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The Seroprevalence of Hepatitis C virus infection among Renal failure patients as a risk factor in hemodialysis units in Basrah - Iraq

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Abstract

The hepatitis C virus was discovered by Choo et al in 1989. It belongs to the Flaviviridae family and has an envelope with nucleic acid ssRNA. There is a clear relationship between infection with hepatitis C virus and patients with kidney failure, so patients undergoing hemodialysis are more likely to be infected with Hepatitis C. **Methods**: The study started from December 2020 to April 2021. The study group included 100 patients with chronic kidney disease undergoing dialysis, of whom 44 were female and 56 were male with ages ranging from 15-75 years and sexes. About 5 mL of venous blood using a disposable syringe of all patients was collected for serologic identification of HCV. **Results**: A total of 100 patients suffering from CKD infection were 54.2% males and 45.8% females, according to their age and gender into six age groups with a mean age ± standard deviation (SD) was 17.5 ± 7.6 years. The results of the current study showed that 23% of patients were anti-HCV positive and 77% were anti-HCV negative using ELISA technique. **Conclusion**: The current study showed a seroprevalence of hepatitis C infection among chronic kidney patients undergoing hemodialysis, which constitutes a burden on patients and affects their recovery from infection.

***Keywords**: HCV, Hemodialysis, Seroprevalence, Renal failure*

1. Introduction

The hepatitis C virus was discovered by Choo et al in 1989 (1). It belongs to the Flaviviridae family and has an envelope with nucleic acid ssRNA (2). The onset of the infection is acute with 80%, and the patient develops jaundice, then develops into a chronic infection with 10-20%, if it continues, liver cirrhosis and hepatocarcinoma may occur and in severe cases, it leads to death (3,4). The liver is the target organ of the hepatitis C virus, where infection occurs in several ways, including frequent blood transfusions, contaminated blood, and its derivatives, which is one of the risk ways to be infected with it. Also, it occurs via sexual transmission, through the syringes for intravenous drug use (IDU), and use of non-sterile tools and materials for patients undergoing dialysis, organ transplantations, and male circumcision and tattooing (5-8). The stage in which the kidneys fail to perform their essential functions is called renal failure (RF) through a dysfunction to filter and eliminate waste substances and electrolytes from the bloodstream, such as urea. The hemodialysis process is a useful therapeutic stage that contributes to ridding the patient of these substances (9,10). There is a clear relationship between infection with hepatitis C virus and patients with kidney failure, so patients undergoing hemodialysis are more likely to be infected with Hepatitis C (8, 11). The study aims to the estimation of hepatitis C prevalence rates among patients in renal dialysis units**.**

2. Methods

2.1 Study design and Collection of samples

The study started from December 2020 to April 2021. The study was conducted in the dialysis unit of Basra Teaching Hospital. Patients participating in the study were randomly selected with written consent to be sampled. The study was based on some variables, the most important of which are age and gender, with a review of medical records at the dialysis unit to take other variables, including the patient's history of kidney disease and the start of dialysis. The study group included 100 patients with chronic kidney disease undergoing dialysis, of whom 44 were female and 56 were male with ages ranging from 15-75 years and sexes. About 5 mL of venous blood using a disposable syringe of all patients was collected for serologic identification of HCV and

separated by centrifugation at 3000-rpm for10 minutes, then transfer the serum into sterile test tubes with patient data written on them and frozen at -20°C (12). The routine ELISA rapid antibody test was used for HCV antibodies according to the manufacturer's instructions (13, 14).

2.3 Statistical analysis

Statistical tests were conducted using Statistical Package for Social Sciences (SPSS) version 20. The mean values and standard deviation (SD) calculated to characterize the study population. In studies groups, The Parametric statistical test assessed by the T test. P values < 0.04 considered statistically significant.

