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Analysis of the qualitative and quantitative dermatoglyphic traits in breast cancer patients association with ABO blood group

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ABSTRACT

Dermatoglyphics provide one of most fruitful subjects of investigations in the field of medical and forensic sciences. Alexander correlates the blood groups to pathological conditions like gastrointestinal, carcinoma and cardiovascular diseases. Blood groups B and AB were especially prone to cancer a conclusion echoed by later workers Mithra and Pautienis 1937, both noticed a greater propensity of groups A and AB to develop cancer. Several dermatoglyphic researchers claim a very high degree of accuracy in their prognostic ability from the hand's features. The association of blood group and different diseases with dermatoglyphics has been used as a scientific tool for early prediction and thus prevention of the development of different diseases.The present study aimed to evaluate the association of dermatoglyphic patterns with different blood groups and also to evaluate the role of dermatoglyphics in early detection of prone individuals and genetic predisposition of disease.
Studies were conducted in 100 patients of breast cancer and various dermatoglyphics parameters.These parameters of study group were compared to controls. Qualitative analysis has shown statistically significant difference among two groups. It was observed that in blood groups A, AB & O, the Whorl pattern in both hands of cancer patients were pre-dominant when compared those of controls and the difference was highly significant (P< 0.05 & 0.001) while loop ulnar pattern was highly significant (P<0.001). Tented arch pattern was highly significant (P<0.05) in left hand of blood group A. The main line index in the study group when compared to controls observed the difference.

INTRODUCTION

Dermatoglyphic word defined as skin ridges and their configurations. The dermatoglyphic patterns make their appearance on volar aspect of palm as early as 12th to 13th week of gestation. The ridge patterns are formed where foetal mounds appears, on the digits and the four interdigital areas, the thenar and hypothenar areas of palms, and soles. As ridge formation progresses specific patterns, emerge in these areas and the mounds disappear. The general large patterns, the ridges, minutiae and flexion creases are in their permanent form by the end of the fourth intrauterine month and the only effect of growth is that in ridges enlarge. These patterns do not change throughout life and hence are used for personal identification. Dermatoglyphics provide one of most fruitful subject of investigations in the field of medical and forensic sciences. Dermal palmar and plantar ridges are highly useful in biological studies. Their notably variable characteristics are not duplicated in other people, even in monozygotic twins.

Dermatoglyphics [1] are configuration of epidermal ridges in the volar aspect of palms and soles. Purkinje classified finger ridge patterns into 9 separate groups in 1823, during this century the dermatoglyphics used in criminology, anthropology, comparative zoology and human genetics by Galton. Dermatoglyphic traits are formed under genetic control early in development but may be affected by environmental factors during first trimester of pregnancy. They however do not change significantly thereafter, thus maintaining stability not greatly affected by age. These patterns may represent the genetic make up of an individual and therefore his/her predisposition to certain diseases.

Breast cancer is very common malignant disease. Breast cancer is caused by a joint activity of both genetic and environmental factors. Palmar dermatoglyphics were already used to determine hereditary base of such malignant diseases like breast, lung and gastric cancer. Evidence is available suggesting that a family history of breast cancer might be associated with a

specific fingerprint pattern. Finger print determination is genetic but has been reported to be affected by the environmental factors in the first trimester of pregnancy [2-4].

The ABO blood group distribution varies in socio-economic groups and geographical groups. The blood group frequency was reported B>O>A>AB in North India. ABO blood groups are inherited through genes on chromosome 9 and they do not change as a result of environmental influences during life. In many cancers genetic alteration is common at chromosome 9. The blood group antigen expression may be affected by genetic change of tumor. Pack et al. and Hu et al. are reported a correlation of blood group antigen expression in tumor with metastasis and prognosis for various malignancies like breast, prostate and colon [5]

The current study was an attempt to correlate dermatoglyphic patterns and blood group frequency with preponderance of breast cancer. The ABO blood group and dermatoglyphic patterns used as preclinical marker. The aims of the study were to obtain a dermatoglyphic characterization of discrete and quantitative traits in cancer patients, compared to healthy control group and to explore the possibility of using dermatoglyphic traits of cancer patients to predict the probability of the appearance of cancer in apparently healthy female at a young age.

