www.jmscr.igmpublication.org
Impact Factor 5.84
Index Copernicus Value: 71.58
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v5i11.113

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Study of Fingerprint Patterns in Oligospermic Male

Authors
Dr Bindu Singh[1], Dr Sajjad Jafar[2]
[1]Associate professor - BRD Medical College Gorakhpur Department of Anatomy
[2]Lecturer -BRD Medical College Gorakhpur Department of Anatomy
Email: *bindusingh10@gmail.com*

Abstract
Introduction: *Dermatoglyphics is the study of the patterns of the ridged skin of the digits, palms and soles. They are important in medical genetics chiefly because of their diagnostic usefulness in some dysmorphic syndromes. The commonest indicator of male infertility is 'semen analysis'. when the spermatozoa concentration is less than 20million/ml the condition is referred to as 'oligozoospermia'. Azospermia is a condition where the semen sample has no spermatozoa. Oligozoospermia & Azoospermia cause infertility.*
The aim of our study is to compare the frequencies of different fingerprint patterns of infertile patient with that of the control group.
Materials and Methods: *The infertile men attending the IVF centre of Rana Hospital pvt. ltd., Gorakhpur, U.P. was investigated for semen analysis. On its basis they were categorized into two groups. Their fingerprint patterns of both hands were taken by standard ink-pad method, on A4 size plain paper. Dermatoglyphic analysis was done.*
Result: *The most frequent type of finger print in both case groups was "loop". Frequencies of different types among two groups of cases were statistically different (P<0.05). also they were statistically different with general population (P<0.05). Identical patterns of both hands were found in cases.*
Conclusion: *It can be concluded that qualitative features of the finger prints of men with oligospermia were different with general population.*
Keywords: *dermatoglyphic, sperm count, infertile male, finger ridge count (FRC).*

Introduction

Dermatoglyphics is the study of the pattern of the ridged skin of the digits, palm and soles[(1)]. Research was begun to see how far the hand could be a guide to diagnose other chromosomal defects and dermatoglyphic analysis became "the poor man's karyotype".

The commonest indicator of male infertility is semen analysis. Normal sperm count of a healthy individual ranges from 35 millions to 200 millions / ml of semen. when the sperm count is less than 20 million per ml , the condition is reffered to as oligospermia. Several dermatoglyphic studies have been done in diagnosed primary infertile male in different populations [(2 – 4)].

The vertebrate Hox gene family is known to be essential for limb and genital development (Herault et al, 1997; Peichel et al, 1997) [(5&6)]. The Hox genes are part of the Homeobox genes, and there are 4 clusters of the Hox gene family, Hox a

to Hox d. Hox d and Hox a are required for the growth and patterning of digits and the differentiation of the genital bud (Kondo et al, 1997)[7]. This Hox genes a are expressed in spermatozoa after meiosis, which may affect sperm structure or its activity (Erickson, 1990) [8]. In humans, a mutation within Hox a is known to result in the condition hand – foot – genital syndrome (Mortlock and Innis 1997)[9]. This common control of digit and gonad differentiation has connected the patterns of digit formation to spermatogenesis (Manning et al, 1998)[10]. On each fingertip, the number of dermal ridges FRC (the ridge count) provides a measure of fingertip growth activity during the early fetal period. These dermal ridges are formed during gestational weeks 12 to 19 and the resulting fingertip ridge appearance i.e. fingerprint is fixed permanently therefore, dermatoglyphics become an identification marker for infertility in male. Different diseases have different dermatoglyphic patterns associated with them. Some diseases showing association with dermatoglyphics include Sickle cell anemia, Congenital heart disease, Rheumatoid arthritis, Diabetes mellitus, Down's syndrome and cancer such as Breast and Prostrate.

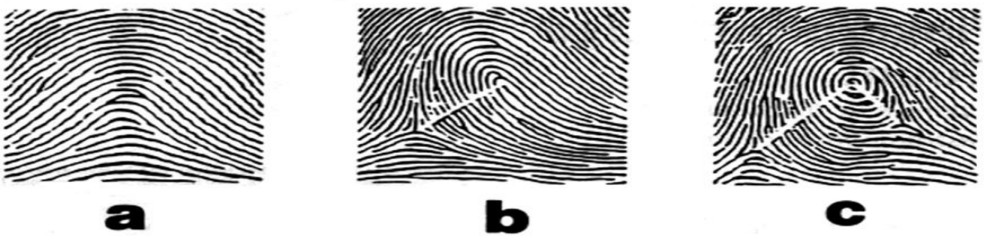
Aim

The aim of the present work was to study the frequencies of different types of fingerprints in infertile men with oligospermia and count the number of finger ridges on fingertip. Finally the results were statistically compared with the men in control group.

Material and Methods

The work was conducted on 25 primary infertile male patients with severe oligospermia reported to "infertility center" of Rana hospital, Gorakhpur. Verbal and informed consent of the patients were taken. Also 25 fertile males with normal sperm counts were included in this study as control. Fingers were impregnated with ink and were pressed on A4 size paper, only clear prints were classified into digital patterns as loops, arches and whorls . Finger ridge counting were done using a hand lens. Each fingerprint was scored independently by two observers. The data was analyzed statistically using the x^2test.P- values less than 0.05 were considered statistically significant.