3. Results and Dissuasion

Kidney failure patients undergoing long-term hemodialysis are more susceptible to viral infections, the most important of which is the hepatitis C virus (HCV), and therefore it is a health problem for countries because of its negative impact on the course of treatment and the health of the patient (15, 16). Hepatitis C infection is endemic throughout the world but its prevalence varies widely. Hemodialysis treatment may contribute to saving the patient's life to reduce the risk of kidney failure and its associated complications and contact with blood and blood products, tools, and equipment contaminated with it. Table (3-1) shows that a total of 100 patients suffering from CKD infection were 54.2% males and 45.8% females, according to their age and gender into six age groups with a mean age ± standard deviation (SD) was 17.5 ± 7.6 years. In a study conducted by (17), the incidence rate of males undergoing hemodialysis was 59.5%, while the percentage of females was 40.5% with the mean age of 43.59 ± 13.28 years, while (18) mentioned that the percentage of males versus females was 64.70 %, 35.3%. In Egypt, (19) mentioned that the rates of infection with HCV were higher in males than in females by 12% and 8%, respectively, and also noted that infection rates increase with age, especially at the age of 50 years, with an increase of more than 25%.

Age Group (years)	Male	Female	Total
	No.	No.	%
15-25	5	2	7
26-35	6	7	13
36-45	4	6	10
46-55	14	8	22
56-65	12	13	25
66-75	15	8	23
Total	56	44	100
mean age ± standard deviation (SD)	17.5 ± 7.6		*P value* < 0.04

Table 1: The characteristics of the hemodialysis patients according to age and gender

Figure 3-1 showed that 23% of patients were anti-HCV positive and 77% were anti-HCV negative using ELISA technique. The results of our current study were in agreement with a study in India where the number of people infected with HCV was approximately 27.7% (18), while other studies recorded that it is estimated at 4%, 5% and 5.9%, respectively (20-22), while (23) it was recorded that the rate of infection with HCV is about 2.7%. In Egypt, it was noted that the prevalence of viral hepatitis infection is more than 10% and the infection is more frequent, especially among patients whose ages ranged between 15 and 59 years (24). In a previous study, the infection rate was 57% higher, while 42.8% had anti-HCV negative results (25). Infection rates varied between countries and came at different rates, due to the most important reasons, the most important of which are frequent blood transfusions, injecting drug use, preventive measures used in dialysis units, surgeries, especially organ transplants, and hand tools for workers in dialysis units, as previous studies recorded The most common method of transmission of infection was from the patient's nursing staff, and they agreed that the most important way to avoid this infection is washing hands, so it is necessary to take preventive measures to reduce the spread of infection among dialysis patients, and the reason may be due to the different examination method used (28-)

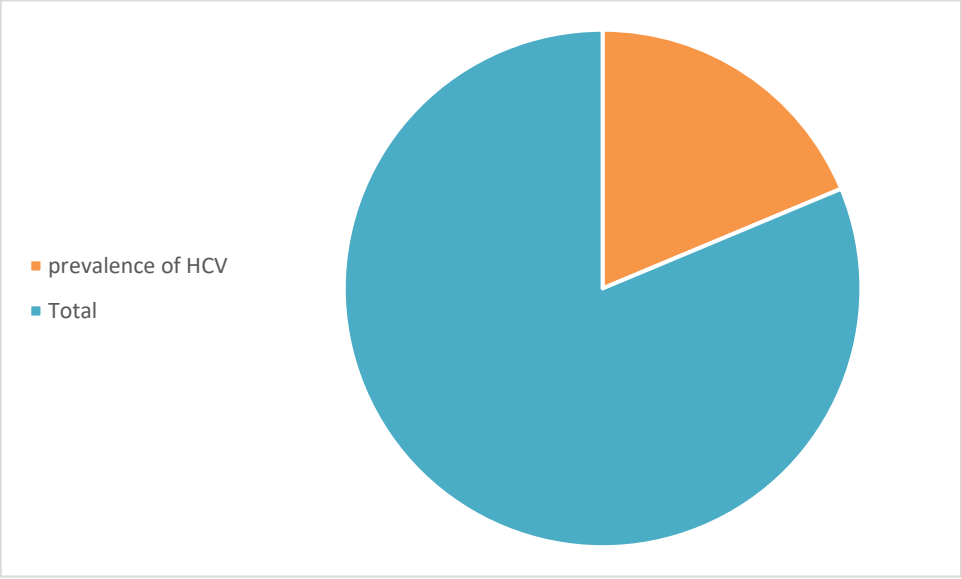

Figure 1: Prevalence of HCV infection among hemodialysis patients (HD)

4- Conclusion

The current study showed a seroprevalence of hepatitis C infection among chronic kidney patients undergoing hemodialysis, which constitutes a burden on patients and affects their recovery from infection.

