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Correlation of HCV Infection and Creatinine Levels in Thalassemia Patients

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***Abstract*— The current investigation was conducted at the Center for Genetic Blood Disorders (on thalassemia). Between December 2019 and February 2020. Their ages range from one to forty. They have an past, thalassemia-ridden, with high creatinine levels. Tubes without EDTA were used to collect blood samples from 20 thalassemia individuals who had no kidney problems. a control group, a history of normal creatinine levels, and a restricted age range of 1 to 40 years. There are 120 patients total across the two groups, and all samples were used for the RT-PCR, creatinine level, and HCV ELISA test. The current study found that 20 of 120 individuals without kidney problems and 100 of 120 individuals with kidney defects both had HCV infections. Kidney disease is diagnosed by first determining the creatinine level, followed by ELISA and to determine the presence of IgM and IgG in the patient's serum. Creatinine levels in men are higher than those in women. The age group of 21–31 years in this study had more kidney defect instances (11) out of 100 (85%) than any other age group, according to the random sample size of the kidney defect group. (The age group of 21-31 was (0.63%) older than the age group of 20. The age group of 21–31 years in the normal kidney group (control group) was older than the group of 3–20 years (0.63%), and the serological test included the fast test for anti-HCV antibodies and the ELISA technique for confirmation. Infection rates were higher in the renal defect group than in the control groups (100/120 and 20/120, respectively). The age group of 21–31 years had more cases (11) out of 100 (0.85) than any other age group.**

Keywords*: Creatinine, HCV, Kidney defect, Thalassemia.*

I. INTRODUCTION

Liver disease is brought on by the hepatitis C virus.an infectious disease that mostly affects the liver. People often have minor symptoms or none at all. While silent during the initial infection, the virus stays in the liver without causing any symptoms. Over several years, the virus has frequently caused rare cases of liver cirrhosis (Ciupkeviciene *et al.*, 2022; Sarwar et al., 2022). C virus 9.6 kilobyte positive-sense, single-stranded RNA genome of the hepatitis C virus (HCV), a member of the Flaviviridae family, codes for a 3,000 amino acid polyprotein. This polyprotein's breakdown into six non-structural (NS2, NS3, NS4A, NS4B, NS5A, and NS5B) and four structural (C, E1, E2, and p7) proteins is a crucial stage in the HCV life cycle (Hayes *et al*., 2022). HCV infection is disseminated by blood and is today most frequently brought on by injecting drugs, performing hazardous injections, or engaging in sexual activity, although many infected individuals before the blood supply was thoroughly screened had been exposed through blood transfusions (Chayama *et al*., 2010).Many Autoimmune disorders are also associated with Hepatitis C Such us insulin resistance, a low platelet count, autoimmune thyroiditis, diabetes mellitus, B-cell lymphoproliferative disorders, lichen planus Sjögren's syndrome, necrolytic acral erythema, porphyria cutanea tarda ,diabetic nephropathy, and glomerulonephritis (membranoproliferative). Several disorders associated with hepatitis, non-hepatitis virus have been reported, involving the central nervous system, kidney, cardiovascular, and metabolic diseases. There is a higher proportion of deaths due to extracranial complications that appear in hepatitis infection(Kumada *et al*., 2018; Pol *et al*., 2017).

One of the side effects of frequent blood transfusions, is chronic hepatitis infection, particularly for those with hepatitis B or C,An antigen-antibody complex, which is produced after viral infection, involves the integral binding of a soluble antigen to an antibody (Razavi et al., 2017). The bound antigen and antibody function as a single entity, essentially acting as an antigen with a particular epitope (Parajuli, 2012).

Numerous immunological responses, including opsonization and complement deposition, are triggered by this binding. Infection with the hepatitis C virus and renal disease chronic HCV infection and glomerular disease have a very clear and likely causal relationship. Membranous nephropathy, mixed cryoglobulinemia, membranoproliferative glomerulonephritis (MPGN), and polyarteritis nodosa(PAN) are a few examples of renal illnesses that have been identified (PAN). The glomerular illness may be clinically silent in some patients (Czarnecka,*et al.*, 2022; Sarha, & Ahmed, 2022). Cryo-electron microscopy and three-dimensional reconstruction views were used to study

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the virus, and the results showed that the virion surface had a multilayered architecture with smooth outer-layer densities arrayed in a "fishbone" pattern. For numerous years, however, further identification of this causative agent was hampered by the lack of an appropriate cell culture technique for the development of the NANBH agent and the scarcity of chimpanzees (Yu *et al.*, 2007). Worldwide, there are different rates of HCV infection prevalence (Organisation, 1999), with Egypt having the highest rate (Hajarizadeh & Dore, 2013; Strauss & Strauss, 2007). The prevalence rate is higher in those aged 30 to 49 than in people older or younger, higher in men than in women, and higher in some ethnic groups than in white people, such as African Americans and Mexican Americans (Feldman, Friedman, & Brandt, 2007). Thalassemia is an inherited blood disorder distinguished by abnormal hemoglobin levels (low RBC quality production). Thalassemia is a hemoglobinopathy, meaning that a decrease in the hemoglobin molecule in erythrocytes is the pathophysiological cause of the condition. Genetic mutations that affect the alpha and beta globin chains that make up the quaternary hemoglobin structure cause alpha- and beta-thalassemia (TALWAR, 2016). Aim of study The current study aimed to find the relationship between hepatitis C virus (HCV) and kidney impairment in thalassemia patients through: The presence of HCV antibodies in a patient's sera,Estimate the creatinine level in urine samples,The relationship between patient demographics, including gender and age, and the occurrence of elevated creatinine levels and viral infections

