STUDY OF DERMATOGLYPHIC PATTERNS OF HANDS IN WOMEN WITH BREAST CANCER

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ABSTRACT:

Objective: Study the relationship of digital dermatogletphic patterns of hands in women with breast cancer and or at risk for developing breast cancer.

Methodology: Fingerprints were studied in 616 women in three groups: (1) 154 breast cancer patients, (2) 154 females at increased risk for developing breast cancer and (3) 308 control females for the purpose of finding patterns that would identify those women with breast cancer or those who are predisposed to its development.

Results: A pattern of 6 or more digital Whorls was identified more frequently in women with breast cancer (48.7%) as compared in the control group to (27.5%) ($P < 0.05$). It was also more frequent in women with known risk factors for breast cancer (47.4%) as compared in the control group to (27.5%) ($P < 0.05$). No obvious differences were noted in women at increased risk for developing breast cancer (47.4%) when compared with women who had breast cancer (48.7%).

Conclusion: Digital dermatoglyphics may play an important role in identifying women either with or at increased risk for breast cancer so that either risk reduction measures or earlier therapy may be instituted.

KEYWORDS: Breast Cancer, Dermatoglyphics, Fingerprints.

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INTRODUCTION

Identification of women at increased risk for the development of breast cancer and the earliest possible diagnosis of patients with breast cancer should improve the results of breast cancer treatment. The important identification of a relationship between a positive family history for breast cancer and subsequent development of the disease is well documented.[1-10] Since the incidence of breast cancer is increased in patients with a positive family history for breast cancer as well as in patients with early menarche, late menopause, and obesity, it may be that genetic factors play an important role. Examination of genetic markers may be of value in identifying some of the population of risk.

This report intends to evaluate the relationship between dermatoglyphic patterns and breast cancer. Figure-1, demonstrates the main digital patterns.

PATIENTS AND METHODS

The present study is a cross-sectional trial undertaken primarily in Institute of Cancer, Imam Khomeini Hospital-Tehran, from September 2002 to March 2004.

An ink-print fingerprints method was used. The patients were identified by code number so that the classification of fingerprint patterns was done in a single blind fashion.

The patients were divided into 3 categories: group 1- (n = 154 females), consisting of breast cancer patients, group 2- (n = 154 females), those at an increased risk for breast cancer and group 3- (n = 308 female) those considered to be the control. Those with a diagnosis of breast

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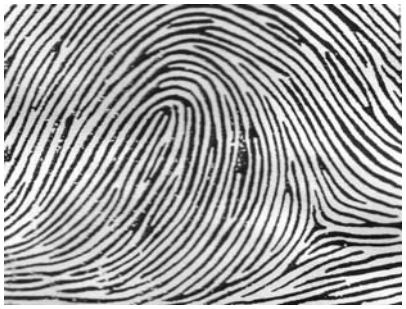
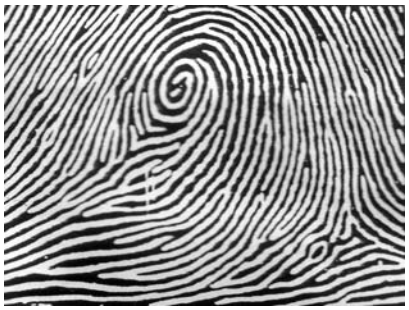


Loop



Central Pocket Loop

Lateral Pocket Loop

Plain Arch

Tented Arch

True Whorl

Accidental Loop

Twinned Loop

Figure 1- The Patterns of Dermatoglyphic

cancer had to have a histopathologic confirmation. Patients with either in-situ or invasive breast cancer were included. Patients were identified as being at increased risk for the development of breast cancer using the criteria described previously .[11] These include a family history of breast cancer in a first degree relative, or two of the following four criteria of: (I) a previous history of breast surgery for a non-malignant, non-cosmetic condition;(II) menarche before age 12;(III) menopause above age 50 and (IV) first live birth at 30 years of age or older the control group had neither cancer nor any of the above risk factors.

Additional study requirements included that high risk and control groups had to have a normal breast examination within two years of dermatoglyphic study. Dates were recorded in SPSS Master program, and statistical evaluation was done by Chi Squared Method and by Predictive Value Testing.[12]

RESULTS

For the entire series (n = 616 female) there was a statistically significant differences between the patterns of 6 < Whorls with relative frequency of 37.8% and patterns of 6 > Whorls with relative frequency of 62.1% per patient (X^2 = 27.452, df = 2, P < 0.05). In addition, within the group – 1, the results of X^2 test (0.104, df = 1) between patterns of 6 Whorls with relative frequency of 48.70% and 6 > Whorls with relative frequency of 51.2% did not show a significant difference (Table-I); but, within the group – 2, the results of X^2 test (X^2 = 0.416, df = 1) between the patterns of 6 Whorls with relative frequency of 47.40% and 6 > Whorls with relative frequency of 52.5% showed a significant difference (P < 0.05). Within the group – 3 the results of X^2 test (X^2 = 61.821, df = 1) between the patterns of 6 Whorls with relative frequency of 27.5% and 6 > Whorls with relative frequency of 72.4% also showed a significant difference (P < 0.05) (Table-I).

