A Comparative study of quantitative dermatoglyphics in patients suffering from essential hypertension with normal individuals

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Abstract

Aims and Objective: To compare the Quantitative dermatoglyphics in patients suffering from essential hypertension with that of normal persons. Introduction: Dermatoglyphics is a branch of genetics dealing with the skin ridge system. Through the years of research dermatoglyphics has immerged as a powerful tool in the diagnosis of psychological, medical and genetic condition. Diagnosis of Diabetes Mellitus Schizophrenia, Hypertension etc. Can now be aided by dermatoglyphicanalysis. This study is undertaken because the dermatoglyphics and essential hypertension both have Genetic basis. Methodology: The present study was carried out in 60 patients of essential hypertension and 60 normal individuals in Rajiv Gandhi Medical Sciences, Adilabad and normal individuals were obtained from UHTC area of RIMS, Adilabad. The study variables were analyzed using Chi-Square test and Relative Deviates for statistical significance. Result: In both the hands the atd angles were decreased in Hypertensive patients as compared controls which highly significant (In Right hand: R.D. = 9.65; p < 0.001 In Left hand: R.D. = 8.96; p < 0.05 Total: R D. = 9.305; p < 0.05). It is also observed that there is significantly increased frequency of Thenar I Pattern (Left hand $\chi^2$=22.396,p<0.0001; Right hand $\chi^2$=10.389 P< 0.005) Thenar I Pattern (Left hand $\chi^2$=23.72, Right hand P<0.0005). $\chi^2$=26.42,P<0.0001) Thenar I Pattern (Left hand $\chi^2$=27.21 P<0.0001) Thenar I Pattern (Left hand $\chi^2$=28.31,P<0.0005). Thenar I Pattern (Left hand $\chi^2$=28.1470.0005.Right hand $\chi^2$=31.814.0.0001.). Hypothenar (Left hand $\chi^2$=17.642 P<0.0001 Right hand $\chi^2$=21.946, P<0.0005). Conclusion: This study is has significantly proved that these quantitative parameters of Dermatoglyphics science i.e. decrease in atd angle, increased frequencies if Thenar I,II,III,IV Pattern and Hypothenar Pattern Can be utilized for screening of Person at risk and early detection of essential hypertension and further prevention of its complications.

Key word: Essential hypertension, Dermatoglyphics, atd-angle, Thenar Dermatoglyphics Pattern, Hypothenar Dermatoglyphics Pattern.

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INTRODUCTION

Essential hypertension is the category of hypertension that has no identifiable cause. It affects 90-95% of hypertensive patients. It is also associated with ageing and inherited genetic factors. Positive family history enhances the risk. Dermatoglyphics, the study of specific patterns of epidermal ridges in the palms and soles, is an unique and stable marker of identity, established in utero. Development of those ridges is regulated by genetic and environmental influences. As there is increased risk of hypertension in individuals with family history because of genetic factors, the study of co-relation between
dermatoglyphics and hypertension can help in early identification of people with the genetic predisposition to develop essential hypertension. Diagnosis of Diabetes Mellitus, Schizophrenia, Hypertension etc. can now be aided by dermatoglyphic analysis. Twin studies have shown that genetic factors play an important role in the pathogenesis of essential hypertension. Dermatoglyphics helps in the early detection of cases of essential hypertension. We have undertaken this study because it is well recognized that hypertension is now a major health problem in India the dermatoglyphics and essential hypertension both have genetic etiology. Study of Dermatoglyphics is a non-invasive and cost effective method. Since other laboratory procedure for hereditary disease are expensive, Dermatoglyphics with other clinical signs can be used to define indications for other laboratory procedure.

MATERIAL AND METHODS
The present study was carried out in 60 patients of essential hypertension and 60 normal individuals. The patients of essential hypertension were collected from Department of Medicine Rajiv Gandhi Medical Sciences, Adilabad attending the medicine OPD and wards. The prints of normal individuals were obtained from UHTC area of RIMS, Adilabad. A detail clinical history was recorded regarding the age, sex, duration of hypertension, drug history, complete general and systemic examination including pulse, blood pressure, Respiratory system, Cardiovascular system, Central nervous system and relevant investigations including blood sugar, blood urea, serum creatinine, serum cholesterol, urine sugar, urine albumin.

