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Dermatoglyphics of Prostate Cancer Patients

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Abstract: The study was carried out to document characteristic dermatoglyphic patterns in prostate cancer which could be useful in early diagnosis of the disease. Dermatoglyphic study of 30 prostate cancer cases and 30 normal subjects were carried out in this study. It involved the digital patterns, ATD angles, DAT angles, A-B ridge and B-C ridge counts, axial triradii and digital triradii on the hands. 44.41% of the digital patterns in the prostate cancer cases were ulnar loop as against 55.33% in the normals. The percentage s of whorl, arch and radial loop in prostate cancer group were 37.17%, 17.11% and 1.32%, respectively as against 30.67%, 13% and 1.07% in the normal. The mean ATD values were 44º and 41º in normal and prostate groups respectively, thus the normal group has significantly higher ATD angle. The mean DAT angle values were 58.7º and 59.8º for normal and prostate groups respectively. The mean A-B ridge counts were 33.4 in normal group and 36.9 in the prostate group. The mean B-C ridge count was 26 in normal group and 30 in prostate group. It was observed that there was significant difference between the two groups in terms of their B-C ridge counts ($p<0.05$) in both hands. Also the A-B ridge count showed significant difference between the groups on the left hand ($p< 0.05$) and also there was significant difference in the ATD angles of the right hand ($p< 0.05$) between the groups. The results could be of importance in early diagnosis of prostate cancer.

Key words: Prostate cancer, ATD angles, digital pattern and Nigerians

INTRODUTION

Prostate cancer is a disease in which cancer develops in the prostate gland in the male reproductive system. It develops most frequently in men over fifty years of age. This cancer can occur only in men as prostate is exclusively of the male reproductive tracts (Potosky *et al.*, 1995).

The occurrence of prostate cancer vary widely between countries across the world, it is least common in South and East Asia and most common in the United States. It is responsible for more male deaths than any other cancer, except lung cancer in the United State. In the UK, around 35,000 men are diagnosed per year; where around 10,000 die of it (Potosky *et al.*, 1995, 2008).

Prostate cancers don't express their full range of malignant biological attributes from the onset but rather progress towards increasing malignancy with time, hence many men who develop prostate cancer never have symptoms and die of causes unrelated to the prostate cancer (Foulds, 1975).

The specific causes of prostate cancer are unknown (Hsing *et al.*, 2006). A man's risk of developing prostate cancer is related to his genetics, race and other factors. Thus the increased incidence of prostate cancer has been reported in black men than in other racial groups (Hoffman *et al.*, 2000).

Dermatoglyphic pattern has positive correlation in a number of genetic diseases. Such conditions include those associated with organic mental retardation (Boroffice, 1978; Steveson *et al.*, 1997; Than *et al.*, 1998; Franceschini *et al.*, 2002). It has been suggested also that dermatoglyhic studies may aid in the diagnosis of such conditions (Rex and Preus, 1982; Schmnidt *et al.*, 1981). Nervous system disorders of functional ethiopathogenesis have also been positively correlated with dermatoglyphics. These include schizophrenia (Oladipo *et al.*, 2005) and schizotypal personality (Van-Os *et al.*, 2000). Reports are also available on the correlation of Dermatoglyphic in Diabetes mellitus (Oladipo and Ogunowo, 2004), Idiopathic (primary) dilated cardiomyopathy (Oladipo *et al.*, 2007) and breast cancer (Oladipo *et al.*, 2009).

Genetically determined prostate cancer is prevalent in Nigeria and the cause of considerable morbidity and mortality. At present, most investigative procedures of prostate cancer are post-natal and are done in adulthood when the initial manifestations of prostate cancer appear. Such procedures are rather too late at this age for any meaningful management of this disease.

