

DERMATOGLYPHICS STUDY OF TUBERCULOSIS PATIENTS AND ITS CORRELATION WITH NORMAL PERSONS IN SOUTHERN (HADOTI REGION), RAJASTHAN

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ABSTRACT

BACKGROUND

Dermatoglyphics is a scientific study of epidermal ridges and their configuration on palmar and sole region. Dermatoglyphics had proved its importance in medicolegal, anthropological and in clinical fields. Abnormal dermatoglyphic pattern has been in many non-chromosomal genetic disorder and other diseases whose aetiology may be influenced directly or indirectly by genetic disorder. The tuberculosis is partly genetic and partly environmental. The genetic contribution is one of the causes of pulmonary tuberculosis. Tuberculosis caused by mycobacterium tuberculosis. So an attempt has been made to study Dermatoglyphic patterns in pulmonary tuberculosis patients and to compare them with normal individuals.

AIMS AND OBJECTIVES

To compare the dermatoglyphics patterns of pulmonary tuberculosis patients with normal individuals, both qualitative and quantitative.

MATERIAL AND METHODS

Dermatoglyphics prints of total 100 (Male 67 and Female 33) pulmonary tuberculosis patients (Sputum Positive) and 100 normal individuals (Male 66, Female 34) from July 2013 to June 2014 were studied qualitatively and quantitatively: Dermatoglyphic printing was done by using older and fairly good "Indian Ink Method." (Cummins and Midlo, 1961).

RESULTS

TFRC of pulmonary tuberculosis significantly high (140.77 ± 39.63) as compared to TFRC of normal (115.02 ± 39.63) and has high % of whorl and low % of loops as compared to normal. P value is significant in whorl and loops and TFRC.

CONCLUSION

Racial and genetic factors play important roles in deciding the qualitative and quantitative patterns of dermatoglyphics. Genetic contribution is one of the causes of pulmonary tuberculosis. Further quantitative study is needed to confirm the findings of present study.

KEYWORDS

Dermatoglyphics, Genetics, Pulmonary Tuberculosis, Palmar Dermatoglyphics, Palmar Prints.

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INTRODUCTION

Dermatoglyphics is the study of surface markings of the skins, especially of the palms and sole region. The study of Dermatoglyphics was pioneered long back by Galton (1892).¹ Palmar creases develop during the 2nd and 3rd month of intrauterine life and are not influenced by movement of hand in utero.² Dermatoglyphics has proved its importance in medicolegal, anthropological and in clinical fields. They are of considerable clinical interest, because they are affected by certain abnormalities of early development including genetic disorders. Dermatoglyphic abnormalities have been found in many conditions associated with chromosomal aberrations in genetically and non-genetically transmitted disorders.

Studies on families have shown that dermatoglyphics have a genetic basis but the number, type and inter-relationship of genes concerned are not explicable yet. Medical dermatoglyphics scrutinizes palm print for clues to hereditary diseases. Abnormal dermatoglyphic pattern has been in many non-chromosomal genetic disorder and other diseases whose aetiology may be influenced directly or indirectly by genetic disorder.^{2,3}

The genetic contribution is one of the causes of pulmonary tuberculosis, tuberculosis caused by mycobacterium tuberculosis. Susceptibility to pulmonary tuberculosis in India has been linked to Mannose Binding Protein Gene.⁴ Significant association has been found between IL-1 Gene clusters and host susceptibility to tuberculosis.⁵ The tuberculosis is partly genetic and partly environmental.⁶

So an attempt has been made to study Dermatoglyphic patterns in pulmonary tuberculosis and to compare them with normal individuals. Considering all above facts, the present study is undertaken to find out various Dermatoglyphic features in pulmonary tuberculosis patients and compare them with normal individuals. Result found whether are statistically significant or not.

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AIMS AND OBJECTIVES

1. To compare the dermatoglyphics pattern of pulmonary tuberculosis with normal, both qualitatively and quantitatively.
 - a. Qualitative parameters are Digital pattern of ridges (a) Arch, (b) Loop, (c) Whorl, (d) Composite.
 - b. Quantitative parameters are: 1. Ridge counting, 2. Total finger ridge count (TFRC).
2. To predict possibility of disease occurrence in individual with particular finger print pattern.

