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Palmar dermatoglyphic and breast cancer: A possible correlation

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Abstract
Introduction: Dermatoglyphic is the scientific study of the pattern of epidermal ridges. Apart from use of dermatoglyphics in predicting the diagnosis of genetic disorders, it is used in forensic science. Breast cancer is by far the most frequent cancer among women. The hereditary breast cancer accounts for 5 to 10 percent of all breast cancer cases, 90% of which involves mutation of BRCA1/BRCA2 genes the present study was conducted to assess any possible correlation between Palmer dermatoglyphics and breast cancer.
Materials & Methods: It comprised of 40 patients of breast cancer. All were informed regarding the study and written consent was obtained. 2 groups were formed. Group I had 40 breast cancer patients and group II had control (40). In all subjects, total finger ridge count was calculated. The a-b ridge count was calculated by counting the number of ridges intersecting a line drawn between the triradius (at the base of the index finger) and b triradius (at the base of the middle finger) of the palm of each hand. The atd angle is the angle between two straight lines joining the triradius a and the triradius d, under the little finger, with a point t, on the lower outer portion of the palm.
Results: Mean total finger ridge count in both groups was statistically significant ($p< 0.001$). Mean atd angle in both groups was statistically significant ($p< 0.001$) due to high angular range in cancer groups. Mean a-b ridge count in both group was statistically significant ($p< 0.001$) due to increased a-b ridge count in breast cancer group.
Conclusion: There were decreased values of total finger ridge count (TFRC) in Breast cancer patients. There were increased values of atd angle in Breast cancer patients. There were increased a-b ridge counts in Breast cancer patients.

Keywords: dermatoglyphic, breast cancer

1. Introduction

Man can change, his behavior can alter, thoughts can diversify but dermatoglyphics pattern will remain the same till forever. Dermatoglyphics is the scientific study of epidermal ridges and their configuration on the volar aspect of the palmar and plantar regions. The ridge pattern depends upon cornified layer of epidermis as well as dermal papillae [1].

Apart from use of dermatoglyphics in predicting the diagnosis of Genetic disorders, it is used in forensic science for criminal identification. Widespread medical interest in epidermal ridges developed only in the last few decades, when it became apparent that many patients with chromosomal aberrations had unusual ridge patterns [2].

All epidermal ridges are usually laid down between tenth and eighteenth weeks of gestation. Once laid down they remain unchanged except for an increase in size parallel with general growth. Since genetic influence has been demonstrated in the formation of epidermal ridge patterns, studies have shown that a positive correlation exists between dermatglyphic patterns and some disease conditions, especially those with genetic basis [3].

It has been suggested also that dermatoglyphic studies may aid in the diagnosis of such conditions. Reports are also available on the correlation of dermatoglyphics in diabetes mellitus, Primary dilated cardiomyopathy, breast cancer, epileptic disorder, rheumatism, prostate cancer. atd angle is a dermatoglyphic trait formed by drawing lines between the triradii below the first and last digits and the most proximal triradius on the hypothenar. ab ridge count is the number of ridges intersected by a line drawn between the a triradius(at the base of the index finger) and b triradius (at the base of the middle finger) of the palm in each hand [4].

Breast cancer is by far the most frequent cancer among women, with an estimated 1.67 million new cases diagnosed in 2012 (about 25% of all cancers). It is now the most common cancer both in developed (794,000 cases) and developing regions. The present study was conducted to assess total finger ridge count, atd angle, ab ridge count type in breast cancer patients.

Materials & Methods

The present study was conducted in the Department of Anatomy & Radiotherapy, GMC Jammu. It comprised of 40 patients of breast cancer. 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. 2 groups were formed. Group I had 40 breast cancer patients and group II had control (40).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.

For finger ridge counting, the basic dermatoglyphic landmarks were considered i.e triradius and core. A triradius is formed by confluence of three ridge systems and core is the approximate centre of the pattern.

A straight line was drawn connecting the triradius to the core and number of ridges was counted along the line using a sharp needle. In loops where there is only one triradii; there is one ridge count. For total finger ridge count, the sum of all ridge counts was taken. Larger count is used in those fingers with more than one ridge count. In loops where there is only one triradii; there is one ridge count. In whorl where there are two triradii there are two ridge counts and here the higher count is used. In double loop whorl, the counting is done from the triradii to the core that is nearer the triradii.

The a-b ridge count was calculated by counting the number of ridges intersecting a line drawn between the a triradius (at the base of the index finger) and b triradius (at the base of the middle finger) of the palm of each hand. The atd angle is the angle between two straight lines joining the triradius a and the triradius d, under the little finger, with a point t, on the lower outer portion of the palm. Results thus obtained were subjected to statistical analysis using chi- square test. P value < 0.05 was considered significant.

Results

Table 1: Relationship of total finger ridge count (TFRC) in both groups

Parameter	Group I (control) Mean$\pm$SD	Group II (Breast Cancer group) Mean$\pm$ SD	Statistical inference
TFRC	119 ± 10.4	89.88 ± 13.26	p<0.001 significant

Table I shows that mean total finger ridge count in both groups was statistically significant (p< 0.001).

Table 2: Relationship of atd angle in both groups

		Group I (Control) Mean$\pm SD$	Group II (Breast Cancer) Mean$\pm SD$	Statistical inference
atd angle	Right Hand	37.18 ± 2.58	42.65 ± 4.14	<0.001
	Left Hand	38.15 ± 2.68	42.93 ± 3.93	<0.001

Table II shows that relationship of mean atd angle in both groups was statistically significant (p< 0.001) due to high angular range in cancer group.

Table 3: Relationship of a-b ridge count in both groups

		Group I Mean$\pm SD$	Group II Mean$\pm SD$	Statistical inference
a-b ridge count	Right Hand	33.63 ± 1.97	37.08 ± 2.58	p<0.001
	Left Hand	34.45 ± 2.98	37.05 ± 2.93	p<0.001

Table III shows that relationship of mean a-b ridge count in both group was statistically significant (p< 0.001) due to increased a-b ridge count in breast cancer group.

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.

The present study found mean total finger ridge count significantly reduced in breast cancer patients. This is in accordance with the study conducted by Raizada A *et al.* [6] who found a reduced number of total finger ridge count (TFRC) in breast cancer subjects. Our study also found mean total finger ridge count (TFRC) significantly reduced in breast cancer patients than in normal subjects in Jammu region. Our study is in accordance with study carried out by Lavanya J *et al*, [7].which also showed a statistically significant reduced total finger ridge count (TFRC) in breast cancer subjects.

The present study shows a statistically significant increase in a-b ridge count in breast cancer patients. Sukre SB [8] in their study found an increase in a-b ridge count on left side in breast cancer subjects. Our study is in agreement with this study which shows an increase in a-b ridge count in both hands in breast cancer patients. Natekar PE *et al.* [9] in their study found an increase in a-b ridge count in breast cancer subjects. Sridevi NS *et al*, [10] conducted a study on 100 breast cancer patients and found an increase in a-b ridge count in breast cancer patients.

The present study shows a statistically significant increase in atd angle in breast cancer patients in jammu region. Our results were in contrast to the study done by Lavanya *et. Al*, (2012) [7] and Natekar PE *et al*. (2006) [9].

Conclusion

There were decreased values of total finger ridge count (TFRC) in Breast cancer patients. There were increased values of atd angle in Breast cancer patients. There were increased a-b ridge counts in Breast cancer patients.

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