

Axial Triradii in Carcinoma of Breast

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ABSTRACT Palmar prints of 100 female patients of carcinoma of breast were compared with 100 controls matched accordingly. The incidence of axial triradius t' and double triradius ($t + t'$) in both hands was significantly higher ($p < 0.001$) in carcinoma of breast patients when compared with controls indicating possible genetic predisposition to cancer of breast.

INTRODUCTION

The study of dermatoglyphics plays an important role in diagnosis of chromosomal disorder. A study by Holt (1970) reveals its significance in Down syndrome. Holt and Lindstein (1964) shows the importance of dermatoglyphics in Turners syndrome, Schauman and Alter (1976), prove its involvement in Trisomy 18, Parker et al. (1996, 1997) and Sakorafas (1999), state that breast cancer is the commonest neoplastic disease in women in the western world, with a lifetime risk of 11-12 per cent in the general population. Sakorafas et al. (2000) further states that hereditary breast cancers account for 5-10 per cent of all breast cancer cases wherein about 90 per cent of hereditary breast cancers involve mutation of the BRCA1 and/or BRCA2 genes. Other cancer related genes (including myc, c-erb B2, Tsg 101 and Mdg1) are involved in breast carcinogenesis, but they do not give rise to familial breast cancer syndromes. Earlier reports by Bierman et al. (1988), Gamel (1989), Huang et al. (1987) and Lynch et al. (1987) have all shown that finger print patterns were also affected in carcinoma of breast.

According to Holt (1968) the palmar ridge pattern shows digital and axial triradii. The purpose of this study was to determine whether the axial triradii shows any significant changes in patients suffering from cancer of breast.

MATERIALS AND METHODS

This study was carried out in 100 female

patients of carcinoma of breast attending the Radiotherapy department of Goa Medical College Bambolim Goa. The cases of carcinoma of breast and the normal controls were selected from the Goan population. The Goan population comprises of around 55% Hindus and 45% Christian (Roman Catholic) population. Both the cases of carcinoma of breast and normal controls were selected randomly for inclusion in this study. The diagnosis of these patients was confirmed by histopathological biopsy. These patients were divided into two groups. Group I consisted of carcinoma of breast who had no history of any other genetic disorder or hereditary diseases. They were matched with 100 controls (Group II) having no family history of cancer breast or any other inheritable diseases. Palmar prints were recorded with cyclostyling ink and rolled prints were taken of both palms. The position of axial triradius was noted and labeled as t , t' and $t + t'$ (double triradius). The triradial patterns of both hands of cancer of breast patients were compared separately with those of controls.

The results were evaluated by using the students t test to determine the significance of difference in the position of the axial triradius t and t' and the double triradii ($t + t'$).

RESULTS

In this study the position of the axial triradii t , t' and double triradii ($t + t'$) was determined in palmar prints of both hands of cancer of breast patients and the controls. It was observed that the incidence of axial triradius t' and double triradii ($t + t'$) was significantly higher in both hands of carcinoma of breast patients as compared to the controls (Tables 1 & 2) respectively. When the position of axial triradii t , t' and double triradii ($t +$

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t') was determined in palmar prints of both hands combined, it was observed that the incidence of axial triradius and double triradii was also significantly high (Table 3). When the statistical significance of the position of difference in the proportion in the right and left hand for position

of triradius was tested, the difference was highly significant (Tables 4, 5) respectively. However, when the statistical significance of the position of difference in both hands for the position of triradius was tested, the difference was also highly significant (Table 6).

