Original Article

DERMATOGLYPHICS IN IDENTIFICATION OF WOMEN EITHER WITH OR AT RISK OF BREAST CANCER

Shivaji B. Sukre[1], Mohammad Laeeque[2], A Mahajan[3], Shilpa N. Shewale[4]

ABSTRACT

Dermatoglyphics is the study of epidermal ridges of palms, soles and fingers. Dermatoglyphic pattern has been studied in various diseases.

In the present study Dermatoglyphic pattern was studied in Breast cancer, 50 Breast cancer patients and 50 normal subjects (free from disease of Breast cancer or family history) were selected and prints of palms and fingers were taken.

The prints were analysed by quantitative and qualitative methods like arches, loops, whorls, Interdigital areas, Triradial count, ab ridge count, atd angle, and total finger ridge count. Statistical tests like chi square test, and standard error of difference between two means was used.

It was observed that radial and ulnar loops, whorls and arches in left hand showed statistically significant difference. Among the quantitative parameters ab ridge count, and atd angle showed statistically significant difference. Remaining parameters did not show statistically significant difference.

Thus dermatoglyphic pattern can be used as a cheap modality in screening of masses at risk of Breast cancer.

Key Words: Dermatoglyphics, Breast Cancer, Radial loop, Ulnar loop, Whorls.

INTRODUCTION

Dermatoglyphics is the study of epidermal ridge configuration on palms, soles and finger tips. It is recognized as a scientific method for Medicolegal anthropological and genetic studies[1]. Dermatoglyphic patterns have been studied in various diseases having chromosomal abnormalities or diseases having hereditary predilection[2]. Correlation of dermatoglyphic patterns and cancer predilection have been reported in earlier studies[3].

Breast cancer is one such disease which has genetic predilection which requires to be studied and may show dermatoglyphic pattern peculiar of at risk group.[4] Breast cancer is one of the commonest malignancies affecting women of 45-55 years age group Dermatoglyphics would help identification of woman at increased risk for the development of breast cancer, and the earliest possible diagnosis of breast cancer would improve the results of breast cancer treatment.

Dermatoglyphics can serve as a cost effective tool for sorting out women at risk and thus decreasing the economic burden on screening mammography in a developing country like ours.

This study intends to evaluate the relationship between dermatoglyphic patterns and breast cancer.

AIM OF THE PRESENT STUDY IS

1. To Analyze the relationship of dermatoglyphic patterns between breast cancer patients and controls
2. To use this study as one of the diagnostic parameter for breast cancer detection.

MATERIALS AND METHODS

Dermatoglyphic prints of 50 control and 50 diagnosed cases of breast cancer were taken. Control cases were selected between the age group of 25-60 years who do not have Breast cancer neither the history of the disease in the blood relatives.

The patients were selected who had confirmed Histophathological breast cancer. The patients registered for radiotherapy or chemotherapy in the department of Radiotherapy constituted this group.

Care was taken to see that the palms were clean, dry and non greasy the ink was uniformly spread and the prints were taken by pressing all the areas of palms and fingers in sequence on a white thick paper sheet. The cases were properly labeled on the sheets with all their relevant data.

All the dermatoglyphic prints of control cases and diagnosed breast cancer cases were studied, tabulated and analyzed by applying statistical tests.

The observations were recorded in tables and separated for right and left hands.

Study was done for qualitative and quantitative analysis

1) Qualitative analysis
   - A. Finger tip patterns
     - I) Arches
     - ii) Loops
       - ❖ Radial
       - ❖ Ulnar
     - iii) Whorls
   - B. Patterns in inter digital areas
     - I) Thenar I1 , area
     - ii) I_2 area
     - Iii) I_3 area
     - iv) I_4 area
     - v) Hypothenar area

2) Quantitative analysis
   - I) Tri radial count
   - ii) a-b ridge count
   - iii) atd angle
   - iv) Total finger ridge count

   The statistical tests used were
   - 1) Chi square test for qualitative parameters
   - 2) SE of difference between two means SEM for quantitative parameters.

