

Study of fingertip pattern in Carcinoma Cervix patients

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Abstract- Dermatoglyphic study to correlate a particular dermatoglyphic pattern with occurrence of cervical carcinoma in the Northern Bengal population was done for a period of one year (July 2015 to June 2016). Fingertip patterns of 72 cases of cervical carcinoma were tested against 72 controls. The results showed a statistically significant decrease in the frequency of ulnar loop pattern in cervical cancer patients (52.78%) compared to control group (60.83%) in both the hands. There is decrease in the percentage of Radial loops in cervical cancer patients (3.19%) compared to control group (7.36%) in both hands and the difference is statistically significant. The percentage of whorls decreased in control group (27.50%) compared to cervical cancer patients (38.89%) and the difference is statistically significant in both hands.

Index Terms- dermatoglyphics, cervical cancer, finger print, fingertip pattern.

I. INTRODUCTION

Dermatoglyphics is the scientific study of epidermal ridges and their configurations on the palmar region of hand and fingers and plantar region of foot and toes. The term dermatoglyphics was coined by Cummins H and Midlo C in 1926 and was derived from Greek words 'derma' means skin and 'glyphics' means carvings (Penrose LS, 1963)[1,2]. Development of dermatoglyphic pattern is under genetic control. This is evident from the clear resemblance of dermatoglyphics among related person (Schaumann B and Alter M, 1976)[3]. There are many diseases known to be caused by abnormal genes. Whenever there is any abnormality in the genetic make up of parents it is inherited to the children and is reflected in dermatoglyphic pattern. (Walkar JFA, 1941)[4]. Dermatoglyphics as a diagnostic aid is now well established in a number of diseases, which have a strong hereditary basis, and is employed as a method of screening abnormal anomalies (Holt SB, 1961)[5]; (Holt SB and Lindsten J, 1964)[6].

Dermatoglyphic analysis as a diagnostic tool has many advantages:

- Epidermal ridge pattern on the palm are fully developed at birth and each individual's ridge configurations are unique & remains unchanged from womb to tomb except in the dimension in proportion to the growth of an individual. Question of chance of similarity is a theoretical possibility being 1:64 billion[7].
- Patterns are readily accessible.
- Recordings are quick, simple & inexpensive.

- There is no trauma to individual during recording.
- Ridge patterns can quickly be analyzed.
- Ridge patterns can be inspected for abnormalities immediately after birth.

The cervical cancer is one of the most extensively studied cancers & its genetic basis was well established[8]. High mortality & morbidity rate poses a heavy economic burden on families[9] as well the country[10]. Additionally high medical costs that are incurred by families due to cervical cancer further impoverish individuals and communities[11]. The screening procedures (i.e. Pap smear test etc.) have been effectively reducing the incidence rate by 80% and mortality by 70%[12]. But they are invasive procedures & expensive also and an equipped set up is required.

The etiology of cervical carcinoma is multi-factorial with genetics playing an important role. Taking into consideration of genetic predisposition of dermatoglyphics and cervical carcinoma, the study was undertaken to find out correlation between them. Being inexpensive and noninvasive procedure (in a country like India) like dermatoglyphics may be useful investigatory or screening procedures for the population at risk in cervical carcinoma.

II. AIMS & OBJECTIVES

- To determine various fingertip patterns in women suffering from cervical carcinoma and compare them with normal subjects in North Bengal.
- To find out fingertip patterns in women having cervical carcinoma in North Bengal.
- To compare the specific fingertip patterns in normal women and women having cervical cancer.

III. MATERIALS & METHODS

3.1 STUDY TYPE AND DESIGN: This was an Analytical and Cross-sectional study.

3.2 STUDY AREA: In collaboration with the departments of Radiotherapy (OPD), Gynecology (OPD & IPD) of North Bengal Medical College & Hospital.