MATERIAL AND METHODS

In the present study One hundred probands with definite clinical evidence of breast cancer patients were collected from Acharya Tulsi Cancer Research Institute, Bikaner (Rajasthan). 100 histo-pathologically confirmed breast cancer patients were studied to assess their association with dermatoglyphic patterns and blood groups. They were matched with One hundred healthy subjects, those who are residing in the same locality and having no family history of breast cancer or any other inheritable disease. Rolled impressions of the fingers and plain impressions of the palm and sole were obtained on smooth white papers by the standard ink and roller method of modified Cotterman's technique [6]. The various palmar, plantar and digital patterns of arches, loops and whorls were counted and classified with the aid of a hand lens using Loesch and Skrinjaric's method [7] Galton in 1892 classified dermatoglyphic patterns in whorls, loops and arches.

Whorl : whorl patterns, ridges courses follow circuits around the core. Patterns have two delta and at least one ridge making complete circuit. Whorls are of four type's plain, central pocket, double loop and accidental.

Loop : loop have one or more ridges entering from one side of the print, recurring and exiting from the same side. It possesses one triradii. Loop patterns are ulnar and radial loops according to opening of respective margins.

Arch : arch pattern composed of ridges without triradii and known as plain arch. In tented arch patterns are transversely coursing ridges with abrupt elevation.

In dermatoglyphic patterns fixed points are

1. Triradii or Delta the delta is formed by bifurcation of a single ridge and triradius is formed by three ridges radiating from a common point.

2. Core it is a short straight ridge and form center of the pattern area.

The palm and finger prints were studied for the parameters of both qualitative and quantitative analysis. The findings were analyzed, tabulated and their statistical significance was noted.

RESULT AND DISCUSSION

In (Table -1) as comparison of right hand between blood

Table No 1 : Comparison of finger print patterns of right hand in control and breast cancer patients with respect to their blood groups A, B, AB, O (C-Control, BC-Breast Cancer, * = significant value)

Finger Pattern	Blood Groups											
	A			B			AB			O		
	C	BC	p	C	BC	p	C	BC	p	C	BC	p
Whorl	58	7	<0.05	174	4	0.45	16	5	<0.01	98	7	<0.01
%	40	20	*	34	25		40	100	**	40	12	***
Loop ulnar	60	22	<0.05	251	9	0.58	21	-	-	97	41	<0.001
%	41	62	*	49	56		52	-		39	74	***
Loop radial	10	1	0.37	25	-	-	3	-	-	22	2	0.38
%	6	2		4	-		7	-		8	3	
Arches	7	-	-	21	-	-	-	-	-	7	2	0.76
%	4	-		4	-		-	-		2	3	
Tented arch %	10	5	0.15	39	2	0.47	-	-	-	21	3	0.44
	6	14		7	12		-	-		8	5	

Table No. 2 : Comparison of finger print patterns of left hand in control and breast cancer patients with respect to their blood groups A, B, AB, O (C-Control, BC-Breast Cancer, * = significant value)

Finger Pattern	Blood Groups											
	A			B			AB			O		
	C	BC	p	C	BC	p	C	BC	p	C	BC	p
Whorl	48	6	<0.05	181	2	0.08	19	4	0.17	110	10	<0.001
%	33	17	*	35	13		47	80		44	18	***
Loop ulnar	74	22	0.22	246	10	0.27	20	1	0.20	101	35	<0.001
%	51	62		48	66		50	20		41	63	***
Loop radial	3	-	-	17	-	-	1	-	-	3	1	0.72
%	2	-		3	-		2	-		1	1	
Arches	8	-	-	20	-	-	-	-	-	8	2	0.76
%	5	-		3	-		-	-		3	3	
Tented arch %	11	7	<0.05	43	3	0.12	-	-	-	23	7	0.44
	7	20	*	8	20		-	-		9	12	

Table No. 3 : Comparison of termination of main lines of palm and sole in control and breast cancer patients with respect to their blood groups A, B, AB, O (C-Control, BC-Breast Cancer, * = significant value)

