Ministry of Higher Education

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College of Medicine

The relationship between chronic liver disease and random blood sugar

A study submitted to the Council of the College of Medicine, Diyala University, In Partial Fulfillment of Requirements for the Bachelor Degree in medicine and general surgery.

Submitted by

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Supervisor Recommendation

I certify that the research article entitle (**The relationship between chronic liver disease and random blood sugar**) was performed by the 6th class student (**Wafaa Khalid**) at the faculty of Medicine, University of Diyala, and Baqubah Teaching Hospital under my supervision.. The student has finished required revisions and the article is ready for debate.

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Abstract

The liver has an essential role in metabolism of carbohydrate subsequently it maintains the quantity of glucose in blood through glycogenogenesis & glycogenolysis. A decreased reaction of islet cells of pancreas &insulin resistance in liver are also influential factors. Insulin resistance causes high risk for the failure of treatment response in cirrhotic patients and triggers evolution of cirrhosis to fibrosis. About 96% of cirrhotic patients may have impaired glucose level while 30% may clinically diagnosed as diabetic

Aim of study: To study the relationship between chronic liver disease and random glucose level.

Patients and methods: This cross-sectional study included analysis of the reported cases of Chronic liver disease. The study was used the available surveillance database for the disease from the health records of both of the consultatory clinic and the central teaching laboratories which both of them are following Diyala health directorate. Data of current study were collected for the period (2022-2023).

Results: 40 patients were enrolled in our study, 65% males and 35% females with mean age of 33 years. Their mean RBS level was 117.8.

Conclusion: we found as association between CLD and the level of blood glucose in our study, as the glucose levels decreases with the advanced liver damage.

Keywords: chronic liver disease, random blood sugar. Dialysis, hyperglycemia, hypoglycemia.

Introduction

The liver is the largest organ in the human the body, which plays a major in various important functions which are essential for the human body. Liver is involved in synthesis of carrier proteins and metabolism of various hormones. In another key function and an important role is in the metabolism of gonadal hormones and synthesis of sex hormone binding globulin. Liver is one of the important target organ for insulin and its counter regulatory hormones, such as glucagon [1].

Hepatocytes perform numerous and vital roles in maintaining homeostasis and health. production of bile and its carriers (bile acids, cholesterol, lecithin, phospholipids), the regulation of nutrients (glucose, glycogen, lipids, cholesterol, amino acids), and the metabolism and conjugation of lipophilic compounds (bilirubin, anions, cations, drugs) for excretion in the bile or urine. Measurement of these activities to assess liver function is complicated by the multiplicity and variability of these functions. Evaluation of patients with liver disease should be directed at (1) establishing the etiologic diagnosis, (2) estimating disease severity (grading), and (3) establishing the disease stage (staging). Diagnosis should focus on the category of disease(hepatocellular, cholestatic, or mixed injury) as well as on the specific etiologic diagnosis [2].

Grading refers to assessment of the severity or activity of disease—activeor inactive as well as mild, moderate, or severe. The natural history of cirrhosis is characterized by an asymptomatic phase, referred toas ―compensated cirrhosis, followed by a progressive phase marked by the development of complications of portal hypertension and/or liver dysfunction, designated ―decompensated cirrhosis [3].

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glycogenolysis. A decreased reaction of islet cells of pancreas &insulin resistance in liver are also influential factors. Insulin resistance causes high risk for the failure of treatment response in cirrhotic patients and triggers evolution of cirrhosis to fibrosis. About 96% of cirrhotic patients may have impaired glucose level while 30% may clinically diagnosed as diabetic [4].

In addition to HCV, obesity and diabetes may contribute to increasing liver cancer rates. Researchers have shown that diabetes is associated with a 2-fold increased risk of CLD, and a large body of evidence supports a positive association between diabetes and liver cancer. Several mechanisms are possible [5].

Aim of study

To study the relationship between chronic liver disease and random glucose level.

Patients and methods

Patients: This cross-sectional study included analysis of the reported cases of Chronic liver disease. The study used the available surveillance database for the disease from the health records of both of the consultatory clinic and the central teaching laboratories which both of them are following Diyala health directorate. Data of current study were collected for the period (2022-2023). The diagnosis of cases achieved by physicians' works in these health associations. The privacy of the patients was preserved by coding their data into number to prevent bias. We collected information about age, gender, RBS level, etc.

The data analysis was done by Statistical Package for Social Sciences (SPSS) version 26. We expressed the qualitative data by frequencies and the quantitative data such as weight and length by arithmetic mean. We used Chi square to analyze the association between variables when $P < 0.05$ considered significant

Methods: we used Monarch Biorex® 240 to measure the RBS levels. The meter measures the amount of sugar in a small sample of blood, usually the fingertip, or vein. We collected 2-5 ml of blood centrifuged in rate of 1500/min and the readings were exported quickly.

Results

40 patients were enrolled in this study. 26 (65%) were males and 14 (35%) were females.

Their age groups are summarized in table 1.

