

The Relationship between ABO Blood Group Antigens and Renal Function Test among Chronic Kidney Disease Patients in Khartoum State

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Abstract

Background: There were four antigens in ABO blood group system A,B,AB,O in human blood that significant for blood transfusion and hemolytic disease of new born. recent study also discover common ABO antigens relate with basal cell carcinoma, pancreatic cancer and other cancers disease , in this study we try to answer this question if polymorphism ABO blood group antigens can be cause of chronic kidney disease. **Objectives:** Detect the relationship between ABO blood group antigens and renal function test among chronic kidney disease patients in Khartoum state. **Methods:** Case control study blood samples of patient collected from dialysis centers and hospitals, the age from 6-72 years in Khartoum state were randomly selected for the study from May 2015 to June 2018, control group selected from central blood bank donated health people, blood samples were tested serological for ABO phenotype and renal function test. **Result:** Different ABO blood group in compared with renal function test show respectively A,B,AB and O in result of urea 131,149,116 and 121 mg/dl, creatinine 10.1,10.0,8.6 and 9.1 mg/dl, sodium 135,136,133and134mmol/l, potassium 4.5,4.6,3.9 and 4.5 mmol/l, finally uric acid 7.2,6.1,5.9 and 6.8mg/dl. **Conclusions:** No significant relation of ABO antigens as cause of chronic renal disease.

Keywords: Chronic renal disease, Renal function test, ABO blood group.

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INTRODUCTION

Kidney is play main role in filtration of the blood from the waste products to extract outside the body, maintain electrolyte balance levels, control the blood pressure and also help in production of red blood cells [1]. There were two condition to failure the kidney function that can be an acute in cause of injures the kidneys or in cause of chronic diseases such as diabetes or hypertension that gradually dysfunction the kidney lead to chronic kidney disease.

The most common causes of chronic renal failure are related to poorly controlled of diabetes and also high blood pressure.

There were four ABO blood group antigens A,B,AB,O in human blood that significant for blood transfusion and hemolytic disease of new born. Recent study also discover common ABO antigens relate with basal cell carcinoma, pancreatic cancer and other cancers disease.

There was no study done in Sudan relationship between the ABO blood group and renal function levels in patients of chronic kidney disease , this study was performed to detect which antigen can be relate with severity of patient.it is start point go forward to discover new science.

PATIENTS AND METHODS

The Study Population

This is a case control study blood samples of patient collected from dialysis centers aged 6-72 years in Khartoum state were randomly selected for the study from May 2015 to June 2018, control group selected from central blood bank donated health people, blood samples tested serological for ABO phenotype .Dialysis centers in Khartoum state were randomly selected such as Princess Nora Pediatric Dialysis Center, Ibn Sina Hospital and The Sudanese Kidney Care Association Hospital.

Ethical Consent approved from university of science and technology Faculty of Postgraduate Studies

and Researches and the self-administered questionnaire was obtained from all patients after inform them about the objective and details of the study.

Sample Size

The sample size was calculated using software known as the survey system that represents confidence interval of 98 ± 0.85 , 100 samples or more should be investigated.

Sample collection

Following standard protocol (5 ml) blood samples were collected from all patient and control

group divided into (2ml) in ethylene diamine tetra acetic acid (K2EDTA) anticoagulant tube for ABO blood group testing immediately by using serology technique Anti-A, Anti-B monoclonal antibody and (3ml) collected in gel tube for result serum that free of hemolysis and gross lipemia for renal function test.

RESULTS

Distribution of ABO blood group in patients of chronic kidney disease in compared with control group A 39% and 37%, B 15% and 11%, AB 3% and 0%, O 43% and 52% respectively shown in (Figure-1).

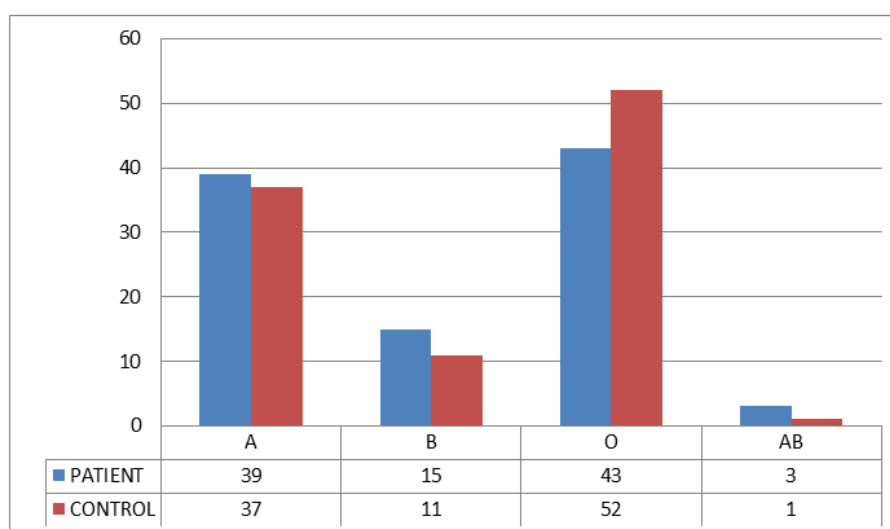


Fig-1: Percentage different in (ABO) blood groups between patients of chronic kidney disease and control group

Different ABO blood group in compared with renal function test show respectively A,B,AB and O in result of 131,149,116 and 121 mg/dl, creatinine 10.1,10.0,8.6 and 9.1 mg/dl, sodium 135,136,133 and 134 mmol/l, potassium 4.5,4.6,3.9 and 4.5 mmol/l, finally uric acid 7.2,6.1,5.9 and 6.8 mg/dl respectively (Table 1), in other hand when compared of ABO blood

group system and causes that lead to chronic kidney disease found that chronic disease (diabetes and hypertension) common cause percentage in A 72%, B 76%, AB 70%, O 66% and other factors congenital, obstructive uropathy, Glomerulonephritis, etc. show A 28%, B 24%, AB 30%, O 34% (Table-2).

