



International Journal of Medical Research & Health Sciences

www.ijmrhs.com

Volume 2 Issue 4 Oct-Dec

Coden: IJMRHS

Copyright ©2013

ISSN: 2319-5886

Received: 29th July 2013

Revised: 18th Aug 2013

Accepted: 27th Aug 2013

Research article

STUDY OF PALMAR DERMATOGLYPHICS IN PATIENTS WITH ESSENTIAL HYPERTENSION BETWEEN THE AGE GROUP OF 20-50 YEARS

Rudragouda S Bulagouda¹, Purnima J Patil², *Gavishiddppa A Hadimani³, Balappa M Bannur⁴, Patil BG⁵, Nagaraj S. Mallashetty⁶, Ishwar B Bagoji³

¹Asso. Prof Dept, ²Undergraduate Student, ³Lecturer, ⁴Professor & HOD, ⁵Professor, ⁶Post Graduate Student, Dept. of Anatomy, Shri B M Patil Medical College Hospital and Research Centre BLDE University Bijapur, Karnataka India

*Corresponding author email: gavish.hadimani@yahoo.com

ABSTRACT

Background: In present study, we tried to determine significant palmar dermatoglyphic parameters in case of essential hypertensive's in age group between 20-50 years and whether the parameters can be used for screening purpose i.e., early detection of hypertension. **Method:** With the use of modified Purvis Smith method, Black duplicating ink (Kores, Bombay) was smeared on both hands one by one and prints will be taken by rolling the hands from wrist creases to finger tips on the roller covered with bond paper. While crystal bond paper, applied firmly over a wooden pad, was used for recording the inked epidermal ridge patterns. Rolled finger prints were recorded after applying uniform pressure on white bond paper from ulnar to radial side. Complete palm impression, including the hollow or the palm was obtained over paper. Thus one set of finger prints and palm prints was obtained. The prints obtained were immediately examined with hand-lens. **Result:** Right hand and left hand of the both male and female study group showed more number of arches than controls. Right hand and left hand of the both male and female study group showed more number of Radial loops than controls. The right hand and left hand of both male and female control group showed more number of ulnar loops than study group. The right hand and left hand of the male control group showed more number of Whorls than study, while in females, the right hand study group showed more number of whorls than control group and the left hand study group showed less number of Whorls as compared to control group. **Conclusion:** The present study indicates that there are some genetic factors which are involved in the causation of essential hypertension and it is possible to certain extent to predict from dermatoglyphics individual's chance of acquiring essential hypertension. Like clinical history, examination and investigations, the dermatoglyphics will play an important role revealing the genetic susceptibility to essential hypertension.

Keywords: Palmar Dermatoglyphics, Essential Hypertension, Arches, Loops, Whorls

INTRODUCTION

The term Dermatoglyphics [from the Greek, Derma = skin, glyphic = carvings] is the scientific term coined by Prof. Harold Cummins. The analysis of dermal ridges and their configurations by studying prints of them is called Dermatoglyphics¹. The term is also used as a collective name for all the features of ridged skin. The skin patterns are studied from prints or impressions². In ancient India, palmistry, an art of fortune telling by reading the pattern of friction ridges and palmar lines, dates from about 2000 B.C.³. Dermatoglyphics has been studied extensively in chromosomal disorders, single gene disorders and those disorders whose genetic basis is not clear.

Amidst oceans of causes of human suffering, hypertension “the silent killer of mankind” is a public health problem. If untreated, it produces a lot of complications like heart attack, heart failure, stroke and kidney diseases. The prevalence of hypertension is 59.9 and 69.9 per 1000 in males and females blood pressure in hypertensive’s even by 2mm can reduce the overall mortality by 3%⁴.Twin studies have shown that genetic factors play an important role in the pathogenesis of essential hypertension⁵. By analyzing various parameters of dermatoglyphics in the palms and fingers, it is aimed to prevent the ill effects of the disease by modifying the risk factors. Dermatoglyphics helps in the early detection of cases of essential hypertension⁶. There is a steady increase in hypertension prevalence over the last 50 years, more in urban than in rural areas. It is well recognized that hypertension is now a major health problem in India⁷. The relevance of dermatoglyphics is not to diagnose, but to prevent by predicting a disease; not for defining an existing disease, but to identify people with the genetic predisposition to develop certain diseases.

MATERIALS & METHODS

The study was carried for a period of 3 months from July 2011 to September 2011, with diagnosed Essential hypertensive patients attending out-patient and in-patient, medicine department, BLDE University’s, Shri B. M. Patil medical college, Hospital and Research Centre, Bijapur were selected. 100 patients [50 Males and 50 Females] between the age group of 20-50 years were taken up for the study and 100 healthy people of same age group included both sexes as control. Informed consent was taken from individual persons and the study was approved by Institutional Ethics Committee of Shri B M Patil Medical College.

