Samarra Journal of Pure and Applied Science

www.sjpas.com

p ISSN: 2663-7405
e ISSN: 2789-6838

Physiological and chemical changes associated with viral hepatitis disease in some regions of the Salah al-Din province

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https://doi.org/10.54153/sjpas.2024.v6i3(2).906

Article Information

Received: 20/04/2024
Revised: 10/05/2024
Accepted: 13/05/2024
Published: 01/10/2024

Keywords:

hepatitis , Liver enzymes, lipid profile, liver failure, haemoglobin concentration

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Abstract

Viral hepatitis is an infectious disease that causes significant damage to the liver. The damage is temporary or permanent .It is transmitted through blood transfusion, fecal-oral transmission, and contaminated tools. The current study was conducted for two months on a group of individuals consisting of (60) samples collected from health institutions affiliated with the Salah al-Din Health Department, which included (60) samples who were diagnosed by doctors, The number of people infected with viral hepatitis among them was (40) samples, the males among them was (23) and the females was (17) samples, and healthy individuals among them was (20) samples, the males among them was (10) and the ather gender was (10) with ages ranging Between (26-56). General examinations were performed, which included the PCV and Hb test, as well as biochemical examinations that included (ALT, AST, Urea, Creatinine, TC, TG, HDL, LDL, VLDL) the People with hepatitis showed increase ($P \leq 0.05$) in the levels of LDL-C lipoproteins ALT, AST, urea, and creatinine for males and a significant decrease in PCV and Hb concentration compared to with healthy people. While there was a decrease ($P \leq 0.05$) in the concentration of TG and HDL-C lipoproteins for females and there was a decrease ($P \leq 0.05$) VLDL-C with TWO infected genders with the virul , We conclude that elevated liver enzymes AST and ALT were clear indicators of hepatitis, IT had clear effect on PCV and Hb values. It was and the levels of lipids in s infected people, including TG, TC and lipid levels.

Introduction

Viral hepatitis is an infectious disease that causes significant damage to the liver that may be temporary or permanent, Liver cells are damaged as a result of exposure to viruses, bacteria, or other microorganisms. Viruses are among the main causes of hepatitis. There are There are 6 main types of viral infections that are difficult to differentiate between clinically: HAV, HBV, HCV, HDV, HEV, and HGV. The viruses that cause them share in common that they contain a single strand of ribonucleic acid (RNA), except for hepatitis B virus, which contains a double-stranded RNA. Oxygen [1] . If the liver suffers any damage, the liver cells are able to

renew themselves quickly and the liver returns to its normal condition. If the disease progresses, this leads to cirrhosis, liver failure, and liver cancer. These diseases cause 1-2 million deaths annually around the world [2] Although the virus has been identified in extrahepatic tissues, such as vascular endothelium, bile duct epithelium, bone marrow, and peripheral blood lymphocytes [3].

The viruses of this disease are transmitted through bodily fluids, or through water, or through the transfusion of blood and its products, as well as sexual contact of all kinds, or through tools contaminated with these viruses, or from the mother to her fetus, and these viruses are diagnosed through examinations and tests. Serology that can show the presence of the virus or detect antibodies to the virus. [4] . One of the routine laboratory tests is the Alanine Aminotransferase (ALT) test, as an indirect indicator of liver cell injury. As well as Aspartate Aminotransferase (AST) examination.

Its level is usually high in cases of cirrhosis, with ALT levels also increasing, so during the evaluation of liver diseases resulting from viral hepatitis, ALT and AST levels are the most common in detecting acute and chronic infections in infected liver cells [1]. In the acute stage of infection, liver function enzymes show a sharp increase in their value, then return to normal over time, but liver enzymes may remain slightly abnormal in the case of chronic infection, and thus liver damage can continue even if liver tests are normal [5].

The major aim of the current study is to examine the Physiological damage caused by this virus Specifically tybe B.

