Original Research Article

Analysis of Serum Sodium and Potassium Levels in Preeclampsia: An Institutional Based Study

B. J. Pradeep Kumar[1], Bindu Sharma[2], Deepasha Shahi[3], Darshna Jain[4*]

[1,2] Associate Professor, Department of Biochemistry, Varun Arjun Medical College & Rohilkhand Hospital, Banthra, Shahjahanpur, Uttar Pradesh, India

[3]Assistant Professor, Department of Biochemistry, Mahatma Gandhi Memorial Medical College, Indore, Madhya Pradesh, India

[4]Assistant Professor, Department of Biochemistry, Government Medical College, Ratlam, Madhya Pradesh India

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Abstract:

Background: Preeclampsia is a syndrome characterized by hypertension, proteinuria and oedema. The present study was conducted to analyse Serum Sodium and Potassium Levels in Preeclampsia. **Materials and Methods:** It were a retrospective cross-sectional clinical study, carried out to analyse Serum Sodium and Potassium Levels in Preeclampsia. The results of 100 blood samples each of normotensives and preeclamptics women were included in the study. The measurement of serum sodium and potassium level was done. Statistical analysis was done. **Results:** In the present study results of 100 blood samples each of normotensives and preeclamptics women which came in the clinical lab for analyzing serum sodium and potassium levels over a period of 6 months were included in the study. The mean serum sodium levels in normotensives were 130.6mmol/l and in women with preeclampsia levels were 143.5mmol/l. The mean serum potassium levels in normotensives were 3.57 mmol/l and in women with preeclampsia levels were 2.67mmol/l. **Conclusion:** The present study concluded that the mean sodium levels were more in preeclampsia patients whereas the mean serum potassium levels were more in normotensives.

Keywords: Normotensives, Preeclampsia, Serum Sodium Levels, Potassium Levels.

Introduction

Preeclampsia is a syndrome characterized by hypertension (both systolic ≥140 mm Hg and diastolic ≥90 mmHg), proteinuria and oedema, noticed after 20-24 weeks of gestation[1].The other associated abnormalities include vision problems, hemolysis, elevated liver enzymes, low platelet count, abnormal fetal growth and preterm delivery[2].Theories of the pathophysiology of preeclampsia involve both maternal and foetal factors. Though the aetiology of preeclampsia remains unclear, many theories suggest abnormal placental implantation and abnormal trophoblastic invasion as a possible cause[3].Electrolytes like Calcium (Ca2+), Magnesium (Mg2+) Sodium (Na+) and Potassium (K+) play an important role in preeclampsia as they contribute significantly in the functioning of the vascular smooth muscles. Ca2+ plays a critical role in the function of vascular smooth muscles[4].Preeclampsia in pregnancy and its complications are the major cause of maternal mortality and morbidity after obstetric hemorrhage, pre-existing chronic disorders, sepsis, and abortions[5,6].Hypokalemia and increased dietary sodium may increase the blood pressure in preeclampsia patients[7]. Magnesium insufficiency might be a potential cause for development of preeclampsia and premature delivery of low birth weight babies. Magnesium deficiency in pregnancy increases the chances of neonatal death[8]. The present study was conducted to analyse Serum Sodium and Potassium Levels in Preeclampsia.

*Correspondence
Dr. Darshna Jain
Assistant Professor, Department of Biochemistry, Government Medical College, Ratlam, Madhya Pradesh, India
E-mail: drdarshna2311@gmail.com

Materials and methods

It was a retrospective cross-sectional clinical study, carried out to analyse Serum Sodium and Potassium Levels in Preeclampsia. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and written consent was taken from the patient after explaining the study. The results of 100 blood samples each of normotensives and preeclamptics women which came in the clinical lab for analyzing serum sodium and potassium levels over a period of 6 months were included in the study. Four mL of blood sample was centrifuged at 3500 rpm for 7 minutes to separate the serum and readings were taken. The device used for measuring serum sodium and potassium level was accurex enlite semi-automated electrolytic analyzer. Statistical analysis was done using statistical package for the social sciences (SPSS) 17.0 for windows, the mean and standard deviation was calculated to estimate the significance. The significance between the cases and controls was measured by students 't' test. A p-value less than 0.05 was considered as statistically significant.

Results

In the present study results of 100 blood samples each of normotensives and preeclamptics women which came in the clinical lab for analyzing serum sodium and potassium levels over a period of 6 months were included in the study. The mean serum sodium levels in normotensives were 130.6mmol/l and in women with preeclampsia levels were 143.5mmol/l. The mean serum potassium levels in normotensives were 3.57 mmol/l and in women with preeclampsia levels were 2.67mmol/l.

Table 1: Mean serum sodium levels and serum potassium levels in normotensives and Preeclampsia

Parameters	Normotensives	Preeclampsia
Serum sodium levels (mmol/l)	130.6 ± 3.8	143.5 ± 2.9
Serum potassium levels (mmol/l)	3.57 ± 0.32	2.67± 0.18

Discussion

Preeclampsia has been labelled as a dreaded disease affecting women and their pregnancy right from ancient times. The numerous complications associated with it have triggered a phobia in pregnant women and aroused the interest of Obstetricians everywhere. Preeclampsia is a multifactorial process & multiorgan dysfunction with no individual factor strictly essential or sufficient for causing it[9]. Thus estimation of electrolytes in preeclampsia provides a very useful index for the study of physiological and pathological changes during pregnancy[4]

In the present study results of 100 blood samples each of normotensives and preeclamptics women which came in the clinical lab for analyzing serum sodium and potassium levels over a period of 6 months were included in the study. The mean serum sodium levels in normotensives were 130.6mmol/l and in women with preeclampsia levels were 143.5mmol/l. The mean serum potassium levels in normotensives were 3.57 mmol/l and in women with preeclampsia levels were 2.67mmol/l.

A study conducted by Dhokikar et al. in 2015 in Mumbai not much difference is observed in serum sodium (138 ± 4.03 mEq/L) and serum Potassium (4.0 ± 0.5 mEq/L)[10]

In a study conducted by Tabassum, Jameil et al. in 2015 in Riyadh, Saudi Arabia, found the level of serum sodium significantly increased in preeclamptics (138.27 ± 2.99 mEq/L), while that of potassium significantly decreased (3.56 ± 0.38 mEq/L)[11]

Levels of serum Na+ were found to be significantly increased in patients of preeclampsia when compared with the normal pregnant women. The precise mechanism of sodium retention in preeclampsia is not clear though the retention is likely due to vasoconstriction leading to reduction of glomerular filtration rate and stimulation of renin angiotensin aldosterone mechanism. The net effect is decreased intracellular fluid and increased extracelluar fluid volume[9].

It has also been observed that reduced serum potassium levels also reduce sodium excretion through probable changes in reabsorption of sodium in the proximal tubule or loop of Henle of the kidney resulting in elevated blood pressure[12]. In fact it has been observed that a diet low in potassium coupled with individual's usual sodium intake can lead to sodium retention and therefore hypertension[13]

Conclusion

The present study concluded that the mean sodium levels were more in preeclampsia patients whereas the mean serum potassium levels were more in normotensives.

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