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Assessment of Lipid profile, total protein, and albumin levels and it's relationship to the level of some liver enzymes in patients with chronic Steatosis Disease resting in al –Hindia Hospital

تقدير مستويات الدهون ,البروتين الكلي ,الالبومين وعلاقتها بمستوى بعض انزيمات الكبد لدى مرضى الكبد الدهني المزمن الراقدين في مستشفى الهندية العام

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Abstract

This study involved 62 chronic steatosis patients(14 males and 48 females) with age (36-52 year) and 35 healthy controls (13 males and 22 females) were randomly selected and they were examined for dislipidaemia and liver disease. Consulting the outpatient clinic at Al-Hindia Hospital/kerbala city during July to Dec 2014 . For all patients anthropometric measures were obtained and fasting blood samples were taken for determination blood lipid profile, glutamic-Oxaloacetate Transaminase(GOT), serum glutamate pyruvate transaminase (GPT) enzyme level, albumin, and total protien . All these parameters were diagnosed in all the samples under this research. The level of Total cholesterol (TC), Triglycerides (TG), High density lipoprotein cholesterol (HDL-C), total protein(T.P), and albumin (ALB)were determined in the serum. In addition , GOT, GPT enzymes activity were measures. The results showed a significant increase in serum TC, TG, , the results also pointed to a significant increase in both GOT and GPT activity, in addition to a significant decrease in serum total protein, and HDL-C concentration where non-significant decrease of albumin in the serum of patient group comparison with control group .

Aim of the study

The aim of study is to investigate the correlation between the levels of lipid profile, total protein ,albumin , and liver enzymes in patient with chronic Steatosis disease for both males and females .

Keywords: cholesterol, triglyceride, GOT,GPT, Steatosis Disease

الخلاصة

الهدف من البحث هو إيجاد علاقة بين مستويات بعض إنزيمات الكبد من جانب و مستوى الدهون, البروتين و الألبومين من الجانب الآخر لدى مرضى الكبد الدهني المزمن ,تضمنت الدراسة على 62 مريضا لديهم تاريخ بأمراض الكبد المزمنة ومن كلا الجنسين (14 رجال ,48 نساء) و مقارنة النتائج بعينات الاصحاء كمجموعة سيطرة والتي تم اختيارهم عشوائيا والبالغ عددهم 35 شخص (13 رجال ,22 نساء),إضافة إلى ذلك تم دراسة تأثير جنس المرضى على المتغيرات قيد الدراسة . تم جمع العينات من مستشفى الهندية العام (محافظة كربلاء) للفترة من منتصف شهر تموز ولغاية نهاية شهر كانون الثاني لهذا العام . وأخذت عينة الدم من المرضى ومجموعة السيطرة في حالة صيام لإجراء الفحوصات اللازمة للدراسة والمشتملة على قياس نسبة الكوليستيرول ,الدهون ألمرتفعه الكثافة , الكليسريدات الثلاثية , البروتينات والألبومين لغرض إثبات العلاقة بينها و بين مستويات بعض إنزيمات الكبد. حيث لوحظ من خلال البحث وجود ارتفاع بمستويات كلا من الكليسريدات ألثلاثيه ومستوى الكوليستيرول الكلي مقارنة بمجموعة السيطرة وعلى خلاف ذلك وجد انخفاض بمستويات الدهون العالية الكثافة والبروتين الكلي لدى المصابين مقارنة بمجموعة السيطرة ومن جهة أخرى وجد ارتفاع معنوي بمستويات إنزيمات الكبد التي تم قياسها ضمن البحث . كما لوحظ انخفاض غير معنوي بمستوى الألبومين إذا ما قورن مع مجموعة السيطرة .

