed with IHD which are different from normal individuals. These traits if well studied can act as screening tools for early detection of susceptible individuals. The objective of this study is to correlate the various dermatoglyphic parameters with IHD. This is a case control study involving 60 patients with IHD and 60 controls, conducted at Jayadeva Institute of Cardiology. The fingerprints were taken with the method suggested by Cummins and Midlo in 1929. The dermatoglyphic parameters observed were digital finger patterns like whorls, arches, radial and ulnar loops. Fischer's test, chi square test and odds ratio were calculated to interpret the results. The dermatoglyphic pattern distribution among the patients was 37.3% whorls, 29% ulnar loops, 15.7% radial loops and 18.3% arches in comparison with control group with 31.3%, 42.7%, 3%, and 23% respectively. The odds ratio was 1.30 for whorls, 0.54 for ulnar loops, 6.1 for radial loops and 0.75 for arches. There is a significant relation between dermatoglyphics and IHD. Dermatoglyphics is not mainly related to the diagnosis of a disease but more to its prognosis.

Keywords: Dermatoglyphics, Ischemic Heart Disease, whorls and arches

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INTRODUCTION

Dermatoglyphics is the study of hand shape designations and related palm and finger prints. [1] Cardiovascular diseases are associated with a high number of arches, The arch type is divided to two subgroups: simple and tented and the loop type is divided to two subgroups: radial and ulnar. The whorl type is divided to five subgroups as simple, central packed loop, twinned loop, lateral packed loop, and accidental. In general population, the line pattern is consisted of 4%, 55 % and 41% from arch type, loop type and whorl type respectively. [2] Correlation has also been found between hand patterns and other diseases like Schizophrenia, Tuberculosis, Myocardial infarction and Down's syndrome.[3] Several studies done in the past has not shown any consistent finding with cases of IHD where arch type more common [4,5] in some and loops, whorls in some.[6]

Cardiovascular disease, including coronary heart disease/IHD and stroke, is the largest cause of mortality in the world, and the majority of deaths occur in low- and middle-income countries such as India. WHO has predicted that from years 2000 to 2020 disability-adjusted life years lost (DALYs) from CHD in India shall double in both men and women from 7.7 and 5.5 million, respectively.[7] Presently the annual number is about 60000 CABG surgeries and 40,000 angioplasty were being performed in India according to industry sources. In the absence of a central registry the exact numbers may not be apparent. [8] So the time has come to put forward simple economical techniques like dermatoglyphics to identify individuals who can be susceptible to the disease. Very few studies have been carried out in Dermatoglyphy and IHD. Therefore this was to study taken to correlate the association of dermatoglyphics with Ischemic Heart Disease.

METHODOLOGY

This is a case control study involving 60 in-patients who are diagnosed with Ischemic Heart Disease (Cases) and 60 healthy volunteers without IHD (Controls) in the age group of 30-65 years. The patients were recruited from Jayadeva Institute of cardiology, Bangalore. Ethical approval taken from Ethical Committee of Sri Jayadeva Institute of Cardiology. Informed consent was duly obtained. After explaining the detailed procedure and purpose, and those satisfying the inclusion and exclusion criteria the fingerprints were obtained.

The fingerprints were obtained by the method suggested by Cummins and Midlo. [1] A thin layer of printers ink was applied over the glass plate, then with the help of a cotton roller pad the ink was taken and applied over the finger and palm of the subject. A cotton pad soaked with spirit was used to remove any dirt or debris present in the hands. Then the finger was pressed on a bond sheet from lateral to medial to get a complete print. The digital finger prints obtained is analyzed on 4 main aspects namely whorls, ulnar loops, radial loops and arches.

Statistical analysis:

Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two groups and Odds ratio has been computed to find the quantitative relationship between fingerprint pattern in IHD cases using SPSS 15.0, and Stata 8.0. $p \leq 0.01$ has taken as significant.

RESULTS

In the present study majority of the cases were in the age group 40-59 years. Among the cases diagnosed with IHD 71.7% of them were found to be smokers with 58.3% smoking for 10-20 years while 68.3% of them were found to be alcoholics.

The variables included in this study are digital patterns like whorls, ulnar loops, radial loops and arches in its relation with Ischemic Heart Disease.

