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Association of breast cancer with fingerprint pattern variations and blood group typing: A clinical study

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Abstract
Introduction: Dermatoglyphics is considered as a window of congenital abnormalities and is a sensitive indicator of intrauterine anomalies. They have proved to be a helpful adjunct to other diagnostic methods in identifying specific syndromes of genetic origin. The present study was conducted to determine prevalent dermatoglyphic pattern and blood group type in breast cancer patients.
Materials & Methods: The present study was conducted in the department of Anatomy on 40 patients of breast cancer and equal number of control. The subjects were asked to wash both hands with soap and water which removed the dirt and grease. A small dab of ink was placed on the inking slab and spread with the inked roller to cover the whole area of palm to be printed for examination and pattern was obtained on A 4 paper. The qualitative parameters observed were: the types of fingerprint patterns of individual digit or finger i.e loop, arch, whorl. The blood group of patients was collected from medical records and those of controls was obtained from documented blood group records.
Results: Both groups had 40 subjects each. Most common pattern was whorl (26.3) in group I (controls) and ulnar loops in group II (cancer patients). Relationship of ulnar loops in Control group and Breast cancer group was statistically significant due to low number of ulnar loops in control group ($p<0.001$). Relationship of whorls in Control group and Breast cancer group was statistically significant ($p<0.001$) due to more number of whorls in Control group. Blood group type B+ ve showed highest (47.5%) association with breast cancer followed by O+ ve (35%) blood group type. In group I, O+ ve (35%) was the most prevalent blood group type followed by A+ ve (12.5%) and B- ve (12.5%) blood group types.
Conclusion: Fingerprints are an easily accessible, lifelong marker formed in early months of gestation. This is one of the best and widely used methods for personal identification. The dermatoglyphic parameters can be used to study genetic basis of Breast cancer and may also serve as a screening tool in high risk population.

Keywords: fingerprint, breast carcinoma, blood group, Loop, B+ve

Introduction

Screening in medicine is a strategy used in a population to identify the possible presence of not-yet diagnosed disease in individuals without signs and symptoms. As such screening tests are somewhat unique in that they are performed on persons apparently in good health [1].

Cancer screening is the main weapon for early detection at a pre invasive or premalignant stage. Since breast cancer is the most common cancer in women and India being a developing country, low economic and non-invasive screening procedures would be of great clinical significance. As fingerprints and palmarprints (dermatoglyphic traits) are formed under genetic control similar to breast cancer, dermatoglyphics can represent a non invasive anatomical marker of breast cancer risk and thus help in early detection and treatment. These patterns may represent the genetic make-up of an individual and his predisposition to certain diseases [2].

The entire human body is clothed with skin which happens to be the largest and most important organ of the body. It performs many vital functions in the life of an individual. The skin on the ventral sides of the hands i.e. palm and plantar sides of the feet *i.e*. sole is exclusively designed and is corrugated with ridges and configurations which are functionally useful. The human hands dominate all other organs in terms of relative importance. That is why brain dedicates the majority of approximately two hundred million nerve endings to the hands [3].

Dermatoglyphics offers at least two major advantages as an aid to the diagnosis of medical disorders: The epidermal ridge patterns on the hands and soles are fully developed at birth and thereafter remain unchanged for life, Scanning of the ridge patterns or recording these permanent impressions can be accomplished rapidly, inexpensively and without trauma to the patient [4].

Dermatoglyphics is considered as a window of congenital abnormalities and is a sensitive indicator of intrauterine anomalies. They have proved to be a helpful adjunct to other diagnostic methods in identifying specific syndromes of genetic origin [5]. Studies of association between tumour outcome and the patients' ABO blood group have shown increased relative risks for some of blood groups. The present study was conducted to determine prevalent dermatoglyphic

pattern and blood group type in breast cancer patients.

Materials & Methods

The present study was conducted in the Department of Anatomy & Radiotherapy, GMC Jammu. It included 40 patients of breast cancer and equal number of control. All were informed regarding the study and written consent was obtained. Ethical clearance was taken prior to the study.

General information such as name, age, gender etc was recorded. The subjects were asked to wash both hands with soap and water which removed the dirt and grease. A small dab of ink was placed on the inking slab and spread with the inked roller to cover the whole area of palm to be printed for examination and pattern was obtained on A 4 paper. The qualitative parameters observed were: the types of patterns of individual digit or finger i.e loop, arch, whorl. Results thus obtained were subjected to statistical analysis using chi-square test. P value < 0.05 was considered significant.

The blood group of patients was collected from medical records and those of controls was obtained from documented blood group records.

Results

Table 1: Relationship of dermatoglyphic patterns in both groups

Pattern Type	Group I (Control) (n=40)		Group II (cancer patients) (n=40)		P value
	No.	%	No	%	
Arches	1.3	3.25	3.2	8	0.006
Radial loops	4.3	10.75	5.9	14.75	0.112
Ulnar loops	7.8	19.5	22.1	55.25	0.001
Whorls	26.3	65.75	8.8	22	0.001
Composite	0.3	0.75	0	0	0.247
Total	40	100.00	40	100.00	

Table I shows that most common pattern was whorl (26.3) in group I and ulnar loops in group II. Relationship of arches in control group and Breast cancer group was statistically not significant (p=0.006). Relationship of radial loops in Control group and Breast cancer group was statistically not significant (p=0.112). Relationship of ulnar loops in Control group and Breast cancer group was statistically significant due to low number of ulnar loops in control group (p<0.001). Relationship of whorls in Control group and Breast cancer group was statistically significant (p<0.001) due to more number of whorls in Control group. Relationship of Composite pattern in Control group and Breast cancer group was statistically not significant (p=0.247).

