STUDY OF EFFECT OF GLYCEMIC CONTROL IN CKD DIABETIC PATIENTS AND THEIR RELATION TO HYPOGLYCEMIA C-PEPTIDE AND ISLET ANTIBODIES

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INTRODUCTION

Diabetes mellitus is a major public health issue with an increasing prevalence worldwide. In Egypt, DM is the leading cause of chronic kidney failure.

Classification: type I DM, type II DM, Gestational DM, MoDY, LADA.

Complication: Diabetic nephropathy is significant cause of morbidity and mortality in DM patients with progression to ESRD.

eGFR ml/min/1.73m²	Albuminuria categories Albumin:Creatinine ratio spot urine		
	A 1 <3 mg/mmol	A 2 3-30 mg/mmol	A 3 >30 mg/mmol
G1 ≥ 90	No CKD	G1 A2	G1 A3
G2 60-89	No CKD	G2 A2	G2 A3
G3a 45-59	G3a A1	G3a A2	G3a A3
G3b 30-44	G3b A1	G3b A2	G3b A3
G4 15-29	G4 A1	G4 A2	G4 A3
G5 <15	G5 A1	G5 A2	G5 A3

Increasing risk

Increasing risk

Hypoglycemic: Hypoglycemic is an essential and frequent adverse effect of glycemic control, as it causes significant morbidity and mortality. A plasma glucose concentration of </= 70 mg/dL on either self-monitored plasma glucose or continuous glucose monitor is used as the cut-off value for hypoglycemia in patients with diabetes. Diabetic kidney disease carries an increased risk of hypoglycemia.

C-peptide: Because C-peptide is released into the circulation alongside insulin, it has been widely used to assess pancreatic beta cell function as a measure of insulin secretion.

Islet cell antibody: Pancreatic islet autoantibodies are the hallmark of pancreatic autoimmunity in type I diabetes. However, increasing notable discoveries had provided evidence supporting the notion that islet autoimmunity is also a vital component involved in the pathogenesis and development of classical T2DM. previous studies had indicated that a wide range of 4-17% of apparent type 2 diabetes had markers of islet autoimmunity as seen in type I diabetes.

AIM OF THE WORK

Study the effect of glycemic control in diabetic patients with CKD stage three, four and five predialysisand their relations with hypoglycemic, C peptide and islet cells antibodies.

SUBJECTS AND METHODS

Subjects: Study population: This study will be conducted on 60 patients with diabetes mellitus and chronic kidney disease divided into 3 groups:

*Twenty patients are having CKD stage 3.

* Twenty patients are having CKD stage 4.

*Twenty patients are having CKD stage 5 (predialysis).

Methods: After giving their informed consent, all the participants were subjected to the following:

1.Full history taking including:

- Family history of DM and DN.
-Related comorbidities as dyslipidemia, hypertension, coronary heart disease, cerebrovascular and peripheral arterial diseases.
- Liver, cardiac, pulmonary and collagenic diseases.
- Special habits as smoking and alcohol intake.
- The time of diagnosis of DM (duration of DM).
- Drug history.
- Attacks of hypoglycemia

2.Complete physical examination including body weight, BMI, vital signs (heart rate, arterial blood pressure), comprehensive heart, chest and abdominal examination.

3.Routine laboratory investigations:

- Renal function tests: blood urea-serum creatinine
- Estimated GFR by cockroft and gault formula.
-Complete urine analysis.
- Albumin creatinine ratio.
- Fasting plasma glucose.
- HbA1c.
- C-peptide.
- Islet cells autoantibodies.
- C.B.C
- Lipid profile
- Liver function test

RESULTS

On examination of the boxplot in figure 2, it was found that the number of **hypoglycemic events** increased as the disease progressed. However, the significance of difference within the stages of renal disease was variable, according to the intensity of glycemic control. The difference in the rate of events within the stages of renal disease was statistically significant within stage 3 and stage 4, but it was not significant in stage 5 (p values were 0.036 vs. 0.013 vs. 1 within stage 3, 4 and 5, respectively). This could be attributed to the progressive loss of renal function and the ability of the kidneys to regulate blood glucose levels.

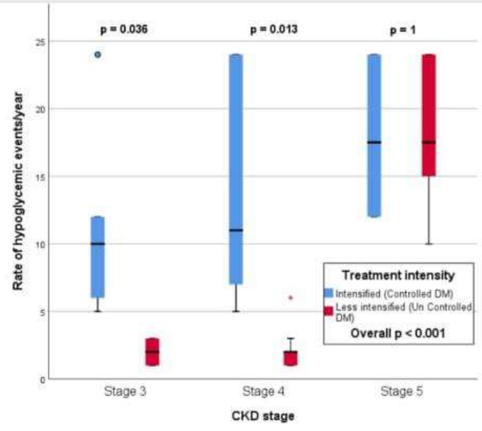

Figure : Chustered boxplot showing the of distribution of hypoglycemic events within the stages of renal dysfunction.

CONCLUSION

- Intensified glycemic control had a significant effect on HBA1c without a statistically significant difference between different CKD stages. Furthermore, intensified glycemic control is associated with hypoglycemic events that are significantly associated with renal disease progression.
- Intensified glycemic control did not show a statistically significant effect on C-peptide or ICA. Moreover, C-peptide did not significantly differ between CKD stages.
- Islet cell antibody is significantly present in advanced CKD stages and significantly correlated with age, eGFR, rate of hypoglycemic events per year, serum creatinine, and insulin.
- C-peptide and islet cells antibodies need more researches to know about their importance in CKD diabetic patients.