MATERIAL AND METHODS

Dermatoglyphics prints of the 100 (Male-67, Femal-33) patients diagnosed as Tuberculosis (Sputum Positive) were taken from TB and Chest Department of New Medical College Hospital, Kota and 100 were normal individuals (Male-66, Female 34) as control from July 2013 to June 2014 were studied.

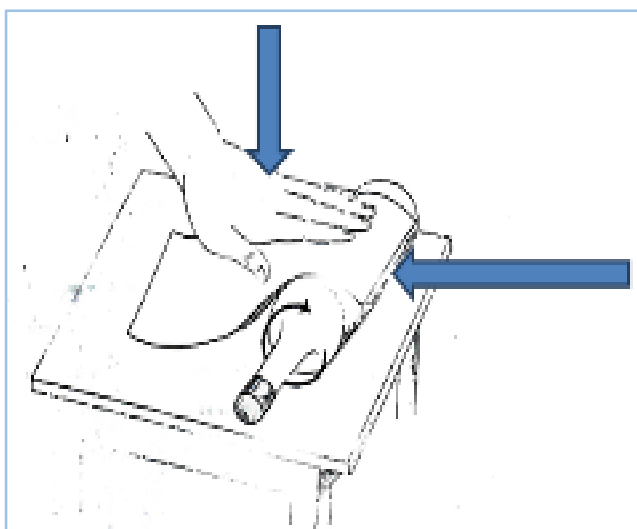
Patients age range from 25 to 75 years including both male and female. Control group were of same age and sex, who had never suffered from tuberculosis in past or having any symptoms of disease. Patients with disease like Leprosy, Burn, Bronchial Asthma, Coeliac Disease or CHD were not included.

Informed written consent from all eligible patients were taken. Dermatoglyphic printing was done by using older and fairly good "Indian Ink Method." (Cummins and Midlo, 1961).⁷

Ordinary white paper with size of A4 size, Thumb impression ink (Kores). Roller for spreading the ink over a glass plate, inking slab, a round bottle is used for printing the palm. A magnifying glass lens of power 10X is used for studying small prints.

Procedure for Inking and Printing

First hands are washed with soap and water and the greasy material is cleared off with the help of ether. A small dab of printer's ink is squeezed out on the inking slab and is spread into thin even film with the help of a roller for direct inking of the fingers. Palm is smeared uniformly with the inked roller to cover the whole area of the palm to be printed for examination.



Picture 1: Technique of Taking Palm Print



Photo 1: Showing palm print Left hand of 40 year Male

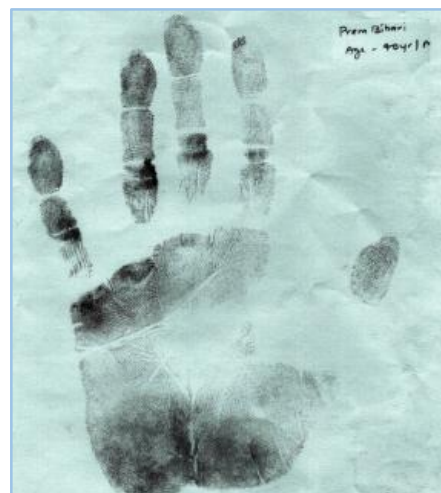


Photo 2: Showing palm print Right hand of 40 year Male

OBSERVATION

Dermatoglyphics prints of the 100 (Male-67, Female-33) patients diagnosed as Tuberculosis (Sputum Positive) were taken from TB and Chest Department of New Medical College Hospital, Kota and 100 were normal individuals (Male-66, Female-34), were studied in Department of Anatomy of Govt. Medical College, Kota.

The data collected in so far was entered into a database. Statistical processing and various calculations were performed with Statistical software for z test and p test.

Status	Number	Mean	SD	p-value
Control	100	115.02	39.63	<0.05
Patients	100	140.77	42.76	

Table 1: Comparison of Mean TFRC by Status

Table 1 shows the mean TFRC of patients is found to be significantly high (140.77±39.63) as compared to TFRC of controls (115.02±39.63).

