



EVALUATION OF PLASMA BETA₂-MICROGLOBULIN FOR EARLY DETECTION OF CHRONIC KIDNEY DISEASE IN SUDANESE PATIENTS WITH HYPERTENSION AND TYPE 2 DIABETES MELLITUS - KHARTOUM STATE

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ABSTRACT

Background: Beta₂-microglobulin is a marker used for early detection of chronic kidney Disease in high-risk patients (hypertension and type 2 diabetes mellitus). **Methodology:** case-control study in which 75 subjects were enrolled with age ranged 40-80 yrs and different gender. Patients were classified into two groups, diabetics and hypertensive (with different duration), and the rest of participants as control. Renal Function Test (serum creatinine and blood urea) and beta₂-microglobulin were measured. **Results:** seventy five individuals included in this study, of whom 50 diabetic and hypertensive patients: diabetic male 5 (20%) and 19(80%) were female, 8 (32%) hypertensive male and 17 (68%) female. 25 apparently healthy subjects 14 (56%) male and 11 (44%)female. Glucose level and beta₂-microglobuline was significantly increased in diabetics and hypertensive Patients when compared to the control group (P-value = 0.001, 0.000 respectively). There a positive correlation between duration of type2 diabetes and hypertension and levels of beta₂microglobulin. **Conclusion:** Beta₂-microglobuline was significantly increased in high-risk population and correlated with duration of type2 diabetes and hypertension. It might a good marker for early detection of chronic kidney disease in such patients.

KEYWORDS: Beta₂-microglobulin (B2MG).chronic kidney disease.

INTRODUCTION

Diabetes mellitus: is disease characterized by Hyperglycemia, And may lead to micro vascular and macro vascular complications.^[1]

And can lead to kidney damage then renal failure.^[3] It is the most common cause of end-stage renal disease in the United States and Europe.^[4] Hypertension: rise of blood pressure above the normal range.^[5]

Hypertension can lead to damage of blood vessels, these can reduce blood supply to the kidneys and damage the filtering unit in kidneys, result the kidney to stop elimination wastes and extra fluid from the body.^[5]

Chronic kidney disease: is a gradual decreasing in renal function over time.^[2] Early detection and treatment are needed to prevent progression to kidney failure and complication such as coronary vascular disease^[7]

Beta₂-microglobulin: is a small, non-glycosylated Peptide^[6] (molecular weight, 11800 da) found on the surface of most nucleated cell and easily filtered by glomerulus and 99.9% is reabsorbed by the renal tubules and catabolized.^[2]

Is used for early detection of renal impairment.^[8]

The aim of this study is used of beta₂-microglobulin as marker for early detection of chronic kidney disease in hypertensive and type2 diabetes patients Baderaldien et al (2014) in their study showed that the mean of the plasma level of Beta-2-microglobulin was significant raise in diabetic group when compared to the control group.^[3]

Musialik D et al (1994) in their study showed that Significantly increased beta₂-microglobulin Excretion with urine was noted in highest values in patients with severe blood hypertension.^[9]

MATERIALS AND METHODS

A case-control study was conducted among 75 Subjects with age above 40 and different genders In Khartoum state in the period from January to March (2017). Subjects defined as patients with Diabetic type2 or hypertensive with different duration. This study approved by U of K ethical committee, all patients was asked to sign an informed consent prior to inclusion in the study. Patients with infection, heart disease or renal disease were excluded. All tests was performed under

defined condition. Beta₂-microglobuline was determined by immune turbid metric assay for quantitative in vitro determination of beta₂-microglobulin in human serum and plasma on Roche COBAS C311 analyzer; the two controls normal and pathological were within range, the sample was taken in lithium heparin and then saved in -20 C. Blood Glucose was determined by the enzymatic hexokinase kit by COBAS integral 400 chemistry analyzer. Creatinine was determined by Jaff reaction and urea by Berthelot reaction COBAS 400 chemistry analyzer.

Patients were divided into subgroups according to the duration of disease:

Diabetic patient with duration [<5 , <10 and more than 10] Hypertension patient with duration [<5 , <10 and more than 10]. The data where input into SPSS version 21.0

Statistical analysis software. The measurement data expressed as mean \pm SD and percentage.

Independent T-test was done to compare the study parameters in cases and controls.

Pearson correlation was use to study the relation between the study parameter and study variable.

