Research Article

DISORDER OF CHOLESTEROL AND ELECTROLYTES METABOLISM IN HYPERTENSION

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Abstract: Hypertension is an asymptomatic, important disease regarded as a multifactorial disorder of modern life. The frequency of hypertension range from 6-32%. People with hypertension have lipid abnormality and electrolyte abnormalities when compared to individual with normotensive. There is positive association between sodium chloride (Nacl) intake and blood pressure. In present study we are going to evaluate serum cholesterol and electrolyte level in hypertensive and in normotensive. The present study was carried out on total 200 subjects, which were divided into two groups. First group of experimental group consists of 100 subjects with known hypertensive patient (B.P>140/90mm of Hg). Another group is control group consists of 100 subjects who were healthy normotensive (B.P<140/90 mm of Hg) with no past or present history of hypertension.12 hours overnight fasting venous blood sample was collected from both the subject group in plane vacutainer and the sample was centrifuged for the estimation of fasting cholesterol level and electrolytes i.e. sodium (Na^+), Potassium (K^+). The study was carried out on two group of population, one group was subject group i.e. hypertensive group, consisting of 65 male and 35 females (total population =100) and another group is the control group i.e normotensive, consisting of 60 male and 40 females (total population = 100). The total cholesterol level significantly elevated in subject group compared to control group (p<0.001). The sodium level is statistically elevated in subject group when compared to control group (P<0.001). The potassium level significantly decreased in subject group when compared to control group (P<0.001). It has been noticed that the serum cholesterol level, serum sodium level were stastically elevated in hypertensive subjects, while serum potassium level is significantly reduced in hypertensive subject when compared to normotensive subjects.

Keywords: Hypertension, Blood Pressure, Systolic BP, Diastolic BP, Cholesterol, Electrolyte.

INTRODUCTION

Hypertension is a major public health problem worldwide and the United States, with 57,100,000 Americans estimated to have the disease[1.] The etiology and causes of essential hypertension, the pathogenesis of the condition is still not explained clearly. Non pharmacological approaches to the treatment of hypertension have included a reduction of salt intake and increases in dietary potassium and calcium consumption, weight loss, and increased physical activity. Although the small reductions in blood pressure from these non pharmacological measures could theoretically have important beneficial public health consequences[2]

Hypertension is an asymptomatic and important disease of modern civilized life. The overall prevalence of hypertension has been reported to range from 6-32%.[3]

People with hypertension are more likely to have lipid abnormality than those with normal blood pressure. This condition is associated with appreciable morbidity and mortality, and may occur together increasing the associated complications. [4]

Hypertension is a metabolic disorder in which different physiological mechanisms participate and

Increase the blood pressure. The association of hypertension with renal disease is not very persuasive there remains the possibility that renal defects, primary or secondary, may be involved and have considerable influence on electrolytes and water balance leading to hypertension. Also considerable discrepancies exist in the reported studies related to blood electrolytes concentration in hypertensive population. [5]

MATERIAL AND METHOD

The total population of study was 200 subjects, which were divided into two groups. First group of case group consists of 100 subjects with known hypertensive patient (B.P>140/90mm of Hg). Another group is control group consists of 100 subjects who were healthy and normotensive (B.P<140/90 mm of Hg) with no past or present and family history of hypertension. Subject with pregnancy and on oral contraceptives were excluded from the study. Overnight fasting venous blood sample was collected from the subject in plane vacutainer and the sample was centrifuged for the estimation of fasting cholesterol level and electrolytes.

Sample was analyzed by using biochemistry auto analyzer. BS-300 chemistry Analyzer (Mindray) was used for analysis of fasting cholesterol level, while AVL

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electrolyte analyzer (AVL-1980 series) was used for analysis of electrolytes i.e. sodium (Na^+) and Potassium (K^+).

RESULT

Present study analyzed the total cholesterol level and electrolytes level (i.e. Sodium and Potassium) in hypertensive patients, and compared with controlled group i.e. normotensive group. The mean standard deviation of age and sex of subjects and controlled group is statistically significant. Personal history consisting of consumption of alcohol, diet, smoking with family history of subject was documented.
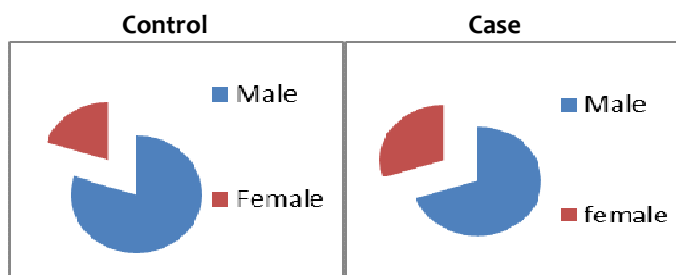

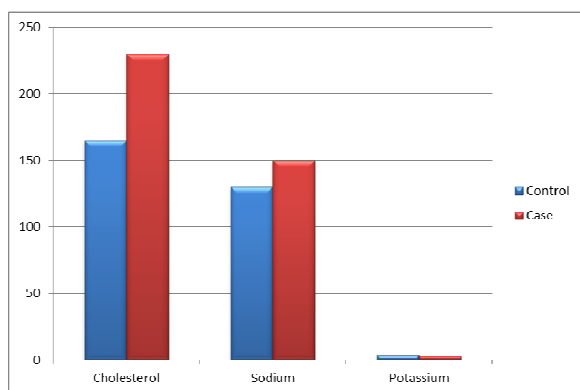**Fig.1:** Gender ratio in case and control group.

Fig.2: Comparison of mean level of parameter for case and control group.

The total cholesterol level significantly elevated in subject group compared to control group (p<0.001) which is shown in Table1. The sodium level is statistically elevated in subject group when compared to control group (P<0.001) which is shown in table 1. The potassium level significantly decreased in subject group when compared to control group shown in table 1, (P<0.001).

Table.1: Levels of study parameters between control and case

Study Parameter	Control	Case	Significance
Cholesterol (mg/dL)	165±25 140-190	230±24.9 205-255	P<0.001**
Sodium (m.mol/L)	132±2 128-132	150±2 148-152	P<0.001**
Potassium(m.mol/L)	4±1 3.0-5.0	3±0.5 2.5-3.5	P<0.001**

DISCUSSION

Hypertension affects approximately 25% of the adult population worldwide and its prevalence is predicted to increase by 60 % by 2025 AD.[6]It is the major risk factor for cardiovascular disease and is responsible for most death worldwide. [7]Sodium the major extracellular cation has long been considered the pivotal, environmental factor in the hypertension and has the bad effect on arterial pressure. [8,9,10,11]

Chloride the extracellular anion has been considered to induce hypertension in association with sodium.[12] Therefore serum and urinary levels of sodium and chloride were significantly higher in hypertensive than in normotensive, which confirm the important roles of these ions in the pathogenesis and maintenance of essential hypertension in population who habitually consume salt.[13]Potassium the main intracellular cation has usually been viewed as minor factor in the pathogensis of hypertension. However, abundant evidence indicates that a potassium deficit has a critical role in hypertension.[14,15,16]A population based study have shown an indirect relation of potassium intake to blood pressure and prevalence of hypertension, [14,17,18,19,20]

CONCLUSION

It has been concluded that the serum cholesterol level, serum sodium level significantly elevated in hypertensive subjects, while serum potassium level is significantly reduced in hypertensive subject when compared to normotensive subjects.

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