Status	≤75	76-150	≥151	Total
Control	14	65	21	100
Patients	6	52	42	100
Total	20	117	63	200

Table 2: Distribution of Subjects according to their Status & TFRC

Table 2 shows the distribution of TFRC among pulmonary tuberculosis patients and controls. The distribution was not significantly different between patients and controls. It can be seen from the table that middle values (76-150) were associated with patients as well as control.

		I		II		III		IV		V		
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	
Patients	Whorl	63	54	60	61	46	52	61	69	36	25	52.7
	Ulnar Loop	34	45	27	22	46	44	35	30	60	73	41.6
	Radial Loop	0	0	10	4	1	0	0	0	0	0	1.5
	Arch	3	1	3	13	7	4	4	1	4	2	4.2
	Composite	0	0	0	0	0	0	0	0	0	0	0
Control	Whorl	52	41	28	17	17	13	37	30	12	2	24.9
	Ulnar Loop	47	51	50	66	78	81	62	65	87	94	68.1
	Radial Loop	0	3	8	6	0	1	0	1	0	0	1.9
	Arch	0	4	12	10	5	5	0	3	1	4	4.4
	Composite	1	1	2	1	0	0	1	1	0	0	0.7

Table 3: Comparison of Finger Print Patterns in Patients and Control (In %) in All Digits

Status	Arch	Loop	Whorl	Composite
Control	4.4	70	24.9	0.7
Patients	4.2	43.1	52.7	0
p-Value	-	<0.05	<0.05	-

Table 4: Dermatoglyphic Patterns in Patients and Control (In %)

Table 4 shows patients has high % of whorl and control has high % of loops, p value is significant in whorl and loops.

FINGERTIP PATTERNS

Whorls

Table 4 shows there is a significant increase in the whorl pattern in pulmonary tuberculosis patients (52.2%) as compared to controls (22.8%) in left hand and 53% and 29.2% in right hand respectively. The frequency of whorls in pulmonary tuberculosis (Table 3) patients vs. controls are- Right thumb (63% vs. 52%); Left thumb (54% vs. 41%); Left index finger (61% vs. 17%); Right index finger (60% vs. 28%); Left middle finger (52% vs. 13%); Right middle finger (46% vs. 17%); Left ring finger (69% vs. 30%); Right ring finger (61% vs. 37%); Left little finger (25% vs. 2%) and Right little finger (36% vs. 12%). Significant rise in whorl pattern (p<0.05) found.

Ulnar Loops

There is a significant decrease of ulnar loops pattern in pulmonary Table 4, Tuberculosis patients 40.6% compared to 64.8% controls in right hand and 42.7% and 71.4% in left hand respectively. The difference is significant (p<0.001) for ulnar loops in right hand of pulmonary tuberculosis patients.

Table 3 right thumb (34% vs. 47%); left thumb (45% vs. 51%); left index finger (22% vs. 66%); right index finger (27% vs. 50%); right middle finger (46% vs. 78%); left middle finger (44% vs. 81%); left ring finger (30% vs. 65%); right ring finger

DISCUSSION

(35% vs. 62%); left little finger (73% vs. 94%) and right little finger (60% vs. 87%).

Radial Loops

Table 4 shows fall in the percentage of radial loops in pulmonary tuberculosis patients (0.8%) as compared to normal (2.2%) Table 3 shows in left hand and 2.2% and 1.6% in right hand respectively. In left thumb (0% vs. 3%); right thumb (0% vs. 0%); left index finger (4% vs. 6%); right index finger (10% vs. 8%); left middle finger (0% vs. 1%); right middle finger (1% vs. 0%); left ring finger (0% vs. 1%); right ring finger (0% vs. 0%); left little finger (0% vs. 0%) and right little finger (0% vs. 0%).