OBSERVATION

It was observed that

Except arches in right hand all the other parameters like radial loops, ulnar loops and whorls in both hands showed statistically significant difference including arches on left side.

The Inter digital patterns like I_1, I_3, I_4 and HT showed more frequency in cancer cases but were statistically not significant.

Among the quantitative parameters the ab ridge count and atd ° angle showed statistically significant difference in control and cancer cases on left side and both hands taken together but not when the right hand values were analyzed independently.

The Triradial count and TFRC were not statistically significant in either hand or both hands taken together.

Fig.1 - Finger Print Of - A] Radial Loop B] Ulnar Loop

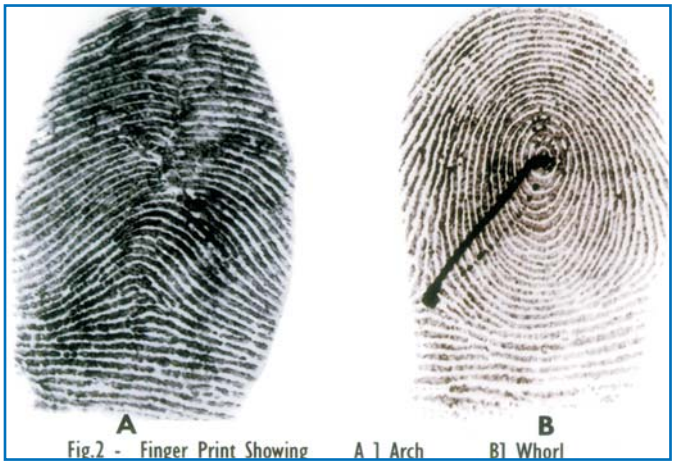

Fig.2 - Finger Print Showing A] Arch B] Whorl