However, because dermatoglyphic pattern existed prenatally, our postulation was that early post-natal dermatoglyphic analysis aid in the early diagnosis of prostate cancer. This study was therefore designed to

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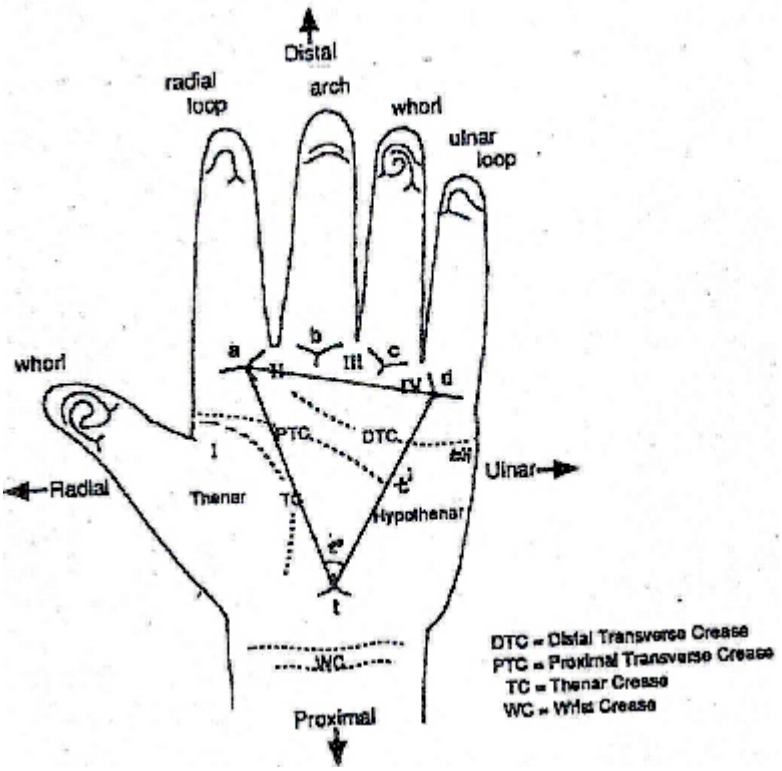

Fig 1: Determination of ATD angle, DAT angle and digital patterns

elucidate the possible diagnostic values of the dermatoglyphic features of Nigerian people with prostate cancer.

MATERIALS AND METHODS

Sixty (60) male subjects (50 years and above) comprising 30 males with prostate cancer and 30 normal male subjects were selected at random from the Department of Urology Of the University of Port Harcourt Teaching Hospital (UPTH) between September and December 2008. The clinical records of the patients were scrutinized properly to ensure that a set of the subjects did have prostate cancer and the other set had not and were not likely to have the disease in future. All subjects were Nigerians by both parents and grand parents.

Fingerprints were taken with white paper and purple ink pad. Hands were thoroughly washed with water and soap and dried before taking prints. This was done to remove dirt from the hands.

Screening was done on the white duplicating paper containing the prints and viewed with the aid of a magnifying glass. No distinction was made between the varieties of whorl(w) patterns, also tented arch was just recorded as an arch(A). Loop was recorded as either ulnar loop(UL) or radial loop(RL). All the patterns are as defined by Penrose (1963). A straight line was drawn to join A and B triradii and B and C triradii and the number of intersecting ridges counted. These give A-B and B-C ridge counts respectively. ATD triradii were also joined as shown in Fig. 1 to determine the ATD and DAT angles.

The various digits were designated as follow: Thumb-i; Index finger-ii; Middle finger-iii; Ring finger-iv; Little finger-v. L and R stand for left and right respectively.

Statistics: The students' t-test, ANOVA and chi-square were used for the statistical analysis in this study.

RESULTS

The percentages of the digital patterns in both prostate cancer group and the normal group are summarized in Table 1. Either ulnar loop or whorl had the highest percentage in all digits of both hands in prostate cancer and normal groups. Although little difference in values occurred but this was not significant. Next to either Ulnar loop or Whorl was Arch followed by radial loop which was not observed in some digits in both groups.

There was significant difference in the mean ATD angle between the two groups in both hands (Table 2) such that normal subjects had higher mean ATD angle than the prostate cancer patients ($p<0.05$).The mean ATD angles were 44.55º, 40.98º, 43.65º and 40.95º for normal and prostate cancer groups in right and left hand respectively, although the difference between the right and left hand was not significant.

The mean dat angle (Table 3) were also significantly different between the two groups with normal group

Table 1: Percentage (%) frequencies of digital patterns for each digit of both hands in prostate cancer (P) and normal (N) subjects.