1. Introduction

Steatosis, is a broad term that describes the buildup of fats in the liver. Fatty liver is a reversible condition and usually goes away on its own. it often has no symptoms and does not cause any permanent damage[1] .The most common cause is alcoholism[2]. Almost all heavy drinkers have fatty liver disease, other causes are toxins, certain drugs, inherited metabolic disorders and may be another relationship to people with fatty liver without alcoholics, but it has been associated with high blood cholesterol, and obesity[3]. Fatty liver or steatosis develops when the body creates too much fat or cannot metabolize fat fast enough. As a result, the leftover is stored in liver cells where it accumulates to become fatty liver disease[4]. Eating a high-fat diet does not directly result in steatosis[2,5]. Besides alcoholism, other common causes of fatty liver include: metabolic syndrome, excess body weight ,and high levels of triglycerides (fats) in the blood[3]. The liver is the primary site of the synthesis of plasma proteins, with synthesis occurring on the rough endoplasmic reticulum of the hepatocytes (Globulins, Albumin and clouting factors), which is produced by B-lymphocytes. The pattern of plasma protein alterations depends on the type, severity and duration of liver injury[5]. Hypoalbominemia is noted in various liver disorders. Hepatic synthesis of albumin is decreased in patients with fatty liver and liver cancer which with portal hypertension, Albumin leaks off the liver surface into the peritoneal cavity. This redistribution may contribute to the production of as cites by increasing entotic pressure in the peritoneal cavity [3,6]. AST (GOT) and ALT (GPT) have been suggested for the two enzymes of greatest clinical significance in viral liver disease . serum AST (GOT) and ALT (GPT) levels which are elevated even before the clinical signs and symptoms of disease (such as fatty liver disease) appear[7,8]. Levels for both enzymes may reach values as high as the upper limits of the reference interval [9]. As we know liver is the principal site for formation and clearance of lipoproteins. It receives fatty acids and cholesterol from peripheral tissues and diet, packages them into lipoprotein complexes and releases these complexes back into the circulation. Hence it is not surprising that liver diseases can affect plasma lipid levels in a variety of ways[10]. steatosis diseases due to various causes are often associated with dramatic reductions in plasma triglyceride and cholesterol level due to reduced lipoprotein biosynthetic capacity. Cholestasis is associated with hypercholesterolemia as the major excretory pathway of cholesterol is blocked in this disorder[11]. Apart from the various complications seen in cirrhotic patients, chronic dyslipoproteinemia is one which can lead to alterations in cellular membrane lipids, that result in formation of abnormal RBCs, such as echinocytes, and alterations in membrane function with potential pathophysiologic consequences[5]. Although several studies have been conducted on dyslipidemia in cirrhotics in developed countries, there is a paucity of data in this regard in India. As there is a high prevalence of chronic liver disease in our country, we conducted this study to determine lipid profile in patients with cirrhosis and to assess if it relates to the severity of steatosis disease[12].

2. MATERIALS and METHODS

Material

This study involved 62 chronic steatosis patients(14 males and 48 females) with age (36-52 year, BMI ≥30) and 35 healthy controls (13 males and 22 females) were randomly selected and they were examined for dislipidaemia and other liver disease. Consulting the outpatient clinic at AL-Hindi Hospital/kerbala city during July-Dec 2014 . For all patients anthropometric measures were obtained and fasting blood samples were taken for determination of serum blood of , glutamic-Oxaloacetate Transaminase (GOT), Serum Glutamate- Pyruvate Transaminase (GPT) enzyme level , Albumin(ALB), total protein (TP) ,total cholesterol , Triglycerides (TG), High-density lipoproteins(HDL-c) .

Methods

After an average fast of 10-14 hours (5) ml of venous blood samples were taken from both patients and control subjects by a sterile disposable syringe then collected in plain plastic tubes. The serum was separated immediately after withdrawal and immediately analyzed or stored in plain tubes in a deep freeze $(-20)^0$C, until used. They were investigated for different parameters of serum levels for liver function tests which include:GOT,GPT,S.cholesterol, (TG), (HDL-c),total Protein, and Albumin . All diagnostic kits were purchased from Randox, Roche, BioMerieux and Biolabo.

Statistical analysis

Statisticsdata were analyzed by SPSS. $\chi 2$, one-way analysis of variance (ANOVA) and Student's t test were used. A p value <0.05 was considered statistically significant.

3. Results

In This study show no any significant $p>0.05$ in both males and female s on the level of all parameters[table .1][fig.1] except the level of total protein as we show in [Fig. 2] , this result may because males taking more calories per day , they need more protein than women, and we know The amount of protein need daily depends on total caloric intake. Liver enzyme activity shows in [Table 2] highly significant differences in concentrations between the patients and control groups. [Fig 4], show the concentrations of serum Glutamic-Oxaloacetic Transamine (AST) (GOT) unit/Liter is highly increased in patient with chronic steatosis more than in the control also, the concentrations of serum Glutamic Pyruvic Transamine serum (ALT) (GPT) unit/Liter is increased highly if compare with the control ($p<0.05$) .The elevation of specific enzymes varies with the type of disease.