Table 1: Incidence of axial triradii in the right hand of carcinoma of breast and the control

Group	Number of right palms	t	%	t'	%	t''	%	t+ t'	%
Carcinoma of breast (I)	100	68	68	20	20	0	0	12	12
Control (II)	100	90	90	6	6	0	0	4	4

Table 2: Incidence of axial triradii in the left hand of carcinoma of breast and the control

Group	Number of left palms	t	%	t'	%	t''	%	t+ t'	%
Carcinoma of breast (I)	100	72	72	16	16	0	0	12	12
Control (II)	100	93	93	4	4	0	0	3	3

Table 3: Incidence of axial triradii in both hands of carcinoma of breast and the control

Group	Number of right and left palms n=100	t	%	t'	%	t''	%	t+ t'	%
Carcinoma of breast (I)	200	140	70	36	18	0	0	24	12
Control (II)	200	183	91.5	10	5	0	0	07	3.5

n=100 persons in each group

Table 4: Statistical significance of difference in the proportions in the right hand

Significance of difference between group I & group II

Position of Triradius	t value	p value
t	4	p < 0.01
t'	3.01	p < 0.01
t + t'	2.11	p < 0.005

I = Carcinoma of breast

II = Control

Table 5: Statistical significance of difference in the proportions in the left hand

Significance of difference between group I & group II

Position of Triradius	t value	p value
t	4.016	p < 0.01
t'	11.14	p < 0.01
t + t'	2.45	p < 0.05

I = Carcinoma of breast

II = Control

Table 6: Statistical significance of difference in the proportions in the right and left hand

Position of Triradius	Significance of difference between group I & II t value	Significance of difference between group I & II p value
t	5.65	p < 0.01
t'	4.16	p < 0.01
t+ t'	3.26	p < 0.01

I = Carcinoma of breast

II = Control

DISCUSSION

More has been written about the epidemiology of breast cancer than any other form of cancer affecting mankind. The specific breast cancer predisposing genes are BRCA1, BRCA2 and p53. Studies by Bowcock (1997), Easton et al. (1993), Shattuck et al. (1995) and Petty et al. (1997), all corroborate the finding that mutations in BRCA1 account for breast cancer in 50 per cent of families. According to Wooster et al. (1994) BRCA2, the second breast cancer susceptibility gene, was mapped to chromosome 13q12-q13. Sakorafas et al. (1993) states that the human p53 gene located on the short arm of chromosome 17, is known to be a tumour suppressor gene that can be inactivated by point mutations.

This study represents an attempt by the investigators to provide a comprehensive coverage of breast cancer patients. The pattern of dermal ridges and furrows are formed very early in the fetal life. Once formed, they remain unchanged throughout life and vary between the individuals.

According to Holt (1968), where three ridge systems meet the ridges form a triradiate structure, the triradius. A triradius occurs at the base of each finger, except the thumb, on both hands.

They are called as digital triradii and are designated a, b, c and d situated in the distal palm under the index, middle, ring and little finger respectively. Another triradius is found at the base of the palm, in the depression between the thenar and hypothenar eminences and is called the axial triradius, t. An axial triradius occurring near the centre of the palm is referred to as t'' whereas one in an intermediate position is called as t'.

Earlier studies in breast cancer patients were centered on the dermatoglyphics patterns of the fingers in individuals suffering from breast cancer. Studies by Seltzer et al. (1990) reveal that a pattern of six or more digital whorls was identified more frequently in women with breast cancer than in those without the disease. According to Bierman et al. (1984), four significantly associated finger patterns were observed with breast cancer: accidentals, transitionals, angled ulnar loops and horizontal ulnar loops. Further, Huang et al. (1987) reported significant excess of radial loops on the left hand and increased frequency of ulnar loops on the left hand in pre menopausal women with breast cancer, whereas excess of radial loops on the left hand in postmenopausal women with breast cancer.

In the present study it was observed that the frequency of axial triradius t' was significantly higher in right hand (Table 1) and left hand (Table 2) in cancer breast patients. Similarly a double triradius (t + t') was also seen in right hand (Table 1) as well as left hand (Table 2) of these patients. The incidence of double triradius was significantly higher in both hands of carcinoma of breast patients as compared to the controls.

CONCLUSION

The above study indicates that there is a possible genetic influence on the palmar ridge patterns in carcinoma of breast patients in whom the digital ridge patterns is otherwise significantly affected. Though a high risk population is epidemiologically identified, these studies will allow us to detect possibility of breast cancer so as to enable us to take preventive prophylactic measures concerning the environmental factors, and in particular hormonal factors.

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