Inclusion criteria: Clinically diagnosed cases of essential hypertension

Exclusion criteria:

1. Any deformities of fingers and palm and Infected hand
2. Diseases causing secondary hypertension
3. Chromosomal abnormalities like Klinefelter’s syndrome, Turner’s syndrome etc.
4. Deep burns of fingers and palms leading to scars.

Material used: wooden table of suitable height, ‘kores’ duplicating ink, roller, white crystal bond paper, magnifying lens, soap, needle, scale, water and towel.

Method: The modified Purvis Smith method was applied. Patients were asked to wash both their hands with soap and water so as to remove any oil or dirt. Black duplicating ink (Kores, Bombay) was smeared on both hands one by one and prints will be taken by rolling the hands from wrist creases to finger tips on the roller covered with bond paper^{8,9}.

Fingerprints: The distal phalanges of person’s right hand were inked over the tile by firm pressure on the dorsum, starting from little finger. The distal phalanges of left hand were similarly inked¹⁰.

While crystal bond paper, applied firmly over a wooden pad, was used for recording the inked epidermal ridge patterns. Rolled finger prints

were recorded after applying uniform pressure on white bond paper from ulnar to radial side.

Palm Print: Palm prints of both hands were obtained after inking them with help of rubber roller. A white crystal bond paper was wrapped around a wooden rod placed on the table. The hand was horizontally placed against it and the rod was gradually rolled on the table. Complete palm impression, including the hollow or the palm was obtained over paper. Thus one set of finger prints and palm prints was obtained. The prints obtained were immediately examined with hand-lens and care was taken to include all essential details. Dermatoglyphics of sole and toes were not recorded (fig 1).

The study included both qualitative and quantitative tests. Qualitative study includes finger print patterns (whorls, radial loop, arches, and ulnar loop) and in the palm includes simian line and Sydney line. Quantitative study includes Total Finger Ridge Count, Absolute Finger Ridge Count and atd angle. To analyze finger pattern frequency, the fingertip pattern configurations were classified as arches (A),

loops (L), whorls (W). The arches were further recorded as simple (A), or tented (At) arches depending upon the presence or absence of a triradius. For statistical purpose, both were grouped together as arches only. Statistical calculations were done by arithmetic mean and standard deviation, Z test and Chi-square test applied wherever necessary.

OBSERVATION

Development of dermatoglyphic pattern is under genetic control. Hence qualitative and quantitative study of dermatoglyphic traits may give us a clue to the susceptibility of essential hypertension.

The Quantitative Analysis includes: The Total Finger Ridge Count (TFRC), Absolute Finger Ridge Count (AFRC) and 'atd' Angle (fig 2)

The Qualitative Analysis includes: Analysis fingertip patterns of Right hand and left hand separately, right hand and left hand combined and abnormal palmar creases Sydney line (Sy line) and simian line (Sm line).



Fig.1: Procedure of finger and Palm prints

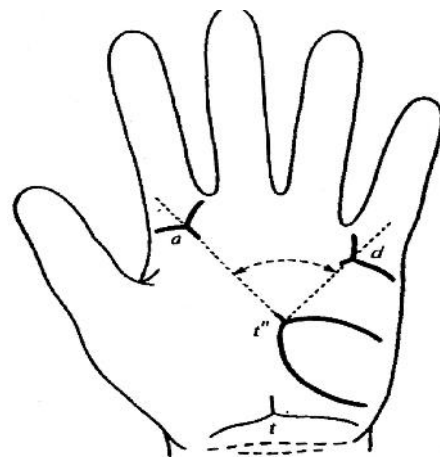


Fig.2: Atd angle measurement

Table 1: Digit wise frequency of pattern

	Male				Female			
	Study Group		Control Group		Study Group		Control Group	
	Right Hand	Left Hand	Right Hand	Left Hand	Right Hand	Left Hand	Right Hand	Left Hand
Arch	25	18	04	07	22	19	0	4
Loop Radial	26	30	11	21	31	32	23	21
Loop Ulnar	115	116	131	120	100	113	129	118
Whorl	84	86	104	102	97	86	88	112

Simian Line absent in right and left hands of both male & female hypertensive individuals

Table 2: Presence of Sydney Line in Right Hand

		Male		Female	
		Study Group	Control	Study Group	Control
Right Hand	Present	14	0	22	0
	Absent	36	50	28	50
Left Hand	Present	15	0	14	0
	Absent	35	50	36	50