In the present study, the increased serum ALT and AST enzyme levels were observed in chronic steatosis patient only when compared to the control subjects and the results are similar to screening and diagnostic evaluation for liver diseases. . In other hands , the comparison of means between control group and the patient group showed highly increasing levels in serum of cholesterol and triglyceride and decrease in the level of HDL.C [Fig .3] .The results also indicate that the total serum protein decreases significantly ($p<0.05$) in patient group ,while decrease level of albumin was not significant if compared with normal or controlee sample [Fig.5].

4. Discussion

The results show no deferential or effect to the sex on the level of all parameters except the level of total protein ,and this result may because that men take in more calories per day, they need more protein than women, and we know The amount of protein you need daily depends on your total caloric intake.

The study of liver enzyme shows highly significant differences in

liver enzyme concentrations between the patients and control groups ($p<0.05$) . the increased serum ALT and AST enzyme levels were observed in seatosis patient when compared to the control subjects and according to the fact that Aspartate aminotransferase (AST) is a measured in the evaluation of suspected coronary hepatocellular disease[13] , when disease or injury affects the cells of these tissues causing cells lyses ,AST is released and picked up by the blood and the serum level rises and cleared from the blood in a few days [14] . as for as GPT, we know that ALT is found predominantly in liver ,kidneys , heart, and skeletal muscles ,so ,any injury or disease like steatosis affecting liver cells will cause a release of this hepatocellular enzme into the blood stream, thus elevating serum ALT level in blood [15,16] the comparison of means between control group and the patient group showed highly increasing levels in serum of cholesterol and triglyceride . ($p < 0.05$)in the other hence, The results of this study indicate that the total serum protein decreases significantly ($p<0.005$) in patient group that means the liver reserves capacity and the relatively long half-life of these proteins, significant decreases will not become apparent except in severe or long-standing hepatic disease [17]. A total protein test measure is used as a screening process to diagnose a number of illnesses, but the most important to screening the liver disease is serum

albumin level. Because the Albumin is synthesized exclusively by the liver; it is secreted from the golg: apparatus across the sinusoidal membrane of the hepatocyte [18]. In some, inflammatory conditions the release of tumor necrosis factor inhibits Albumin synthesis but induces the synthesis of proteins of the acute phase response. In this study, the serum albumin level is decreased in patient but non significantly ($p<0.5$) than in the control group. Steatosis is increasingly recognized as a major cause of liver related morbidity and mortality, because of its potential to progress to cirrhosis and liver failure. The pathologic picture of chronic steatosis disease, ranging from simple steatosis to steatohepatitis, advanced fibrosis, and cirrhosis, resembles that of alcohol induced liver disease, but it occur in patients who do not abuse alcohol[19,20]. Steatohepatitis that is characterized by the hepatic steatosis, liver cell injury, hepatic in-flammation. fibrosis and necrosis is believed to be an intermediate stage of steatosis dangers[21] . The present study attempted to describe the abnormality of lipid levels among the patients of chronic steatosis in al- Hindia setting. A total of 35 non-diabetic, non-fatty liver subjects of both sexes free from any liver disease participated in the present study as a control . In the present study, male sex were lower than females which is contradictory to the study by Trinchet *et al* [7] who reported the male predominance 91% males in his study. This difference may be due to that in our setting the fatness or obesity in female mor than male .

Increased lipid profile among steatosis subjects had been reported in many studies. In reference [22,23]in USA study a cross-sectional study found that fatty liver subjects were higher in high triglycerides levels. In another cross-sectional study in Brazil, subjects with steatosis or fatt liver had a higher triglyceride[16]. However, Ghadir. MR *et al*[17] in Mexico found that the high level of cholesterol was found in 63^{0} of the steatosis subjects. In our study, the total cholesterol, triglycerideswas higher. In an our population, the subjects with fatty liver had significantly higher values of total cholesterol and triglycerides than controls