II. Materials and Methods

The current investigation was conducted at the Center for Genetic Blood Disorders (on thalassemia).The research was conducted between December 2019 and February 2020. The study was sourced from the subsequent sources a patient's blood sample in a tube without EDTA and urine (Urines: should be collected at precisely timed intervals (4, 12, or 24 hours)., one hundred kidney problems. Their ages span from one to forty. They have a strange past filled with thalassemia and high creatinine levels. Twenty patients with thalassemia who had no kidney problems had blood samples in a tube without EDTA. a control group with a restricted age range of 1 to 40 years, a history of normal creatinine levels, and thalassemia. Overall, 120 patients are in both groups, and all samples were used for the HCV ELISA test, and creatinine level. Serum or heparinized plasma.

Determination of Creatinine

Whistle the spectro device at a wavelength of 490 nm, then putting 500 microns from R1 in a test tube and add 500 microns from 2, after that added 100 microns from the patient’s serum. put the model in the spectrometer, turn on the stopwatch, and record the first reading after 30 seconds and the second reading after 2 minutes. Calculations Second reading of the form— First reading of the form The second reading of the standard is the first reading of the standard

III. Results and Discussion

The serological test included the detection of anti-HCV antibodies by rapid test and then confirmation by the ELISA technique. The infection rate in the kidney defect group was higher than in the control groups (100/120 versus 20/120, respectively). as in Table 1

Anemia and a reduction in hemoglobin (Hb) in red blood cells are the outcomes of a series of genetic and hereditary blood illnesses known as "thalassemia syndromes," which are characterized by altered or absent hemoglobin chain production. Recessive characteristics that are the most common kind of thalassemia are inherited (Eleftheriou, 2008; Galanello & Origa, 2010). shows the clinical presentation of major thalassemia between 60 days and two years. The normal maturation and growth of the infants who have this disease have been altered. Growth and development typically remain at a normal level for ten to twelve years with a regular blood transfusion system that maintains a lower Hb concentration of 9.5 to 10.5 g/dL. HCV infection is possible through medical procedures like blood transfusions. Transfusion of blood components and/or organ transplants dramatically increase infection risks without HCV screening (Wilkins, Malcolm, Raina, & Schade, 2010). HCV can directly invade the renal parenchyma due to its pathogenesis, which includes the immune complex of the glomeruli and development, followed by deposition. When medications are used to treat HCV, this might result in nephrotoxicity and other issues outside of the kidneys. All of these factors work together with HCV infection to change normal kidney function and result in renal disease (Barsoum, 2007). According to the results of the current investigation, 20 of 120 people without kidney defects and 100 of 102 people with kidney defects both had HCV e infections. The detection of the creatinine level, followed by the detection of the presence of IgM and IgG in the patients' serum by ELISA, is used to diagnose kidney disease. Men's levels of creatinine are greater than women's levels because men skeletal muscles are typically more powerful (1.54 percent from 55 vs. 1.66% from 45). as in the table

Table (1): Creatinine level with gender

Sex	Total number	Creatinine level
Males	45	1.66
Females	55	1.54

The e random sample size e of the kidney defect group in this study revealed that the age group 21–31 years had a higher number of cases (11) out of 100 (0.85%) than another age group, which was found in Tables 2 and 3. In the normal kidney group (control group), the age group of 21–31 years was higher than another group of 20 (0.63%). The kidney abnormality associated with younger age may be due to the high metabolic activity of the liver and the high immune response to virus infection, all of which cause load on the kidney and are reflected by an increase in creatinine level.

Table(2) :Thalassemia patient with Kidney infection according to age group

Age group	Kidney defect patient	Percentage %
1-10	37	0.56
11-20	48	0.55
21-30	11	0.85
31-40	4	0.75

Table (3): Thalassemia patient without Kidney infection according to age group

Age group	Thalassemia patient without kidney	Percentage%
1-10	5	0.56
11-20	10	0.6
21-30	3	0.63
31-40	2	0.55

In the normal kidney group (control group), the age group 21–31 years was higher than another group 21–30 years (0.63%), because in a young stage, especially in muscular youth, a higher percentage of creatinine is present in the blood (increase in muscle mass = increase in creatinine level). The serological test included the detection of anti-HCV antibodies by rapid test and then confirmation by ELISA technique. The kidney defect group showed a higher infection rate than the control groups (100/120 and 20/120, respectively). As in the table (4)

Table (4) :The HCV infectivity in kidney defect groups of a thalassemia patient

HCV	Kidney defect patient
Positive	100
Negative	20

IV.CONCLUSIONS

The first group of thalassemia patients is more susceptible to HCV infection, and high levels of HCV in groups with abnormal creatinine levels may indicate viral effects on kidney function.

V. RECOMMENDATIONS

Further research should be conducted to identify HCV genotypes in all Iraqi cities and estimate their relationship with creatinine levels.

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