

Effect of Hemodialysis on Blood Glucose Level

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ARTICLE INFO

Article history:

Received: 26 August 2015;

Received in revised form:

07 October 2015;

Accepted: 12 October 2015;

Keywords

Hemodialysis,
Renal failure,
Glucose estimation.

ABSTRACT

The study targeted the evaluation the effect of hemodialysis on blood glucose in renal failure patients at Shendi town in Sudan during (January–February) 2013.

To estimate blood glucose level pre and post hemodialysis.

1. To identify the blood glucose level pre and post hemodialysis.

2. To identify the effect of duration of hemodialysis.

3. To identify the risk factors that cause hypoglycemia during hemodialysis.

4. To identify the people prone to hypoglycemia during hemodialysis.

Across sectional descriptive study, conducted at Shendi town during the period from March to May 2015 that aimed to estimate blood glucose in renal failure pre and post dialysis. The study was done at Shendi town which is located in the north of Sudan and north of the capital Khartoum located about 173km and covering area about 30km. total of 30 sample pre dialysis, and 30 sample post dialysis was collected from renal failure patients in hospital. patients were collected in performed questionnaire. 2.5 ml of fresh venous blood was collected from each patient pre and post dialysis in fluoride oxalate container for determination of glucose level. For the quantitative determination of glucose in serum and plasma Glucose oxidase method was used. The statistical analysis of the results showed that the mean of glucose is lower in post hemodialysis (84.5)mg/dl. While the mean of glucose in pre hemodialysis (117.8)mg/dl. The P value is 0.000 which means that there is a highly significant variation between pre and post, where the values are high in post, and this agrees with Study done by Miho Senda et al. entitled (The strong relation between post – hemodialysis blood methylglyoxal levels and post-hemodialysis blood glucose concentration rise, Clinical and Experimental Nephrology, 20 Aug 2014. From this research we concluded that the level of blood glucose in renal failure patients is decrease post hemodialysis, which means there is a clear effect of hemodialysis on blood glucose level.

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Introduction

Kidneys are vital organs that perform a variety of important functions. the most prominent functions are removal of unwanted substances from plasma (both waste and surplus); homeostasis (maintenance of equilibrium) of body water, electrolyte, and acid –base status; and participation in hormonal regulation.⁽¹⁾

Problem that affect renal function

One of the problems that affect renal function is Renal failure.⁽¹⁾

Renal failure is loss of renal function for control of water and electrolyte, decline in filtration and removal wastes and loss of nutrients

Renal failure

Mean failure of renal excretory function due to depression of glomerular filtration rate.⁽²⁾

Effect of renal failure

Anemia: Normocytic normochromic anemia

Due to erythropoietin deficiency, abnormal red cell membrane and increased blood loss (occult gastrointestinal bleeding, blood loss during hemodialysis or platelet dysfunction.

Metabolic abnormality

Gout

Plasma urate concentration in parallel with plasma urea, urate retention is common feature of chronic kidney disease.⁽⁴⁾

Insulin

Changes in glucose metabolism can lead to hypoglycemia.

Lipid metabolism abnormalities

Impaired clearance of triglyceride rich particles.

Hypercholesterolemia.⁽²⁾

Plasma phosphate concentration rise and plasma total calcium concentration fall.⁽⁴⁾

Bone disease

The pathogenesis of this related to decrease renal production of the 1 α hydroxylase enzyme result in reduced conversion of 25-(OH) 2D3 to the 1,25-(OH) 2D3, reduce in the vitamin D receptor in parathyroid gland lead to increase release of parathyroid hormone and Phosphate retention owing to reduce excretion by the kidneys (hyper phosphatemia) also indirectly by lowering ionized calcium result in an increase in parathyroid hormone synthesis and release.⁽²⁾

Endocrine abnormalities

Hyperprolactinaemia, increase luteinizing hormone level in both sex, decrease serum testosterone level, absence of normal cyclic changes in female sex hormone, complex abnormalities of growth hormone secretion and action, resulting in impaired growth in uremic children and abnormal thyroid hormone level due to altered protein binding.⁽²⁾

Muscle dysfunction

Uremia interfere with muscle energy metabolism, but the mechanism is uncertain. Decreased physical fitness.⁽²⁾

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Hypertension.⁽³⁾
Prephral neuropathy⁽³⁾

Effect of renal failure on carbohydrate metabolism

Insulin is catabolized by and to some extent excreted via the kidneys .for this reason, insulin requirements in diabetic patients decrease as renal failure progresses. by contrast ,end-organ resistance to insulin is a feature of advanced renal impairment resulting in modestly impaired glucose tolerance when a standard glucose tolerance test is carried out .⁽²⁾

Methods

Study design

Across sectional descriptive study, conducted at Shendi town during the period from March to May 2015 that aimed to estimate blood glucose in renal failure pre and post dialysis.

Study area

The study was done at Shendi town which is located in the north of Sudan and north of the capital Khartoum located about 173km and covering area about 30km.

Study population sampling

A total of 30 sample pre dialysis, and 30 sample post dialysis was collected from renal failure patients in hospital.

Data collection tools

Information from dialysis patients were collected in performed questionnaire.

Collection technique

2.5 ml of fresh venous blood was collected from each patient pre and post dialysis in fluoride oxalate container for determination of glucose level.

Method used

For the quantitative determination of glucose in serum and plasma Glucose oxidase method was used.

Results

Table No (3-1) show the blood glucose level in renal failure patient pre and post hemodialysis

	Mean	Number	Significant
Pre hemodialysis	117.8	30	.000
post hemodialysis	84.55	30	.000

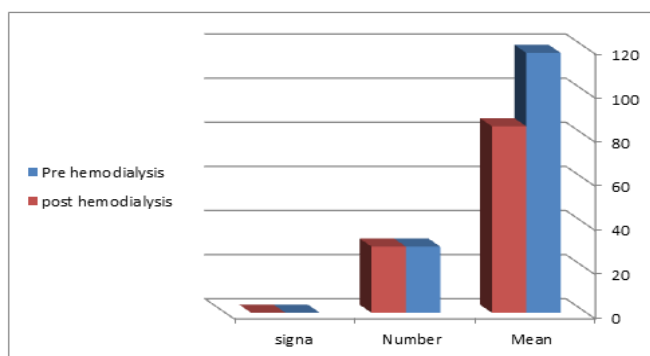


Figure No (3-1) show the blood glucose level in renal failure patient pre and post hemodialysis

Results

The statistical analysis of the results showed that the mean of glucose is lower in post hemodialysis (84.5)mg/dl. While the mean of glucose in pre hemodialysis (117.8)mg/dl .The P value is 0.000 which means that there is a highly significant variation between pre and post , where the values are high in post.

Discussion

The statistical analysis of the results showed that the mean of glucose is lower in post hemodialysis (84.5)mg/dl. While the mean of glucose in pre hemodialysis (117.8)mg/dl .The P value is 0.000 which means that there is a highly significant variation between pre and post , where the values are high in control, and this agrees with Study done by Miho Senda et al (,20 Aug 2014) ,The strong relation between post hemodialysis blood Methylglyoxal level and post hemodialysis blood glucose concentration rise .⁽⁵⁾

Conclusion

From this research we concluded that the level of blood glucose in renal failure patients is decrease post hemodialysis, which means there is a clear effect of hemodialysis on blood glucose level.

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