Fabbrini E *et a l*[9]in a cross-sectional study in Brazil found that subjects with steatosis were more obese. and high BMI. The findings of these studies are similar to our study. We also observed higher BMI among steatosis patients. A limitation of our study is that the diagnosis of fatty liver or steatosis was based on ultrasonography and was not confirmed by liver biopsy as well as lack of controls to investigate the risk of chronic steatosis. Angel Lasunción *et al* [18] found that HDL level is lower in steatosis than and the most causes of the lower value is an affected

factor in those with liver damage. It is well known that fatty liver disease and steatosis disease are associated with increased atherogenic risk and increased cardiovascular mortality [19]. An increase in TG secretion form the liver in the form of LDL is likely responsible for the increase in serum TG concentrations commonly noted in patients with chronic steatosis pattern [24]. ypolipidemia, in particular decreased(HDL.c) level is also an important risk factor for cardiovascular disease and vascular events of liver damage or injury [13,14,21]

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Table (1) Effect of sex to the level of study parameters for patient group

Parameters	Sex	Mean	Std. Deviation	p. value
S.cholesterol	female	9.66	2.04	0.074
	Male	9.80	1.98	
S.HDL	female	. 0.48	0.15	0.1
	Male	0.51	0.19	
S.TG	female	3.92	8.24	0.058
	Male	4.07	9.89	
S.GPT	female	107.35	48.57	0.055
	Male	102.31	57.29	
S.GOT	female	241.35	116.21	0.07
	Male	173.56	102.10	
S.ALB	female	29.67	3.913	0.14
	Male	30.6	2.729	
S.T.P	female	29.574*	11.83	0.042*
	Male	35.623	10.57	

Table (2) comparison of lipid profile, total protein, albumin & liver enzymes in patient with steatosis and control group

Parameters		Mean	Std. Deviation	p-value
s.cholesterol mmol/L	patient	9.73*	1.97*	0.044
	control	5.15	0.84	
s.HDL mmol/L	patient	.2.003*	0.17	0.042
	control	4.59	0.96	
S.TG mmol/L	patient	4.00*	. .0.90	0.05
	control	1.96	0.62	
S.GPT U/L	patient	104.66*	52.55	0.017
	control	19.06	7.02	
S.GOT U/L	patient	205.20*	112.38	0.047
	control	25.0	10.48	
s.total protien g/l	patient	32.86*	11.42	0.05
	control	71.53	7.56	
s.albumin g/l	patiant	33.17	4.30	0.053
	control	35.98	5.024	

