

Study of Double Loop Pattern in I4 and Hypothenar Region of Palm in Cervical Cancer Patients

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ABSTRACT

Dermatoglyphic study to correlate a particular palm print pattern with occurrence of cervical carcinoma in the Northern Bengal population was done. Patterns of 72 cases of cervical carcinoma were tested against 72 controls. The results showed that there is an increase of double loop pattern in I4 area in cervical cancer patients in both the hands which is statistically significant (8.33%, left & 2.78%, right). In both hands, there is also an increased frequency of hypothenar area double loop pattern in cervical cancer patients (1.39% on right hand and 5.56% on left hand). The differences in left hand are statistically significant only.

Key Words: dermatoglyphics, cervical cancer, finger print, palmar print.

INTRODUCTION

The scientific study of epidermal ridges and their configurations on the palmar region of hand and fingers and plantar region of foot and toes is Dermatoglyphics. The term was coined by Cummins H and Midlo C in 1926 and was derived from Greek words 'derma' meaning skin and 'glyphics' meaning carvings (Penrose LS, 1963) ^[1,2]. Genetics controls the development of dermatoglyphic pattern, evident from the clear resemblance of dermatoglyphics among related persons (Schaumann B and Alter M, 1976) ^[3]. Genetic abnormalities resulting in inherited diseases in the children are often reflected in the dermatoglyphic pattern. (Walkar JFA, 1941) ^[4]. Dermatoglyphics is slowly being

established as a diagnostic aid in a number of diseases having a strong hereditary basis as a screening test (Holt SB, 1961) ^[5]; (Holt SB and Lindsten J, 1964) ^[6].

Dermatoglyphic analysis as a diagnostic tool has multiple advantages:

- Palmar epidermal ridge patterns are fully developed at birth and individual ridge configurations are unique. Dermatoglyphics remain unchanged for the entire lifespan of the individual except changes in the dimensions proportionate to the growth of the individual. Question of chance of similarity is a theoretical possibility being 1:64 billion ^[7].
- Easily accessible.
- Recordings are quick, simple & relatively inexpensive.
- Procedures are non-invasive non-traumatic.
- Ridge patterns can be quickly analyzed.
- Pattern inspection for abnormalities can be done immediately after birth.

Cervical cancer being one of the most extensively studied cancers & because its genetic basis well established ^[8], it is high time to find a screening test which helps identify probability of disease. Being a high mortality & morbidity disease, cervical cancer poses a heavy economic burden on the poor families ^[9] and developing countries alike ^[10,11]. Though screening procedure (i.e. Pap smear test) have been effective in reducing the incidence rate by 80% and mortality by 70%

^[12], but they are invasive & expensive procedures requiring an equipped set-up.

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

AIMS AND OBJECTIVES

- To find out dermatoglyphic feature (double loop pattern in palm) in women having cervical carcinoma in North Bengal.
- To compare the dermatoglyphic feature (double loop pattern in palm) in normal women and women having cervical cancer.

MATERIALS & METHODS

STUDY TYPE AND DESIGN:

This was an Analytical and Cross-sectional study.

STUDY AREA:

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

STUDY PERIOD:

The tenure of the study was one year from July 2014-June 2015;

STUDY POPULATION:

Women having Cervical carcinoma who were attending Radiotherapy OPD and Gynecology OPD & IPD in North Bengal Medical College and Hospital.

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.

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.

SAMPLE SIZE:

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

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.

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.

STUDY TECHNIQUES: The most routinely used method for recording dermatoglyphics, that which causes no harm onto the human body is the INK METHOD, described by Cummins H in 1936 ^[14] and Cummins H and Midlo C in 1961 ^[1], was used for this study.

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).



Figure 1_ 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

PARAMETER/VARIABLE STUDIED:

• QUALITATIVE PARAMETER:

1. Palmer patterns i.e. parameter(double loop pattern) is present in I4, hypothenar area

MORPHOLOGY:

Pattern Configurations:

- Palms: Palmar pattern configuration.
 1. Hypothenar (Hyp).
 2. Thenar (Th).
 3. Interdigital area - 1st, 2nd, 3rd and 4th (I1, I2, I3, I4).

PALMAR PATTERN CONFIGURATION: (Figure 4)

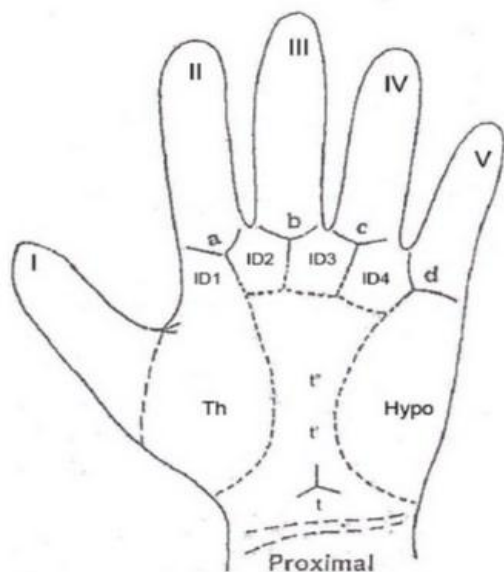


Figure 4_ palm pattern configuration, palmar areas and triradii

The palm has been divided into several anatomically well-divided areas to carry out dermatoglyphic analysis. These areas approximate the sites of embryonic volar pads. They include the thenar area, interdigital areas and hypothenar area.