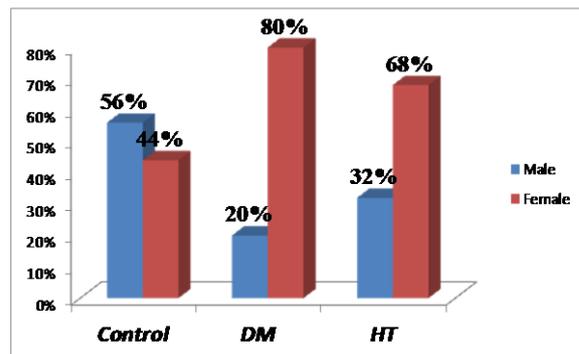
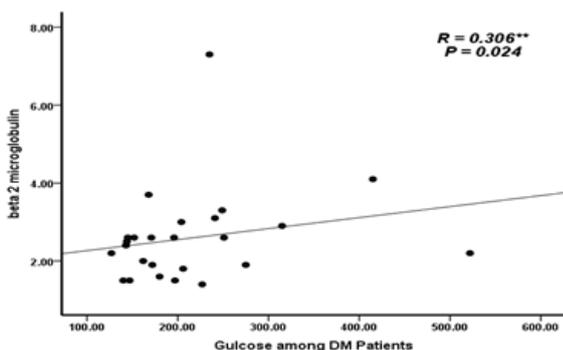
P-value = or $< 5\%$ ($=$ or < 0.05) consider as significant difference.

Table (1): showed glucose level and beta2-micoglobuline was significantly increased in diabetic patients when compared to the control group (p-value = ≤ 0.05),

Parameters	Control (Mean \pm SD)	DM (Mean \pm SD)	P-value
Glucose	96.68 \pm 14.28	215.36 \pm 91.18	0.000
Urea	21.52 \pm 8.27	24.44 \pm 8.38	0.122
Creatinine	0.82 \pm 0.25	0.98 \pm 0.33	0.053
B2MG	1.74 \pm 0.27	2.59 \pm 1.21	0.001

Table 2: showed that level creatinine and beta₂-microglobulin were significant increase in hypertensive compared to control group (p-value= ≤ 0.05).

Parameters	Control (Mean \pm SD)	HT (Mean \pm SD)	P-value
Urea	21.52 \pm 8.27	19.04 \pm 5.14	0.209
Creatinine	0.86 \pm 0.25	0.94 \pm 0.22	0.044
B2MG	1.74 \pm 0.27	2.71 \pm 0.89	0.000

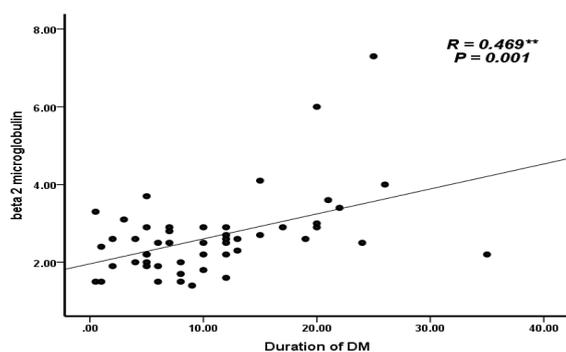


RESULTS

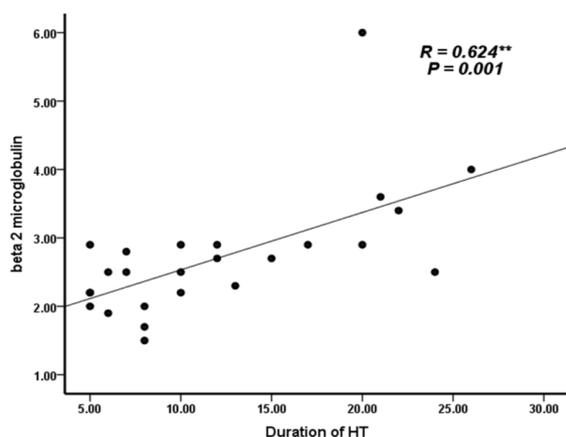
A total of 75 participants were enrolled in this study, 25 hypertensive, 25 diabetic patients type 2 and 25 healthy patients.

The mean age was match in all groups. General distribution among the study group showed, 50% diabetic and hypertensive patients: diabetic male 5 (20%) and female 19 (80%), hypertensive male 8 (32%) and female 17 (68%). 25% apparently healthy subject 14 (56%) male and 11 (44%) female.

Pearson correlation the beta₂-microglobulin was showed positively correlated with glucose level in diabetic patients (R=0.0306, P-value=0.024).



Pearson correlation of beta-2-microglobulin with duration of glucose was positively increased ($R=0.469$, P -value=0.001).



Pearson correlation of beta-2-microglobuline was positively increased with duration of hypertension ($R=0.0624$, P -value=0.001).

DISCUSSION

Chronic kidney disease was disease that damage the kidneys function and decreased their ability to eliminate the waste product.^[7] The diabetes and hypertension is highly risk-factor for chronic kidney disease^[3,5], evaluation of beta₂-microglobulin used for early detection and control the complication.^[3]

In present study there is a positively correlation between beta₂-microglobulin and duration type 2 diabetes mellitus and hypertension.

These results agreed with result of study done by dr.baderaldain Hassan *et al* (2) they reported that plasma level of B2MG was significantly increased in diabetic group when compared to the control groups.

And also agreed with result of study done by Musialik D *et al* (1994) in their study showed that Significantly increased beta₂-microglobulin Excretion with urine was noted in highest values in patients with severe blood hypertension^[9]

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CONCLUSION

Beta₂-microglobulin was significantly increased in high-risk population and correlation with duration of type2 diabetes and hypertension. It might a good marker for early detection of chronic kidney disease.

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