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Evaluation of liver enzymes in patients with renal failure

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ABSTRACT

Background and Objective: Renal failure is a disorder with a feature of high urea and creatinine level with the outcome of anunexpected decrease in kidney function resulting in a significant decline in glomerular filtration rate. Apart from the major clinicalimportance of ABO blood group on blood transfusion and organ transplantation, there seem to be strong associations betweenblood group types and some diseases as a result of the carbohydrates compound found on the surface of the red blood cellmembrane. This study aims to determine the effect of ABO blood group on renal disease patients.

Materials and Methods: This case study was conducted on 150 patients with renal failure attending Dialysis unit in Tikrit Hospital from April-June, 2022. Ethical approval and patient consent statements were taken from everyone and the study was performed in the Medical Laboratory department of the hospital. Total 3 mL of patient blood was put into plain bottles. Serum was used to the determine ABO blood group was done with red cell samples by tube agglutination method. The data obtained were analyzed by SPSS software version 22.

Results: Generally, the study revealed a strong association of ABO blood group on renal failure ($p<0.001$). However, Group O antigen was statistically discovered to cause the severity of renal failure ($p<0.05$).

Conclusion: The results showed that blood group O individuals are more susceptible and suffer severely in renal disease than other blood group individuals.

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Introduction:

In chronic renal failure CRF the Renal capacity of filtration is decreased and followed by anuria . There are many causes of chronic renal failure (CRF) such as hypertension, , toxic substances, diabetes mellitus and Systemic Lupus Erythematosus (SLE) (1). Liver function tests used to monitor disease progression are (bilirubin, GPT, GOT, ALP, LDH, total protein and albumin,). CRF composed of a variable conditions associated with a decrease in renal functions and abnormal Glomerular Filtration Rate (GFR) (2). In patients with CRF, hepatitis B and C are the most frequently detected associated chronic liver disorders. In addition, alcoholic liver .disorders exist. So that, the patients with CRF require to be monitored with liver functions tests regularly espicially liver enzymes serum levels for recognition of associated liver diseases . The liver enzymes such as Glutamic - pyruvic Transaminase (GPT), Glutamic-oxaloacetic transaminase (GOT) and Alkaline Phosphatase (ALP). The ALP enzyme is elaborated from the liver, intestine, bone and placenta. the majority of the circulating enzyme are from the liver and bone. Serum ALP level is an important marker for screening and monitoring patient with a liver disease. Renal osteodystrophy can be a complication of CRF and lead to a significant increase in the level of ALP bone isoenzymes (3). In CRF, due to the accumulation of electrolytes, toxins and fluids, death can occur unless treated by Renal Replacement Therapy (RRT). Renal replacement therapy includes either dialysis or renal transplant (4). In patients with CKD, the most common associated chronic liver diseases are hepatitis B and C (5). Added to these, is alcoholic liver diseases (4). Serum levels of enzymes such as Alanine Aminotransferase (ALT), Aspartate Aminotransferase(AST) and Alkaline Phosphatase (ALP). The

plasma ALP levels can originate from liver, bone, intestine and placenta. In general, the isoenzymes from liver and bone contribute to the majority of the circulating enzyme levels. However, in a CKD patient, renal osteodystrophy could result in a significant increase in the bone isoenzymes of ALP contributing to high serum ALP level (6). Elevated GGT activity is a well-known biological marker of excessive alcohol consumption or liver injury including fatty degeneration. The enzyme has also been demonstrated to predict the development of Cardiovascular (CV) risk factors such as hypertension (7) and diabetes mellitus (8).

The goal of this study is to examine the levels of the serum liver enzymes AST, ALT, and ALP (consequently Glutamate Oxaloacetic Transaminase, Glutamic Pyruvic Transaminase, and Alkaline Phosphatase) in patients with CRF and the control group.

Subjects and Methods:

This study was done from August to October 2022, in the Tikrit teaching hospital at Renal Dialysis Unit. There was fourty patients with chronic renal failure selected for the study after taking a permition for ethical purposes and then the sample of blood was taken before making hemodialysis for patients. Before performing hemodialysis on patients, blood was drawn. Twenty of those patients were men and twenty were women. Twenty subjects, ten men and ten women in the control group, were healthy individuals without liver or renal .disorders. The blood samples were collected from the forearm by venipuncture using 3ml syringe and then kept in a gel tubes. After that, a clot formation was allowed at room temperature for each blood sample, then centrifuging was done at 4000 rpm for about 10 minutes for serum collection which was used in analysis of serum Alanin taransaminase (ALT), Aspartate trenaminase (AST) and Alkaline phosphatase (ALP) usin (Erba Mannheim XL-300).