Materials and Methods

Samples were collected for the period 12/4/2022 until 2/14/2023. (40) samples were collected from health institutions affiliated with the Salah al-Din Health Department. It included: Tikrit Teaching Hospital and Samarra General Hospital, from which (60) samples were collected, i.e. (100%). The number of those infected with hepatitis virus was (40), i.e. (66.6%), and the number of males was (23), i.e. A percentage of 57.5%, and the number of furniture, i.e. (17) samples, i.e. a percentage of (42.5%). The number of healthy individuals was (20) samples, i.e. (33.3%). The number of males was (10), i.e. (50%), and the number of females was (10), i.e. (50%). Their ages ranged between (26-56) years. Some health information was taken for each patient.

About (5) milliliters of venous blood was drawn from the study sample members using a medical syringe with a capacity of (5) milliliters, then 2 milliliters of blood was placed in a special tube containing an anticoagulant called Ethylene Diamine Tetraacetate , abbreviated as EDTA, which is used to perform a CBC analysis (Complete Blood Count), then the EDTA tube is placed in the Lab Blood Mixer for the purpose of mixing the blood with the anticoagulant and not clotting until it is used. Then the remaining blood is placed in a special tube to separate the serum. This tube contains a special gel. The blood tube is then placed in the incubator for (5) minutes at a temperature of (37°C), and then later placed in a centrifuge (1000 rpm). minute) for (10) minutes. The serum is separated from the blood cells (during the centrifugation process). Fibrin separates the serum from the blood cells.

The gelatinous material is placed between the blood clot and the serum, forming the separating barrier. Then we withdraw the serum using a micropipette, place it in a clean test tube, and record the patient's information on it, which includes the patient's name, type of examination, and date, to conduct the chemical tests that included (ALT, AST) Which was measured by semeotomated spectrophotometer with Agape Kits With a wavelength of 340 (7) , The Urea and Creatinine was assay by spectrophotometer With a wavelength 600 (8) , the tests (TC TG, HDL, LDL, VLDL was check bylabo kits With a wavelength 500 (9) ,The cbc tests was measured by hematology analyser BC-30(10) and then the tests for blood diseases and biochemical tests must be performed within a maximum period of three hours.

Results and Discussion:

It is noted from Table 1 that people with hepatitis showed a significant increase ($P \leq 0.05$) in the levels of ALT, AST, urea, and creatinine, and a significant decrease in the level of blood cell volume (PCV) and hemoglobin Hb concentration compared to healthy people .

Table1: Liver enzymes for infected and healthy groups.

Standards / group	ALT (mIU/ml)	AST (mIU/ml)	Urea (mg/dl)	Creatinine (mg/dl)	PCV %	Hb %
Healthy males, 20-40 years old	34 ± 6 b	63 ± 12 a	26 ± 5 d	0.38 ± 0.2 b	41 ± 3 b	13.33 ± 2 b
Healthy males over 40 years old	19 ± 8 c	18 ± 7 c	28 ± 4 d	0.46 ± 0.3 b	50 ± 2 a	16.33 ± 3 a
Healthy females, 20-40 years old	17 ± 6 c	24 ± 6 c	14 ± 6 e	0.42± 0.2 b	40 ± 4 b	13 ± 2.5 b
Healthy females over 40 years old	25 ± 4 c	25 ± 4 c	23 ± 3 d	0.44 ± 0.4 b	37 ± 3 b	12 ± 1.8 b
Affected males aged 20-40 years	19 ± 7 c	23 ± 5 c	219 ± 8 b	6.23 ± 0.78 a	28 ± 5 c	9 ± 3 b
Affected males older than 40 years	37 ± 4 b	46 ± 5 b	35 ± 7 d	7.43 ± 0.65 a	44 ± 3 b	15 ± 2.4 a
Affected females aged 20-40 years	8 ± 5 d	22 ± 6 c	154 ± 6 c	8.66 ± 0.68 a	30 ± 4 c	9.7 ± 1.8 b
Affected females over 40 years old	46 ± 4 a	30 ± 7 c	270 ± 9 a	7.34 ± 0.28 a	22 ± 3 c	7 ± 2 b

*Values represent the arithmetic mean ± standard error.