Hypothenar (Hypo): Hypothenar area is situated along the lower part of ulnar border of hand and labeled as ‘Hypo’.

Thenar (Th): Thenar area is situated at the base of the thumb and labeled as ‘Th’.

First, Second, Third, Fourth Interdigital Areas (I1, I2, I3, and I4): The first, second, third, fourth interdigital areas are found in the distal palm in the region of heads of metacarpal bones. Each is bordered laterally by a digital triradii. The digital triradii are located proximal to the base of digits II-V.

Double loop: Two loops going in two directions. (Figure 5)



Fig-5

STATISTICAL ANALYSIS:

Chi Squared test was used for analysis the qualitative values. Statistical analyses were done using a computer-based on-line Programmer [15]. Differences were considered significant if P values were less than 0.05.

1. Chi square test [17]:

$$\chi^2 = \frac{\sum(O - E)^2}{E}$$

Degree of freedom (d.f.)=(r-1)(c-1).

O=the observed value.

E=the expected value.

R=number of rows.

C=number of columns.

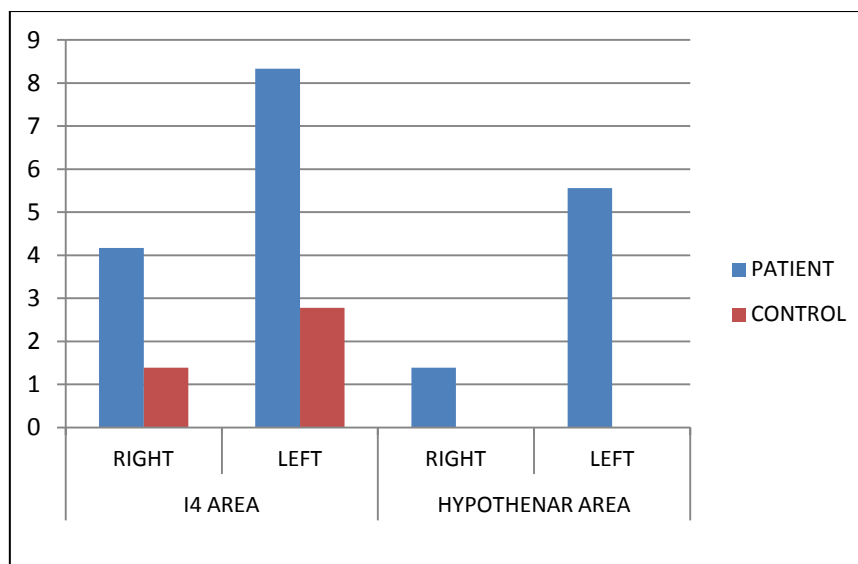
r x c = size of contingency table.

RESULTS AND 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 double loop patterns on I4 and hypothenar area pattern among patients(n1=72) & controls(n2=72).

Groups		I4 area		Hypothenar area	
		Right hand	Left hand	Right hand	Left hand
Patients	Frequency	3	6	1	4
	Percentage	4.17	8.33	1.39	5.56
Controls	Frequency	1	2	0	0
	Percentage	1.39	2.78	0	0
Chi square value		4.1129	5.4213	1.1183	4.7671
P value		<0.05	<0.05	>0.05	<0.05
Remarks		S	S	NS	S



The above table 1 shows that, the difference of percentages double loop pattern of hypothenar area for both hands between cancer cervix patients and controls are statistically significant for the left hand but not-significant for the right hand.

The difference of percentages double loop pattern of I₄ area for left hand and right hand between cancer cervix patients and controls is statistically significant.

There is no double loop present in Hypothenar area in control group in the right hand.

There is an increase in the double loop patterns in cancer cervix groups.

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 double loop patterns in palms among cervical cancer females and control group. The double loop patterns in palms are analyzed under following heading:

A. ANALYSIS OF QUALITATIVE PARAMETERS:

1. I₄ pattern area:

There is an increase of double loop pattern in I₄ area in cervical cancer patients in the right hand. The difference (2.78%) is statistically significant.

In left hand, there is also an increase in frequency of I₄ double loop pattern in cervical cancer patients (8.33%) compared to control group (2.78%). This difference is statistically significant(x^2 value=5.4213, $P<0.05$).

The difference of percentages of I₄ double loop pattern in left and right hand between cancer cervix patients and control groups could not be compared as no workers found any statistical significance I₄ pattern.

2. Hypothenar pattern area:

In both hands, there are increased frequency of hypothenar double loop pattern in cervical cancer patients (1.39% on right hand and 5.56% on left hand) compared to control group(00%). The differences in left hand is statistically significant(x^2 value=4.7671, $P<0.05$).

The differences of percentages of hypothenar double loop pattern in both hands between cancer cervix patients and control groups could not be compared as no workers found any

statistical significance hypothenar pattern.

CONCLUSION

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

Significant finding in qualitative analysis of cervical cancer patients include:

1. Double loop pattern of hypothenar area in left hand.
2. Double loop pattern of I₄ area of right and left hands

No significant differences were observed in the following parameters:

1. Double loop pattern of hypothenar area in right hand.

Thus from the present study, it appears that there do exist a variation in the dermatoglyphic patterns(double loop pattern increase in hypothenar and I₄ area) 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 statistically significant difference of dermatoglyphic pattern (double loop pattern in hypothenar area of left hand and I₄ areas of both hands) is present between the cervical cancer patients and control group, it can be use for mass screening program for prevention of cervical cancer.

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