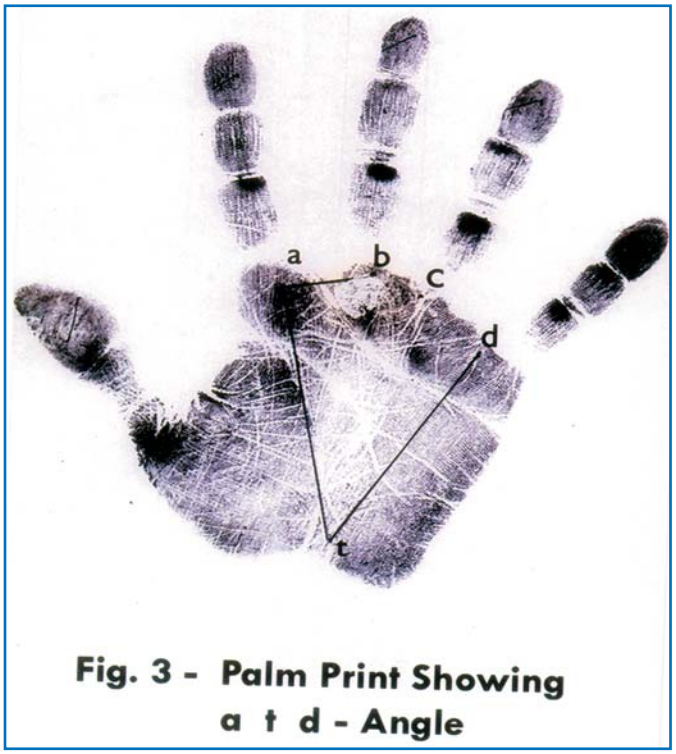

Fig. 3 - Palm Print Showing a t d - Angle

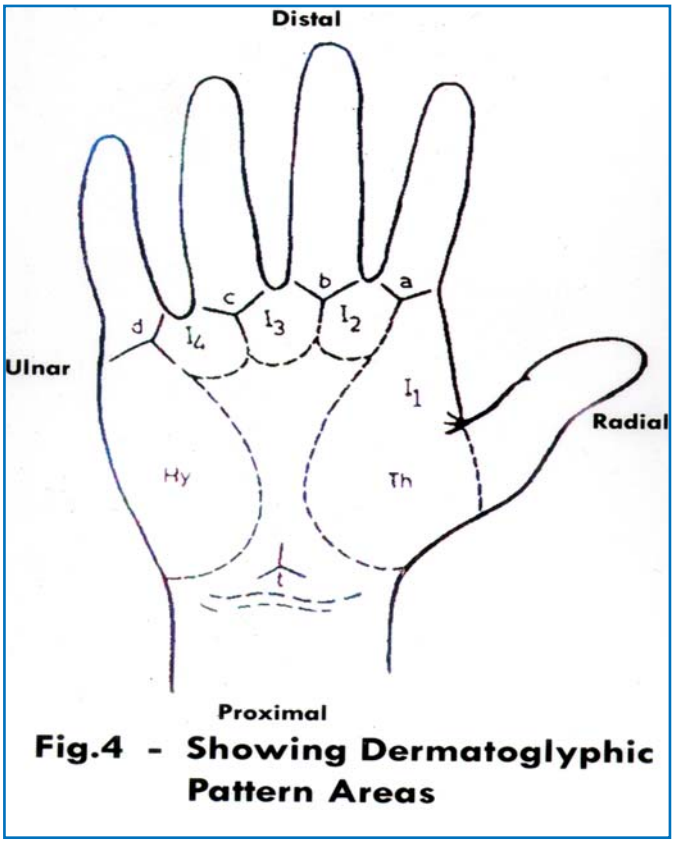

Fig.4 - Showing Dermatoglyphic Pattern Areas

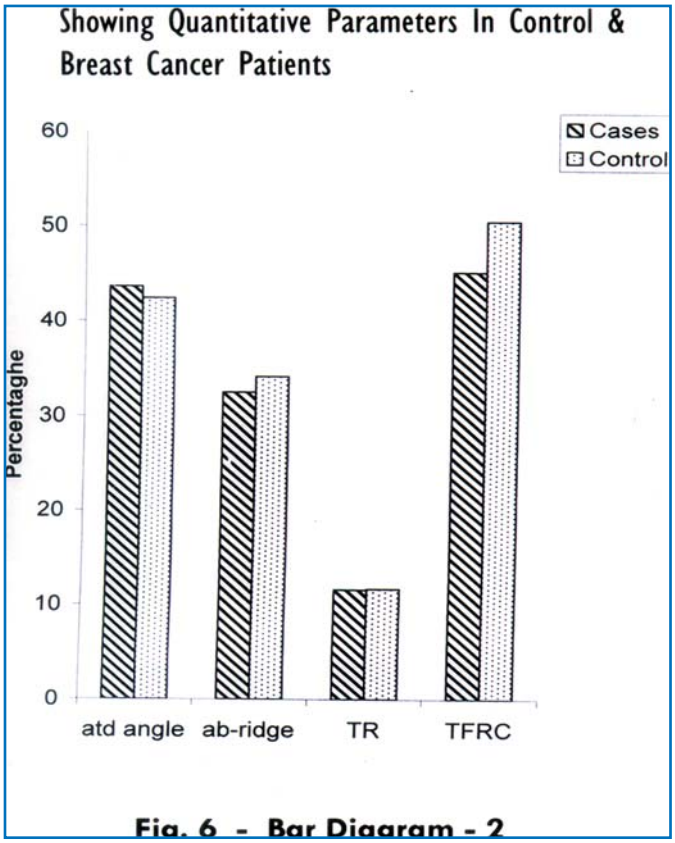

Fig. 6 - Bar Diagram - 2

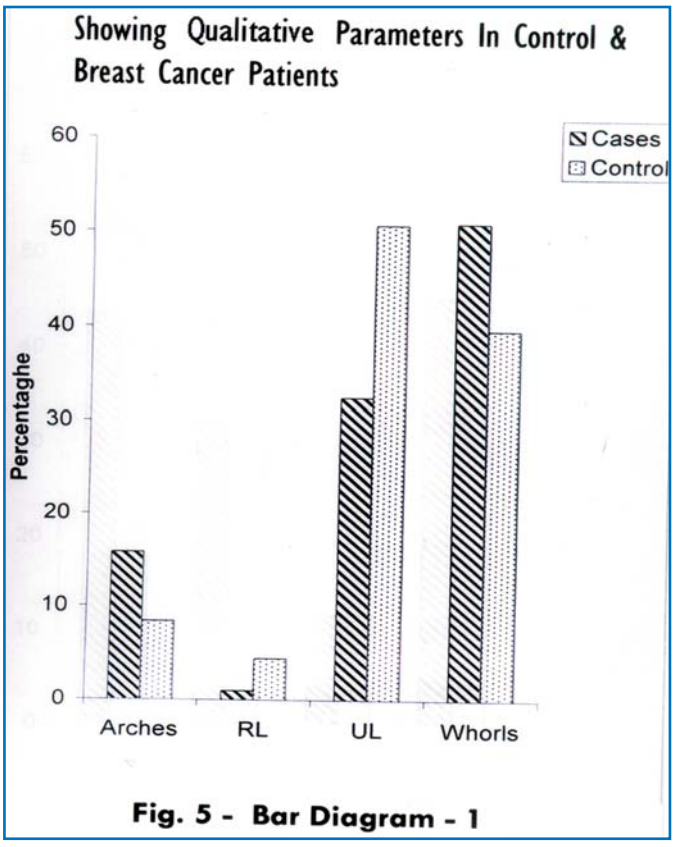

Fig. 5 - Bar Diagram - 1

Sr. No.	Parameter	% Cancer Cases			% Control			Chi square P value		
		Rt	Lt	Both	Rt	Lt	Both	Rt	Lt	Both
1	Arches	10.8	20.8	15.8	8.4	8.4	8.4	>0.05	<0.05	<0.05
2	Radial Loops	0.8	1.2	1	4.0	4.8	4.4	<0.05	<0.05	<0.05
3	Ulnar Loops	35	29	32	53	48	50	<0.05	<0.05	<0.05
4	Whorls	52	49.6	50	38	41	39	<0.05	<0.01	<0.05
5	Th I_1 I_2 I_3 I_4 HT			1.2% 0.6% 6.2% 6.8% 3%			0.2% 0.6% 2.6% 4.0% 2.4%			

Table - 1 : QUALITATIVE ANALYSIS OF DERMATOGLYPHICS IN BREAST CANCER

Sr. No.	Parameter	Cancer			Control			Stastical		
		Rt	Lt	Both	Rt	Lt	Both	Rt	Lt	Both
1	atd °	42.9 ±3.28	45.1 ±6.01	43.7 ±3.1	43.7 ±3.63	42.8 ±4.01	42.46 ±2.8	>0.05	<0.05	<0.05
2	Abridge count	33.44 ±5.55	31.6 ±5.17	32.54 ±5.23	34.04 ±4.76	33.98 ±3.97	34.14 ±3.79	>0.05	<0.05	>0.05
3	Triradial count	11.68 ±2.16	11.5 ±2.45	11.59 ±2.15	11.64 ±1.81	11.70 ±1.86	11.69 ±1.66	>0.05	>0.05	>0.05
4	TFRC	46.18 ±15.46	44.34 ±15.36	45.26 ±15.1	51.7 ±13.5	49.26 ±12.7	50.48 ±12.7	>0.05	>0.05	>0.05

Table - 2 : QUANTITATIVE ANALYSIS OF DERMATOGLYPHICS IN BREAST CANCER

DISCUSSION

Chintamani et al[5] (2007) found significantly reduced arches in breast cancer patients than in control group. N.S.Sridevi et al[6] (2010) did not found any statistically significant difference in cases and control groups with respect to arches. In the present study (2012) left hand and over all on both sides showed increase in arches with no significant difference when seen on right side alone.

