



DERANGEMENT OF SERUM ELECTROLYTES LEVEL IN DIABETIC PATIENTS

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ABSTRACT Diabetes mellitus is a chronic disease that requires long term follow up to limit the development of its serious complications. Electrolyte imbalances that can occur in diabetic patients which is responsible for many long-term diabetic complications can lead to increased morbidity and mortality. The aim of the study is to evaluate the Derangement of serum electrolytes level in diabetic patients. This is a cross sectional study including 80 T2DM patients attending OPD in Coimbatore medical college & hospital. The levels of serum electrolytes were found to be statistically significant ($p < 0.05$) in diabetic patients. A significant negative correlation was observed between fasting plasma glucose and serum sodium and a positive correlation between fasting plasma glucose and serum potassium. Thus, the study suggests the importance of electrolyte profile in the follow up of diabetes mellitus patients to prevent serious complications.

KEYWORDS : T2DM- Type 2 Diabetes Mellitus, Serum electrolytes, Fasting plasma glucose

INTRODUCTION:

Diabetes mellitus is a major global public health problem ⁽¹⁾. It is characterized by chronic hyperglycaemia which results from defective insulin action or secretion or both ⁽²⁾. The complications of diabetes are metabolic disturbances, microvascular and macrovascular problems, electrolyte imbalance etc ⁽³⁾.

Serum electrolytes play a significant role in maintaining acid base balance, blood clotting and controls the electrical gradient of the body fluids & muscle contraction ⁽⁴⁾. Major electrolytes present in intracellular fluid are potassium, magnesium, phosphate and sulphate whereas sodium, chloride and bicarbonate in extracellular fluid ⁽⁵⁾. Sodium is mainly associated with acid-base regulation, maintenance of osmotic equilibrium as well as uniform distribution and conservation of body fluids. Potassium is mainly responsible for the neuromuscular excitability, acid-base balance, cardiac action and acts as co-factor for the enzyme pyruvate kinase ⁽⁶⁾.

Electrolyte imbalances are early biochemical events responsible for long term diabetic complications. Measurement of ions such as sodium & potassium can be useful as an indicator for the patient's susceptibility to develop diabetes related complications.

The aim of this study is to evaluate the Derangement of serum electrolytes level in diabetic patients.

MATERIALS AND METHODS:

This is a cross sectional study conducted at Coimbatore Medical College & Hospital, Coimbatore. A total of 80 participants aged between 40 to 60 years who are previously diagnosed type 2 DM cases were enrolled. Type 1 Diabetes mellitus, Gestational diabetes mellitus, Diabetic neuropathy, Diabetic nephropathy, Smokers, Chronic alcoholics, Hypertension, Cardiovascular and Kidney disturbances were excluded from this study since all the above, mentioned conditions will alter the levels of serum electrolytes.

Blood sample was collected and fasting plasma glucose level and serum sodium and potassium levels were measured. Plasma fasting glucose was estimated in Fully automated clinical chemistry analyzer by Glucose Oxidase- Peroxidase method. Serum sodium & potassium were estimated by Ion selective electrodes using Electrolyte analyzer.

The results are presented as Mean \pm SD. Student t test was performed to study the significance of serum electrolytes in DM. Pearson's correlation was done to study the correlation between serum sodium and potassium with DM. Statistical analysis was done by using software GraphPad Prism 8.0

RESULTS:

The levels of serum electrolytes were found to be statistically significant ($p < 0.0001$) in diabetic patients. A significant negative correlation was observed between fasting plasma glucose and serum

sodium and a positive correlation between fasting plasma glucose and serum potassium.

Table:1 Values of electrolytes among study population

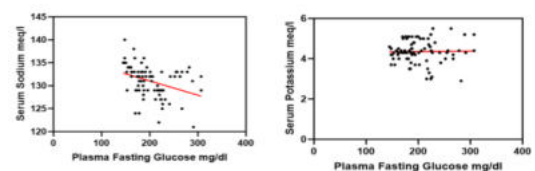
Variables	Diabetes (n=80)	Normal	Student's t test p value	Pearson's Correlation r value; p value
Sodium	130.98 \pm 3.47	140.0 \pm 5.0	<0.0001	-0.36; < 0.005
Potassium	4.35 \pm 0.57	4.0 \pm 0.50	<0.0001	+0.02; ns

DISCUSSION:

This study was conducted to know how far the serum electrolytes are involved in diabetic complications. In this study, we have found that the level of serum sodium has been decreased in diabetes mellitus patients and it is negatively correlated with fasting blood glucose.

And potassium levels have been positively correlated with fasting blood glucose and it is insignificant. This is consistent with the findings of Bohara J et al, Kunwar S et al, who showed that the levels of serum electrolytes get altered in uncontrolled type 2 diabetes patients (3)

Figure:1 Correlation between serum sodium, serum potassium and plasma fasting glucose



Diabetes mellitus is a multisystem disorder that can lead to devastating complications. These electrolyte imbalances are due to hyperglycemia, hypo-insulinemia and acidosis. Hyponatremia is the most common electrolyte disturbance in Diabetes mellitus. The reason behind this abnormality can be explained as, normally sodium is reabsorbed in proximal convoluted tubule of kidney but in diabetes mellitus excessive urination happens due to hyperglycemia, can cause maximum excretion of sodium through urine ⁽⁷⁾

CONCLUSION:

Therefore, the study suggests the importance of electrolyte profile in the follow up of diabetes mellitus patients to prevent the development of electrolyte disturbance related complications.

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