Family History, BMI and Sympathetic Hyperactivity in Healthy Offsprings of Hypertensive Parents

Sangeeta Dattatreya Tuppad
Assistant Professor, Department of Physiology, Koppal Institute of Medical Sciences, Koppal, Karnataka

ABSTRACT

Objective: Hypertension is associated with large and growing health and economic burden of Cardiovascular and renal diseases. Hypertension doubles the risk of cardiovascular disease, including coronary heart disease(CHD), congestive heart failure, ischemic and hemorrhagic stroke, renal failure and peripheral arterial disease.

Recent study suggests prevalence of Hypertension is increasing as a consequence of increasing obesity. Both environmental and Genetic factors contribute to the increased prevalence of Hypertension. Obesity and weight gain are strong, independent risk factors for hypertension. Aim of this study was to assess relation between Family history, BMI and autonomic function tests in healthy offsprings of hypertensive parents.

Method: The present study was conducted in 35 normotensive healthy offsprings of Hypertensive parents (Study Group) and 35 normotensive healthy offsprings of Nonhypertensive parents (Control Group), in the age group of 18-21 years, randomly selected from 1st and 2nd MBBS Students of Shri.BM patil Medical College. Bijapur.

Results: There is also significant increase in sympathetic function tests and insignificant increase in the readings of parasympathetic function tests and significant increase in resting Respiratory rate and Resting Systolic Blood Pressure in study group compared to control group.

Conclusion: This cross sectional study showed increase in prevalence of cardiac autonomic dysfunction more of sympathetic overactivity in normotensive healthy offsprings of Hypertensive parents, compared to normotensive healthy offsprings of Nonhypertensive parents.

Keywords: Family History, BMI, autonomic function tests

INTRODUCTION

Hypertension is associated with a large and growing health and economic burden of Cardiovascular and renal diseases\(^1,2\). Hypertension doubles the risk of cardiovascular disease, including coronary heart disease(CHD), congestive heart failure, ischemic and hemorrhagic stroke, renal failure and peripheral arterial disease.

Recent study suggests that prevalence of Hypertension is increasing as a consequence of increasing obesity. Both environmental and Genetic factors contribute to the increased prevalence of Hypertension. Obesity and weight gain are strong, independent risk factors for hypertension. It has been estimated that 60% of hypertensives are >20% overweight\(^3\). About 30% of patients with primary hypertension have genetic predisposition\(^4\). The ANS maintains Cardiovascular homeostasis via pressure, volume and chemoreceptor signals\(^5\). In both normal weight and obese individuals, hypertension often is associated with increase in sympathetic outflow\(^6\). Aim of this study was to assess the relation between Family history, BMI and autonomic function tests in healthy offsprings of hypertensive parents.

Corresponding author:
Dr. Sangeeta Tuppad
Email: dr.sangeeta.dt@gmail.com
MATERIALS AND METHOD

The present study was conducted in 35 normotensive healthy offsprings of Hypertensive parents (Study Group) and 35 normotensive healthy offsprings of Nonhypertensive parents (Control Group), in the age group of 18-21 years, randomly selected from 1st and 2nd MBBS Students of Shri.BM patil Medical College, Bijapur.

Exclusion criteria:
Subject on any medication
History of Chronic disease.
Smokers
Subject with a history of tobacco and alcohol intake.
Any disease affecting autonomic Nervous System

Inclusion Criteria:
Only healthy subjects of Indian origin were included in the study. The subjects without the signs of Cardiovascular, Endocrinological, Neurological, Hematological and inflammatory diseases were selected for the study. Systolic BP (SBP) in the range of 90-139 mm Hg, Diastolic BP (DBP) between 60-89 mmHg was considered for the study. Informed Consent was taken from all the subjects in the study.

All the tests were done in morning hours to maintain uniformity among subjects.

STATISTICAL ANALYSIS: Statistical analysis was done by Students t test using SPSS software version 20.

p Value >0.05 is taken as not significant. p Value <0.05 is taken as significant.

p Value <0.01 is taken as highly significant. p Value <0.001 is taken as very highly significant.

Recording of Physical Anthropometry: Height (in cms), Weight (in kgs), Body Surface Area (Square meters)Dobois Nomogram, Body Mass Index (Kilogram/meter^2) Recording of Physiological Parameters: Respiratory rate (cycles/minute), Heart rate (Beats/minute), Systolic and Diastolic blood pressure (mm of Hg) by using mercury sphygmomanometer.

Recording of Autonomic Function Parameters

The Cardiovascular Autonomic Nervous System Function Parameters are selected as recommended by American Diabetic Association and performed as per methods described by Sir Roger Bannister and as prescribed by the criteria of Ewing and Clarke.

A) The Parasympathetic activity is assessed by:
Heart Rate response to Valsalva Maneuver
Heart rate response to deep breathing
Immediate heart rate response to standing (30:15 ratio):

B. The sympathetic activity is assessed by:
1. Blood pressure response to standing
2. Blood pressure response to sustained handgrip exercise.

