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Dermatoglyphics in Patients with Oligo/Azospermia

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Abstract

The study of patterns of fingerprints is important in anthropology and medical genetics, chiefly because of their diagnostic usefulness. In the present work, we studied the frequencies of various types of skin ridges of the first phalanx in patients with sever oligospermia or azospermia. In a double-blind case-control study, we determined the frequencies of fingerprints in 880 first phalanxes belonging to 48 men with sever oligospermia and 40 men with azospermia. We determined the types of fingerprints based on Galton classification. Also their FRC, TFRC and AFRC were calculated. Then the results were compared with each other and general population as control group. The most frequent type of fingerprint in both case groups was "Loop". Frequencies of different types among two groups of cases were statistically different (P<0.005). Also they were statistically different with general population (P<0.005). The largest mean of FRC in men with oligospermia was belonging to the left ring fingers (23.1) and the second to the right thumbs (21.91). The largest mean of FRC in men with azospermia was belonging to the right thumbs (23.6) and the second to the right ring fingers (22.6). The mean of TFRCs in men with oligosoermia and azospermia were 106.8 and 114.39, respectively, and the mean of AFRCs in those two groups were 14 and 11, respectively; their differences were not statistically significant. It can be concluded that qualitative feathers of the fingerprints of men with oligospermia and azospermia were different with each other and with general population. And quantitative feathers of the fingerprints in those two case groups were statistically different as well.

Keywords: *Azospermia, Oligospermia, Dermatoglyphics, Infertility, Iran*

Introduction

Dermatoglyphics is the study of the patterns of the ridged skin of the digits, palms and soles (1). They are important in medical genetics chiefly because of their diagnostic usefulness in some dysmorphic syndromes (2). Today the diagnostic role of these patterns is bright especially in chromosomal abnormalities (3). Studies on chromosomal constitution of infertile men have shown chromosomal rearrangements and azospermia among a majority of them (4-7). Finger and palmar dermatoglyphic variations have been studied in diagnosed primary infertile males in different populations (8-11). Abeliovich and colleagues (12) concluded that the patients with the chromosome Y aberrations were azoospermic and might have lost the genes necessary for normal spermatogenesis. Diaz-Castanos and colleagues explained an azoospermic male with a 46, X, t (Y; 19) (q12; q13) karyotype (5). Finger and palmar dermatoglyphic variations have been studied in 160 diagnosed primary infertile males (11).

The goal of present work was to study the frequencies of different types of fingerprints in infertile men with oligo and azospermia referred to IVF centre of Fattemieh hospital, Hamadan. Also the FRC (finger ridge count), TFRC (total finger ridge count), and AFRC (asymmetry of finger ridge count) were determined. Finally the results were statistically compared with the men in general population of Hamadan.

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Materials and Methods

The present work was a double-blind case-control study. The cases were all men with sever oligospermia or azospermia that refered to IVF centre of Fattemieh hospital, Hamadan who were satisfy to enroll our study; 48 men with sever oligospermia (aged between 24 to 60 yr, mean= 33.6 and 40 men with azospermia, aged between 24 and 67 and mean= 35.2 years).

Prints were taken from the first phalanx of both hands of the patients in two groups. Firstly the total number of prints was 880 but some of them were unclear. After omitting the unclear prints, the total of reminder were 816, and for quantitative study we could use 625 prints. The prints were collected by standard ink method after diagnosing of the type of infertility. The diagnosis was based on clinical and laboratory findings. Then the patients were introduced to another member of research team to print pattern of their skin ridges of the first phalanxes of both hands and give to each print a special number (the number that introduced the type of disease, type of the hand, right or left, and type of the finger, little, ring, middle, index and thumb). Then another member of the research group classified the prints based on the standard nomenclature (Galton system), loop, whorl, arch and unknown (Fig. 1) (3). We did not employ the subgroups of those three main classes that usually are used when the size of population is big enough (1, 13-16). We named "unknown" to any prints other that three major classes and their subgroups.

Also we calculated the following parameters: a) finger ridge count= FRC, the number of the ridges between triradus and the center of the print of each phalanx; b) total finger ridge count = TFRC, total of the FRCs of 10 phalanxes; c) asymmetry of finger ridge count= AFRC, that was calculated based on the following formula (17): $\text{AFRC} = \sqrt{A^2} = \sqrt{\sum_{i=1}^{5}(R_i - L_i)^2}$ while $\sqrt{A^2}$ =Asymmetry of finger ridge count, R_i=Ridge count of the right hand and L_i= Ridge count of the left hand.

In the last step the results were statistically compared with the same results of male population of Hamadan (13).

Fig.1: Three major shapes of fingerprints, based to "Galton system". From left to right, arch, loop and whorl

Results

In men with oligospermia, the most frequent type of fingerprint was "Loop" (51.7%). The frequencies of different types were not significant between two hands. In men with azospermia, the most frequent type of fingerprint was "Loop" (58.6%) too. The frequencies of different types were not significant between two

hands of men with azospermia as well. Comparison of frequencies of different types of fingerprints of these two groups showed a statistically significant difference (P<0.005) (Table 1). Tables 2 and 3 show that frequencies of different types of fingerprints of oligosermia and azospermia were statistically different in comparison with the men in general population of Hamadan (P<0.005 and 0.05, respectively).