Statistical analysis

Data processed using SPSS package (version 23), independent student test was used for the testing the relation between variables. P value < 0.05was identified as significant.

Results:

In this study, the mean S.GOT was higher among the cases (55.7± 25.03) U/L than the control group (17.52± 7.3) U/L, In table 1 .There were significant.differences in the relationship. The mean S.GPT was more in the patients group (52.7± 18.4) U/L than the control group(22.5± 8.8) U/L, this relation was statistically significant as shown in table 1. The mean S.GPT was more among the cases (174.5± 50.6) IU/L than the control group(82.5± 32.6) IU/L , this relation was statistically significant as shown in table 1.

Table 1. The mean liver enzymes according to disease status

enzymes	Case		Control		P value
	Mean	Std. Deviation	Mean	Std. Deviation	
S.GOT u/l	55.7	25.03	17.52	7.3	< 0.05
S.GPT U/l	52.7	18.4	22.5	8.8	< 0.05
S.ALP I U/l	174.5	50.6	82.5	32.6	< 0.05

Among male participant the patient with renal failure had mean S.GOT (63.25± 35.7) U/l, higher than control group (17.52± 7.57) U/l, this relation was statistically significant as shown in table 2. Among female participant the patient with renal failure had mean S.GOT (48.15± 23.27) U/l, higher than control group (17.52± 7.43) U/l , there were significant differences in the relationship as table 2 and figure 1show.

Table 2 : The mean S.GOT according to sex and disease status

Sex	S.GOT u/l				
	Case		Control		P value
	Mean	Std. Deviation	Mean	Std. Deviation	
Male	63.25	35.7	17.52	7.57	< 0.05
Female	48.15	23.27	17.52	7.43	< 0.05
P value	>0.05		>0.05		

Among male participant the patient with renal failure had mean S.GPT (28.16± 30.75) U/l, higher than control group (22.50 ± 9.01) U/l , this result was non-significant statistically as table 3 show. Among female participant the patient with renal failure had mean S.ALT (77.23± 35.4) U/l , higher than control group (23.6 ± 10.01) U/l , this result was significant statistically as table 3 show.

Table 3: The mean S.GPT according to sex and disease status

Sex	S.GPT U/L				
	Case		Control		P value
	Mean	Std. Deviation	Mean	Std. Deviation	
Male	28.16	30.75	22.50	9.01	>0.05
Female	77.23	35.4	23.6	10.01	< 0.05
P value	<0.05		>0.05		

Among male participant the patient with renal failure had mean S.ALP (171.52± 105.39), higher than control group (77.5 ± 34.8) , this result was significant statistically as table 4show. Among female participant the patient with renal failure had mean S.ALP (177.39 ± 108.15) , higher than control group (87.5 ± 31.3) , this result was significant statistically table4 show.

Table 4 : The mean S.ALP according to sex and disease status

Sex	S.GPT IU/L				P value
	case		Control		
	Mean	Std. Deviation	Mean	Std. Deviation	
Male	171.52	105.39	77.5	34.8	< 0.05
Female	177.39	108.15	87.5	31.3	< 0.05
P value	>0.05		>0.05		

