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(RESEARCH ARTICLE)

Correlation between hepatitis B virus with chronic kidney disease

Ahmed Mudher AL- khay kanee [1,*], Abbas Ghali Hamed [2] and Z Muhsen M Ali [3]

[1] *General Directorate of Education of Babylon Governorate, Iraq.*
[2] *Department of Technical Nursing, Technical Institute-Baghdad, Middle Technical University ,10074, Iraq.*
[3] *Department of Technical anesthesia Technical Institute-Baghdad, Middle Technical University, 10074, Iraq.*

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Abstract

Background, Chronic kidney disease CKD is an illness that affects more than 9.8% of the global, population, The amied of our stady is to track down the relationship of hepatitis B virus (HBV) with CKD.

Methods: 150 samples from people suffering from hepatitis B with chronic kidney disease, chronic kidney disease, and healthy people.

Result: showed a significant increase in urea, creatinine, albumin and glomerular filtration rate in the chronic HBV group and less in the CKD group. A significant increase in ALT, AST and ALP levels in the chronic renal failure group infected with HBV and CKD group.Regarding hemoglobin, white blood cells and platelets; it showed that there was a significant decrease in hemoglobin, platelets and white blood cells in chronic renal failure patients infected HBV and chronic renal failure patients.

Conclusion: In conclusion, clear evidence emerged from laboratory analyses of a clear relationship between infection with HBV and the degree of progression of chronic kidney disease. The results were statistically highly significant in people with CKD and viral hepatitis, more important than in people with CKD only.

Keywords: HBV; CKD; GFR; Kidney and hepatitis

1. Introduction

Persistent renal illness CKD is an illness that affects more than 9.8% of the global, population, or over 800 million people. It is less common in young adults, affecting 1 in 50 of them. [1, 2]. CKD is more prevalent in elderly women and individuals of, color, and those with high blood pressure and diabetes. and it is among the few non-transmittable diseases that has seen an increase in associated deaths in recent years. Increased efforts for improved prevention and treatment should be spurred by the large amount of afflicted people and the serious negative consequences of a chronic, kidney, infection [3]. Adults with CKD are evaluated for potential health risks based on the existence of kidney construction abnormalities, or a glomerular filtration rate test (egfr) that has been performed for more than 90 days. The creation of the CKD definition is an important standard for more precise diagnosis of the condition, increases in eGFR that fall short of the ,60 mL\min\1.73 m2, threshold Indicates CKD because they approximate the normal loss of roughly half of renal function in an adult who is healthy [4]. Approximately 257 million people worldwide are currently estimated to be affected by ,hepatitis B virus HBV [5] .patients with Chronic hepatitis B (CHB) have a number of extra-hepatic co-morbidities, and a recent study has suggested a critical link between renal capability debilitation and CHB [6, 7] HBV is a hepatotropic virus that can induce a persistent and chronic infection in humans through immune anergy.[8].Numerous studies link chronic liver diseases to CKD , demonstrating a mutual interaction between the liver

* Corresponding author: Ahmed Mudher AL- khay kanee.

and kidney. It has been demonstrated that NAFLD and HBV infection increase the risk of CKD [9, 10]. Based on these results, We predicted that a link exists between HBV and the progression of CKD.

2. Materials and Methods

This study included 150 samples and was distributed as follows The first group included: of 50 samples from people suffering from hepatitis B with CKD The second group included of 50 samples from people with CKD The third group consisted of 50 samples from healthy people Samples were collected from Marjan Teaching Hospital in Babil Governorate from the Department of Kidney Diseases and Artificial Kidneys between 2022 and 2024, the study obtained ethical clearance from the relevant committees that comply with the Helsinki principles, as everyone in the study agreed to provide information completely freely.

2.1. Sample collection

Blood samples were collected from the people included in this study, six ml from each person, and the blood samples were divided into groups, 2 ml was placed in a tube containing EDTA for the purpose of performing a complete blood count examination, and the remainder was placed in tubes. It was emptied and left for fifteen minutes to coagulate, then centrifuged at 3000 rpm for 10 minutes. Then the serum was separated into several aliquots to measure liver function tests. Kidney function tests, lipid profile, and chemical element analyses.

