Dermatoglyphic pattern in male infertility

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ABSTRACT

Dermatoglyphics in infertile male patients were studied and compared with that of age matched controls to see whether any specific dermatoglyphic pattern exists in infertile male patients. Infertile male patients with abnormal semen profile were referred to Cytogenetic Laboratory for karyotyping. We selected twenty-four infertile male patients with abnormal semen profile. Out of twenty-four infertile male patients, nineteen were with normal Karyotype and five patients were with abnormal Karyotype. Loop was the commonest pattern observed in the infertile male patients. All these fingertip and palmar dermatoglyphic findings were compared with that of result on finger and palmar dermatoglyphics of equal number of age matched controls. Statistical evaluation was done with software "EPI- info, version-6.04 d". Infertile males had reduced number of loops as compared to that of controls which was statistically significant. Total whorls were increased in infertile male patients as compared to that of controls which was statistically insignificant. Percentage of true palmar pattern in I 3 and I 4 areas was reduced in infertile male patients as compared to that of controls which was statistically insignificant.

Keywords: Dermatoglyphics, infertile, fingertip, palmar

INTRODUCTION

Infertility whether it is male or female is usually defined as lack of conception leading to a live birth after one year of regular coitus. The commonest indicator of male infertility is 'Semen Analysis'. Normal sperm count of a healthy individual varies from 35 millions to 200 millions per milliliter (ml) of semen with an average of 100 millions per milliliter of semen. When the spermatozoa concentration is less than 20 million/ml the condition is referred to as 'Oligozoospermia'. Azoospermia is a condition where the semen sample has no spermatozoa in a neat fresh sample or in a centrifuged resuspended sample. Oligozoospermia and Azoospermia cause infertility. When the semen has less than 50 percent progressively motile spermatozoa or less than 25 percent fast progressive spermatozoa then this is considered to be 'Asthenozoospermia'. Teratozoospermia is a condition where there is presence of more than 70% abnormal spermatozoa.[1] During last two and half decades there had been a marked increase in patient population in all infertility clinics world over. It would be better if one can find an infertile subject much before the onset of disease. Dermatoglyphics is a science which can help us to predict occurrence of a specific disease much before clinical onset of the disease or much before the person becomes susceptible to that disease especially in those who are having strong hereditary basis. Dermatoglyphics may be useful to find out suspected infertile male patients from a large population which can further be subjected to more investigations.

Different diseases have different dermatoglyphic patterns associated with them. Some diseases showing association with dermatoglyphics include Sickle cell anemia,[2] Congenital heart disease,[3] Rheumatoid Arthritis,[4] Diabetes mellitus,[5] Downs syndrome[6] and Cancers such as Breast[7] and Prostate.[8] Authors done dermatoglyphic study on sickle cell anemia found that the whorl was the highest percentage in persons with sickle cell disease and carriers among male and total sample.[2] Authors who studied dermatoglyphic pattern on congenital heart disease observed a slight increase in the frequency of patterns in the fourth Interdigital area, thenar-first interdigital areas of the palm, and a slightly higher frequency of double and other patterns in the hypothenar areas.[3] While doing dermatoglyphic analysis of patients of rheumatoid arthritis, authors found that the radial loop and whorl were more frequent whereas the arch and ulnar loop were less frequent in the rheumatoid arthritis group.[4] A statistically significant increase in the 'atd' angle was noted on both hands of both sexes in diabetic patients when compared to that of controls.[5]

We could find one literature detailing the study of dermatoglyphic pattern of infertile male around Delhi area of India. In this study authors observed that the loop was the most common pattern in infertile male patients. They also noted significant increase in loops and insignificant reduction in whorl in primary infertile male patients when compared to that of controls. They also observed the insignificant increase

in arches in primary infertile male patients as compared to that of controls.[9] Another study done on infertile male patients was from Iran, where authors classified the infertile males into two categories as severe oligospermic and azoospermic. They reported loop as the most common pattern in both type of infertile male patients. They also reported insignificant increase in of loops whereas reduction of whorls and arches in both types of infertile male patients and as compared to that of men in general population.[10] In a third study which was done on 30 patients of clinically detectable varicocele, the authors observed the significant higher incidence of whorl pattern on terminal phalanges of thumb in both hands.[11] The aim of present work is to study the dermatoglyphic patterns in infertile males and to compare dermatoglyphic findings of patients with that of controls in order to find out whether a specific dermatoglyphic feature exists in infertile males.

MATERIALS AND METHODS

The present work was a study of dermatoglyphic pattern in infertile male with a comparative study of normal individual. The cases were men with infertility referred to cytogenetic laboratory of Mahatma Gandhi Institute of Medical Sciences, Sevagram. Sample size consists of 24 males with infertility and equal number of controls. Verbal and informed consent of the patient was taken. Idea about detail procedure was given to the patient in brief, in local language. The prints were collected by standard ink method.[12] Necessary equipment required includes Printer's ink, a roller, a glass, good quality of paper, spirit, gauze piece and magnifying lens (Magnavision). Controls were all examined medically and will be classified as healthy and free of any genetic or other disorders. Dermatoglyphic analysis was done and compared with that of age matched controls (Table-1, 2). Statistical evaluation was done with software "EPI- info, version-6.04 d".