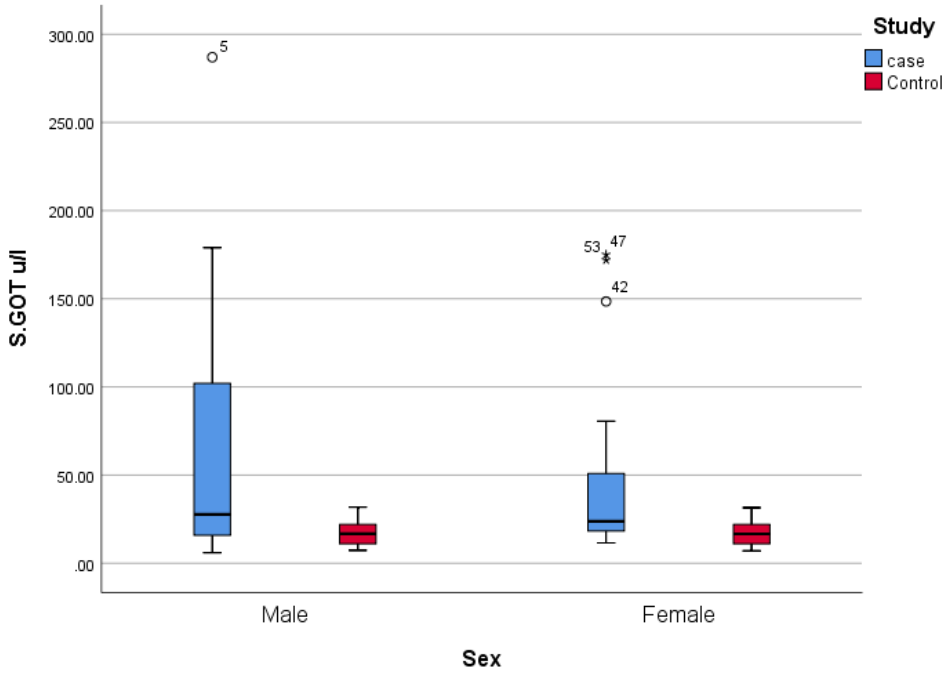

Figure 1: The mean S.GOT according to sex and disease status

Discussion:

In this study, the serum levels of liver enzymes which include ALP, GOT and GPT were statistically significant in patients with renal failure as compared with control group among both male and female groups. The enzymes of the liver are present with in the cells cytoplasm at a level more than the plasma, because of the truth that these enzymes which are inracellular are important to stimulate the metabolic reactions which are needed in the

physiological functions. Large quantities of enzymes are elaborated extra-cellularly because of the high level of proliferation of the cells. In this work, the enzymes ALP levels was high in the chronic renal failure group in comparison to the control group. This study is agree with a previous work done by Taliercio *etal.* at 2013 which recognize the high levels of serum ALP in patients with chronic renal failure (9) .Another works clarified a same results (10) (11) (12). And this is agree with this present work. This high level of ALP is happen because of the disturbance of the processes that occure in the mineral disease of the bone which can lead to an increase risk of cardiovascular complications among these patients. The results of this work with the previous works are useful for the clinicians to regard ALP as an assessment marker in highly risky in the progression of ESRD. In this study, there was a high levels of GPT and GOT in patients with chronic renal failure in comparision with control group. This result suggests that high levels of these enzymes have a role in CRF. It may be considered that elevated GPT and GOT for the detection of CRF. However, further studies are needed to recognize the mechanism (12). In patients with CRF Some of liver diseases are also common, especially viral hepatitis, it occurs either because of the viral hepatitis complication, or may be the viral hepatitis is obtained as a dialysis result. Cholestasis is also seen frequently in renal tubular dysfunction .

In liver disease patients, the renal disease is a common complication and associated with high morbidity and mortality rate. The relationship between liver and kidneys is complex, as renal failure could be structural or functional. Hepatorenal pathophysiology is common in liver disease patients, characterized by splanchnic vasodilation, arterial underfilling and renal vasoconstriction that develop in cirrhosis patients (13). The pathophysiology of kidney disease

development in liver failure is useful in therapy and to recognize the reversibility of kidney disease and the need for liver–kidney transplantation. In ddition, erythropoietin treatment and its derivatives have not been implicated in cases of severe hepatitis, acute liver failure, chronic hepatitis or vanishing bile duct syndrome. There is no reason to suspect any degree of cross sensitivity in risk for hepatic injury among the various hematologic growth factors and other agents used to treat bone marrow insufficiency (14). Serum aminotransferase elevations above 5 times the upper limit of normal (if confirmed) during CRF therapy should lead to dose reduction or temporary cessation(15). Finally, to recognize the pathophysiological changes that caused by chronic kidney disease a routine measurments of liver function tests (GOT , GPT, ALP, LDH, GGT, albumin, total protein ,total bilirubin and direct bilirubin) need to be considered .

Conclusion:

Careful interpretation of routine liver function tests (total protein, albumin, AST, ALT, ALP, GGT, LDH, total bilirubin and direct bilirubin) should be considered due to pathophysiological changes caused by chronic kidney disease. Liver enzymes (ALP, AST and ALT) are elevated in patients with CRF.

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