Table 3: Total finger ridge count (Mean±SEM)

	Study Group (Hypertensive)	Control (Normal)	Inference
Male	80.3 ± 1.4*	84.3 ± 1.4	Significant
Female	84.7 ± 1.6	83.8 ± 1.2	Not significant

*P<0.05 compared to control group

Table 4: Absolute finger ridge count (Mean ± S.D)

	Study Group	Control	t test	P value	Inference
Male	103.9 ± 14	109.9 ± 18	1.85	0.067	not significant
Female	112.6 ± 18.4	110 ± 14.6	0.77	0.443	not significant

Table 5: atd Angle (Mean ± S.D)

		Study Group	Control	t	p	Inference
Male	Right Hand	40.76 ± 5.77	39.45 ± 7.18	1.00	0.32	not significant
	Left Hand	41.87 ± 5.54	41.91 ± 6.38	0.03	0.977	not significant
Female	Right Hand	41.03 ± 8.59	42.84 ± 4.92	1.10	0.275	not significant
	Left Hand	39.31 ± 6.52	39.34 ± 6.5	0.03	0.979	not significant

On statistical analysis atd angle was not significant in both the hands of male and female study and control group.

DISCUSSION

Hypertension “the silent killer of mankind” is a public health problem. If untreated, it produces a lot of complications like heart attack, heart failure, stroke and kidney diseases. The prevalence of hypertension is 59.9 and 69.9 per

1000 in males and females blood pressure in hypertensive’s even by 2mm can reduce the overall mortality by 3%⁴. The relevance of dermatoglyphics is not to diagnose, but to prevent by predicting a disease; not for defining an existing disease, but to identify people with genetic predisposition to develop certain

diseases. There are various studies mentioned about the dermatoglyphic pattern in various diseases like pulmonary tuberculosis, Diabetes Mellitus Type II Essential Hypertension, Eczema, psoriasis and alopecia areata and even in healthy Indian children¹¹⁻¹⁴. Present study is compared with a study by K M Godfrey¹⁵.

In present study, we tried to determine significant palmar dermatoglyphic parameters in case of essential hypertensive's in age group between 20-50 years and whether the parameters can be used for screening purpose i.e., early detection of hypertension.

Qualitative Analysis

Arches: Right hand and left hand of the both male and female study group showed more number of arches than controls. K M Godfrey studied dermatoglyphics of hypertensive patients and found that arches were least common in the study group¹⁵.

Radial loops: Right hand and left hand of the both male and female study group showed more number of Radial loops than controls. K M Godfrey studied dermatoglyphics of hypertensive patients and found that loops in general i.e., both radial and ulnar loops were most common in the study group¹⁵.

Ulnar loops: The right hand and left hand of both male and female control group showed more number of ulnar loops than study group. K M Godfrey studied dermatoglyphics of hypertensive patients and found that loops in general i.e., both radial and ulnar loops were most common in the study group¹⁵.

Whorls: The right hand and left hand of the male control group showed more number of Whorls than study, while in females, the right hand study group showed more number of whorls than control group and the left hand study group showed less number of Whorls as compared to control group. On study of K M Godfrey on dermatoglyphics of hypertensive patients found that whorls were second most common in the study group.

Sydney Line: 14 cases had Sydney line in male and 22 in female study group. All the cases in

control had sydney line. There is no study of sydney line in the available literature.

Simian Line: No cases in study as well as control group had simian line. There is no study of simian line in the available literature.

II) Quantitative Analysis:

Mean The Total Finger Ridge Count (TFRC): The Mean the Total Finger Ridge Count (TFRC) in Male patients was lesser 80.3 with S.D. of 10.1 as compared to male control group which had TFRC 84.3 with S.D. of 10.0 This difference was statistically significant ($P=0.05$). The Mean Total Finger Ridge Count (TFRC) in female patients was higher 84.70 with S.D. of 11.6 as compared to female control group which had TFRC 83.38 with S.D. of 8.64. This difference was statistically not significant ($P=0.515$).

Mean Absolute Finger Ridge Count (AFRC): The Mean Absolute Finger Ridge Count (AFRC) in Male patients was lesser 103.9 with S.D. of 14 as compared to male control group which had AFRC 109.9 with S.D. of 18. This difference was statistically not significant ($P=0.067$). The Mean Absolute Finger Ridge Count (AFRC) in female patients was higher 112.6 with S.D. of 18.4 as compared to female control group which had AFRC 110 with S.D of 14.6. This difference was statistically not significant ($P=0.443$).