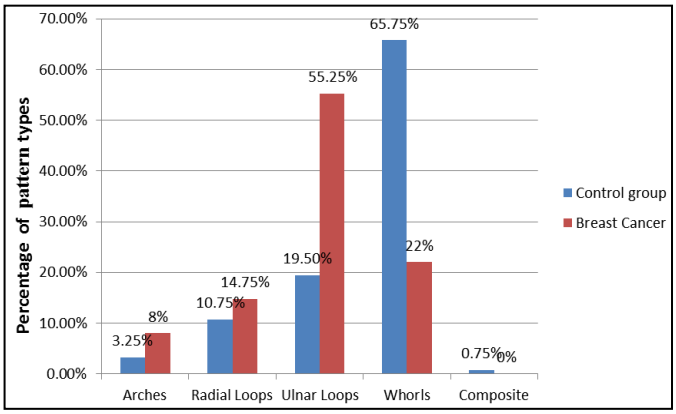

Fig 1: Relationship of dermatoglyphic patterns in control group and Breast cancer group

Graph I shows that most common pattern in group I was whorls (65.75%) and in group II was ulnar loops (55.25%). The difference of pattern between both groups was significant (P< 0.05).

Table 2: Relationship of Blood group in Control group and Breast cancer group in Jammu region

Blood group type	Control (n=40)		Case (n=40)	
	No.	%	No.	%
A-ve	8	20	0	0
A+ve	5	12.5	5	12.5
B-ve	5	12.5	0	0
B+ve	4	10	19	47.5
O-ve	2	5	0	0
O+ve	14	35	14	35
AB+ve	2	5	2	5
Total	40	100.00	40	100.00

Table II shows that blood group type B+ ve showed highest (47.5%) association with breast cancer followed by O+ ve (35%) blood group type. In group I, O+ ve (35%) was the most prevalent blood group type followed by A+ ve (12.5%) and B- ve (12.5%) blood group types.

Discussion

Dermatoglyphics can serve as a non-invasive, anatomical marker and a predictor tool to determine the individuals with breast cancer. Dermatoglyphics can be used in predicting the diagnosis of genetic disorders.

In this study, we included 40 breast cancer patients and equal number of controls. We found that most common pattern was whorl (26.3) in group I and ulnar loops in group II. It was 55.25% in breast cancer subjects, followed by whorls (22%), radial loops (14.75%) and arches (8%). The relationship of fingertip pattern in control group and breast cancer group showed significant variations with respect to ulnar loops (p<0.001), and whorls (p<0.001). The relationship of fingertip pattern in control group and breast cancer group showed significant difference with respect to whorls (p<0.001) and arches (p<0.001).

Akhtar *et al.* [6] performed a study on 100 diagnosed breast cancer patients and found a significant increase in loop pattern in cases as compared to controls in all digits of left hand and combined count of both hands. Our study is in consonance with the above study which also shows an increase in ulnar loop count.

A study conducted by Aly *et al*. [7] on the palmar dermatoglyphics in 50 breast cancer female patients found increased whorls in breast cancer cases and an increased pattern of ulnar loops in control group. Amini *et al*. [8] in their study on dermatoglyphics of 616 women found that a pattern of 6 or more digital whorls was identified more frequently in women with breast cancer as compared in the control group. Sukre SB *et al.* (2015) [9] carried a study on 50 breast cancer patients and found an increased whorl pattern in breast cancer patients than in control group. Dermatoglyphic patterns in 30 breast cancer patients were studied by Lavanya J *et al.* (2012) [10] and results exhibited that majority of the prints belonged to whorl pattern of fingerprints.

We observed that blood group type B+ ve showed highest (47.5%) association with breast cancer followed by O+ ve (35%) blood group type. In group I, O+ ve (35%) was the most prevalent blood group type followed by A+ ve (12.5%) and B- ve (12.5%) blood group types. This is in agreement with Zaki SM *et al.* (2013) [11] who conducted a study on 250 breast cancer patients. The results found highest association of blood group A (64%) and least association of blood group AB (8.4%) with breast cancer. The study also showed an increased frequency of blood group O (36%) followed by blood group A (29%) in Control group. The present study is in partial accordance with the above study which shows highest association of blood group B in contrast to blood group A. The least association is reported in blood group AB which is same as found in our study. In present study, the Control group shows highest occurrence of blood group O (40%) followed by blood group A (32.5%), which resembles the results of above study by Zaki SM *et al.* [11] which also shows increased frequency of blood group O (36%) followed by blood group A (29.4%) in Control group.

Conclusion

Fingerprints are an easily accessible, lifelong marker formed in early months of gestation. This is one of the best and widely used methods for personal identification. The dermatoglyphic parameters can be used to study genetic basis of Breast cancer and may also serve as a screening tool in high risk population.

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