2.2. Laboratory investigations

Measurement of renal function tests (urea, Albumin and creatinine), lipid profile total cholesterol (TC), and triacylglycerol (TG) , liver function test aspartate aminotransferase (AST), Alkaline phosphatase (ALP), total protein ,albumin, , and ,alanine aminotransferase (ALT), activities was determined using Monarch-240 – Clinical Chemistry Analyzer Fully Automate And using kits from the company biorex Determination of GFR by MDRD formula = Determined GFR (ml/min/1.72 m2) = 176.3 x serum creatinine −1.155 x Age −0.204 x ,0.752 in the case of a female,Serum hepatitis markers (HBsAg) were examined using a kit obtained from Siemens Healthcare Diagnostics2 using the chemiluminescence method. Complete blood picture (CBC)was determined using SYSMEX JAPAN Fully Automated 3 part Cell Counter XP300 (Japanese)And using kits from the company SYSMEX , Regular testing for liver and renal function as well as hepatitis indicators were performed on healthy patients., CBC ,and chemical element analyses.

2.3. Statical analysis

Utilizing a PC, the information was explored, coded, and organized involving a measurable bundle for Sociology {SPSS 20}. The information acquired was exposed to fitting examinations for every limit Empirical observations: Mean ± Standard deviation {SD} for numerical data and Frequency and magnitude of non-mathematical data Unusual quantitative variables were estimated to consider

between two concentrated on bunches utilizing the Mann-Winetti test Absolute factors were estimated utilizing the Chi-square test to examine the differences between different groups. $p \leq 0.05$ was considered crucial, while $p < 0.01$ was considered extraordinarily large.

3. Result

The study included 150 samples: 50 patients with chronic kidney disease, 50 people with HBV and CKD, and 50 healthy people. In all tables, if P value > 0.05 is not significant, P value ≤ 0.05 is significant.

Table 1 Statistical comparison among studied groups as regarding demographic criteria

Group	KCD (n=50)	KCD & HBV (n=50)	control (n=50)	p value
Male	58	45	52	0.989
Female	42	55	48	0.652
Age	63.2 ± 0.82 a	63.13 ±0.88 a	60.54 ± 1.3 a	0,123

This table shows no significant statistical differences among the studied groups as regarding age and gender.

Table 2 Statistical comparison of renal function test values and chemical element analysis among the study groups.

Group	CKD (n=50)	CKD & HBV (n=50)	control (n=50)	p value
Ca(gm/dl)	2.31 ± 0.17 [b]	2.48 ± 0.18 [b]	9.33 ± 0.06 [a]	<0.001*
Na(gm./dl)	170.22 ± 1.12 [b]	175.92 ± 1.6 [c]	136.4 ± 0.7 [a]	<0.001*
K(gm./dl)	5.88.88 ± 0.07 [b]	6.05 ± 0.16 [c]	4.08 ± 0.06 [a]	<0.001*
urea(mg/dl)	183.62 ± 5.97 [b]	236.64 ± 6.64 [c]	28.62 ± 0.45 [a]	<0.001*
Creatinine (mg/dl)	10.23 ± 0.47 [c]	7.007 ± 0.26 [b]	0.91 ± 0.024 [a]	<0.001*
Albumin (gm/dl)	2.15 ± 2.71 b	2.33± 2.2 a	4.76 ± 0.28C	<0.001*
GFR (mg/dl)	28.7 ± 10.88b	29.6 ± 11.5a	76.5 ± 7.8 C	<0.001*

This table shows that there was a significant increase in the levels of urea, creatinine, albumin and glomerular filtration rate in the HBV virus group and less in the HBV group compared to the control group.

Table 3 Statistical comparison among the studied groups as regards liver function test parameters.

Group	KCD (n=50)	KCD & HBV (n=50)	control (n=50)	p value
ALp(IU/L)	231.7 ± 15.6 [b]	284.82 ± 14.95 [c]	67.7 ± 1.042 [a]	<0.001*
AST (IU/ml)	49.4 ± 1.94 [b]	99.49 ± 2.04 [c]	15.94 ± 0.2 [a]	<0.001*
ALT (IU/ml)	62.52 ± 2.1 [b]	187.58 ± 4.26 [c]	17.3 ± 0.56 [a]	<0.001*

This table shows that, a highly significant increase in levels of AST, ALP, ALT, , in CKD withHBV group and CKD group in comparison with control groups.

Table 4 Statistical comparison among the studied groups as regards CBC parameters.