Table-1: Age distribution among cases and controls

Age (yrs)	Cases	Control
20-25	2 (8.33%)	2 (8.33%)
25-30	5 (20.83%)	10 (41.67%)
30-35	14 (58.33%)	5 (20.83%)
35-40	3 (12.50%)	7 (29.17%)
Total	24	24

Table-2: Mean and SD of Age in cases and controls

Particular	Cases	Controls
Number of subjects	24	24
Mean Age	30.5	30.5
St. deviation	3.61	3.65

t=0, d. f. 46, P > 0.01

The subjects- cases and controls do not vary significantly (P > 0.01) on age

Out of twenty-four infertile male patients nineteen were with normal Karyotype (46,XY) and five patients were with abnormal Karyotype. Out of five abnormal Karyotype, four were with 47,XXY (Klinefelter's Syndrome) and one with 46,XY,t(5;15) (Translocation).

RESULTS

Out of three primary fingertip patterns, loop was the commonest pattern observed in our group of infertile male patients (133; 55.42%) as well as in controls (156, 65%). But the total number of loops were observed to be less in infertile male patients (133; 55.42%) as compared to that of controls (156; 65.00%). This was statistically significant (Table-3). Next to loop, whorl was the second common pattern observed in infertile male patients (96; 40.00%) as well as in controls (83; 34.58%). Total whorls were increased in infertile male patients (96; 40.00%) as compared to that of controls (83; 34.58%) which was not statistically significant (Table-3). While only one arch (1, 0.42%) was seen in controls total arches observed in infertile males patients were 11, 4.58%. Due to small number of arches observed in controls the significance could not be assessed (Table-3).

Percentage of true palmar pattern in I 3 and I 4 areas was observed to be reduced in infertile male patients (39.58% and 43.75% respectively) as compared to that of controls in I 3 and I 4 areas (41.67% and 54.17% respectively). This was not statistically significant (Table-4). We observed less percentage of true palmar patterns on Hypothenar (4, 8.33%) and I 2 (3, 6.25%) area in infertile male patients but no pattern was observed in controls in above mentioned areas. Other significance could not be assessed palmar patterns like total finger ridge count

Table-3: Fingertip patterns observed in cases and controls

Parameter	Controls		Cases		Statistical Significance	Results
	n.	%	n.	%		
Loops	156	65.00	133	55.42	Z_{TL}= 2.15	**P < 0.05, Significant**
Whorls	83	34.58	96	40.00	Z_{TW}= 1.23	P > 0.05, not significant
Arches	1	0.42	11	4.58	*	
Total	240	100.0	240	100.0		

* Due to small number of Arches in controls, the significance could not be assessed

Table-4: Palmar patterns observed in cases and controls

Palm Site	Patterns (loop distal) observed on Palm		Statistical Significance
	Cases	Controls	
I3	19(39.58%)	20(41.67%)	Z=0.207, P > 0.05, not significant
I4	21(43.75%)	26(54.17%)	Z=1.026, P > 0.05, not significant

(TFRC), absolute finger ridge count (AFRC), a-b ridge count (a-b RC) and atd angles were not much deferent in two groups (Table-5).

Table-5: TFRC, AFRC, a-b RC and atd angle observed in cases and controls

Parameter	Controls (n=24)		Infertile Male (n=24)	
	n	Mean	n	Mean
TFRC	3364	140.17	3334	138.92
AFRC	4237	176.24	4290	178.75
a-b RC	1914	79.75	1901	79.21
atd	1958	81.58	2009	83.71

DISCUSSION

In our study we found statistically significant reduction of loops in infertile male patients (133, 55.42%) when compared to that of controls (156, 65.00%) (Table-3). But in a study done in New Delhi, the authors observed the significant increase in loops in primary infertile males as compared to that of controls.[9] In another study done on infertile male patients of Iran[10] reported the insignificant increase in the loops in infertile male patients compared to that of men in general population (Fig. 1). Though or findings of reduction of loops were statistically significant compare with controls it did not match with above two studies of New Delhi and Iran, suggesting polygenetic expression is variable as for dermatoglyphic pattern.

