

Quantitative Dermatoglyphic traits in patients with Breast Cancer - a preliminary report of an ongoing study.

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Abstract: Breast cancer is one of the most extensively studied cancers. Pattern of dermatoglyphics has been an object of interest to people for a long time for various reasons. Dermatoglyphic traits are formed under genetic control early in development and do not change thereafter, thus maintaining stability not affected by age. The study was conducted on 30 histo-pathologically confirmed breast cancer patients and their digital dermatoglyphic patterns were studied to assess their association with the type and onset of breast cancer. It was observed that "Loops" is the most common type of ridge pattern observed in all the digits ranging from 98 – 60 % including both controls and breast cancer patients. The most common pattern seen in all the digits was "Loops" (75%) in the cancer patients group. Whorl pattern frequency showed maximal changes as compared to other pattern i.e. 4 % increase in the right digits in cancer patients as compared to the controls. It was observed that the mean ridge count on the right and left hand was 10.4 and 12.4 respectively, while in the controls the ridge count in the left hand was observed to be 18.4 and 19.6 respectively. The dermatoglyphic study might contribute to various aspects of breast cancer including the genetic pattern and also may serve as a screening tool in the high risk population. In a developing country like India it might prove to be an inexpensive and effective tool for screening and studying the patterns in the high risk population.

Key words: Breast cancer, dermatoglyphics

Introduction:

The genetic component in breast cancer is well established and two genes (BRCA1 and BRCA2) have been identified as genetic links. However these account for only a small proportion of cases. Evidence is available suggesting that a family history of breast cancer might be associated with a specific fingerprint pattern. If we do find an association, fingerprints might potentially be used for screening or to guide future research in this direction¹ and one day the screening of breast cancers could be at our fingertips! The prints will thus represent a noninvasive anatomical marker of breast cancer risk². An effort in this regard has been initiated to devise a screening program for hereditary breast cancer using finger prints or dematoglyphic study.

Material and methods:

The study was conducted on 30 histo-pathologically confirmed breast cancer patients (both indoor as well as outdoor) after taking the informed consent, at Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi. They were asked to fill a proforma and their digital prints recorded on the sheet enclosed. The fingerprints were taken on a glossy paper, digitally photographed and were analyzed using Adobe Photoshop software for palmar ridge patterns and ridge counts. Simultaneously 20 controls were also selected who had no self or familial history of a diagnosed breast cancer and their observations were also recorded.

Observations:

The two most common patterns for a digit were recorded for keeping the numbers optimum and only for more clarity in interpretation of the data.

Table no 1. Right digital observations in Breast cancer patients:

| Digit | Pattern (%age) | | Ridge count (mean) |
|-------------|----------------|------------------|--------------------|
| Thumb (R1) | Loop – 70 | Whorl - 20 | 16 |
| Index (R2) | Loop – 70 | Double Loop - 20 | 11 |
| Middle (R3) | Loop – 60 | Tented Arch - 30 | 13 |
| Ring (R4) | Loop – 77 | Double Loop - 20 | 13 |
| Little (R5) | Loop – 98 | - | 9 |

Ridge count S.D. 2.33

Table no 2. Left digital observations in Breast cancer patients:

| Digit | Pattern (%age) | | Ridge count (mean) |
|-------------|----------------|------------------|--------------------|
| Thumb (L1) | Loop – 97 | | 13 |
| Index (L2) | Loop – 83 | Whorl - 15 | 8 |
| Middle (L3) | Loop – 42 | Tented Arch - 42 | 10 |
| Ring (L4) | Loop – 83 | Tented Arch - 16 | 10 |
| Little (L5) | Loop – 72 | Tented Arch - 16 | 11 |

Ridge count SD 1.62

Table no 3. Right digital observations in Control group:

| Digit | Pattern (%age) | | Ridge count (mean) |
|-------------|------------------|------------------|--------------------|
| Thumb (R1) | Loop - 75 | Double Loop - 24 | 18 |
| Index (R2) | Double Loop - 80 | Tented Arch - 15 | 25 |
| Middle (R3) | Loop - 66 | Tented Arch - 30 | 14 |
| Ring (R4) | Loop - 50 | Tented Arch - 30 | 22 |
| Little (R5) | Loop - 50 | Tented Arch - 25 | 13 |

Ridge count: SD 4.58

Table no 4. Left digital observations in Control group:

| Digit | Pattern (%age) | | Ridge count (mean) |
|-------------|------------------|------------------|--------------------|
| Thumb (L1) | Loop- 30 | Whorl - 30 | 23 |
| Index (L2) | Tented Arch - 75 | Loop- 22 | 25 |
| Middle (L3) | Tented Arch - 70 | Loop- 18 | 14 |
| Ring (L4) | Loop- 65 | Arch- 35 | 22 |
| Little (L5) | Double Loop - 52 | Tented Arch - 46 | 14 |