Mean 'atd' Angle: The Mean 'atd' angle in right hand of male patients (40.76°) was more than that of controls (39.45°). It was less in left hand of patients (41.87°) than that of controls (41.97°). This difference was not statistically significant. The Mean 'atd' angle in right hand of female patients (41.3°) was lesser than that of controls (42.84°). Similarly it was less in left hand of patients (39.31°) than that of controls (39.34°). This difference was statistically not significant. K M Godfrey studied dermatoglyphics of hypertensive patients and found that the mean palmar atd angle was $41.7 (5.5)$ degrees⁶.

CONCLUSION

In present study, we tried to determine significance of palmar dermatoglyphic parameters in case of essential hypertension in age group between 20-50 years and whether these parameters can be used for screening purpose i.e. to identify people with genetic predisposition to develop to essential hypertension. The analysis revealed the following findings:

Significant findings in qualitative and quantitative analysis of both sexes of essential hypertension in age group between 20-50 years were: the Mean Total Finger Ridge Count (AFRC) in study group of males was lesser when compared to control group.

The present study indicates that there are some genetic factors which are involved in the causation of essential hypertension and it is possible to certain extent to predict from dermatoglyphics individual's chance of acquiring essential hypertension. Like clinical history, examination and investigations, the dermatoglyphics will play an important role revealing the genetic susceptibility to essential hypertension.

At present there are very few studies on palmar dermatoglyphics in essential hypertension. The findings of previous studies are many ways similar to our present study. But still the number of studies is limited. Since this is an interesting subject, more number of studies is expected. This was a small study consisting of 100 patients. Hence its findings can't be generalized. So further large case controls are needed to establish the exact relation between essential hypertension and dermatoglyphics and utility of dermatoglyphics in prediction of susceptibility to essential hypertension.

ACKNOWLEDGEMENT

Authors are thankful to ICMR for selecting this project for short term studentship (ICMR-STSS-2011 Reg. no. 201102292) project and for

funding. Authors are also thankful to Principal and Anatomy department staff of Shri B M Patil Medical College Hospital and Research centre BLDE University for kind support.

REFERENCES

1. Bannister LH, Berry MM, Collins P, Dyson M, Dussek JE, Ferguson MWJ. Gray's Anatomy. Integumental system. 38th ed. New York: Churchill Livingstone; 2000.p.380.
2. Holt SB. Significance of dermatoglyphics in medicine. *Clinical pediatrics* 1973;12(8):471-83.
3. Saha KC. Dermatoglyphics. *Indian Med Associ* 1970; 54: 428.
4. Park K. Hypertensive. Park's Textbook of Preventive and Social Medicine. 18th Ed. Banarsidas Bhanot; 2005; 295.
5. Chobanian VA, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL. Hypertension. *American Heart Association* 2003; 42; 1206.
6. Godfrey KM, Barker DJP, Peace J, Cloke J, Osmond C. Relation of fingerprints and shape of the palm to fetal growth and adult blood pressure. *British Medical Journal* 1993; 307: 405-09.
7. History of dermatoglyphics. Available from url: http://www.handanalysis.net/library/derm_history.htm accessed on 2005 June 28.
8. Schaumann B, Alter M. Dermatoglyphics in medical disorders. New York: Springer Verlag; 1976.p.1-129.
9. William JB. Embryonic development of epidermal ridges and their Configurations-Birth defects: Original Article Series 1991; 27:95-112.
10. Schaumann B, Alter M. Dermatoglyphics in medical disorders. New York:Springer Verlag;1976.p.1-129.
11. Desai SD, Hadimani GA. Dermatoglyphics and Health *Anatomica Karnataka*; 2013: 7(1),

01-09

12. Kumar S, Kumar N, Mangal BD. Dermatoglyphics in healthy Indian children: An analysis of finger prints, palm prints, axial triradii, and 'atd' angle, sole and toe prints. *Indian J Pediatric* 1974; 41:249-56.
13. Babu SS, Powar BP, Khare ON, Palmar Dermatoglyphics in Pulmonary Tuberculosis. *J. Anat Soc.India* 2005; 54:64-6.
14. Pour Jafari H, Farhed DD, Yazdani A, Hashe Mzadeh CM. Dermatoglyphics in patients with eczema, psoriasis and alopecia areata. *Skin Res Technol* 2003; 9:240-44.
15. Oladipo GS, Osogba IG, Bobmanuel I, Ugboma HAA, Sapira MK, Ekeke ON. Palmar Dermatoglyphics in Essential Hypertension Amongst Rivers Indigenes. *Australian J of Basic and Applied Sci.* 2010;4(12): 6300-05