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References

1- Choo QL, et al. (1989). Isolation of a cDNA clone derived from a blood-borne non-A, non-B viral hepatitis genome. Science. 244 (4902): 359-62. DOI: 10.1126/science.2523562.

2- Teimourpour, R., Tajani, S.A., Askari, R.V., Rostami, S. and Meshkat, Z. (2016). Designing and Development of a DNA Vaccine Based On Structural Proteins of Hepatitis C Virus. Iran J. Pathol. 11(3), 222 – 230. http://eprints.mums.ac.ir/id/eprint/36891.

3- Lavanchy, D. (2009). The global burden of hepatitis C. Liver Int. 29 Suppl 1: 74-81 [PMID: 19207969]. DOI: 10.1111/j.1478-3231.2008.01934.x

4- Lavanchy, D. (2011). Evolving epidemiology of hepatitis C virus. Clin Microbiol Infect 2011; 17: 107-115 [PMID: 21091831]. DOI: 10.1111/j.1469-0691.2010.03432.x

5- Alter, M.J. (2007). Epidemiology of hepatitis C virus infection. World J Gastroenterol. 13(17):2436-41. DOI: 10.3748/wjg.v13.i17.2436

6- Alavianm S.M., Hajarizadeh, B., Ahmadzad-Asl, M., Kabir, A., Bagheri Lankarani, K. (2008). Hepatitis B Virus infection in Iran: A systematic review. Hepat Mon 8: 281-294. https://www.sid.ir/en/journal/ViewPaper.aspx?id=127131.

7- Papadakis, M. and McPhee, S. (2014). CURRENT Medical Diagnosis and Treatment. 53 ed, p 664, McGraw-Hill Education. https://accessmedicine.mhmedical.com/book.aspx?bookID=3081

8- Caragea, D., Mihailovici, A., Streba, C. (2018). Hepatitis C Infection in Hemodialysis Patients. Curr Health Sci J. 44(2):107–112. DOI: 10.12865/CHSJ.44.02.02

9- Amin, N., Mahmood, R.T., Asad, M.J., Zafar, M., and Raja, A.M. (2014). Evaluating Urea and Creatinine Levels in Chronic Renal Failure Pre and Post Dialysis: A Prospective Study. JCvD 2(4), 182-185. http://www.researchpub.org/journal/jcvd/jcvd.html

10- Kadhim, A.R. (2016). Estimation of Physiological Parameters and Biochemical Markers in Patients with Chronic Renal Failure. M.Sc. Thesis. Kufa University. 79p.

11- Ramzi, Z.S., Abdulla, A.A., AL-Hadithi, T., and Al-Tawil, N. (2010). Prevalence and Risk Factors for Hepatitis C Virus Infection in Hemodialysis Pateints in Sulaimani. Zanco J. Med. Sci., Vol. 14,(Special issue 1). https://zjms.hmu.edu.krd/index.php/zjms/article/view/491

12- Polnay, L., Hampshire, M., and Lakhanpaul, M. (2006). Manual of pediatrics, an integrated approach. 1st ed., Churchill Livingstone Elsevier. China.

https://www.amazon.com/Manual-Paediatrics-Leon-Polnay-FRCPCH/dp/0443074941

13- Laperche, S.1., Le Marrec, N., Girault, A., Bouchardeau, F., Servant-Delmas, A., Maniez-Montreuil, M., Gallian, P., Levayer, T., Morel, P., and Simon, N. (2005). Simultaneous detection of hepatitis C virus (HCV) core antigen and anti-HCV antibodies improves the early detection of HCV infection. J Clin Microbiol., 43(8):3877-83. DOI: 10.1128/JCM.43.8.3877-3883.2005

14- Lambert, N. (2007). Value of HCV antigen-antibody combined HCV assay in hepatitis C diagnosis. Dev Biol (Basel), 127:113-21. https://pubmed.ncbi.nlm.nih.gov/17486884/

15- Gomes, M., Gigante, L.P., Gomes, J., Boschetti, J., and Carvalho, G. (2006). Anti-HCV seropositivity in dialysis patients. Rev Saude Publica. 40(5):931–4. DOI: 10.1590/s0034-89102006000600026