3.3 STUDY PERIOD: The tenure of the study was one year from July 2014-June 2015.

3.4 STUDY POPULATION: Women having Cervical carcinoma who were attending Radiotherapy OPD and

Gynecology OPD & IPD in North Bengal Medical College and Hospital.

3.5 INCLUSION CRITERIA:

- Histopathologically confirmed cases of cervical carcinoma of above 15 years of age[13].
- The first degree relatives were selected for normal group who are above 15 years of age.

3.6 EXCLUSION CRITERIA:

- Very seriously ill patients.
- Women having any obvious genetic disorder and having any other carcinoma in body and diseases causing dermatoglyphic changes[7].
- History of any type of skin hypersensitivity.
- Women not willing to give consent.
- Cervical cancer patient with no first degree relatives.

3.7 SAMPLE SIZE:

- 72 patients with cervical cancer.
- 72 women with no cervical cancer.
- Total 144 subjects.

3.8 SAMPLING DESIGN: Sampling design by complete enumeration method. After taking proper history of 108 histopathologically confirmed cervical cancer patients, 36 patients were excluded. So remaining 72 patients' dermatoglyphics were taken. The 72 control women were also found from the first degree relatives of cervical cancer patients.

3.9 STUDY TOOLS: Black duplicating gel, 'T' shaped rubber roller, Inking slab, Reducer, One side glazed mop lithography paper(A-3), Doctors' spirit, Soap, Drawing board and board clips, Cotton, Protractor, magnifying lens, scale, calculator, pencil and pen, Needle with a sharp point, for ridge counting, Format for Consent and History taking.

3.10 STUDY TECHNIQUES: Among the various number of methods used for recording dermatoglyphics, the most routinely used one (that having no harm onto human body) is the INK METHOD (described by Cummins H in 1936[14] and Cummins H and Midlo C, 1961[15]) was used for this study.

3.11 STEPS IN THE PRINTING METHOD:

1. After taking proper consent and brief history, the subjects were asked to clean their hands with soaps and water to remove any oil or dirt and dry their hands but to leave some moisture.
2. The requisite amount of Black Duplicating Ink was placed on the glass slab. It was uniformly spread by the 'T' shaped rubber roller to get a thin even ink film on the glass slab.
3. The thin film of ink was applied on the palm by passing the inked rubber roller uniformly over the palm and digits.
4. Left hand of the subject was then placed on the sheet of paper (kept over the pressure pad) from proximal to distal end. The palm was then lifted from the paper in reverse order, from the distal to proximal end. The fingers were also printed below the palmar print by rolled finger print method. (**Figure 1, 2**).
5. The same procedure was repeated for right hand.
6. The prints were then subjected for detail dermatoglyphic statistical analysis (**Figure 3**).



Figure1: Print of Finger taken by rolled finger print method



Figure 2: Print of Palm taken by rolled finger print method



Figure 3: The Completed set of both sides palm and all ten fingertip prints taken on mop-lithography paper.

3.12 PARAMETERS/VARIABLES STUDIED:

Fingertip patterns i.e. loops (radial and ulnar), Whorls, arches.

3.13 FINGERTIP PATTERN CONFIGURATION:

Galton F (1892)[16], divided fingertip patterns into 3 groups - Loops, Arches and Whorls. Henry ER (1900)[17], added 4th group 'Composites' to demarcate more complex patterns.

3.14 Fingertip Pattern:

1. Arch (A): An arch is the simplest pattern. It consists of more or less parallel ridges. This pattern is present in 6-7% cases.

2. Loop (L): It is the most frequent pattern on fingertip. This pattern is present in 65-67% cases. It is subdivided into two types: Ulnar Loop (Lu), Radial Loop (Lr)

3. Whorl (W): According to Galton's classification, whorl is any ridge configuration with two or more triradii. According to Henry's classification whorl is a ridge configuration in which ridges actually encircle core and more complex patterns are called as 'Composites'[7].