Furthermore the results of predictive value tests in the pattern of 6 Whorls as compared to 6> Whorls, showed a significant difference between Group – 1 & 3 and Groups – 2 & 3 (P <0.05) but not between Groups – 1 & 2 (Table-I).

The results of predictive value represent the highest frequency of pattern in digit I (Right hand Thumb finger) was Loop with relative frequencies of 45.7% and lowest was Tented Arch with relative frequencies of 0.9% (X^2 = 17.470%, df = 14).

In digit II (Right hand Forefinger) the highest frequency of 41.8% and the lowest frequency was accidental loop with relative frequency of 0.9% (X^2 = 21.283, df = 14).

The highest and lowest frequency of pattern in digit III (Right hand Middle finger) were Loop and accidental loop with relative frequency of 65.4% and 0.4% respectively. There was significant difference between eight dermatoglyphic patters in this digit (X^2 = 45.895, df = 1, P < 0.05).

In digit IV, (Right hand Ring finger) the highest frequency of pattern was True Whorl with relative frequency 46.7% and the lowest frequency belonged to patterns of Twinned Loop

Table I – Frequency Distribution of Digital Patterns among Group – 1 (Breast Cancer Patients), Group – 2 (High Risk Females) and Group – 3 (Controls).

Total		3		2		1		groups / Whorl subtype patterns
%	*No*	*%*	*No*	*%*	*No*	*%*	*No*	
37.8	233	27.5	85	47.4	73	48.7	75	Whorls 6
62.1	383	72.4	223	52.5	81	51.2	79	Whorls < 6
100.0	616	100.0	308	100.0	154	100.0	154	**Total**
27.452		61.831		0.416		0.104		Test Result
2		1		1		1		df
P<0.05		P<0.05		NS		NS		X^2

with relative frequency of 0.1% (X^2 = 33.977, df = 12).

In digit IV (Right hand Little finger), the highest frequency of patterns was Loop with relative frequency of 71.2% and the lowest frequency pattern (after Twinned Loop which was not observed) Tented Arch with 0.1% and showed a significant difference between eight different dermatoglyphic patterns in this digit (X^2 = 27.868, df = 12, $P < 0.05$)

In the digit VI (Left hand Thumb finger) the highest and lowest frequencies of patterns were Loop and Accidental Loop with relative frequencies of 53.8% and 0.3% (X^2 = 22.526, df = 14) respectively.

In digit VII (Left hand Forefinger) the highest and lowest frequencies of patterns were Loop with relative frequency of 38.6% and Accidental Loop with 0.8% respectively (X^2 = 26.189, df = 14, $P < 0.05$) showed a significant difference between eight patterns in digit VII.

In the digit VIII (Left hand Middle finger) the highest and lowest frequencies were patterns of Loop with relative frequency of 85.2% and Accidental Loop with relative frequency of 0.4% respectively. This result showed a significant difference between eight different patterns in digit VIII (X^2 = 40.356, df = 14, $P < 0.05$).

In digit IX (Left hand Ring finger) the highest and lowest frequencies were belonged to patterns of Loop and Lateral Pocket Loop with relative frequencies of 44.8% and 0.4% respectively, and the difference appeared to be significant between eight different patterns of dermatoglyphic in IX digit (X^2 = 28.180, df = 12, $P < 0.05$).

In digit X (Left hand Little finger) the highest frequency of patterns was Loop with relative frequency of 71.5%, and lowest frequency pattern was Tented Arch with relative frequency of 0.4% the result of the predictive test value in this digit, between the eight studied patterns, showed the difference was significant (X^2 = 21.333, df = 12, $P < 0.05$).

DISCUSSION

With an ever increasing population it is important that methods be developed to identify individuals who are either at risk or, already have a given illness in the most cost – efficient manner without sacrificing quality of care. The use of dermatoglyphics such as presented in this paper is a rather unique approach and cost effective for identification in such individuals.

While examining dermatoglyphics and cancer patients in general, other studies [2,13] have noted an increase in Whorls in 201 and 391 females respectively. In another study patients with different cancers, showed Whorls to be present and while studying high risk kindred also found more Whorls, and an increased Proportion of Loops in cancer patients.[14,15]

Furthermore, genetic evaluation in breast cancer [16,17] suggests that an increased susceptibility to breast cancer was, inherited as an autosomal dominant allele with high penetrance in women. Hereditary and familial breast cancer are well recognized entities [7,18,19] .

Studies specifically related to correlation between digital Whorl subtypes and breast cancer [5,20,21] have confirmed a statistically significant difference of the presence of 6 or more digital Whorls out of 10 digits in patients with breast cancer and high risk women as compared to control females (without breast cancer).

It is interesting to note that in our (616 Iranian females) study, we have found a statistically significant difference of the presence of digital Whorl subtypes < 6 out of 10 digits, between groups 1 (patients with breast cancer) & 3 (control) and groups 2 (high risk women) & 3 (control) ($P < 0.05$) but not between groups 1 & 2.

In conclusion, we have demonstrated that the presence of 6 or more Whorls is associated in a statistically significant fashion with breast cancer. It is hoped that in future this dermatoglyphic abnormality will prove useful in identifying some of the women who are at increased risk for development of breast cancer.

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