Table 1. age groups

Age groups	Frequency	Males	Females	Percent
Less than 10 years	11	6	5	27.5
11-20 years	7	2	5	17.5
21-40 years	1	0	1	2.5
41-60 years	13	4	9	32.5
More than 60 Years	8	2	6	20.0
Total	40	14	26	100.0

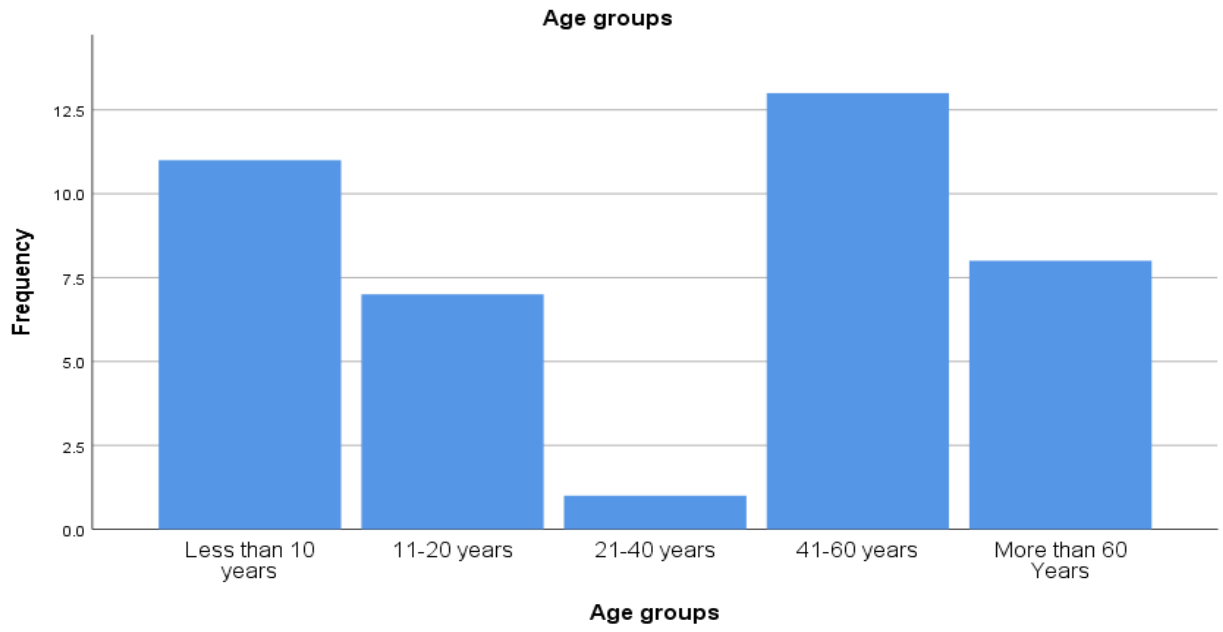

Figure 1. age groups in our study

the glycemic state is demonstrated in the following table 2.

Table 2. value of glucose for the study group.

Class	age	Gender	Glucose value	Normal value	Low blood glucose ratio			High blood glucose ratio		
					M	F	T	M	F	T
< 10 years	3	Male	155	140	27%	54.4%	71.4%	18%	0%	18%
	4	Male	124							
	3	Female	121							
	7	Female	126							
	6	Female	101							
	8	Male	122							
	5	Male	128							
	5	Female	95							
	2	Female	130							
	3	Male	153							
	3	Female	127.4							
11-20 years	20	Male	100	130	71%	29%	100%	0%	0%	
	11	Female	102.4							
	11	Male	92.7							
	12	Male	93							
	14	Male	93.8							
	17	Female	97							
	13	Male	91.3							
20-40	27	Male	100	125	100%	0%	1	0%	0%	
41-60	57	Female	98.3	125	38%	32%	70%	23%	7%	30%
	46	Female	180							
	54	Male	136							
	60	Male	155							
	57	Male	111							
	54	Male	92							
	60	Male	130.2							
	50	Female	110							
	53	Male	96.4							
	58	Male	112							
	53	Female	100.3							
	55	Female	90.6							
	58	Male	111.7							
> 60	61	Male	285	125	62%	0%	62%	25%	13%	38%
	66	Male	67.4							
	68	Male	82.6							
	64	Male	96.6							
	67	Male	105							
	61	Female	140.3							
	68	Male	152							
	66	Male	120							

Discussion

There are two sources of glucose in human boy the first one is from food products while the second source is come from metabolism activities. Food contains carbohydrates, lipids, proteins, etc. Dietary carbohydrates are digested to yield simple sugar molecules in the gut. Simple sugars like glucose, galactose, and fructose pass from the liver's intestinal lumen via the portal circulation. Glucose makes up about 80% of absorbed dietary sugars. Galactose and fructose make up the difference.

In addition to dietary carbohydrates, the human body can synthesize glucose from noncarbohydrate products of metabolism (gluconeogenesis). Gluconeogenesis (GNG) is a metabolic pathway that results in the generation of glucose from certain non-carbohydrate carbon substrates. It is a ubiquitous process, present in plants, animals, fungi, bacteria, and other microorganisms. In vertebrates, gluconeogenesis occurs mainly in the liver and, to a lesser extent, in the cortex of the kidneys. It is one of two primary mechanisms – the other being degradation of glycogen (glycogenolysis) – used by humans and many other animals to maintain blood sugar levels, avoiding low levels (hypoglycemia).

Most forms of liver disease are probably associated with impaired gluconeogenesis. Abnormal glucose tolerance is present in both acute and chronic liver disease, but is usually not of clinical importance. The results of the current study are compatible with these aspects especially with adults and elder people as the value of glucose ratio come down and the ratio of glucose are decreased for about 71% for the age between 11-20 years old, 38% for the age between 40-60 years old while its about 62% in people elder then 60 years old.

Glucose levels is less effected by liver dames in children and infants its value is decrease by 27% only, This results is acceptable if we consider this group of people is usually depend feeding as a source of glucose instead of glucose synthesized by liver.

Conclusion

We found positive correlation between blood sugar and chronic liver disease in our study as the sugar level is decreasing with the advanced liver damage due to malfunction of the liver.

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