

Triradii of The Palm in Primary Glaucoma Patients



Medical Science

KEYWORDS: Dermatoglyphics, primary glaucoma, a-b ridge count, main line index, angles – “atd”, “adt” and “dat”.

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ABSTRACT

Dermatoglyphics are the dermal ridge configurations on the digits, palms and soles. They are important in medical genetics chiefly because of their diagnostic usefulness. The present study was undertaken to investigate the existence of any correlation between dermatoglyphics and primary glaucoma. Seventy primary glaucoma patients (18 males, 52 females) and fifty normal healthy persons (22 males, 28 females) participated in this study. The parameters studied were a-b ridge count, main line index and angles – “atd”, “adt” and “dat”.

Introduction

Dermatoglyphics are the dermal ridge configurations on the digits, palms and soles. These features are found to be permanent variables and are inherited. During the 10th week of embryonic life, the fetal hands bear conspicuous volar pads. About the 13th week the pads regress accompanied by differentiation of dermal ridges in the thickening skin. Growth disturbance at or before this stage can produce abnormal dermatoglyphics but later ones cannot (Thompson and Thompson, 1989).

Primary glaucoma is characterized by an increase in intra-ocular pressure without an external cause or other disease. Glaucoma is becoming an increasing important cause of blindness as the world population ages. The World Health Organization estimates for the number of people blind from glaucoma were 4.4 million (12.3% of the blind worldwide).

Estimated risk factors for primary glaucoma are age, race, intra ocular pressure (IOP), central corneal thickness (CCT), high myopia and a positive family history (Tielsch et al., 1994, Wolfs 1998). In recent years extensive studies have been conducted on the genetic contribution to glaucoma. Several chromosomal loci associated with primary open angle glaucoma have been mapped. Usually presence of chromosomal aberrations is associated with abnormal embryonic development (Mathur, 2002).

The importance of dermatoglyphics in clinical medicine is that, during development, maternal environment, gene deviants and chromosomal aberrations affect ridge formation. Once formed, they are age and environment stable, becoming a reliable indicator of genetic damage (Padmini et al., 2011). Dermatoglyphic variations in glaucoma patients may furnish additional evidence to support a genetic cause in the etiology of primary glaucoma. It may also provide a screening tool for persons susceptible to glaucoma. The present study was undertaken to investigate the existence of any correlation between dermatoglyphics and primary glaucoma.

Materials and Methods:

For this study 70 patients (18 males, 52 females) with primary glaucoma from glaucoma OPD of NRS Medical College and Hospital, Kolkata were examined. A control group consisting of 50 normal healthy persons (22 males, 28 females) who do not have family history of primary glaucoma was also included.

A history of visual symptoms and detailed family history of glaucoma was taken. Clinical examination including refraction, tonometry, gonioscopy, ophthalmoscopy and visual field testing was done. The digito-palmar prints were taken by traditional ink method proposed by Cummins and Middel (1976).

On the palm the following parameters were observed – (1) a-b ridge count (a-b rc); (2) main line index (MLI); (3) palmar angles – “atd”, “adt” and “dat”, (measured in degrees); a-b “ridge count was done by counting the number of ridges crossing the line joining triradii “a” and “b”. Main lines “A” and “D” were drawn from triradii “a” and “d” and main line index was recorded by adding the numbers given to terminations of “A” and “D”. Lines were drawn from triradii “a” to “d”, “d” to “t” and “a” to “t” and the angles between them were measured.

Results:

Triradii of palms among the primary glaucoma patients and normal is furnished in Tables 1 and 2 for the males and females respectively. In case of the males the higher mean of a-b ridge count in right palm, dat angle in right and left palms are noticed among the patients as compared to the controls. The reverse trend is perceptible in other cases. In application of t-test none of the characters show significant difference between the cases and control. Thus the two groups do not vary much (Table 1).

Among the females the mean of dat angle on right and left palms and main line index on right and left palms show higher value among the cases than that of the control. In others cases the reverse trend is perceptible. In application of t-test it is found that like the males, in case of females also there exist no significant difference between the cases and control.

Table 1: Triradii of Palm in primary glaucoma: Male

Characters	Male patients (n=18)			Male controls (n=22)			t-value (d.f.=38)
	Mean	S.D.	S.E.	Mean	S.D.	S.E.	
a-b ridge count-right	40.6	5.46	±1.29	39.09	5.10	±1.11	0.89
a-b ridge count-left	34.39	7.45	±1.76	39.81	5.09	±1.11	0.20

atd-right	40.67	6.03	±1.42	41.90	3.79	±0.83	0.75
atd-left	41.33	4.06	±0.96	41.95	4.20	±0.92	0.47
adt-right	78.39	3.88	±0.91	78.48	2.38	±0.52	0.09
adt-left	79.28	2.08	±0.49	79.09	3.75	±0.82	0.20
dat-right	60.61	5.27	±1.24	59.62	3.79	±0.83	0.66
dat-left	60.39	4.16	±0.98	58.57	3.46	±0.75	1.48
Main line index-right	7.55	2.20	±0.52	8.22	2.14	±0.46	0.97
Main line index-left	6.5	1.82	±0.43	7.18	2.06	±0.44	1.15

Table 2: Triradii of Palm in primary glaucoma: Female

Characters	Female patients (n=52)			Female controls (n=28)			t-value (d.f.=78)
	Mean	S.D.	S.E.	Mean	S.D.	S.E.	
a-b ridge count-right	36.35	5.81	±0.81	36.93	6.48	±1.20	0.40
a-b ridge count-left	37.75	7.52	±1.04	40.27	7.38	±1.37	1.61
atd-right	43.15	4.88	±0.68	44.34	6.96	±1.29	0.81
atd-left	44.17	6.31	±0.87	45.59	5.49	±1.02	1.06
adt-right	77.71	3.93	±0.54	78.48	3.35	±0.62	0.94
adt-left	78.31	4.18	±0.58	78.72	3.65	±0.68	0.46
dat-right	59.15	5.01	±0.69	57.55	6.96	±1.29	1.14
dat-left	57.96	5.89	±0.82	55.62	5.60	±1.04	1.77
Main line index-right	8.07	1.97	±0.27	7.71	2.02	±0.38	0.77
Main line index-left	7.46	2.16	±0.30	6.92	2.11	±0.40	1.08

Discussion:

Few studies have been conducted on the association between dermatoglyphics and primary glaucoma. Qualitative dermatoglyphic traits have been utilized to find out the existence of genetic predisposition for the development of primary glaucoma (Katia et al., 2005). These authors have found the following significant variables in patients diagnosed with primary open angle glaucoma i) decreased “a-b” ridge count on the right palm in both sexes ii) increased atd angle on both palms in females only. These testify to a certain extent to the usefulness of dermatoglyphics in screening individuals susceptible to primary glaucoma.

In case of the males the higher mean of a-b ridge count in right palm, dat angle in right and left palms are noticed among the patients compared to the controls. Whereas among the females the mean of dat angle on right and left palms and main line index on right and left palms show higher value among the cases than that of the control. However, in application of t-test none of the character shows significant difference between the cases and control. Thus the two groups do not vary much.

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