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Original Research Article

A case-control study on relationship between dermatoglyphics and hypertension

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ABSTRACT

Background: In current study, we attempted to direct significant palmar dermatoglyphic restricts if there should be an occurrence of hypertension hypertensive's in age group among 20-50 years and whether the cutoff points can be utilized for broadcast reason.

Materials and Methods: Along with the utilization of modified Purvis Smith strategy, Black copying ink (Kores, Bombay) was grimy on similarly pointers individually and plans will be involved by advancing the hands since wrist creases to fingertips on the breaker covered with the bond paper. In spite of the fact that crystal bond paper, applied unfalteringly over a wood cushion, has been utilized for recording the inked epidermal edge plans. Rolled finger desing has been created in the wake of applying consistent greatness on white bond paper since ulnar to radial side. Entire palm imprint, alongside the reverberating or the accolade was found over paper. Subsequently, one bunch of fingerprints and palm prints was acquired. The prints discovered were straightforwardly assessed with hand-focal point.

Results: Right hand and left hand of the together male and female examination bunch demonstrated extra number of curves than controls. Right hand and left hand of the together male and female investigation group demonstrated extra number of Circular loops than controls. The right hand and left hand of together male and female controller bunch introduced extra number of ulnar loops as opposed to study cluster. The right hand and left hand of the male controller group introduced more number of Whorl instead of study, however in females, the right hand study bunch introduced additional amount of whorl than regulator bunch and the left hand study bunch introduced less amount of Whorl as related to regulator group.

Conclusion: The current study shows that there are some hereditary variables which are engaged with the causation of essential hypertension and it is conceivable to certain degree to foresee from dermatoglyphics person's possibility of securing basic hypertension. Like clinical history, assessment and examinations, the dermatoglyphics will assume a significant job uncovering the hereditary powerlessness to essential hypertension.

1. Introduction

Essential hypertension is the type of hypertension that has no identifiable explanation. It is connected with age and congenital acquired issues. Positive family ancestry enhances the danger. Dermatoglyphics, the information on exact plans of epidermal ridge in the recognitions and soles, is a solitary and steady indication of uniqueness, perceived in utero. Extension of those ridge is constrained by acquired and eco-accommodating impacts. As there is improved danger of hypertension in people alongside family ancestry because of acquired issues, the investigation of co-connection among dermatoglyphics and hypertension can help in starting recognizable proof of individuals alongside the acquired propensity to develop basic hypertension.[1]

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Here are exact plans of epidermal ridge on fingertip – Loop (Ulnar circle has uncovered toward the end of the circle towards ulnar side and Radial circle has open the end in the direction of the circular side), Whorl (Ridge are Rounded), Double Circle Spiral, Curves (Ridge enter from one side make a development in the midpoint and exit from another side).

A triradius is the gathering purpose of three edge at a point. Presently since this point, a straight line is drawn to the basic of the specific plan. The ridge that cut this line are determined. This amount is the total ridge check (TRC).[2] (Figure 1) for that particular finger. Some time ago customary of every one of the 10 TRCs in an impression is determined. Extra restriction of this investigation, the atd approach is normally called as the acclaim approach. Presently for the component of the atd approach a definition is utilized. This plan supports to compute the changed atd approach. The procedure of its measurement is as appeared: This atd triangle is planned by connecting 3 triradii in the commendation. The triradii a and d are correspondingly at the base of the directory and slight fingers. "t" is the pivotal triradius found extra underneath (Figure 1). Thus, the atd approach is planned at the "t" triradius. Thus, at beginning all the 3 methodologies are determined, at that point altered atd point is fearless by the plan.[3]

$$\tan\left(\frac{corrected\ atd\ angle}{2}\right) = \frac{\sin(measured\ atd\ angle}{2\times\sin(dat\ angle)\times\sin(adt\ angle)}$$