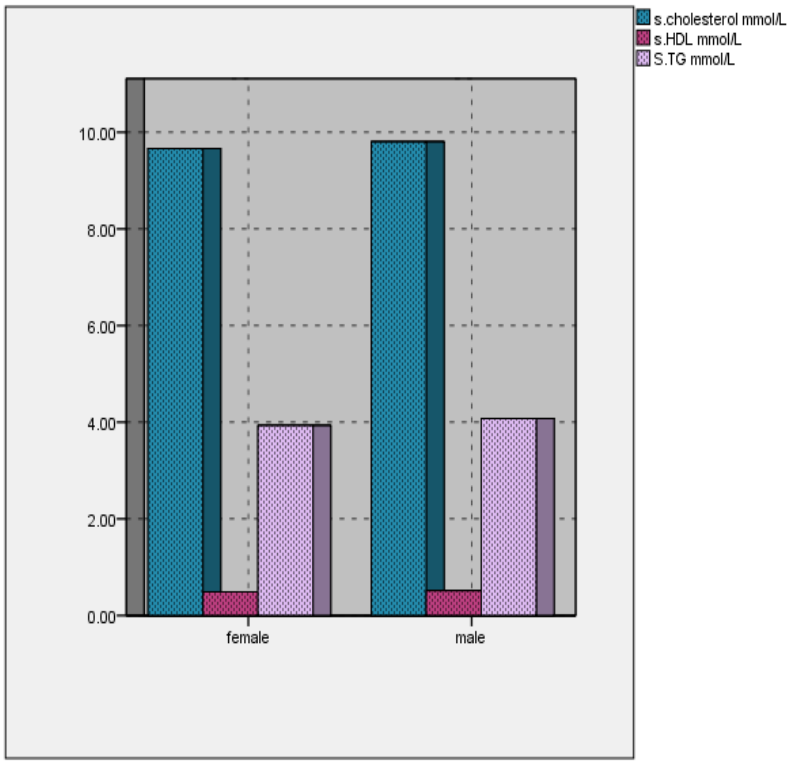

Fig (1) sex effect on the level of lipid profile for the study

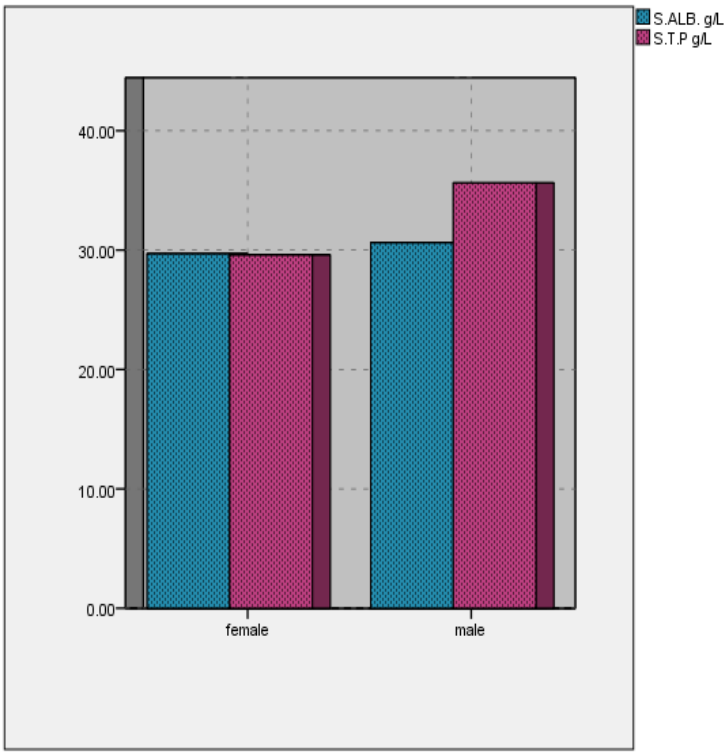

Fig (2) sex effect on the level of serum total protein and albumin

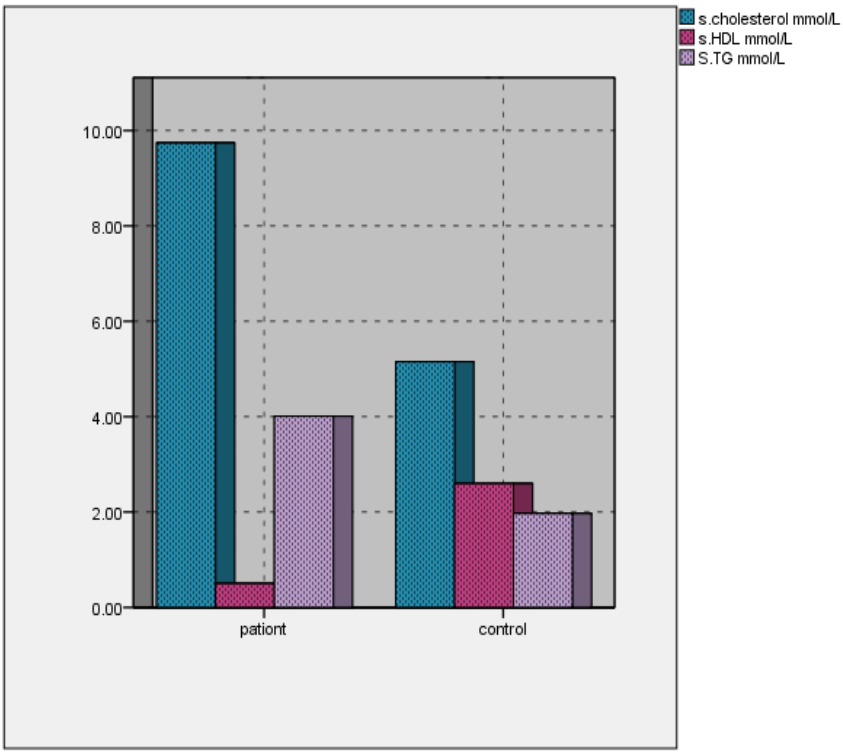