Ridge count : SD 4.67

Table no 5: Frequency of each digital pattern.

| | Right digits patterns | | Left digit patterns | |
|-------------|-----------------------|---------|---------------------|---------|
| | Patients | Control | Patients | Control |
| Loops | 75.0 | 48.2 | 75.4 | 19 |
| Whorl | 40 | - | 30 | 6 |
| Double Loop | 80 | 16.0 | - | 10.4 |
| Tented Arch | 60 | 20.0 | 14.8 | 29 |

It may be appreciated that Loops were the most common type of ridge pattern observed in all the digits ranging from 60-98%.

It was observed that overall the most common pattern seen of all the digits is Loop (75%) in the cancer patients group. (See figures 1,2,3)

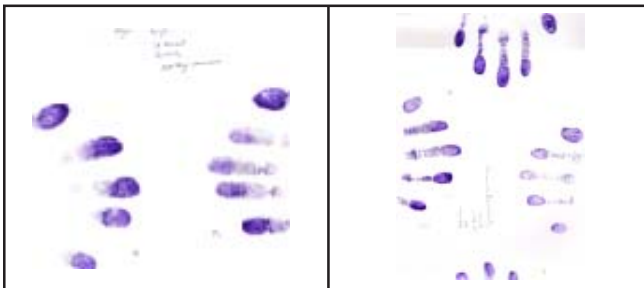


Figure 1: 40 yrs old lady with Papillary Ca breast ($T_2N_0M_0$)

Figure 2: 46 yrs old lady with Breast Ca ($T_3N_1M_0$)



Figure 3: 45yrs, Left Breast Ca ($T_4N_1M_0$)

Discussion:

More has been written about the epidemiology of breast cancer than possibly any other form of cancer affecting mankind. However, in the face of this intense interest, only a paucity of attention has been given to the role of genetics in its etiology⁴. Familial clustering of breast cancer was first recorded in the Roman medical literature at around 100AD³. We have some evidence from this preliminary study to suggest that a family history of breast cancer might be associated with a specific fingerprint pattern thus making fingerprints a potential tool to be used for screening and for guiding future research.

A pattern of six or more digital whorls is recorded more frequently in women with breast cancer than in those without the disease (Murray H Seltzer et al. 1990)⁵. No conclusions could be drawn based on this preliminary study, however certain findings that

point towards some correlation between the digital patterns and the breast cancer have been observed and the role of dermatoglyphics in future is becoming clearer.

In the present study it was observed that the loop pattern is the most frequent pattern i.e. in 75% of the patients (Table No.5) in all the digits, which is in variance from the other available data suggesting the whorl pattern to be more common in breast cancer patients (Murray). This further suggests different dermatoglyphic pattern in our population as it is reinforcing the belief that Indian breast cancer behaves differently from elsewhere⁷. This is also suggested by Gilligan et al (1985) where a significant correlation between dermatoglyphic and geographic distances was found confirming the biological validity of the social and ethnic criteria⁶. This gives us more reasons to work on these patterns extensively to come to a conclusive statement about our population for application in the field and we indeed need "an Indian solution to an Indian problem".

Presence of Whorl pattern in our study is also important but for a different reason. It is seen that the Whorl pattern frequency showed maximal changes as compared to other patterns i.e. 4 % increase in the right digits in cancer patients as compared to the controls.

Moreover the ridge count was also considered for correlation as it is more objective and easier to assess. In the present study it was observed that the ridge count is significantly lower as compared to the controls. It was observed that the mean ridge count on the right hand and left hand was 10.4 and 12.4 respectively, while in the controls the ridge count in the right and left hand was observed to be 18.4 and 19.6 respectively.

Conclusion:

The study is ongoing and the pattern seems to be appearing wherein a definite approach in the form of "dermatoglyphics" might play a significant role in the near future not only for the purpose of screening but also for studying the behavior of breast cancer.

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Conference News

The Third MDRF-ADA Postgraduate Course on Diabetes will be held from 29th September to 1st October 2006 at Chennai, India. The meeting will be hosted by the Madras Diabetes Research Foundation, Chennai. For further details; contact : Dr. V. Mohan, M.D., FRCP, Ph.D., D.Sc. Madras Diabetes Research Foundation & Dr. Mohans Diabetes Specialities Centre, No.4 Conran Smith Road, Gopalapuram, Chennai-600086, India. Phone : (91 44) 28359048, 28359051, 28353351, Fax : (91 44) 28350935, E-mail : mvdsc@vsnl.com Visit website at www.mdrf-ada.com or www.drmohansdiabetes.com for details regarding registration etc.