Fig. 1: Procedure of finger and Palm prints

In a study revealed by Palyzova D et al (1991),[4] appeared in young hypertensive patients had a marginally lesser event of fingertip ulnar circles, progressed occurrence of whorl, progressed TFRC and progressed mean atd point. Extra investigation (1989)[5] set up similarly sensitive whorl and slight palmar point are connected with hypertension in youthful life. Kulkarni DU, Herekar NG (2005)[6] intentional that hypertensive patients required a marginally lesser event of fragile ulnar circles, progressed event of whorl and progressed TFRC and likewise a fairly progressed mean atd point. The current study was endorsed out to control relationship of palmar dermatoglyphics with the event of Hypertension, especially the imperative assortment.

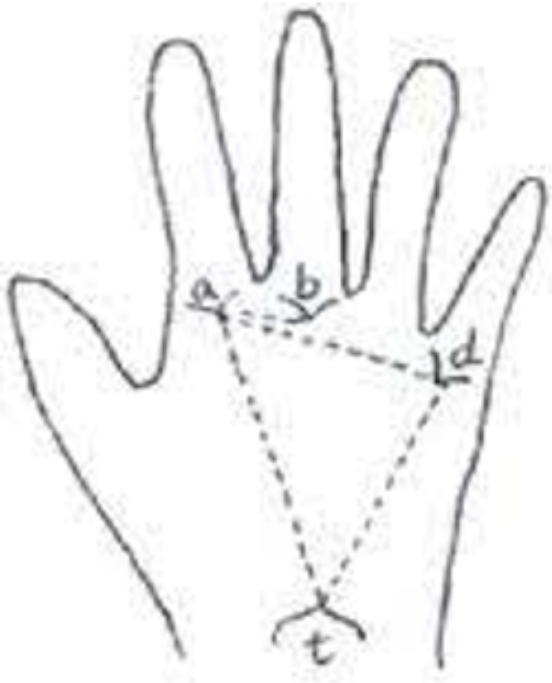

Fig. 2: Atd angle measurement

2. Materials and Methods

The investigation was conducted for a term of a quarter of a year from January 2020 to March 2020, with examined Essential hypertensive patients joining out-patient and in-patient, restorative area, Khaja Banda Nawaz Institute of Medical Sciences, Karnataka were chosen. 100 patients [50 Males and 50 Females] among the age group of 20-50 years were taken up for the investigation and 100 fit individuals of comparable age bunch included both genders as regulator. Knowledgeable understanding was involved from independent people and the investigation was acknowledged by Institutional Ethics Committee of Medical College. Inclusion criteria: Clinically analyzed instances of fundamental hypertension.

2.1. Exclusion criteria

1. Any distortions of fingers and palm and Infected hand.
2. Infections influencing subordinate hypertension.
3. Chromosomal anomalies like Klinefelter's condition, Turner's disorder.
4. Significant wounds of fingers and palms prompting scars.

2.2. Material used

Wood table of appropriate height, 'kores' duplicating ink, roller, white crystal bond paper, magnifying lens, soap, needle, scale, water and towel.

3. Materials and Methods

The changed Purvis Smith technique was applied. Patients has been requested to wash both of their hands with water and cleanser so as to remove any oil or dirt. Black rehashing ink (Kores, Bombay) was filthy on two hands individually and prints will be taken by advancing the hands from wrist wrinkles to fingertips on the roller encased with bond paper.[7,8]

3.1. Fingerprints

The distal groups of individual's right hand were inked on the tile by firm weight on the dorsum, opening from slight finger. The distal groups of left hand were likewise inked10. While crystal bond paper, applied unfalteringly on a wood pad, has been utilized for recording the inked epidermal edge plans. Rolled fingerprints were recorded later applying unvarying load on white bond paper from ulnar to circular side.