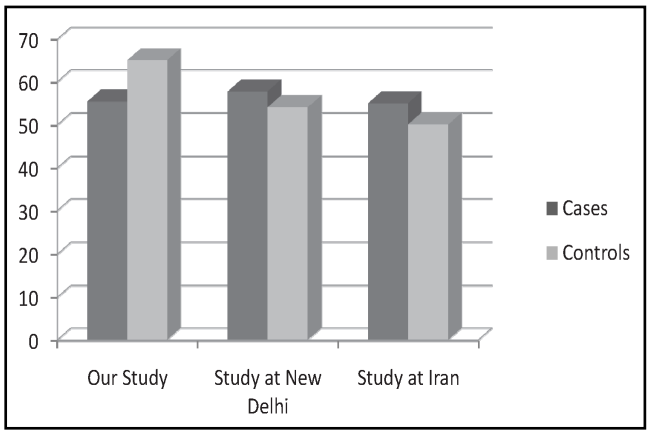

Fig. 1. Comparative statement of loops

In our study total whorls were increased in infertile male patients (96; 40.00%) as compared to that of controls (83; 34.58%) which was not statistically significant (Table-3). Our finding was partly supported by a study done on varicocele infertile patients who reported significant higher incidence of whorl pattern on terminal phalanges of thumb in both hands.[11] The reported study on infertile male patients from New Delhi[9] and Iran[10] showed insignificant reduction of whorl pattern in infertile male patients as compared to that of controls which was contrary to our finding of insignificant higher incidence of the whorl pattern in infertile male patients as compared to that of controls Fig. 2. Authors who studied on infertile male patients from New Delhi[9] commented that arches were insignificantly increased in infertile male patients as compared to that of controls. Contrary to this, authors from Iran[10] observed the insignificant reduction of arches in infertile male patients as compared to that of men in general population. In the present study we could not assess significance of arches because of less number of arches in controls (Table-3) (Fig. 3).

Fig. 2. Comparative statement of whorls

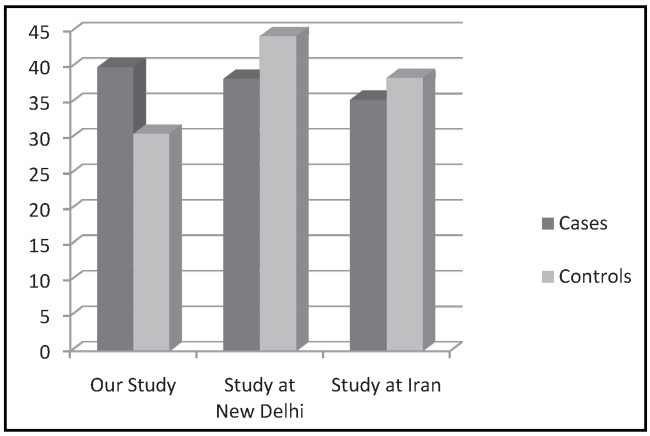

Fig. 2. Comparative statement of whorls

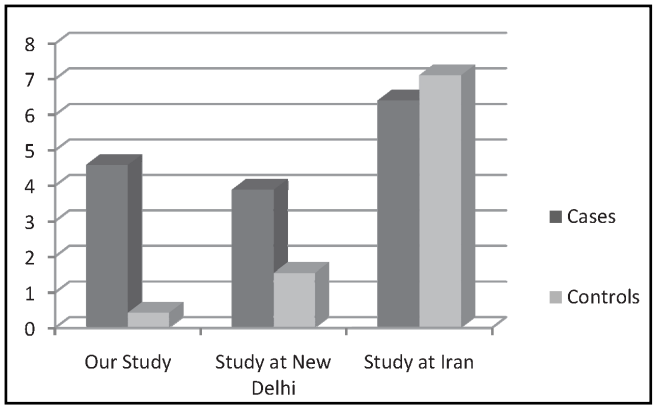

Fig. 3. Study of arches

Our observation of palmar patterns like total finger ridge count (TFRC), absolute finger ridge count (AFRC), a-b ridge count (a-b RC) and atd angle (atd) did not differ significantly between infertile patient and that of control (Table-5). The same was reported by authors who studied

on varicocele infertile male patients.[11] The best possible explanation of not matching the findings of our central Indian study with that of North Indian might be due to different expression of gene.

We analyzed the dermatoglyphic patterns in nineteen infertile male patients with normal Karyotype (46,XY) and five infertile male patients with abnormal Karyotype (four with 47,XXY and one with 46,XY,t(5;15). It was interesting to note that loop was the commonest pattern observed in infertile male patients with normal Karyotype whereas whorl was the commonest pattern observed in infertile male patients with abnormal Karyotype. Since the infertile male patients with abnormal Karyotype were less in number the statistical analysis could not be assessed. The study had to be extended to include more cases of infertile male with abnormal karyotype to make any significant opinion. As dermatoglyphic findings of different studies were contradictory to each other, there is a necessity to carry out similar study with a large sized sample of infertile male patients and controls in different regions of India as well as different parts of world which might solve the controversies.

It can be concluded that such a dermatoglyphic study may be useful as a supportive investigation to state predisposition of an individual to infertility. Dermatoglyphics can be used as a ready screener to evaluate infertile individuals from a larger population for further investigations and to confirm infertility in such patients.

ACKNOLEDGEMENTS

We sincerely thankful to Mr. M. S. Bharambe, Associate Professor from the department of community medicine for help in statistical analysis. We acknowledge Dr. Chaudhari, Professor and Head from the department of Physiology for giving us information about semen analysis of infertile male patients. We are thankful to Mr. Prafulla Ambulkar for helping us in collection of prints of infertile patients. We are thankful to whole staff of the anatomy department for being cooperative.

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