16- Ko, S.Y., and Choe, W.H. (2018). Management of hepatitis C viral infection in chronic kidney disease patients on hemodialysis in the era of direct-acting antivirals. Clin Mol Hepatol. 24(4):351-357. DOI: 10.3350/cmh.2017.0063

17- Badgal, A., Mittal, J., Tali, H. A., Aseri, R. Amrita. (2014). Prevalence of hepatitis c virus infection in chronic kidney disease patients on hemodialysis: a single centre prospective observational study in north india. J of Evolution of Med and Dent Sci/ eISSN- 2278-4802, pISSN- 2278-4748/ Vol. 3. DOI:10.14260/jemds/2014/4051

18- Jasuja, S., Gupta, A.K., Choudhary, R., Kher, V., Agarwal, D.K., Misra, A., et al. (2009). Prevalence and association of hepatitis C viremia in hemodialysis patients at a tertiary care hospital. Indian J Nephrol. 19: 62–8. DOI: 10.4103/0971-4065.53324

19- Kamel, S.M., and Nasser, I.A. (2008). Hepatitis Genotype 4: what we know and what we don't yet know. Hepatology, 47:1371-1383. DOI: 10.1002/hep.22127

20- Reddy, G.A., Dakshinamurthy, K.V., Neelaprasad, P., Gangadhar, T., and Lakshmi, V. (2005). Prevalence of HBV and HCV dual infection in patients on haemodialysis. Indian J Med Microbiol. 23:41–3. DOI: 10.4103/0255-0857.13872

21- Poddar, N., Lenka, P.R., Chayani, N., Mohanty, S., Mallick, B., and Pattnaik, D. (2012). Seroprevalence of hepatitis-c virus in blood donors and high risk individuals. J Evol Med and Dent Sci.1:959–63. [DOI via Crossref]

22- Dholakia, P.J., and Dholakia, U.J. (2013). Hepatitis C virus infections and risk factors among Hemodialysis patients at Tertiary care hospital of India. SEAJCRR. 2 (5):300–8.

23- Subramanian, G.P., Vegad, M.M, Vadsmiya, M.G, Murawala, S.M., and Patel, F.V. (2016). Seroprevalence of hepatitis C in renal failure patients on maintenance hemodialysis – Study in a tertiary care hospital – Western India. International Journal of Medical Science and Public Health. Vol 5, Issue 04. doi: 10.5455/ijmsph.2016.22072015109

24- Ahmed, S.H.H, Ibrahim, A.M., Abo-El-Azaem, N.G.M., Mohamed, M.A., Ghaith, A.A., and Zaki, M.M.A. (2018). Evaluation of some available HCV antibody detection tests (ELISA, Chemiluminescence, Immune Assay) and RT-PCR assay in the diagnosis of Hepatitis C virus infection. The Egyptian Journal of Hospital Medicine (July 2018) Vol. 72 (7), Page 4874-4879. DOI: 10.21608/EJHM.2018.10167

25- Fabrizi, F., Lunghi, G., Aucella, F., Mangano, S., Barbisoni, F., Bisegna, S., Vigilante, D., Limido, A., Martin, P. (2005). Novel Assay Using Total Hepatitis C Virus (HCV) Core Antigen quantification for Diagnosis of HCV Infection in Dialysis Patients. journal of clinical microbiology, Vol. 43, No.1, p. 414–420. DOI:https://doi.org/10.1128/JCM.43.1.414-420.2005

26- Kalantar-Zadeh, K., McAllister, C.J., and Miller, L.G. (2005). Clinical characteristics and mortality in hepatitis C-positive haemodialysis patients: a population based study. Nephrol Dial Transplant. 20:1662–9. https://doi.org/10.1093/ndt/gfh895

27- Rahnavardi, M., Hosseini Moghaddam, S.M., and Alavian, S.M. (2008). Hepatitis C in hemodialysis patients: Current global magnitude, natural history, diagnostic difficulties, and preventive measures. Am J Nephrol. 28:628–40. DOI: 10.1159/000117573

28- Gómez-Gutiérrez, C., Chávez-Tapia, N.C., Ponciano-Rodríguez, G., Uribe, M., and Méndez-Sánchez, N. (2015). Prevalence of hepatitis C virus infection among patients undergoing haemodialysis in Latin America. ANNAIS of Hepatology. Vol. 14 No. 6, 807-814. DOI: 10.5604/16652681.1171751