3.15 STATISTICAL ANALYSIS:

Chi Squared test was used for analysis the qualitative values. Statistical analyses were done using a computer-based on-line Programmer[18] and Microsoft Office Excel 2007. Differences were considered significant if P values were less than 0.05.

IV. RESULTS & ANALYSIS

In the present study after taking fingerprints of all 144 (72 patients suffering from cancer cervix were considered as cases and 72 normal females were considered as controls) females, following observations were made. Differences are considered significant if P values are less than 0.05.

Table 1: Distribution of study population and statistical analysis according to fingertip pattern of both hands(72x10=720) among patients(n₁=72) & controls(n₂=72).

Groups		Fingertip patterns			
		Ulnar loops	Radial loops	Arches	Whorls
Patients	Frequency	380	23	37	280
	Percentage	52.78	3.19	5.14	38.89
Controls	Frequency	438	53	31	198
	Percentage	60.83	7.36	4.31	27.50
Chi square value		4.112	11.842	0.530	14.067
P value		<0.05	<0.001	>0.05	<0.001
Remarks		S	ES	NS	ES

Legend Table 1: The above table 1 shows that the frequencies of ulnar loop and radial loop are more in control groups than cervical cancer patients. The differences are statistically significant for ulnar loop and radial loop. The

frequency of whorl pattern is more in patients than controls, and this difference is statistically significant. The frequencies of arch pattern are statistically non-significant.

Table 2: Distribution of study population and statistical analysis according to fingertip pattern of right hand (72 x 5=360) among patients(n₁=72) & controls(n₂=72).

Groups		Fingertip patterns			
		Ulnar loops	Radial loops	Arches	Whorls
Patients	Frequency	175	15	22	148
	Percentage	48.61	4.17	6.11	41.11
Controls	Frequency	196	34	20	110
	Percentage	54.44	9.44	5.56	30.56
Chi square value		1.188	7.368	0.096	5.596
P value		>0.05	<0.01	>0.05	<0.05
Remarks		NS	HS	NS	S

Legend Table 2: The above table 2 shows the differences of frequencies of whorls and radial loops between patients and control groups statistically significant for right hands. But the frequencies of other two patterns are not statistically non-significant between two groups.

Table 3: Distribution of study population and statistical analysis according to fingertip pattern of left hand (72 x 5=360) among patients(n₁=72) & controls(n₂=72).

Groups		Fingertip patterns			
		Ulnar loops	Radial loops	Arches	Whorls
Patients	Frequency	205	8	15	132
	Percentage	56.94	2.22	4.17	36.67
Controls	Frequency	242	19	11	88
	Percentage	67.22	5.28	3.06	24.44
Chi square value		3.063	4.482	0.616	8.800
P value		>0.05	<0.05	>0.05	<0.01
Remarks		NS	S	NS	HS

Legend Table 3: The above table 3 shows the differences of frequencies of radial loops and whorls are statistically significant between cervical cancer patients and controls in left hands. The differences of frequencies of ulnar loops and arches are statistically non-significant between two groups.

V. DISCUSSION

The study consisted of 72 histopathologically confirmed cervical carcinoma patients (above 15 years of age) and equal numbers of normal healthy females were selected from the first degree relatives who were above 15 years of age, were included

as controls for comparison. The prints were obtained by “Ink method” on the one side glazed mop lithography paper (A-3) and analyzed to find out variations in dermatoglyphic features among cervical cancer females and control group. The dermatoglyphic patterns were analyzed under following heading:

5.1 Ulnar loops:

In the present study there is decrease in the frequency of ulnar loop pattern in cervical cancer patients(52.78%) compared to control group(60.83%) in both hands. The difference is statistically significant(x^2 value=4.112, $P<0.05$).

The percentage of ulnar loops in right hand is decreased in cervical carcinoma patients(56.94%) than control group(67.22%), but the difference is not statistically significant. The difference of percentage of ulnar loop pattern in left hand of cervical cancer patients(48.61%) and control group(54.44%) is statistically not significant.