Group	KCD (n=50)	KCD & HBV (n=50)	control (n=50)	p value
Hb (gm/dl)	9.87 ± 0.38 [b]	8.54 ± 0.22 [a]	11.758 ± 0.12 [c]	<0.001*
P.C.V(%)	63.98 ± 1.16 [a]	69.68 ± 0.84 [b]	85.76 ± 1.95 [c]	<0.001*
WBCs (X103/ul)	5.89 ± 0.8 [a+b]	5.27 ± 0.17 [a]	6.76 ± 0.1 [b]	<0.001*
PLT(X103/ul)	116.02 ± 2.96 b	95.92 ± 2.51 a	271.76 ± 10.46 c	<0.001*

This table shows that, there is significant statistical difference among the studied groups; as regard hemoglobin, white blood cells and platelets; showed that, there was a highly significant decrease in hemoglobin, platelets and white blood cells in CKDwithHBV and CKD patients in comparison with control groups.

Table 5 Statistical analysis of lipid profile test parameters among the examined groups.

Group	CKD (n=50)	CKD &HBV (n=50)	control (n= 50)	p value
Total Cholesterol (mg/dl)	219.8 ± 29.11[b]	236.1 ± 38.09 [a]	175.87 ± 24.55[c]	< 0.001*
TG (mg/dl)	184.72 ± 4.39 [b]	221.94 ± 9.27 [c]	134.76 ± 1.32 [a]	< 0.001*

This table shows that there were statistically significant differences between the studied groups regarding cholesterol and triglycerides in CKD with HBV and CKD patients compared to the control groups.

Table 6 Statistical comparison among the studied groups as regards viral load of hepatitis B.

Group	CKD (n=50)	KCD & HBV (n=50)	control (n=50)	p value
Viral load (IU)	-	105.6 ± 180.7	-	**<0.001***
Alpha fetoprotein (ng/ml)	**-**	11.33±2.86	**-**	**<0.001***

* HBsAg was negative in all controls and CKD.

This table shows highly significant statistical increase among the studied groups as regarding viral load and Alpha fetoprotein. The highest level in CKD and HBV patients group.

4. Discussion

CKD, is a kidney illness characterized by a slow decline in GFR over an extended period of time and a subsequent decline in kidney function over months to years [18]. CKD actually become a significant general medical issue, both in created and emerging nations [11] Patients with persistent illnesses like diabetes, hypertension, and cardiovascular infections are known as high-risk bunches for creating CKD. Around the world, CKDs are the twelfth driving reason for death [12].

HBV infection is related with the gamble of creating ongoing kidney illness in more seasoned individuals [13]

Laboratory results in this study showed statistical significance in increasing concentration Sodium and potassium, while calcium concentration was low in a patient with chronic kidney infection

The amount of sodium increases in patients with chronic kidney infection and is considered toxic uremia. Also, the possible metabolic effects indicate the presence of sodium in greater proportions in people with chronic kidney infection [14]

Patients with CKD commonly experience various complications including, hypocalcaemia[15]

In the ongoing stady, there was a statistical significant increase of the mean serum levels of ALT, , ALP, GGT, and number of patients positive for CKD with HBV and CKD patients compared to controls.

Liver enzyme AlP,ALT and GGT levels were high in people with CKD[16].

Moreover, there was statistical significant decrease in platelets, WBCs, PCV%and Hb in CKD with HBV and CKD patients compared to controls ($p < 0.05$ & $p < 0.01$).

Hemoglobin levels were high in people with chronic kidney disease [17]

It found a significant decrease in RBC, Hb, HCT, and lymphocytes among the participants, a moderate decrease in procalcitonin level, and a decrease in eosinophil's and platelets in the subjects. In people with chronic kidney infection [18]

Meanwhile, tremendous distinction was identified between the two gatherings CKD with HBV and CKD patients compared to controls regarding TG and Total cholesterol. Zolezi et al. also documented elevated total cholesterol and triglyceride levels in patients with chronic renal disease [19] .

There was a statistical significant increase of the mean serum levels of urea, creatinine, and albumin number of patients positive for CKD with HBV and CKD patients compared to controls. Creatinine levels in CKD patients were very high [20]

Albumin levels were low in people with chronic kidney infection [21]

In the ongoing stady, there was a measurable significant There was a clear decrease in the level of GFR and number of patients positive for CKD with HBV and CKD patients compared to controls according with. The glomerular filtration rate was low, The chances of hyper filtration (for glomerular filtration rate ≥60 and <90 mL/min/1.73 m2) were [22].

5. Conclusion

In conclusion, this study provided clear evidence about the relationship between HBV and CKD, as the presence of hepatitis increases the severity of the disease through laboratory tests that were conducted, all of which were statistically highly significant for people with CKD and viral hepatitis, more significant than for people with only CKD.

Compliance with ethical standards

Disclosure of conflict of interest

The author reports no conflicts of interest in this work.

Statement of ethical approval

Ethical approval was obtained.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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