Seidman HM et al[7] (1982) and Haung c and Mi M.[8] (1987) found more loops in breast cancer cases than in control subjects. Howard R. Bierman et al[9] (1988) analyzed the four patterns of ulnar loops significantly associated with breast cancer and classified them as accidentals, transitionals, angled ulnar loops, and horizontal ulnar loops. Chintamani et al[5] (2007) also found more loops in breast cancer patients.. N.S. Sridevi[6] (2010) in their study found that ulnar loops were significantly more in breast cancer patients. S. P. Fulari et al[10] (2012) found lower percentage of ulnar loops in cases as compared to control group which is in agreement with the present study (2012), that the ulnar loops were found to be less in cases as compared to control group. This may be due to different racial groups of study.

P.E. Natekar, Fatima M. Desouza[11] (2006) found more radial loops in left hand in breast cancer patients S. P. Fulari et al [10](2012) found less radial loops as compared to control group which is in corroboration with the present study. The difference in the finding of P E Natekar, Fatima M. Desouza [11] (2006) may be due to isolated left side data.

King MC et al[12](1980), Haung C and Mi M[8],(1987), Seltzer M H. et al[4](1990) and including present study also observed that the whorl patterns are more in breast cancer patients than in control group. M.H. Seltzer[13] (1982) noted that subjects with six or more whorls 95% of either had cancer or were at high risk. Sakineh Abbasi et al[14] (2006) in their study found more digital whorls (6 out of 10) in breast cancer patients as compared to control group. Chintamani et al[5] (2007) showed that the whorls are increased in cancer patients as compared to controls. S.P. Fulari et al[10] (2012) found significantly more whorls i.e. having six or more in majority of patients (highly statistically significant) In the present study (2012) also patient group showed significantly more whorls than in control group.

P.E. Natekar[15] (2006) found Axial triradius t and double triradi (t+t') significantly more in breast cancer patients, however in the present study (2012) triradii did not showed any difference between the two groups.

Luis de Andres Basauri [16](1975) in his study found that ab ridge count was less in cases as compared to control group. Yunyu Zhou et al[17](2001) found that median a-b ridge count is significantly lower in breast cancer patients. On the contrary, Prashant E. Natekar, Fatima M. Desouza[11] (2006) and N.S. Sridevi et al[6] (2010) found ab ridge count significantly more in breast cancer patients than in control group. S.P. Fulari et al[10] (2012) also found ab ridge count higher in cases than control group. In the present study (2012) median ab ridge count on left showed significant increase in patients where as on right hand alone and overall it was not statistically significant . The differences in patterns in the various studies may be due to different racial groups of study.

Prashant E. Natekar, Fatima M. Desouza[11] (2006) found less atd angle in breast cancer patients. S.P. Fulari et al[10] (2012) found that mean atd angle was higher in breast cancer patients as compared to controls. In the present study (2012) left side showed decreased atd angle in corroboration with the study of Prashant E. Natekar, Fatima M. Desouza [11](2006) however right side did show statistical relevance, the difference in the present study (2012) and that of Fulari et al[10] (2012) may be due to non availability of the data on sides in the previous study.

Chintamani et al[5] (2007) in their study found significantly decreased Total finger ridge count in breast cancer patients. N.S. Sridevi et al[6] (2010) found increase in Total finger ridge count in breast cancer patients. In the present study (2012) Total finger ridge count was not found to be of any relevance.

Previous studies with interdigital patterns were not available in breast cancer dermatoglyphics.

Except the study of Yunyu Zhou et al[17] (2001) on hypothenar pattern which showed no significant difference in the patterns.

Present study (2012) showed slightly increase in the hypothenar patterns.

CONCLUSION

Since breast cancer is one of the commonest malignancies affecting females, vigorous screening and timely intervention can save thousands of lives.