*Different letters vertically mean there is a significant difference at a significant level ($P \leq 0.05$).

It is noted from Table 2 that there is a significant decrease ($P \leq 0.05$) in the concentration of triglycerides for males infected with viral hepatitis, while for females there was a significant increase compared with healthy people, while in the level of cholesterol no

significant differences were observed between infected males and females. Compared to healthy people, as for the concentration of HDL-C and HDL-C lipoproteins, there was a significant decrease in HDL-C lipoproteins and a significant increase in LDL-C lipoproteins in infected people compared to healthy people, while the concentration of VLDL-C was lower for males and for females. There was a significant increase compared to infected males and females, respectively.

Table 2: Lipids concentration in blood serum.

standers / group	Cholesterol mg/(100ml)	Triglyceride mg/(100ml)	HDL-c mg/(100ml)	LDL-c mg/(100ml)	VLDL-c mg/(100ml)
Healthy males, 20-40 years old	176 ± 7 b,c	250 ± 21 a	32 ± 4 c	96 ± 14 d	50 ± 2 a
Healthy males over 40 years old	209 ± 12 b	255 ± 12 a	37 ± 6 c	121 ± 16 c	51 ± 4 a
Healthy females, 20-40 years old	188 ± 18 b	138 ± 8 d	46 ± 4 b	114 ± 12 c	27 ± 3 c
Healthy females over 40 years old	263 ± 14 a	169 ± 17 b	60 ± 11 a	170 ± 14 a	34 ± 5 b
Affected males aged 20-40 years	183 ± 22 b	159 ± 13 c	30 ± 5 c	121 ± 9 c	23 ± 7 c
Affected males older than 40 years	190 ± 17 b	134 ± 14 d	44 ± 4 b	119 ± 12 b	27 ± 4 c
Affected females aged 20-40 years	136 ± 26 c	182 ± 24 b	20 ± 7 d	79 ± 16 d	36 ± 6 b
Affected females over 40 years old	232 ± 22 a	284 ± 40 a	31 ± 6 c	144 ± 9 b	57 ± 8 a

*Values represent the arithmetic mean ± standard error.

*Different letters vertically mean there is a significant difference at a significant level ($P \leq 0.05$).

The current study is consistent with the results of previous studies that indicated a significant increase in ALT/AST concentrations, and these results coincide with [5,6] . This increase may be due to the type of inflammation among patients with hepatitis B, as well as This study is consistent with [7] . Which showed that the ALT level was higher in patients infected with the hepatitis virus than in others who do not suffer from the disease [8]. Which

showed that the ALT level was higher in patients infected with the hepatitis virus. It is generally considered a very sensitive indicator of the damage caused by hepatitis to liver cells, and increased liver enzymes with increased viral infection may be a cause of increased damage to liver cells as well. Wang and her colleagues conducted a study that found that normal ALT levels do not always indicate the absence of fibrosis. A combination of ALT levels, gender, and HBV DNA load in the blood may more effectively identify patients with CHB [9]. It has also been reported that neither ALT nor AST reflects the degree of inflammation observed on liver biopsy in patients with chronic hepatitis C (CHC). Consistent with Wang in not identifying fibrosis, it has also been suggested that AST, not ALT, is a useful indicator of liver disease. Although an AST/ALT ratio >1 has been observed in cirrhotic patients with viral hepatitis including non-A and B hepatitis, controversial results have been obtained from using the ratio to predict liver fibrosis in CHC when compared with other laboratory indices. Commonly used for liver diseases, [10]. The current study, which indicated in Table (1) a significant decrease in the volume of blood cells (PCV) and the concentration of hemoglobin Hb compared to healthy people, is consistent with a study [11], hematological characteristics of patients Which also indicated a decrease in the levels of both PCV and Hb in patients with viral hepatitis . also agrees in a study it conducted that talks about: - A physiological study and some biochemical parameters in patients infected with chronic viral hepatitis B also indicated that there are no statistically significant differences between the patient groups and the control group in the concentration of blood cell volume (PCV) and the concentration of hemoglobin Hb, and thus it agrees with the two previous studies. [12]. The current study showed in Table 1 that people with viral hepatitis had a significant increase in urea and creatinine in people with viral hepatitis compared to healthy ones. Some research reported that urea and creatinine were the main indicators of kidney failure in both acute and chronic disease, but others indicated that in all stages of renal failure, blood creatinine was a more reliable indicator of kidney function than blood urea. The reason is that urea in the blood is likely to be affected by physiological and nutritional conditions that are not related to kidney function [13] She disagreed with the two studies [12] in the study it conducted, that there was an overall decrease in the levels of urea and creatinine. The reason for the difference may be due to the ketones used. At work and different demographics .