Palmar & Plantar Main lines	Exit Areas Of Main Lines In Blood Groups of Control & Breast Cancer Patients							
	A		B		AB		O	
	C	BC	C	BC	C	BC	C	BC
a	5	5	5	5	5	5	5	5
b	5’	5’	5	5’	5’	5’	5’	7
c	5	9	7	9	5’	5’	9	9
d	7	9	7	9	7	7	11	11
PTC	3	3	3	4	3	4	4	4
DCT	11	11	11	12	11	11	12	11
VC	2	2	1	2	1	2	2	2
A	7	7	5	15	9	7	5	7
B	7	15	7	7	7	7	15	15
C	9	9	9	9	9	9	9	15’
D	15’	15’	15’	15’	15’	7	7	15’

groups of control and breast cancer patients, show significant importance. In blood group A, whorl were found to occur in 40% controls while their presence in patients was 20%. The parameter showed significant value (p=<0.05). In blood group A, loop ulnar pattern parameter showed significant value (p=<0.001). In blood group AB, whorl pattern parameter showed significant value (p=<0.01). Whorls were found to occur in 40% controls while their presence in patients was 100%. No significant values were observed in different dermatoglyphic patterns of right hand of blood group B. In blood group O, whorl and loop ulnar patterns parameter showed significant value respectively p=<0.01 & p=<0.001.

In (Table -2) as comparison of left hand between blood groups of control and breast cancer patients show significant values. In blood group A of left hand whorl and tented arch patterns found statistically significant. Whorl was found to occur in 33% controls while their presence in patients was 17% in blood group A. The parameter showed significant value (p=<0.05). Tented arch pattern were found to occur in 7% controls while their presence in patients was 20% in blood group A. The parameter showed significant value (p=<0.05) in left hand of blood group A. Dermatoglyphic patterns of left hand of blood group O showed significant value (p=<0.001). In whorl pattern were observed 44% in control and 18% in patients. In loop ulnar pattern found in left hand of control was 41% while 63% in patients.

The main line terminations in cancer patients significantly differed from the controls in different blood groups (Table -3). The differences are apparently the result of low frequency of b-line terminating at 7^{th} and high frequency at $(5')^{th}$ positions in blood groups O and high frequency of d-lines terminating at 9^{th} & 7^{th} and low frequency at 11^{th} position in blood groups AB and O on palms of the patients when compared to controls of blood groups. The high frequency of C-line terminating at 9^{th} and low frequency at $(15')^{th}$ position in blood groups O observe in comparison between sole of patients and control groups. The high frequency of D-line terminating at $(15')^{th}$ and high frequency at 7^{th} position in blood groups AB observed. The significant associations of main line terminations as found with breast cancer patients and blood groups.

Whorl is significantly greater in hands with A, AB and O blood group (p= <0.05; p= <0.01; p= <0.001). Loop ulnar pattern are significantly greater in right hand of patients than controls in A blood group (p= <0.05). In both hands shows significantly value in Loop ulnar pattern with O blood group (p= <0.001). Tented arch is significantly greater in left hand of patients than control with A blood group (p= <0.05).

Seltzer et al. & Abbasi et al [8,9] studied on a pattern of six or more digital whorls was recorded more frequently in women with breast cancer than in those without the disease. The presence of six or more whorls was found to be significant of breast cancer patients possessing this number of whorls as compared to controls. Similar results were obtained in the present study.

After the discovery of ABO blood groups by Landsteiner, the geneticists were looking for the significance of the occurrenec of different blood groups by studying the association of certain blood groups in diseases.Oxford Press paper foucuses on studies on the association of blood groups with breast cancer [10].

It is observed in present study that prevalence of breast cancer patients shows following order of association with blood groups- A > B > O> AB.

Tyagi et al [11],1965 concluded that incidence of blood group B and O was higher and increased B blood group has been reported by Surekha et al [12], 2004 in breast cancer patients.

A study of breast cancer in Tunisian women found a increased risk of a positive diagnosis in blood group A. In 1980 Mourali et al. [13] were observed high frequency of blood group A (35.7%), followed by group O (28.5%), group B (19.0%) and group AB (16.6%) breast cancer patients.

A high risk of early death in breast cancer patients with blood groups B and AB with AB having greater local recurrence risk has been reported by Holdsworth et al. in 1985. Trygvadottir et al. [14]1988, higher prevalence of blood group B in familial case of breast cancer than sporadic cases has been reported the presence of a genetic factor in the etiology of familial breast cancer.

Palmar main lines 'a', 'b', 'c', 'd', PTC, DTC, VC from area 5, 5', 9, 9, 3, 11 & 2 and Plantar main lines 'A', 'B', 'C', 'D' from area 15, 7, 9 & 15' in diseased group.

CONCLUSION

On the basis, it has been opened that any epidermal ridge alterations in individuals have a distinctive dermatoglyphic feature, which remain unchanged throughout life. So the association of blood group and different diseases with dermatoglyphics has been used as a scientific tool for early prediction and thus prevention of the development of different diseases.

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