Principle types of fingerprint patterns



Observation and Result

Table -1 comparative study of fingerprint patterns in control and infertile group

PATTERNS	CONTROL		CASE		Chi 2	P-value
	Number	%	Number	%		
LOOPS	137	54.8	163	65.2		
WHORLS	91	36.4	75	30	6.73	0.03
ARCHES	22	8.8	12	4.8		
TOTAL	250		250			

Table -2 comparison of fingerprint pattern of both hands of each individual

	CONTROL		CASE		Chi 2	P-value
PATTERN	NUMBER	%	NUMBER	%		
IDENTICAL	1	4	7	28		
DIFFERENT	24	96	18	72	5.35	0.02
TOTAL	25		25			

Table -3 comparision of distribution of F.R.C of right hand

FINGERS	CONTROL (MEAN)	CASE (MEAN)
THUMB	15.38	20.15
INDEX	11.68	13.35
MIDDLE	12.48	12.16
RING	11.58	15.72
LITTLE	10.45	10.78

Table-4 comparison of distribution of F.R.C of left hand

FINGERS	CONTROL (MEAN)	CASE
THUMB	13.62	18.38
INDEX	11.9	11.9
MIDDLE	12.28	12.65
RING	13.68	14.47
LITTLE	11.38	11.86

Loop was the commonest pattern in both groups. But total number of loops were more in infertile group (65.2%) as compared to control group (54.8%). Next to loop, whorl was the second common pattern in both groups but more in control group (36.4%) compared to infertile group (30%). More arches were seen in control group (8.8%) as compared to infertile group (4.8%) (Table- 1).

Comparative study of fingertip pattern of both hands shows similar patterns in identical fingers of right and left hands in 7 infertile males while the similar pattern was observed in only 1 male with normal sperm count (table – 2) .

Table -3 and 4 reveals Mean value of Finger ridge count (FRC) for each digit of both hands of case and control group that showed no significant difference in all fingers . The mean of TFRC (total finger ridge count) in oligospermia and normospermia were 141. 42 and 124.43 respectively. The data were not statistically significant.

Discussion

The significant increase in loops and significant reduction in whorl and arches in primary infertile male patients in our study matches with the two studies done by Makol et al (1994) in New Delhi [(11)] and Jafari et al (2005) in Iran [(12)]. While, Sontakke et al (2012) in Sevagram[(13)] found significant reduction of loop and increased frequencies of whorl and arches in infertile group. A majority of works have shown that chromosomal rearrangements, even some translocations can lead to defective spermatogenesis[(14)]. Usually persons affected with chromosomal aberrations have abnormal embryonic development [(15)].

The study has to be extended to include more cases and examine the chromosomal situations to make any significant opinion on correlation among fingerprint patterns, finger ridge count and infertility in oligospermia in support of gonadal dysfunction.

Conclusion

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. It may provide a prognostic preoperative screening method for infertile patients from a larger population.

References

1. Pour-Jafari H, Farhud DD, Yazdani A, Hashemzadeh M (2003). Dermatoglyphics in Patients with Ecxema,Psoriasis and Alopecia Areata. Skin Research and Technology, 9(1): 240-44.
2. Pour-Jafari H, Sarihi AR, Hashemzadeh M,Farhud DD (2003). Dermatoglyphic Observations in an Iranian Girl Affected with Congenital Cutis Laxa (Autosomal Recessive). Iranian J Public Health,32 (2):12-15.
3. Thompson JS, Thompson MW (1989). Geneticsin Medicine (4th ed). W.B. SaundersCo., Toronto, PP 283-86.
4. Stengel-Rutkowski S, Zankl H, Rodewald A, Scharrer S, Chaudhuri JP, Zang KD (1976). Aspermia, associated with a presumably balanced X/autosomal translocation karyotype 46, Y, t (X; 5) (q28; q11). Hum Genet, 31(1): 97-106.
5. Heralaut Y,Fradeau N.Zakany J.Ulnaless (UI),a regulatory mutation inducing both loss-of—function of posterior Hoxd genes.Development.1997;124,3493-3500.
6. Peichel C,Prabhakaran B,Vogt T,The mouse Ulnaless mutation deregulates posterior Hox D gene expression and alters appendicular parterning. Development. 1997;124:3481-3492.
7. Kondu T.Zakany J.Innis J. Duboule D. Of finger, toes and penises. Nature, 1997;390: 185-198.
8. Ericson R.Post meiotic gene expression, Trends Genet,1990;6:264-269.
9. Mortolock D,Innis JW. Mutations of the Hoxa 13 in hand-foot-genital syndrome, NatGenet.,1997;15:179-180.
10. Mnning J.Scutt D,Wilson J, Lewis-Jones DI. The ratio of 2^{nd} to 4^{th} digit length:a predictor of sperm number and concent-ration of testosterone ,luteinising hormone and oestrogen .HumReprod .1998;13: 3000-3004.
11. Makol N, Kshatriya G, Basu S (1994). Study of finger and palmar dermatoglyphics in primary infertile males. Anthropol Anz, 52(1): 59-65.
12. Pour-Jafari H, Hashemzadeh M, Farhud DD (2005). Dermatoglyphics in Patients with ologo/azospermia . Iranian J publ Health, 2005, Vol .34;56-61.
13. Santokke B R,Talhar S ,Ingole IV, Shande M R, Pal A K, Bhattacharya T(2012) Dermatoglyphic pattern in male infertility. Nepal Med Call J 2012; 15(2):106-109.
14. Diaz-Castanos LR, Rivera H, Gonzalez-Montes RM, Diaz M (1991). Translocation (Y; 19) (q12; q13) and azoospermia. Ann Genet, 34(1): 27-9.
15. Mathur R, Dubey S, Hamilton S, Singh G,Deka D, Kriplani A, Kabra M, Menon PS (2002). Rapid prenatal karyotyping using foetal blood obtained by cordocen-tesis. Natl Med J India, 15 (2): 75-7.