Arches

Table 4 shows there is no significant change in arch pattern in pulmonary tuberculosis patients (4.2%) as compared to controls (5.2%) in left hand and 4.2% and 3.6% in right hand respectively. Table 3 shows Left thumb (1% vs. 4%), right thumb (3% vs. 0%), left index finger (13% vs. 10%), right index (3% vs. 12%), left middle finger (4% vs. 5%), right middle finger (7% vs. 5%), left ring finger (1% vs. 3%), right ring finger (4% vs. 0%, left little finger (2% vs. 4%) and right little finger (4% vs. 1%).

Status	Number	Mean	SD	p-value
Control	100	115.02	39.63	<0.05
Patients	100	140.77	42.76	

Table 5: Total Finger Ridge Count (TFRC)

Table 5 shows that mean TFRC in Tuberculosis patients is found to be significantly high (140.77+39.63) as compared to TFRC of normal (115.02+39.63).

Author	Fingertip Pattern				TFRC	P-value
	Whorls	Ulnar Loop	Radial Loop	Arches		
Sangita B et al. ⁸	56.6%	32%	-	11.3%	112.4	(P<0.05) Highly significant
Geetha V et al. ⁹	60.6%	36.4%	-	3%	-	Highly significant
Nechaeva et al. ¹⁰	-	-	-	-	-	Statistically significant
Sidhu LS et al. ^{11,12}	-	-	-	-	-	Statistically not significant
Jagdish Choudhary et al. ¹³	34.4%	59.3%	2.2%	4%	-	Statistically not significant
Present Study	52.7%	43.1%	.8%	4.2%	(140.77)	(P<0.05) Highly significant

Table 6: Comparative Study of Finger Tips Pattern & TFRC

In our study, there is a significant increase in the whorl pattern in pulmonary tuberculosis patients (52.2%) as compared to controls (22.8%) in left hand and 53% and 29.2% in right hand respectively. There is a significant decrease of ulnar loops pattern in pulmonary tuberculosis patients 40.6% compared to 64.8% controls in right hand and 42.7% and 71.4% in left hand respectively. The difference is significant ($p < 0.001$).

There is fall in the percentage of radial loops in pulmonary tuberculosis patients (0.8%) as compared to normal (2.2%) in left hand and 2.2% and 1.6% in right hand respectively.

There is no significant change in arch pattern in pulmonary tuberculosis patients (4.2%), as compared to controls (5.2%) in left hand and 4.2% and 3.6% in right hand respectively.

The mean TFRC in Tuberculosis patients is found to be significantly high (140.77+39.63) as compared to TFRC of normal (115.02+39.6).

Table 6 shows that our study is in accordance with Sangita et al.⁹ Nechaeva et al.¹⁰ Geetha V et al.¹¹ which is highly statistically significant ($P < 0.05$), but it is different than Sidhu LS et al.^{7,8} and Choudhary J. et al.¹³ who observed no statistical significant differences in finger print patterns in pulmonary tuberculosis patients compared with controls. These observations can be an additional supports in diagnosis patients of pulmonary tuberculosis.

CONCLUSION

Dermatoglyphic patterns are affected by various factors. Racial and genetic factors play important roles in deciding the qualitative and quantitative patterns of dermatoglyphics. Our aim was to find out a definite correlation between dermatoglyphics in pulmonary tuberculosis. We cannot label one factor as a single absolute factor, so it is difficult to find out absolute and independent correlation with the disease, but nevertheless a corroborative value is of concordant importance.

The current status of dermatoglyphics is such that the diagnosis of some illness can now be done on the basis of dermatoglyphic analysis alone and currently several dermatoglyphic researchers claim a high degree of accuracy in their prognostic ability from the hand features.

1. A significant increase ($p < 0.05$) in the whorl pattern in pulmonary tuberculosis patients (52.7%) as compared to normal (24.9%).
2. A significantly lower ($P < 0.05$) in the loop pattern in pulmonary tuberculosis patients (43.1%) as compared to normal (70%).

3. The mean TFRC of tuberculosis patients is found to be significantly high (140.77+39.63) as compared to TFRC of normal (115.02+39.63).

Genetic contribution is one of the causes of pulmonary tuberculosis. We recommend further quantitative study to confirm the findings of present study.

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