Inclusion criteria
The studied cases comprise of newly detected and old cases of essential hypertension reporting the medicine OPD and ward, RIMS, Adilabad.

Exclusion criteria
Patients with secondary hypertension were excluded, History of smoking, Diabetes Mellitus, Ischemic Heart Disease, Serum cholesterol > 200 mg/dl, Pregnancy, Fever.

Criteria for selection of controls
60 age and sex matched healthy, non-hypertensive individuals without any of the above mentioned exclusion criteria and with normal clinical examination were chosen as controls.

Data collection
Structured format for details of subjects, Dermatoglyphic prints of both hands of each subject

Method
Dermatoglyphic prints were obtained using ink method described by Cummins and Midlo (1961) and modified Purvis Smith method was applied.

RESULT

Table 1: Showing mean value of 'atd' angle in right and left hand of patients and controls

<table>
<thead>
<tr>
<th>Side of hand</th>
<th>'atd' angle (degrees)</th>
<th>Patients</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>Mean ± SD</td>
<td>42 ± 4.95</td>
<td>54 ± 4.25</td>
</tr>
<tr>
<td>Left</td>
<td>Mean ± SD</td>
<td>41 ± 4.98</td>
<td>43 ± 4.25</td>
</tr>
<tr>
<td>Right + Left</td>
<td>Mean ± SD</td>
<td>41.5 ± 2.91</td>
<td>43 ± 2.34</td>
</tr>
</tbody>
</table>

(In Right hand: R.D. = 9.65; p < 0.05, Total: R.D. = 9.305; p < 0.05.)

Table 2: Showing frequency of Thenar / I1 area pattern in right and left hand of patients and controls

<table>
<thead>
<tr>
<th>Side of hand</th>
<th>Patients</th>
<th>Controls</th>
<th>X²</th>
<th>P value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>37 (61.66%)</td>
<td>16 (26.66%)</td>
<td>22.396</td>
<td>0.00001</td>
<td>Significant</td>
</tr>
<tr>
<td>Left</td>
<td>43 (71.66%)</td>
<td>34 (56.66%)</td>
<td>10.389</td>
<td>0.0055</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 2 shows frequency of thenar / I1 pattern in both right and left hands. In right hand there is increased frequency of I1 area pattern in patients i.e 37 (61.66%) as compared to controls i.e. 16 (26.66%) which is statistically significant (X²=22.396, P< 0.00001 which is highly significant).

Similarly in left hand also there is increased frequency of thenar pattern is observed in patients i.e. 43 (71.66%) as compared to controls i.e. 34 (56.66%), which is statistically significant (X²=10.389 P< 0.005, highly significant).

Table 3: Showing frequency of I2 area pattern in right and left hand of patients and controls

<table>
<thead>
<tr>
<th>Side of hand</th>
<th>Patients</th>
<th>Controls</th>
<th>X²</th>
<th>P value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>25 (41.66%)</td>
<td>9 (15.00%)</td>
<td>26.423</td>
<td>0.00001</td>
<td>Highly Significant</td>
</tr>
<tr>
<td>Left</td>
<td>24 (40.00%)</td>
<td>10 (16.66%)</td>
<td>23.721</td>
<td>0.0005</td>
<td>Highly Significant</td>
</tr>
</tbody>
</table>
The above table shows that there is increased frequency of \( I_2 \) area pattern in patients i.e. 25 (41.66%) as compared to controls i.e. 09 (15.00%) in right hand which is highly significant (\( X^2=26.42, P<0.00001 \)). Similarly there is increased frequency of \( I_2 \) area pattern in patients i.e. 24 (40.00%) as compared to controls i.e. 10 (16.66%) in left hand which is highly significant (\( X^2=23.72, P<0.00005 \)).