3.2. Palm print

Palm prints of two hands were found subsequent to inking them with assistance of elastic roller. A white precious stone bond paper was enveloped about a wooden pole situated on the table. The hand was equal set against it and the pole was gradually bowled on the table. Complete palm impression, with the empty or the palm was increased over paper. In this way, one bunch of fingerprints and palm prints was picked up. The prints picked up were quickly examined with hand-focal point and care has been taken to incorporate every single basic detail. Dermatoglyphics of sole and toes were not noted (Figure 1). The examination included both subjective and quantitative tests. Subjective investigation contains unique mark designs (whorls, spiral circle, curves, and ulnar circle) and in the palm, contains simian line and Sydney line. Quantitative examination contains Total Finger Ridge Count, Absolute Finger Ridge Count and atd point. To analyze finger design event, the fingertip design plots were named curves (A), circles (L), whorls W). The curves were extra recorded as basic (A), or rose (At) curves dependent on the presence or nonattendance of a triradius. For factual assurance, both were assembled as curves as it were. Arithmetical controls were finished by number juggling mean and standard deviation, Z test and Chi-square test utilized where required.

4. Result

Development of dermatoglyphic configuration is under hereditary control. Subsequently subjective and quantitative investigation of dermatoglyphic attributes may offer us a hint to the weakness of fundamental hypertension.

4.1. The quantitative analysis incorporates

The Total Finger Ridge Count (TFRC), Absolute Finger Ridge Count (AFRC) and 'atd' Angle (Figure 2)

4.2. The qualitative analysis incorporates

Analysis fingertip examples of Right hand and left hand independently, right hand and left hand joint and anomalous palmar wrinkles Sydney line (Sy line) and simian line (Sm line). dirty on both hands one by one and prints will be taken by progressing the hands from wrist creases to finger tips on the roller enclosed with bond paper.[7,8]

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

5. Discussion

Hypertension "the quiet enemy of masculinity" is a public fitness issue. In the event that untreated, it creates a ton of challenges likely coronary episode, cardiovascular breakdown, stroke and kidney sicknesses. The event of hypertension is 59.9 and 69.9 per 1000 in guys and females circulatory strain in hypertensive's even by 2mm can diminish the total humankind by 3%.[9] The noteworthiness of dermatoglyphics isn't to distinguish, yet to dodge by determining an infection; not for significant a momentum sickness, but rather to perceive individuals with acquired propensity to develop certain illnesses. There are various examinations expressed about the dermatoglyphic plan in various diseases like pneumonic tuberculosis, Diabetes Mellitus Type II Essential Hypertension, Eczema, psoriasis and alopecia areata and even in solid Indian youngsters.[10–15] Current investigation is related with an examination by K M Godfrey.[16] In current examination, we attempted to control significant palmar dermatoglyphic restricts if there should arise an occurrence of fundamental hypertensive's in age bunch among 20-50 years and whether the cutoff points can be utilized for inspect reason i.e., starting finding of hypertension.

5.1. Qualitative Analysis

5.1.1. Arches

Right hand and left hand of the similarly male and female investigation group introduced more number of curves than controls. K M Godfrey conscious dermatoglyphics of hypertensive patients and begin that curves were least regular in the examination gathering.[16]

5.1.2. Radial loops

Right hand and left hand of the similarly male and female investigation bunch introduced extra number of Radial circles than controls. K M Godfrey considered dermatoglyphics of hypertensive patients and found that circles when all is said in done i.e., both roundabout and

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	23	17	04	08	18	17	0	4
Loop Radial	24	29	13	19	29	29	22	19
Loop Ulnar	103	104	134	116	94	101	125	117
Whorl	79	75	106	101	93	81	84	105

Table 2: Presence of Sydney Line in Right Hand

		Male Study Group	Female Control	Male Study Group	Female Control
Right Hand	Present	16	0	23	0
	Absent	34	50	27	50
Left hand	Present	14	0	16	0
	Absent	36	50	34	50

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

	Study Group (hypertensive)	Control (Normal)	Inference
Male	81.4 ± 1.3*	85.9 ± 1.8	Significant
Female	83.6 ± 1.5	83.7 ± 1.3	Not Significant