Fig (3) level of lipid profile in both groups of patient and control

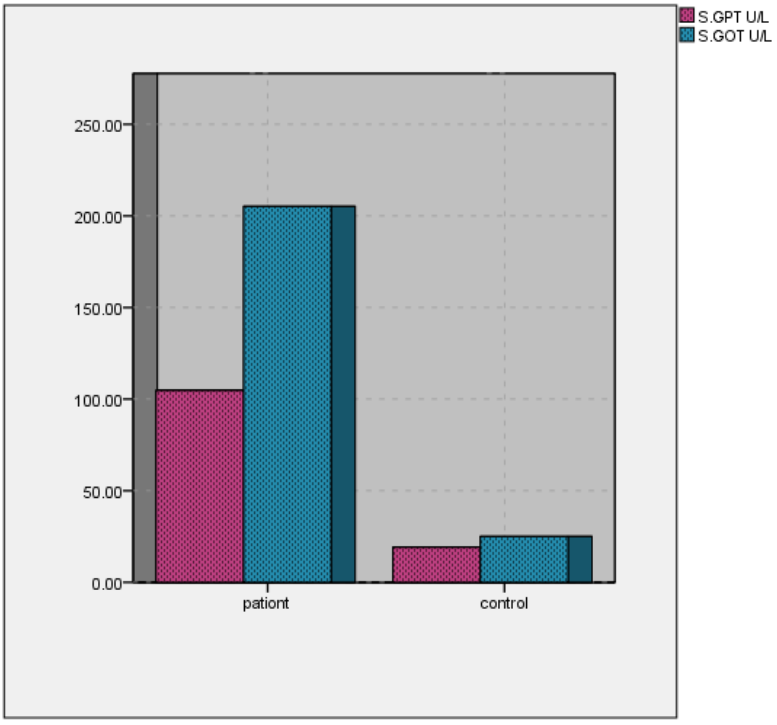

Fig.(4) level of some liver enzymes in both control and patient group

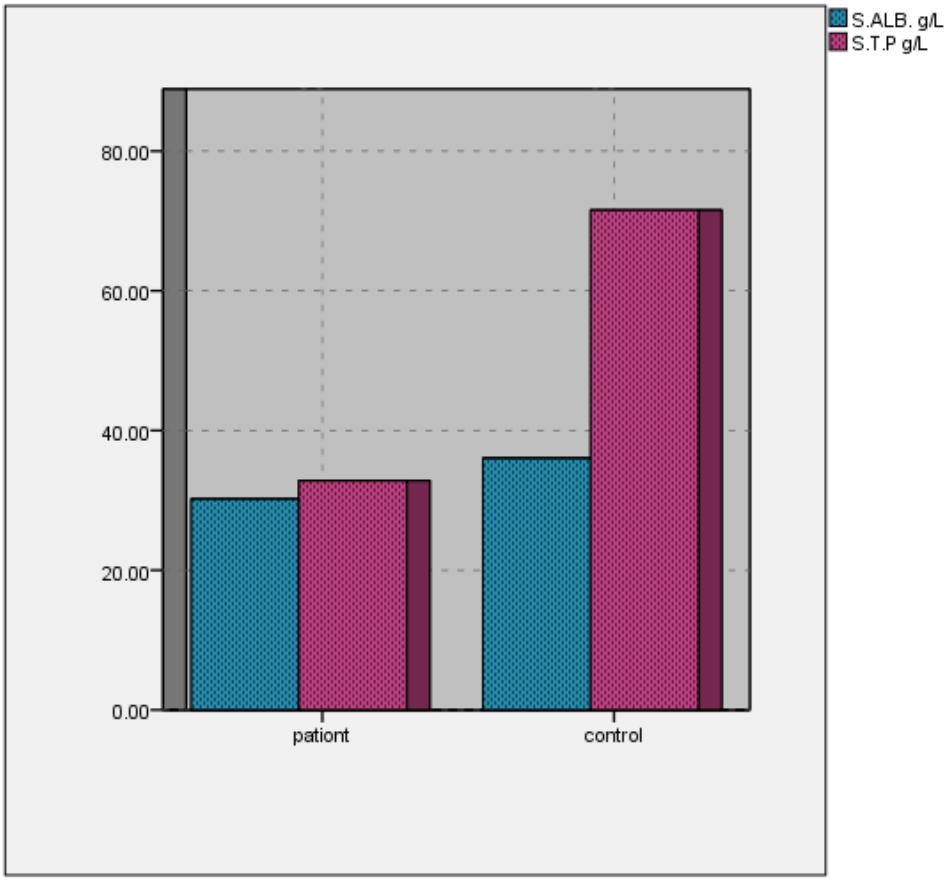

Fig (5) level of serum total protein and albumin in both groups of patient and control