Pal GP *et al.* (1985)[19] observed significant decrease frequency of ulnar loop on fingertips of carcinoma of cervix patients.

Inamdar VV *et al.* (2006)[20] noticed decrease frequency of ulnar loops in both hands of cancer cervix patients.

Kashinathappa BS. *Et al.*(2013)[21] reported significant decrease in frequency of ulnar loops in both hands of carcinoma cervix patients as compared to controls.

However Umama U. *et al*(2012)[22] found that the cervical cancer group presented with 74.9% of loop pattern on the right compared to the 64.0% in the normal, while the left hands had 68.5% in the case compared to the 61.2% ($P<0.001$).

5.2 Radial loops:

There is decrease in the percentage of Radial loops in cervical cancer patients (3.19%) compared to control group(7.36%) in both hands and the difference is extremely statistically significant(x^2 value=11.842, $P<0.001$).

There is decrease in the percentage of radial loops of right hand in cervical cancer patients(2.22%) compared to control group(5.28%) and the difference is statistically significant(x^2 value= 4.482, $P<0.05$).

There is decrease in the percentage of radial loops in left hands in cervical cancer patients(4.17%) compared to control group(9.44%) and the difference is highly statistically significant(x^2 value=7.368, $P<0.01$).

The increased and decreased percentages of cancer cervix patients and control groups radial loop could not be compared as no workers found any statistical significance for radial loop pattern.

5.3 Arches:

In the present study the percentage of arches decreased in control groups compared to cervical cancer patients in both hands, right hand, left hand, But the differences are not statistically significant.

Pal GP *et al.* (1985)[19] observed significant increase in arches on fingertips of carcinoma of cervix patients.

Inamdar VV *et al.* (2006)[20] studied dermatoglyphic features in carcinoma cervix and observed significant increase in the frequency of arches in left hand.

5.4 Whorls:

The percentage of whorls decreased in control group(27.50%) compared to cervical cancer patients(38.89%)

and the difference is extremely statistically significant(x^2 value=14.067, $P<0.001$) in both hands.

There is decreased percentage of whorls in control group(24.44%) compared to cervical cancer patients(36.67%), this difference is highly statistical significant(x^2 value=8.800, $P<0.01$) in right hand.

There is decreased percentage of whorls in control group(30.56%) compared to cervical cancer patients(41.11%) and the difference is statistically significant(x^2 value=5.596, $P<0.05$) in left hand.

Floris G. *et al.*(1990)[23] explains the increase in whorls in cervical cancer patients compared to normal.

Inamdar VV *et al.* (2006)[20] studied dermatoglyphic features in carcinoma cervix and observed significant increase in the frequency of whorls in both hands of cervical cancer patients.

Kashinathappa BS. *et al.*(2013)[21] showed significant increase in frequency of whorls in both hands of carcinoma cervix patients as compared to controls.

VI. CONCLUSION

The present work on dermatoglyphics in cervical cancer patients has determined few significant parameters applicable to the cervical cancer patients.

Significant findings in qualitative analysis of cervical cancer patients include:

1. Decrease in frequency of ulnar loop in both hands.
2. Decrease in frequency of radial loop in both hands(extremely significant).
3. Decrease in frequency of radial loop in right hand.
4. Decrease in frequency of radial loop in left hand(highly significant).
5. Increase in frequency of whorl in both hands(extremely significant).
6. Increase in frequency of whorl in right hand(highly significant).
7. Increase in frequency of whorl in left hand.

Thus from the present study, it appears that there do exist a variation in the fingertip patterns in cervical cancer patients and it is possible to a certain extent to predict the individual's tendency for acquiring cervical cancer with an advantage of being very simple and economical 'Ink method'. Moreover the materials required for the dermatoglyphic procedure are easily available and portable. As the specific features of fingertip patterns are present in the cervical cancer patients, it can be use for mass screening program for prevention of cervical cancer.

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