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

	Study Group	Control	T test	P Value	Inference
Male	102.7 ± 11.2	103.7 ± 11.4	1.78	0.074	not significant
Female	111.4 ± 12.3	101.4 ± 13.3	0.84	0.539	not significant

Table 5: atd Angle (Mean ± S.D)

		Study Group	Control	T test	p-value	Inference
Male	Right Hand	41.64 ± 4.45	38.59 ± 4.73	1.47	0.432	not significant
	Left Hand	41.47 ± 4.38	41.91 ± 4.52	0.34	0.850	not significant
Female	Right Hand	40.43 ± 4.59	42.49 ± 4.40	1.04	0.482	not significant
	Left Hand	38.43 ±3.48	39.89 ± 3.53	0.09	0.832	not significant

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

ulnar circles were generally mutual in the investigation gathering.[16]

5.1.3. Ulnar loops

The correct hand and left hand of similarly male and female regulator bunch introduced extra amount of ulnar circles than study gathering. K M Godfrey contemplated dermatoglyphics of hypertensive patients and begin that circles when all is said in done i.e., similarly round and ulnar circles were practically same in the examination gathering.[16]

5.1.4. Whorls

The correct hand and left hand of the male regulator bunch introduced extra amount of Whorls than study, while in females, the right-hand study bunch introduced extra amount of whorls than regulator bunch and the left-hand study bunch introduced less amount of Whorls as connected to regulator group. On investigation of K M Godfrey on dermatoglyphics of hypertensive patients start that whorls were another most prominent basic in the examination gathering.

5.1.5. Sydney line

16 cases had Sydney line in male and 34 in female examination gathering. All the cases in charge had sydney line. There is no investigation of sydney line in the realistic writing.

5.1.6. Simian line

No cases in concentrate just as regulator bunch had simian line. Here is no investigation of simian line in the reachable works.

5.2. Quantitative analysis

5.2.1. Mean the Total Finger Ridge Count (TFRC)

The Mean the Total Finger Ridge Count (TFRC) in Male patients was more modest 81.4 ± 1.3 as connected to male regulator group which had TFRC 85.9 ± 1.8. This change was measurably significant (P<0.05). The Mean Total Finger Ridge Count (TFRC) in female patients was more noteworthy 83.6 ± 1.5 as identified with female regulator bunch which had TFRC 83.7 ± 1.3. This fluctuation was factually not significant (P=0.632).

5.3. Mean Absolute Finger Ridge Count (AFRC)

The Mean Absolute Finger Ridge Count (AFRC) in Male patients was more modest 102.7 ± 11.2 as identified with male regulator group which had AFRC 103.7 ± 11.4. This fluctuation was measurably not significant (P=0.073). The Mean Absolute Finger Ridge Count (AFRC) in female patients was more prominent 111.4 ± 12.3 as identified with female regulator group which has AFRC 101.4 ± 13.3. This difference was measurably not significant (P=0.532).

5.3.1. Mean 'atd' Angle

The Mean 'atd' point in right hand of male patients (41.64°) was more than that of controls (38.59°). It was lesser in left hand of patients (41.47°) than that of controls (41.91°). This fluctuation was not measurably significant. The Mean 'atd' point in right hand of female patients (40.43°) was more modest than that of controls (42.49°). Similarly, it was lesser in left hand of patients (38.43°) than that of controls (39.89°). This fluctuation was measurably not huge. K M Godfrey contemplated dermatoglyphics of hypertensive patients and found that the mean palmar atd point was 41.7 (5.5) degrees.[17]

6. Conclusion

The current examination demonstrates that there are some hereditary elements which are associated with the causation of fundamental hypertension and it is conceivable to certain degree to foresee from dermatoglyphics person's possibility of obtaining basic hypertension. Like clinical history, assessment and examinations, the dermatoglyphics will assume a significant job uncovering the hereditary powerlessness to fundamental hypertension.