### Table 4: Frequency of \( I_3 \) area pattern in right and left hand of patients and controls

<table>
<thead>
<tr>
<th>Side of hand</th>
<th>Patients</th>
<th>Controls</th>
<th>( X^2 )</th>
<th>( P )-value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>30 (50.00%)</td>
<td>13 (21.66%)</td>
<td>28.312</td>
<td>0.0005</td>
<td>Highly Significant</td>
</tr>
<tr>
<td>Left</td>
<td>31 (51.66%)</td>
<td>14 (23.33%)</td>
<td>27.213</td>
<td>0.00001</td>
<td>Highly Significant</td>
</tr>
</tbody>
</table>

The above table shows that there is increased frequency of \( I_3 \) area pattern in patients i.e. 30 (50.00%) as compared to controls i.e. 13 (21.66%) in right hand which is highly significant (\( X^2=28.31, P<0.00005 \)). Similarly there is increased frequency of \( I_3 \) area pattern in patients i.e. 31 (51.66%) as compared to controls i.e. 14 (23.33%) in left hand highly significant (\( X^2 =27.21 \ P<0.00001 \)).

### Table 5: Frequency of \( I_4 \) area pattern in right and left hand of patients and controls

<table>
<thead>
<tr>
<th>Side of hand</th>
<th>Patients</th>
<th>Controls</th>
<th>( X^2 )</th>
<th>( P )-value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>39 (65.00%)</td>
<td>15 (25.00%)</td>
<td>31.814</td>
<td>0.00001</td>
<td>Highly Significant</td>
</tr>
<tr>
<td>Left</td>
<td>35 (58.33%)</td>
<td>13 (21.66%)</td>
<td>28.147</td>
<td>0.00055</td>
<td>Highly Significant</td>
</tr>
</tbody>
</table>

The above table shows that there is increased frequency of \( I_4 \) area pattern in patients i.e. 39 (65.00%) as compared to controls i.e. 15 (25.00%) in right hand which is Highly Significant. Similarly there is increased frequency of \( I_4 \) area pattern in patients i.e. 35 (58.33%) as compared to controls i.e. 13 (21.66%) in left hand which is Highly Significant.

### Table 6: Frequency of hypothenar area pattern in right and left hand of patients and controls

<table>
<thead>
<tr>
<th>Side of hand</th>
<th>Patients</th>
<th>Controls</th>
<th>( X^2 )</th>
<th>( P )-value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>27 (45.00%)</td>
<td>10 (16.66%)</td>
<td>21.946</td>
<td>0.00053</td>
<td>Significant</td>
</tr>
<tr>
<td>Left</td>
<td>31 (51.66%)</td>
<td>16 (26.66%)</td>
<td>17.642</td>
<td>0.0001</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 6: shows that there is increased frequency of hypothenar area pattern in patients i.e. 27 (45.00%) as compared to controls i.e. 10 (16.66%) in right hand which is Highly Significant. Similarly there is increased frequency of hypothenar area pattern in patients i.e. 31 (51.66%) as compared to controls i.e. 16 (26.66%) in left hand which is Highly Significant.

### DISCUSSION

The \( atd \) angle is formed by a line drawn from triradius "a" to triradius "t" with a line from triradius "t" to triradius "d". When more than one triradius arc present, the most distal point is used to measure the \( atd \) angle. \( atd \) angle shows statistical significance in right, left and both (right and left hand) in present study i.e. \( atd \) angle decreases in essential hypertension patients as compared to controls this could be because of shift of axial triradius. Pursnani ML, Elhence GP, Tribewala L (1989)\(^1\) in their study observed that \( atd \) angle in right and left hand shows significant decrease when compared with normal. Present study co-relates with their observation Jain PK et al (1984)\(^2\). Reported decreased ‘\( atd \)’ angle in hypertensive cases in both sexes as compared to controls10. KulkarniDU (2005)\(^3\) revealed the same result in their study.

**Thenar/\( I_1 \) area:** In hypertensive patients the pattern frequency is increased significantly in both right and left hands, more so in left hand. The pattern resembles arch opening towards radial side. **\( I_3 \) area:** The pattern frequency is found to be significantly increased in right and left hands of hypertensive patients as compared to controls. **\( I_4 \) area:** The area pattern frequency in both the hands of hypertensive patients is significantly increased as compared to controls. **Hypothenar area:** The area pattern frequency is significantly increased in both the hands of hypertensive patients as compared to controls.

### CONCLUSION

This study has significantly proved that these quantitative parameters of Dermatoglyphics science i.e. decrease in \( atd \) angle, increased frequencies if Thenar \( I_1,I_2,I_3,I_4 \) Pattern and Hypothenar Pattern Can be utilized for screening of Person at risk and early detection of essential hypertension and further prevention of its complications.

### REFERENCES


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