Table 1/Fig 1: Comparison of Finger Pattern in Controls and Cases

	Whorls		Arches		Ulnar loops		Radial loops	
	Controls	Cases	Control	Cases	Controls	Cases	Controls	Cases
F1 (thumb)	29 (48.3%)	48 (80%)	6 (10%)	7 (11.7%)	22 (36.7%)	2 (3.3%)	3 (5%)	3 (5%)
F2 (index)	16 (26.7%)	17 (28.3%)	17 (28.3%)	9 (15%)	22 (36.7%)	26 (43.3%)	5 (8.3%)	8 (13.3%)
F3 (middle)	15 (25%)	12 (20%)	15 (25.0%)	16 (26.7%)	30 (50%)	29 (48.3%)	0 (0)	4 (6.8%)
F4 (ring)	25 (41.7%)	25 (41.7%)	12 (20%)	15 (25%)	22 (36.7%)	17 (28.3%)	1 (1.7%)	3 (5%)
F5 (little)	9 (15%)	10 (16.7%)	19 (31.7%)	8 (13.3%)	32 (53.3%)	13 (21.7%)	0 (0)	29 (48.3%)

Table 1/Fig 1: Shows comparison of Finger pattern in controls and cases. Here Individual finger pattern was evaluated was found that whorls are significantly higher in first digit (thumb) i.e 80% vs 48.3%. There is no significant difference in the occurrence of arches among the controls and the cases with F5 (little) showing major difference. The biggest differences in radial loops are seen in the fifth finger (little) with the cases having 48.3% as compared to the controls who incidentally had none. There is a significant difference in the pattern of ulnar loops where controls had more nos. and greatest variation was seen in the F1 (thumb) and F5 (little) in controls and cases respectively. In contrast to ulnar loop, cases are having predominantly radial loop and F5 (little) had the greatest variation 48.3% vs. none. Finger F3 also showed large variation 6.8% vs. none.

Table 2/Fig 2: Overall comparison of Whorls, Ulnar loops, Radial loops and Arches in controls and cases

Finger print pattern	Controls	Cases	P value	OR
Total number of Finger patterns (5 fingersx60)	300	300	-	-
Whorls	94 (31.3%)	112(37.3%)	0.122	1.30
Ulnar loops	128(42.7%)	87(29.0%)	<0.001**	0.54
Radial loops	9 (3.0%)	47(15.7%)	<0.001**	6.1
Arches	69 (23.0%)	55(18.3%)	0.107	0.75

P ≤ 0.01: Significant; * Significant; ** Highly significant

Table 2/Fig 2: The study shows that there are differences in some of the dermatoglyphic traits between the cases and the controls. The frequency of occurrence of ulnar loops are found to be present significantly (P<0.001) less in case of the cases than the controls. Radial loops are found to be significantly (P<0.01) higher for the cases than the controls. No significant difference was observed with whorls (37.3% to 31.3%) and arches (18.3% to 23%) among the cases and the controls. The odds ratio observed is 0.54 suggesting that people having less ulnar loops.

The odds ratios were calculated for whorls as 1.30, 0.54 for ulnar loops, 6.1 for radial loops and 0.75 for arches. This suggests the chance of developing IHD is 6 times more with radial loops and half the chance with ulnar loop. There is no much difference with respect to whorls and arches

DISCUSSION

The variables included in this study are digital patterns like whorls, ulnar loops, radial loops and arches in its relation with Ischemic Heart Disease.

In our study, among the ischemic heart disease patients taken for the study 70% of them were reported Myocardial Infarction while congestive heart failure and angina pectoris was observed in 18.3% and 10% patients respectively. Stroke was observed in only 1.7% of patients. This is in accordance with previous study. [9]

The present study shows occurrence of ulnar loops is significantly lower and radial loops significantly higher for the IHD cases, which is in accordance with previous study [5] but contrasting different from previous study where whorls were higher in cases [6] and controls. [4]

The odds ratio observed is 0.54 suggesting that people having less ulnar loops might be more susceptible to develop ischemic heart diseases. The biggest differences in ulnar loops are seen in the first finger (thumb) with the controls having 36.7% as compared to the cases who had only 3.3%. Radial loops are found to be significantly higher for the cases, which was similar to a study where both radial and ulnar loops significantly increased in thumb, ring and fore

finger of MI patients, one of the features of IHD. [4] The odds ratio observed is 6.1 suggesting that people having more radial loops might be more susceptible to develop ischemic heart disease.

Finally it can be said that dermatoglyphics is not mainly related to the diagnosis of a disease but more to its prognosis, its main purpose is not to give a new definition to an existing disease but to identify individuals who are genetically more susceptible to develop certain diseases. If any association can be established then it can be used as a cheaper way to screen the populations who are at risk and they may be watched to see for any early onset of symptoms.

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