The current study showed in Table 2 that there are no significant differences in the cholesterol level of those infected with viral hepatitis compared to the control group. As for the concentration of HDL-C lipoproteins, there was a significant decrease compared with healthy subjects, and a significant increase for LDL-C lipoproteins compared with healthy subjects, while the concentration of VLDL-C cholesterol occurred for males, there was a decrease, and for females, there was a significant increase compared with infected males and females, respectively. There was a significant significant decrease for There was also a decrease in the concentration of triglycerides for males and a significant significant increase for females compared to infected males and females, respectively. The reason may be due to their structural nature or the influence of physiological factors on them. In a study conducted by [14]. As the only significant predictive variable associated with lower serum cholesterol concentration. HCV infection is associated with clinically significant reductions in cholesterol levels (TC, LDL, and HDL) when compared to the levels of normal subjects. This study is partially consistent with the previous study, except that the concentration of glycerides in the first study occurred in males, and in females, there was a significant increase in concentration.

The reason may be due to medications taken by the patient, genetic reasons, or high blood sugar levels. [12] showed that insulin resistance in HCV cases can be attributed to increased lipid profile and changes in glucose metabolism .

Conclusions

Hepatitis C induced an increase in the levels of ALT, AST, urea, and creatinine, and a significant decrease in the level of blood cell volume (PCV) and hemoglobin Hb concentration compared to healthy subjects . Likewise, there was a decrease in the concentration of triglycerides in males infected with viral hepatitis, while in females there was a significant increase compared to healthy people, while in the level of cholesterol, no significant differences were observed between infected males. And females. Compared to healthy people.

Reference

[1] Colm , G. (2012). Hepatitis B, http//en.wikipedia.org/wiki/ category hepatitis B .com Disease Burden ,Treatment ,and Emerging prevention and ControlDivision.P.1707-11.

[2] Eminler, A. T., Ayyildiz, T., Irak, K., Kiyici, M., Gurel, S., Dolar, E., ... & Nak, S. G. (2015). AST/ALT ratio is not useful in predicting the degree of fibrosis in chronic viral hepatitis patients. European journal of gastroenterology & hematology, 27(12), 1361-1366.

[3]Blum HE, Stowring L, Figus A, Montgomery CK, Haase AT, Vyas GN (1983) Detection of hepatitis B DNA in hepatocytes, bile duct epithelium, and vascular elements by in situ hybridization. Proc Natl Acad Sci USA 80: 6685–6688

[4] Liu CJ, Chen DS, Chen PJ. Epidemiology of HBV infection in Asian blood donors: emphasis on occult HBV infection and the role of NAT. J Clin Virol. 2006;36 Suppl 1:S33–S44.

[5] Dodson SF. Prevention of de novo hepatitis B infection after liver transplantation with allografts from hepatitis B core antibody positive donors. Clin Transplant. 2000;14 Suppl 2:20–24.

[6] Khalaf A R S, Jabair I S and Al-Kayat R M (1996). Prevalence of hepatitis C antibodies and hepatitis B markers in Iraqi hemodialysis patients*. J Fac MedBaghdad*38(4):369.