Subjects were informed about the procedure.

The ECG recordings for these tests were performed on Computerized 4 channel Physiopac(Medicaid). Blood pressure (BP) was measured with the help of mercury sphygmomanometer (Diamond).

RESULTS

Results were tabulated and analysed using 't'test. *p value <0.05 was considered Significant

Table 1: Physical Anthropometric Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control Group</th>
<th>Study Group</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>18.26 ± 1.10</td>
<td>19.36 ± 0.58</td>
<td>0.323</td>
</tr>
<tr>
<td>Height (cms)</td>
<td>168.06± 4.94</td>
<td>170.53±6.01</td>
<td>0.04*</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>67.2 ± 9.86</td>
<td>72.08 ± 10.91</td>
<td>0.03*</td>
</tr>
<tr>
<td>BMI (kg/m^2)</td>
<td>23.12 ± 3.45</td>
<td>24.21 ± 3.03</td>
<td>0.11</td>
</tr>
<tr>
<td>BSA (Sq m)</td>
<td>1.74 ±0.13</td>
<td>1.81 ± 0.15</td>
<td>0.01**</td>
</tr>
</tbody>
</table>

*p <0.05: Significant, **p <0.01: Highly significant.
Table 2: Physiological Parameters.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control Group</th>
<th>Study Group</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting PR (bpm)</td>
<td>78.8±6.31</td>
<td>77.86±5.75</td>
<td>0.279</td>
</tr>
<tr>
<td>Resting RR (cycles/min)</td>
<td>14.03±2.51</td>
<td>15.50±1.57</td>
<td>0.03*</td>
</tr>
<tr>
<td>Resting SBP (mm of Hg)</td>
<td>117.53±11.4</td>
<td>125.13±12.20</td>
<td>0.05*</td>
</tr>
<tr>
<td>Resting DBP (mm of Hg)</td>
<td>77.06±5.29</td>
<td>78.66±6.74</td>
<td>0.23</td>
</tr>
</tbody>
</table>

*p <0.05: Significant, ** p <0.01: Highly significant, *** p <0.001: Very highly significant

Table 3: Autonomic function test parameters

<table>
<thead>
<tr>
<th>Autonomic function parameters</th>
<th>Control Group</th>
<th>Study Group</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valsalva Ratio</td>
<td>1.32 ± 0.20</td>
<td>1.28 ± 0.24</td>
<td>0.212</td>
</tr>
<tr>
<td>HR variation to deep breathing (Maximum-Minimum)</td>
<td>28.16 ± 7.24</td>
<td>26.12 ± 8.26</td>
<td>0.112</td>
</tr>
<tr>
<td>Immediate HR response to standing (30:15)</td>
<td>1.33 ± 0.68</td>
<td>1.30 ± 0.22</td>
<td>0.225</td>
</tr>
<tr>
<td>BP response to Standing (Fall in SBP)</td>
<td>5.66 ± 1.76</td>
<td>4.66 ± 2.33</td>
<td>0.012**</td>
</tr>
<tr>
<td>BP response to sustained Hand grip (Increase in DBP)</td>
<td>21.0 ± 3.95</td>
<td>18.4 ± 5.68</td>
<td>0.055*</td>
</tr>
</tbody>
</table>

*p <0.05: Significant, ** p <0.01: Highly significant, *** p <0.001: Very highly significant

DISCUSSION.

The present study was carried out in 70 healthy normotensive subjects (Offsprings of Hypertensive parents n=35, Offsprings of Nonhypertensive Parents n=35). In our study, we recorded physical and physiological parameters in both control and study groups. Autonomic functions were assessed by Heart Rate response to Valsalva Maneuver, Heart rate response to deep breathing, Immediate heart rate response to standing (30:15 ratio): Blood pressure response to standing, Blood pressure response to sustained handgrip exercise.

Present study showed significant increase in Weight and height in study group Compared to control group. Our study is in accordance with studies done by Josiane M. Motta et al 7 Nafiu et al 8

Present study also showed significant increase in resting Respiratory rate and Resting Systolic Blood Pressure in Study group compared to control group. Our study is in accordance with studies done by Schneider GM et al, Lopes HF et al 9,10

There is also significant increase in sympathetic function tests and insignificant increase in the readings of parasympathetic function tests in study group compared to control group. Our study is in accordance with studies done by Rathi P et al 11, Matthews CF et al 12.

CONCLUSION

This cross sectional study showed increase in prevalence of cardiac autonomic dysfunction more
of sympathetic overactivity in normotensive healthy offsprings of Hypertensive parents, compared to normotensive healthy offsprings of Nonhypertensive parents. These tests can be used as routine tests for earlier detection of hypertension in persons who have genetic predisposition. Health promoting lifestyle modifications like regular physical activity, healthy diet are recommended for individuals with prehypertension. Prevention and treatment of obesity are also important factors for reducing blood pressure and cardiovascular disease risk.

**Ethical Clearance:** The ethical clearance for the study was obtained from ethical committee.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**


