

Comparison of Correlation between Serum Uric Acid and Blood Pressure in Offspring's of Patients with Essential Hypertension and in Healthy Controls

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Abstract

Background: Studies have suggested a tight linear correlation between the SUA and SBP, DBP in children with pre-hypertension. Many factors, including family history, genetics, insulin resistance and BMI, play a role in the development of essential hypertension. **Aims and Objectives:** 1) To assess the SUA, BP in offspring's of patients with essential hypertension (cases), and in age and sex matched healthy controls. 2) To compare and thereby to test the hypothesis that a “*significant correlation is present between the SUA and BP*”. **Methodology:** Thirty cases and thirty controls without history of essential hypertension in the family were randomly selected. Out of thirty subjects in each group, ten females and twenty were males aged between 17-25 years. SUA, blood urea, serum creatinine, triglycerides, total cholesterol, FBS and BP were measured in both groups along with anthropometric measurements viz., height, weight, BMI, waist-hip ratio. Data was tabulated and statistically analysed using SPSS software. **Results and Conclusions:** It was found that both groups were well matched with respect to age, sex, BMI, and waist-hip ratio. The two groups also did not differ much in their lipid parameters, renal parameters, FBS (except serum creatinine). BP (systolic and diastolic, $p < 0.001$, $p = 0.075$) was significantly higher in cases in comparison to controls. Further analysis did not reveal any positive correlation between SUA and SBP in cases ($r = -0.265$, $p = 0.157$). So it was concluded that the correlation between SUA and SBP has been distorted in cases due to confounding factors like age, etc.

Keywords: BP; Essential hypertension; SUA.

Introduction

Essential hypertension affects upto 25% of adults and significantly increases the risk of myocardial infarction, stroke, congestive heart failure, and renal failure. The development of the disease process has been clearly shown to begin in childhood.[1]

Many factors such as family history, genetics, insulin resistance, and a high body mass index play a role in the development of essential hypertension. The family history is an important risk factor for essential hypertension seen in children.[2]

Epidemiological studies have demonstrated an association between

serum uric acid levels and the incident as well as prevalent hypertension in diverse populations including Asians.[3] A significant correlation between elevated uric acid levels (5.5 mg/dl) and blood pressure has been demonstrated in children and adolescents. Earlier studies have also shown an association between higher serum uric acid levels with higher diastolic blood pressure and lean body mass in children and young adults.[1]

Hence the present study was done to determine the association between the serum uric acid levels and the blood pressure in apparently normal offsprings of patients of essential hypertension. This study helps in understanding early stages

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of the relationship and therefore in early identification and prevention of hypertension.

Materials and Methods

Thirty offspring's of patients of essential hypertension (diagnosed based on their blood pressure measurements and clinical manifestations) and thirty age and sex matched healthy controls without history of essential hypertension in the family, were randomly selected from the general population for the study, as per the inclusion and exclusion criteria.

Inclusion Criteria

- Healthy offsprings of patients of essential hypertension in the age group of 17-25 years.
- Healthy age and sex matched control subjects are selected from general population.
- Subjects who are willing to participate in the study and give consent for the same.

Exclusion Criteria

- Smokers, alcoholics.
- Any history of diabetes, metabolic syndrome, hypertension, coronary heart disease, stroke, gout, renal colic, chronic kidney disease.
- Non-cooperation by the subjects.

This study was done after taking ethical clearance from the institute.

Out of the thirty subjects in each group, ten were females and twenty were males. Informed written consent was taken from all the subjects. Detailed (family, dietary and personal) history was taken from all the subjects and medical examination was also done. The anthropometric measurements like height (in cms), weight (in kgs), were done and body mass index (kg/sq.m) was

calculated. Also waist circumference was measured at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest; hip circumference measurement was taken around the widest portion of the buttocks (WHO, 2008b).[4] Then the waist-hip ratio was calculated for all the subjects. Heart rate and blood pressure were also recorded.

Measurement of Blood Pressure

Blood pressure was measured manually using mercury sphygmomanometer by palpatory and auscultatory method. The subject was made to sit comfortably on a chair with back supported, legs uncrossed and upper arm bared. Subject's arm was supported at heart level. It was ensured that the cuff bladder encircled 80% or more of the arm circumference (size of cuff used 12.5*23 cm). Then the cuff is inflated by raising the mercury column and then deflated at 2-3 mm of Hg/second. The level of the mercury column at which the radial pulse reappears is noted as the systolic blood pressure.

After placing the chestpiece of the stethoscope over the arm medial to the tendon of biceps blood pressure of the subject was then recorded by auscultatory method. The first and the last audible korotkoff sounds were recorded as systolic and diastolic blood pressure respectively. Measurements were taken to the nearest 2mm Hg. Neither the subject nor the examiner talk during the procedure. The recordings were made in two different sittings and the lowest of the two recordings was taken in to consideration.[5]

Analysis of the Blood Sample

About 3 ml of blood sample was collected from the ante cubital vein of all the subjects (after 8 hours of overnight fasting) under aseptic precautions and the following parameters were measured at Central Laboratory, Vijayanagar Institute Of