[7] Jagadish, S., Hemshekhar, M., NaveenKumar, S. K., Kumar, K. S. S., Sundaram, M. S., Girish, K. S., & Rangappa, K. S. (2017). Novel oxolane derivative DMTD mitigates high glucose-induced erythrocyte apoptosis by regulating oxidative stress. *Toxicology and applied pharmacology*, *334*, 167-179.

[8] Ali, D. K., Fakhre, N. A., & Rasheed, C. M. (2023). Ratio derivative-zero crossing and successive derivative of ratio spectra for simultaneous determination of urea, creatinine, and uric acid in human urine samples. *Bulletin of the Chemical Society of Ethiopia*, *37*(4), 817-829.

[9] El-Ghonemy, D. H., Ali, S. A., Abdel-Megeed, R. M., & Elshafei, A. M. (2023). Therapeutic impact of purified Trichoderma viride L-asparaginase in murine model of liver cancer and in vitro Hep-G2 cell line. *Journal of Genetic Engineering and Biotechnology*, *21*(1), 38.

[10] Pankov, A. (2023). NEUTROPHIL/LYMPHOCYTE RATIO DYNAMICS IN DOGS WITH THE INVOLVEMENT OF CANNABIS SATIVA L. IN GRANULATED FOOD. *Tradition & Modernity in Veterinary Medicine*, *8*(2).

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Samarra Journal of Pure and Applied Science

SJPAS
مجلة سامراء للعلوم الصرفة والتطبيقية

www.sjpas.com

p ISSN: 2663-7405
e ISSN: 2789-6838

التغيرات الفسيولوجية والكيميائية المصاحبة لمرض التهاب الكبد الفيروسي في بعض مناطق محافظة صلاح الدين

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معلومات البحث:

تأريخ الاستلام: 2024/04/20
تاريخ التعديل : 2023/05/10
تأريخ القبــول: 2023/05/13
تاريخ الـنشر: 2024/10/01

الكلمات المفتاحية:

التهاب الكبد، إنزيمات الكبد، تحليل الدهون، فشل الكبد، نسبة الهيموجلبين

معلومات المؤلف

الايميل:
الموبايل:

الخلاصة:

التهاب الكبد الفيروسي هو مرض معدي يسبب ضررا كبيرا للكبد ويكون الضرر مؤقت او دائمي، وينتقل عن طريق نقل الدم، وانتقال البراز عن طريق الفم، والأدوات الملوثة، أجريت الدراسة الحالية لمدة شهرين على مجموعة أفراد مكونة من (60) عينة تم جمعها من المؤسسات الصحية التابعة لدائرة صحة صلاح الدين والتي شملت (60) عينة تم تشخيصهم من قبل الأطباء، وعدد المصابين المصابين بالتهاب الكبد الفيروسي كان بينهم (40) عينة، كان عدد الذكور منهم (23) والإناث (17) عينة، وكان الأصحاء منهم (20) عينة، وكان عدد الذكور منهم (10)) وكان عدد الإناث (10) تتراوح أعمارهن بين (26-56). تم إجراء الفحوصات العامة والتي شملت اختبار PCV وHb بالإضافة إلى الفحوصات البيوكيميائية التي شملت (ALT، AST، Urea، Creatinine، TC، TG، HDL، LDL، VLDL)وأظهر مرضى التهاب الكبد ارتفاعاً ($P \geq 0.05$)في مستويات البروتينات الدهنية LDL-C عند الذكور، ALT، AST، اليوريا، والكرياتينين، وانخفاض ملحوظ في تركيز PCV وHb مقارنة مع الأشخاص الأصحاء. في حين كان هناك انخفاض ($P \geq 0.05$) في تركيز البروتينات الدهنية TG وHDL-C للإناث وVLDL-C لدى الذكور والإناث المصابين بالتهاب الكبد الفيروسي، نستنتج أن ارتفاع إنزيمات الكبد AST وALT كانت مؤشرات واضحة لالتهاب الكبد. كان لتكنولوجيا المعلومات تأثير واضح على قيم Hb. PCV ومستويات الدهون في المرضى، بما في ذلك مستويات TG، TC