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ASSESSMENT OF GLYCOSYLATED HEMOGLOBIN (HBA1C) IN POST RENAL TRANSPLANTATION PATIENTS-KHARTOUM STATE-SUDAN

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ABSTRACT

Background: Abnormal HbA1c and random blood glucose concentrations have been associated with post renal transplantation patients using Tacrolimus. Therefore, our study aimed to find out the relationship between HbA1c and Tacrolimus levels. **Methodology:** A case control study involving forty post renal transplantation patients and forty control subjects with different ages and gender. The study measuring HbA1c and Tacrolimus concentration in post renal transplantation patients. **Result:** Forty post renal transplantation patients and forty control subjects were studied. The mean±SD of duration was 2.22±2.39 years and Tacrolimus dose was 6.09±3.17 μg/day. There is an elevation in HbA1c and Tacrolimus in post renal transplantation patients. Tacrolimus concentration Mean±SD was 6.71±1.89 μg/ml and has no effect (P=0.0675) on HbA1c concentration of patients. **Conclusion**: The present study showed that there is no significant relationship between elevation of HbA1c and the concentration of Tacrolimus.

KEYWORD: Glycosylated hemoglobin (HbA1c), D.M, Post kidney transplant, Tacrolimus.

INTRODUCTION

Diabetes has been shown to be closely related to post transplantation patients.[1] [2] Even they did not have diabetes after an organ transplant this type of diabetes is called new-‘onset diabetes’ after transplanting, it is also called (NODAT). New onset diabetes can occur as a

side effect of the medication. Therefore, it should be control in order to prevent needed to prevent rejection of kidney.[3] Patients after transplantation must continue taking immune suppression medications to prevent their bodies against rejection of new transplanted kidney. Normally, their bodies fight off anything that isn't part of itself, like germs or viruses. That system of protection called immune system. Tacrolimus keeps their immune system less active.[3] [4] [5] Without it, their immune system would recognize the new kidney as a foreign invader and try to destroy it. Unfortunately, these medicines (Tacrolimus) can also increase the risk for diabetes or make it worse.[6] [7] This study aimed to investigate HbA1c level in post renal Transplantation patients under Tacrolimus Therapy.

MATERIALS AND METHODS

Forty patients from 3 transplant centers in Khartoum State with HbA1c >6 µg/ml and period of transplantation between 10 days to 5 years with stable renal function and normal glucose level before transplantation against 40 control apparently healthy individuals where included in this study. HbA1c was measured in both groups in a whole blood sample using Cobas CIII (Affinity chromatography).

RESULTS

Total of Forty patients treated with Tacrolimus and 40 control subjects with different age ranged from (14 – 65 year) and gender were included in this study. Patients also were classified according to the dose of Tacrolimus from (1 – 12 Mg/day) Mean ± SD= 6.09 ± 3.17 µg/ml Table. 1 and concentration of Tacrolimus from (4 – 12 mg/mL) Mean ± SD = 6.71 ±3.17 Table. 2.

Table 1: Classification of patients according to Tacrolimus dose

Dose (mg)	Frequency	%
<4	9	22.5
4-5	11	27.5
6-8	11	27.5
>8	9	22.5
Total	40	100%
Mean ± SD	6.09 ± 3.17	

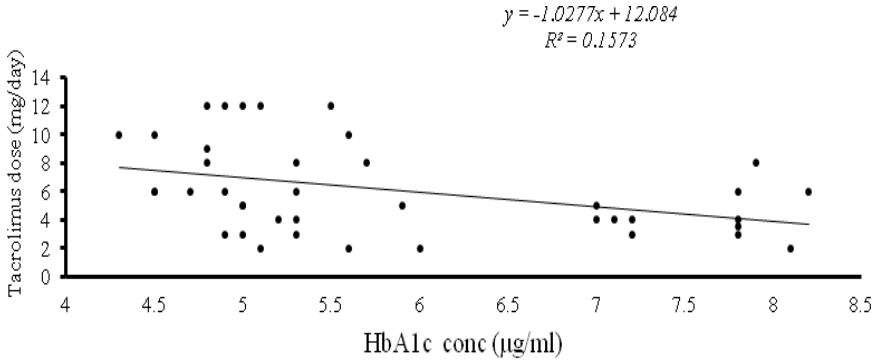
Table 2: Classification of patients according to concentration Tacrolimus

Conc. (µg/ml)	Frequency	%
<6	10	25
6.0-7.9	20	50
8.0-9.9	6	15
≥10	4	10
Total	40	100%
Mean ± SD	6.71 ± 1.89	

There is no significant difference between the daily dose, the concentration of Tacrolimus and HbA1c concentration in patients (Table. 3, 4) and "Fig. 1,2". Correlation between HbA1c concentration and Tacrolimus dose showed weak relationship (R^2=0.1573) and also weak correlation (R^2 = 0.1994) between HbA1c and Tacrolimus concentrations of patients.