7. Conflicts of Interest

All contributing authors declare no conflicts of interest.

8. Source of Funding

None.

References

1. Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann Intern Med*. 2009;151:264–9.
2. Floris G, Marini E. The analysis of digital-palmar dermatoglyphics in a sample of individuals affected by essential hypertension. *Int J Anthropol*. 1998;13(1):1–10. doi:10.1007/bf02442245.
3. Arrieta MI, Ibarrondo MA, Lostao CM. Digital dermatoglyphics in the Basque population: Univariate and multivariate comparison with other Spanish populations. *Am J Phys Anthrop*. 1987;73(1):89–98. doi:10.1002/ajpa.1330730109.
4. Palyzová D, Kuklík M, Beránková M. Dermatoglyphics in juvenile hypertension. Department of Pediatrics, School of Medicine, Charles University, Prague, CSFR; 1991.
5. Pursnani ML, Elthence GP, Tiberwala L. Palmar dermatoglyphics in essential hypertension. *Indian Heart J*. 1989;41(2):119–22.
6. Kulkarni DU, Herekan NG. Dermatoglyphics in essential hypertension in Western Maharashtra Population. *J Natomical Soc India*. 2005;54(2):1.
7. Komatz Y, Ohshiro K, Kiriyama T, Yoshida O. Hallucal ridge counts in patients with Klinefelter's syndrome. *Ann Human Biol*. 1981;8(2):171–4. doi:10.1080/03014468100004911.
8. Vera M, Cabrera E, Guell R. Dermatoglyphics in insulin-dependent diabetic patients with limited joint mobility. *Acta Diabetol*. 1995;32(2):78–81. doi:10.1007/bf00569561.
9. Jain PK, Sharma BK, Mathur BD. Dermatoglyphics in essential hypertension. *J Assoc Physicians India*. 1984;32:335–7.
10. Tafazoli M, Dezfooli SR, Kazemi T, Shahri HM, Shahri NM. Comparison of Dermatoglyphic Patterns Between Healthy and Hypertensive People. *Asian J Med Sci*. 2013;5(1):19–25. doi:10.19026/ajms.5.5341.
11. Palyzová D, Kuklík M, Beránková M, Schaumann B. Dermatoglyphics in juvenile hypertension. *Anthropologischer Anzeiger*. 1991;49(4):361–6. doi:10.1127/anthranz/49/1991/361.
12. Lahiri A, Bandyopadhyay S, Adhya S, Ghosh S, Goswami S, Bhattacharya P, et al. A study on relationship between dermatoglyphics and hypertension. *J Dent Med Sci*. 2013;7:62–5.
13. Umana UE, Netete BV, Timbuak JA, Ibegbu AO, Musa SA, Hamman WO, et al. Dermatoglyphics and cheiloscopy pattern in hypertensive patients; a study in Ahmadu Bello University Teaching Hospital, Zaria, Nigeria and Environs. *Int J Sci Res Publ*. 2014;4.
14. Rashad MN, Mi MP. Dermatoglyphic traits in patients with cardiovascular disorders. *Am J Phys Anthropol*. 1975;42:281–3.
15. Tafazoli M, Dezfooli SR, Shahri NM, Shahri HM. The Study of Dermatoglyphic Patterns and Distribution of the Minutiae in Inherited Essential Hypertension Disease. *Curr Res J Biol Sci*. 2013;5(6):252–61. doi:10.19026/crjbs.5.5426.
16. Godfrey KM, Barker DJ, Peace J, Cloke J, Osmond C. Relation of fingerprints and shape of the palm to fetal growth and adult blood pressure. *BMJ*. 1993;307(6901):405–9. doi:10.1136/bmj.307.6901.405.
17. Shield JP, Wadsworth EJ, Hobbs K, Baum JD. Dermatoglyphics, fetal growth, and insulin dependent diabetes in children under 5 years. *Arch Dis Childhood*. 1995;72(2):159–60. doi:10.1136/adc.72.2.159.

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