Table-1: Difference of ABO blood group antigen compared with renal function test in chronic kidney disease patients

Renal function test	Mean \pm STD			
	A	B	AB	O
Serum urea mg/dl	131 \pm 54	149 \pm 76	116 \pm 50	121 \pm 49
Serum creatinine mg/dl	10.1 \pm 4.0	10.0 \pm 5.8	8.6 \pm 2.0	9.1 \pm 3.8
Serum sodium mmol/l	135 \pm 5.3	136 \pm 5.0	133 \pm 4.2	134 \pm 8.2
Serum potassium mmol/l	4.5 \pm 0.8	4.6 \pm 1.0	3.9 \pm 0.4	4.5 \pm 0.8
Serum uric acid mg/dl	7.2 \pm 2.1	6.1 \pm 1.8	5.9 \pm 1.4	6.8 \pm 2.4

Table-2: Distribution of ABO blood group antigens relationship patients with chronic disease and patients with other factor

	A	B	AB	O
Chronic	72%	76%	70%	66%
Other factor	28%	24%	30%	34%

Distribution of sex group in chronic kidney disease that represent one hundred thirty six males (59%) and ninety four females (41%) not like control

group that represent one hundred seventy nine males (78%) and fifty one females (22%) (Figure-2).

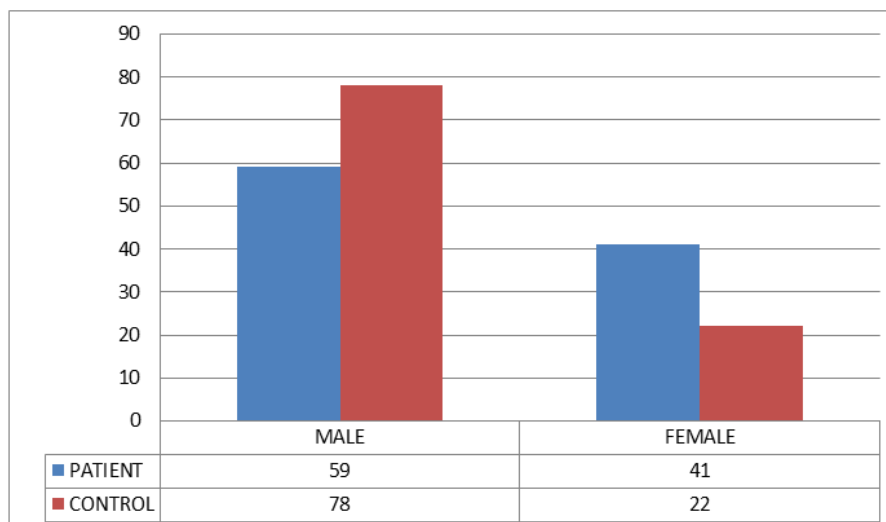


Fig-2: The sex-related incidence distributions among the chronic renal disease patients compared with control group

DISCUSSION

The percentage distribution of ABO blood phenotypes in chronic kidney disease patients compared with control group that show insignificant relation between prevalence blood group and chronic kidney disease patients in Sudanese population, similar to research done by Riham and Khaldia found insignificant different between patient chronic kidney disease and control in patients group the highest distribution of ABO blood group system was O (60%) while the lowest distribution was AB (4%). in control group the highest distribution was O (47%) while the lowest distribution also was AB(8%) [2].

Dis agree with study in Latakia, Syria because there were different in races between us, they suggest the distribution of blood groups in the hemodialysis patients when compared with those healthy blood donors, found group A (30.7%), group B (14.7%), group O (51.1%), group AB (3.5%). These results compare to 40%, 8%, 47%, and 5% in Groups A, B, O, and AB, respectively.

Renal function test show high urea in B blood group 149 mg/dl and lowest in AB blood group 116 mg/dl, creatinine show high in blood group A 10.1 mg/dl and lowest in AB blood group 8.6 mg/dl, uric acid high in blood group A 7.2 mg/dl and lowest in AB blood group, in cause of serum sodium and potassium almost similar .but statistically insignificant different renal function test in different ABO group antigens ,this almost similar to samar *et al.*, found that no significant association between renal function test and blood groups of patients with renal failure, except the level of potassium [3].

Distribution of ABO blood group in hypertension was most common cause of chronic kidney disease 67%, diabetes leaser factor in this study 4% and all other factors (congenital, chronic glomerulonephritis ..etc) 29% that lead to dialysis.

Distribution of sex in chronic kidney disease found that statistically insignificant different in gender group (male, female), males group were slight more exposed to chronic kidney disease and ESRD than female. The different in control group found male more than female because social reasons that not mean female not accepted donation but male more common donation.

Agree with Amin *et al.*, the common cause of ESRF was hypertension [4]. Other study conducted in 2009 by Elsharif *et al.*, among ESRF patients found no cause in the most common patients followed by hypertension [5].

CONCLUSION

There were insignificant different between ABO blood group phenotype, also renal function test in chronic renal disease patients with different antigens show insignificant different. The most common cause of chronic kidney disease was hypertension that can be lead to ESRD, in the other hand there were no different observed if the gender as a factor of chronic kidney disease such as in male prevalence more than female.

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