Table. 3: Relationship between HbA1c and dose of Tacrolimus of patients

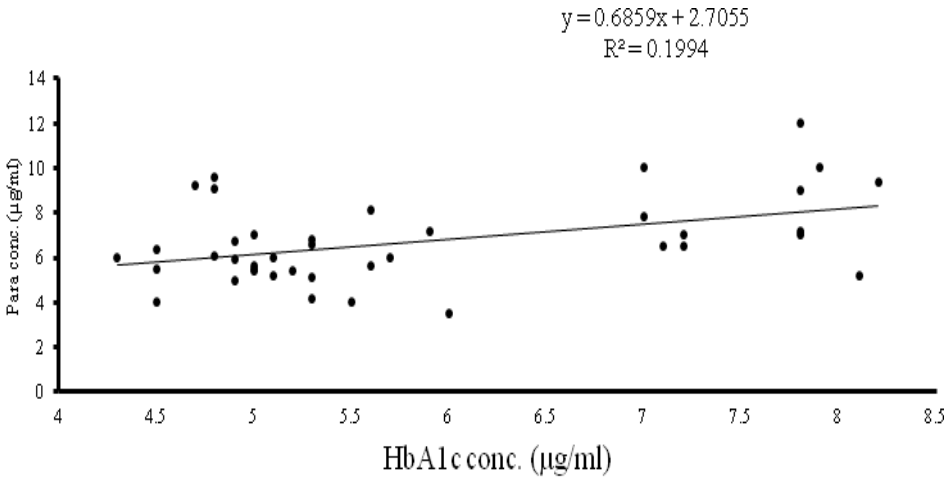
HbA1c (µg/ml)	Tacrolimus dose (mg)							
	<4		4-5		6-8		>8	
	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
<4	-	-	-	-	-	-	-	-
4-6	6	15.0	5	12.5	8	20.0	9	22.5
>6	3	7.5	6	15.0	3	7.5	-	-
Total	9	22.5	11	27.5	11	27.5	9	22.5
P-value	0.3117							



"Fig. 1": HbA1c concentration and Tacrolimus dose of patients

Table 4: Relationship between HbA1c and Tacrolimus concentrations of patients

HbA1c (µg/ml)	Tacrolimus concentration (µg/ml)							
	<6		6.0-7.9		8.0-9.9		≥10.0	
	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
<4	-	-	-	-	-	-	-	-
4-6	9	22.5	15	37.5	3	7.5	1	2.5
>6	1	2.5	5	12.5	3	7.5	3	7.5
Total	10	25.0	20	50.0	6	15.0	4	10.0
P-value	0.0675							

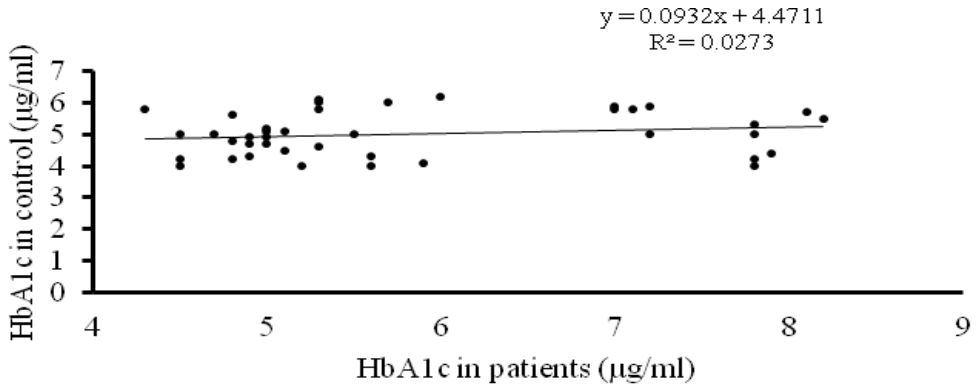


"Fig. 2": HbA1c and Tacrolimus concentrations of patients

When we compare the HbA1c concentration between control and patient showed significant difference with weak relationship (R^2=0.0273) as shown in Table. 5, "Fig. 3".

Table (5): Relationship between HbA1c concentration in control and patients

HbA1c (µg/ml)	Control		Patient	
	Freq.	%	Freq.	%
<4	-	-	-	-
4-6	38	95	28	70
>6	2	5	12	30
Total	40	100%	40	100%
Mean±SD	5.02±0.69		5.84±1.29	
P-value	0.0081			



"Fig. 3": HbA1c concentration of control and patients

DISCUSSION

HbA1c abnormalities have been described in all patient using immunosuppressive drugs. Uncontrolled glucose level can result in limitation of transplanted organ. New-onset diabetes after transplantation said that development of diabetes after transplantation has serious

consequences for the patient and threatens the outcome of transplantation, studies suggest that diabetes development after transplantation is associated with reduced graft function.[11] HbA1c act as a marker for glycemic control status. In the present study we measure HbA1c in post kidney transplant patient using Tacrolimus.

We found that there is no significant relationship between the daily dose, concentration of Tacrolimus and HbA1c level this is in-concordance with Malinow et al in study of effect of Tacrolimus dosing on glucose metabolism in an experiment rat found that there was no difference in the serum glucose and insulin level between the Tacrolimus treated and control group only high doses of Tacrolimus might induce glucose intolerance in transplanted patients.[9]

Other studies disagree with our study done by Hoban *et al.* 2006, which found an elevated HbA1c in twenty subjects (10.1%) of the study group. High normal fasting glucose (P=0.003) and African American race (P=0.08, marginally significant) were found to be associated with an elevated HbA1c. Subjects with normal and abnormal HbA1c levels were otherwise similar. There was no difference in HbA1c in Tacrolimus versus cyclosporine treated subjects or in the percent of subjects with elevated HbA1c between these groups, so HbA1c levels is more sensitive test than fasting blood glucose level in PTDM.[10]

CONCLUSION

The present study conducted that there is no relationship between HbA1c level and the concentration of Tacrolimus in post kidney transplant patient.

Conflicts of interest

The authors declare no conflicts of interest.

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