	Right hand digits Prostate cancer=30; Normal =30									
	Ri		Rii		Riii		Riv		Rv	
Patterns	P	N	P	N	P	N	P	N	P	N
Arch	16.7	20.0	23.3	23.3	16.7	20.0	13.3	3.3	10.0	0.0
Whorl	53.3	43.3	50.0	26.7	33.3	26.7	46.7	46.7	13.3	13.3
Ulnar loop	30.0	36.7	20.0	43.3	50.0	53.3	40.0	50.0	76.7	86.7
Radial loop	0.0	0.0	6.7	6.7	0.0	0.0	0.0	0.0	0.0	0.0
	Left hand digits Prostate cancer=30; Normal=30									
	Li		Lii		Liii		Liv		Lv	
Patterns	P	N	P	N	P	N	P	N	P	N
Arch	10.0	20.0	16.7	23.3	13.3	10.0	26.7	6.7	13.3	3.3
Whorl	36.7	33.3	26.7	36.7	36.7	26.7	50.0	36.7	30.0	16.7
Ulnar loop	53.3	46.7	50.0	36.7	50.0	63.3	23.3	56.7	56.7	80.0
Radial loop	0.0	0.0	6.7	3.3	0.0	0.0	0.0	0.0	0.0	0.0

Table 2: Mean and standard error of palmar ATD angles in prostate cancer(P) and normal (N) subjects.

	Right Palm		Left Palm	
	Normal	Prostate(cancer)	Normal	Prostate(cancer)
Mean(^{0})	44.5	40.98	43.65	40.95
Standard error	1.18	1.00	1.15	0.82

P<0.05

Table 3: Mean and standard error of palmar dat angles in prostate cancer(P) and normal(N) subjects.

	Right Palm		Left Palm	
	Normal	Prostate(cancer)	Normal	Prostate(cancer)
Mean(^{0})	59.08	40.98	58.28	60.07
Standard error	1.28	1.00	0.72	0.90

P<0.05

Table 4: Mean and standard error of palmar A-B ridge counts in prostate cancer and normal groups.

Groups	Mean ±Standard error	
	Right palm	Left palm
Prostate cancer	35.80±0.97	38.00±1.01
Normal	33.70±1.07	33.07±0.84

P<0.05

Table 5: Mean and standard error of palmar B-C ridge counts in prostate cancer and normal groups.

Groups	Mean ±Standard error	
	Right palm	Left palm
Prostate cancer	29.47±1.08	30.77±0.82
Normal	26.27±0.83	25.80±1.01

P<0.05

showing higher value (59.08º) on the right palm than the prostate cancer patients (40.98º).On the left palm, the normal group, however showed significantly lower value(58.28º) than the prostate cancer patients(60.07º).

Analysis of the palmar A-B ridge count in Table 4 showed that prostate cancer group had significantly higher count than the normal group(p<0.05) in both hands. Similarly the B-C ridge count in Table 5 showed that prostate cancer group has significantly higher B-C ridge count than the normal group in both hand (p<0.05)

The mean A-B ridge counts on the right palm and left palm of prostate cancer and normal groups were 35.80, 33.70, 38.00 and 33.70 respectively while those of BC ridge counts were 29.47, 26.27, 30.77 and 25.80 respectively.

DISCUSSION

Dermatoglyphic analysis of the digital patterns in Down's syndrome and normal individuals showed a statistically significant different of 96% loop pattern as against 63.6% in normal (Boroffice, 1978).No such difference was observe in the present study.

The average A-B ridge count in normal individuals was put at 34 while values higher than this were said to be abnormal (Oladipo *et al*., 2007).

The A-B ridge count observed in prostate cancer group falls in the range of the abnormal groups as it is higher in both hands than 34.

Normal ATD angles was equally put at 45º. An average value that is far above or below this value is considered abnormal (Oladipo *et al*., 2007). Thus the values observed for prostate cancer were clearly abnormal as these were far below the normal value 45º.This suggests that both A-B ridge count and ATD angles are good parameters for the assessment of individuals who are likely going to show syndromes of prostate cancer later in life.

Apart from these parameters, the values of B-C ridge count and dat angle could also be very good indication of prostate cancer trait as these values are significantly different between normal person and individuals with tendency to develop prostate cancer.

Thus, the presence of abnormally high A-B and B-C ridge counts is a characteristic dermatoglyphic pattern of prostate cancer which could be very useful in its early diagnosis. These data is therefore recommended as a tool which could be used for early diagnosis of prostate cancer amongst Nigerians.

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