Table 4 shows FRCs in men with oligo and azospermia according to types of hands (left or right) and fingers. The mean of TFRCs in men with oligosoermia and azospermia were 106.8 and 114.39, respectively, and the mean of AFRCs in those two groups were 14 and 11 respectively, their differences were not statistically significant. The same data of general population were not available to compare with our cases.

Tapes of fingerprints	Oligospermia		Azospermia		Total		Chi 2	*P*-value
	No	%	No	%	No	%		
Loop	222	51.7	229	58.6	451	55	0.002	15.3
Whorl	161	37.5	129	33	290	35.4		
Arch	17	4	25	6.4	42	5.1		
Unknown	29	6.8	8	2	37	4.5		
Total	429	100	391	100	820	100		

Table1: Comparison of frequencies of different types of fingerprints in two groups of cases (men with sever oligospermia and men with azospermia). Chi 2 = 0.002 and *P*-value = 15.3.

Tapes of Fingerprints	Oligospermia		Azospermia		Total	
	No.	%	No.	%	No.	%
Loop	222	51.7	229	58.6	451	55
Whorl	161	37.5	129	33	290	35.4
Arch	17	4	25	6.4	42	5.1
Unknown	29	6.8	8	2	37	4.5
Total	429	100	391	100	820	100

Table 2: Comparison of frequencies of different types of fingerprints between men with sever oligospermia and men in general population. Chi2 = 14.42 and *P*-value = 0.002.

Tapes of fingerprints	Oligospermia		Men in GP*		Chi2	*P*-value
	No.	%	No.	%		
Loop	222	51.7	881	50.9	14.42	0.002
Whorl	161	37.5	666	38.5		
Arch	17	4	123	7.1		
Unknown	29	6.8	60	3.4		
Total	429	100	1730	100		

* GP = General population.

Table 3: Comparison of frequencies of different types of fingerprints between men with azospermia and men in general population. Chi2 = 8.38 and *P*-value = 0.038.

Tapes of fingerprints	Azospermia		Men in GP*		Chi2	*P*-value
	no	%	no	%		
Loop	229	58.6	881	50.9	8.38	0.038
Whorl	129	33	666	38.5		
Arch	25	6.4	123	7.1		
Unknown	8	2	60	3.4		
Total	391	100	1730	100		

* GP = General population.

Table 4: FRCs in men with oligo/azospermis according to types of hands (left or right) and fingers.

Types of fingers	Oligospermia				Azospermia			
	Left hand		Right hand		Left hand		Right hand	
	no	mean	no	mean	no	mean	no	mean
Thumb	37	17.48	36	21.91	33	20.45	31	23.6
Index	40	16.72	40	20.3	33	16.7	3	14.2
Middle	39	17.97	39	19	30	19.2	32	15.93
Ring	37	23.1	36	21.25	30	19.8	33	22.6
Small	35	15.14	33	17.48	28	17.7	32	16.1

Discussion

The prime concern of the present work was the analysis of dermatoglyphic patterns in infertile patients presenting with laboratory detectable sever oligospermia and azospermia. Based to the results the frequent type of finger prints in men with sever oligospermia was "Loop". Frequencies of different types were different in two hands but they were not statistically different. In men with azospermia the same results were obtained. Comparison of those two case groups showed a meaningful result. The same comparison between them and the men in general population (13) showed the same result as well. A majority of works have shown that chromosomal rearrangements, even some translocations (4, 5) can lead to spermatogenesis. Usually persons affected with chromosomal aberrations have abnormal embryonic development (18). During the 10 weeks of embryonic life, the fetal hands bear conspicuous volar pads, relatively as large as a cherry on adult fingertips. At about the 13th week the pads regress; meanwhile, the dermal ridges differentiate in the thickening skin. Growth disturbances at or before this stage can produce abnormal dermatoglyphics, but later ones can not (3). Although we did not examine the chromosomal situations of our cases, but such characteristic dermatoglyphic patterns in infertile men may furnish additional evidence in support of a genetic cause for oligo/azospermia and its associated gonadal dysfunction. Furthermore, it may provide a prognostic preoperative screening method for infertile patients.

The TRC or TFRC (total ridge count or total finger ridge count) is another index which is important in dermatoglyphic studies. In this study, mean of TRCs in men with oligospermia and azospermia were 106.8 and 114.39, respec-

tively. This parameter in some cases such as cutis laxa was 77 (2) in normal population of Swedish around 120 (19) and in German 131.40 (20). We can assume that TFRC in the men with oligo/azospermia was not "very low" or "very high" but "intermediate".

Symmetry is known to be decreased in a variety of disorders of developmental origin, and thus could potentially serve as a risk marker for disorders with developmental component (21). AFRC in men with oligospermia and azospermia were 14 (SD= 26.4) and 11 (SD= 11), respectively. The same parameter in Hamadanian population was not clear but based to the data on dermatoglyphics of the Iranians of African decent, one can estimate that the AFRC in those men was 8.376 (22), which showed that symmetry in our cases was lower than that of Iranian population. Decreasing of symmetry in genetic disease has been documented once more in congenital cutis laxa (2).

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