In a developing country like ours with limited resources particularly in rural places sophisticated screening is not affordable

Qualitative analyses of dermatoglyphic pattern like Arches, whorls, loops can be of immense help to screen out of risk group which then can be subjected to timely mammography.

REFERANCES

1) Henry ER: Classification and Uses of Finger Prints. 1937: 8th edi. London, HM Stationary Office, Quoted by Cummins H. (ref. No. 6)

2) William : Family History Of Breast Cancer, American Journal of Medical Genetics, 1931: 37 : 482.

3) Mutin Attasu Ad Teletar : Cancer and Dermatoglyphic Lancet , 1980: 861.

4) M.H. Seltzer, C.C. Plato and K.M. Fox, Dermatoglyphics in the Identification of Women Either With or at Risk for Breast Cancer, American Jornal of Medical Genetics,1990; 37(4) 482–488.

5) Chintamani, Rohan Khandelwal, Aliza Mittal, Sai Saijanani, Amita Tuteja, Anju Bansal et al. Qualitative and quantitative dermatoglyphic traits in patients with breast cancer: a prospective study. BMC Cancer 2007, 7:44.

6) N.S.Sridevi, C.R. Wilma Delphine Silva,Roopa Kulkarni and C.Seshagiri: Romanain Journal of Morphology and Embryology 2010,51 (3):547-550.

7) Seidman HM, Stellman SD, Mushinski MH. A different perspective on breast cancer risk factors: Some implications of the nonaltributable risk. Cancer Research 1982; 32: 301-313.

8) Huang C and Mi M. Digital dermal patterns in breast cancer. Proc Natl Sci Counc Repub China B 1987; 11 (2):133-136.

9) Howard R. Bierman, Michael R. Faith and Morgan E. Stewart. Digital Dermatoglyphics in Mammary Cancer 1988; 6: 1;15-27

10) S. P. Fulari, M.M. Pirzade, Ashwini Jadhav. Study of dermatoglyphics in breast cancer: National Journal of Medical Sciences, January 2012; vol. 1,no. 1: 29-32.

11) Prashant E.Natekar, Fatima M. And De Souza: Fluctuting asymmetry in dermatoglyphics of carcinoma of breast: Indian Journal of Human Genetics May – august 2006, vol. 12 (2):76-81.

12) King MC, Go RCP, Elston RC, Lynch HT, Petrakis NL. Allele increasing susceptibility to human breast cancer may be linked to the glutamate pyruvate transaminase locus. Science 1980; 28:406 -408.

13) Seltzer MH, Plato CC, Engler PE, Fletcher HS. Digital dermatoglyphics and breast cancer. Breast Cancer Res Treat. 1982; 2(3): 261-265.

14) Sakineh Abbasi, Nahid Einollahi, Nasrin Dashti and Vaez Zadeh: Study of dermatoglyphics patterns of hands in women with breast cancer. Pak J Med Sci January – March 2006, vol.22 No.1:18-22.

15) P. E.Natekar, F.Desouza and A.K. Pandey: Axial triradii in carcinoma of breast: Anthropologist, 2006, 8 (3): 193 – 195.

16) Luis de Andres Basuri: Identification of high risk group by means of Dermatoglyphic investigation: Genetic Factors in Breast Cancer Oncology, 1975,32; 37 – 43.

17) Yunyu Zhou, Yanjun Zeng, Lizhen and Wenlei Hu: Technology and Health Care 10:2002,383-390.

1. **Shivaji B. Sukre**
Associate Professor
Department of Anatomy
Govt. Medical College, Aurangabad.

2. **Mohammad Laeeque**
Assistant Professor
Department of Anatomy
Govt. Medical College, Aurangabad.

3. **A Mahajan**
Professor and Head
Department of Anatomy
Dr Ulhasrao patil Medical College Jalgaon

4. **Shilpa N. Shewale**
Assistant Professor
Department of Anatomy
Govt. Medical College, Aurangabad.