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Hepatitis Viruses in Hemodialysis Patients at a Tertiary Care Hospital

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Abstract **Original Research Article**

Hepatitis C virus and Hepatitis B virus are the most important infections transmitted in Hemodialysis patients. HBV and HCV are the major cause of liver diseases in these patients. These infections lead to serious complications like cirrhosis and hepatocellular carcinoma. Hence the present study was done to determine the seroprevalence of HCVand HBV in chronic renal failure patients undergoing Hemodialysis. The study was a prospective study conducted over a period of 1 year from 2018-2019 in Chronic Renal failure patients undergoing Hemodialysis. A total of 60 serum and plasma samples were collected and tested for HBV by HBsAg ELISA, HCV by Anti HCV ELISA, HCV RNA by HCV RT PCR. All the patients were seronegative for HBsAg. Anti HCV antibodies were detected in 13(21.66%) patients. HCV RNA was detected in 25(41.66%) patients.To conclude Hemodialyis patients are at risk of acquiring blood borne viral infections like HBV and HCV. Prevention and adherence to universal precautions are the main factors for the control of these blood borne viral infections. Hence use of dedicated dialysis machines, screening of patients for Blood borne viral infections for every 3 months and training of staff is recommended to reduce the risk of complications in these patients.

Keywords: Hemodialysis, Hepatitis viruses, Cirrhosis, Carcinoma, Universal precauions, Chronic Renal Failure.

INTRODUCTION

Chronic renal failure (CKD) is a global public health problem due its main risk factors hypertension and diabetes. It requires hemodialysis, peritoneal dialysis or renal transplantation in its terminal stage. As soon as the patient is terminally ill with CKD, these treatments are started [1]. In hemodialysis blood is removed from the patients and pumped across the dialysis membrane. Poisons and toxins in the blood are discarded after entering the dialysate and blood is returned to the patient [2]. Hemodialysis allows survival but increases the risk of viral infections. Vascular exposure for prolonged periods and frequent blood transfusions increase the risk of acquiring blood-borne infections. Contaminated equipment, environmental surfaces and health care workers also play a crucial role in the nosocomial transmission of these infections [3-5]. HCV and HBV are the most important infections transmitted via parenteral routes in patients undergoing hemodialysis. They are the major cause of liver diseases in these patients. These infections lead to serious complications like cirrhosis and hepatocellular carcinoma [6]. At present in India around 10-15 million are infected with Hepatitis C virus (HCV) with a prevalence of 0.5-1.5% of population [7]. High prevalence of HBV infection (20.2%) has been reported after conducting various studies at hemodialysis centres in developing countries [8]. There is a considerable reduction in the spread of HBV infection in hemodialysis patients with the advent of infection control practices particularly immunization and separation of patients who are HBsAg positive. The best way to prevent HBV infection in hemodialysis patients is to vaccinate the patients against HBV before progressing to end stage renal failure in these patients [9]. Hence the present study was done to know the most common blood borne hepatitis viruses in patients undergoing hemodialysis.

MATERIALS AND METHODS

The study was prospective study conducted over a period of 1year from 2018 to 2019 in chronic renal failure patients undergoing treatment for maintenance hemodialysis in Nephrology Department of Osmania General Hospital. Patients who have given informed consent, both sexes & all age groups were included in the study after ethical committee permission. Acute renal failure patients and patients not willing to give informed consent were excluded from the study. A total of 60 Patients undergoing

hemodialysis were explained about the protocol of the study and written consent was obtained. In each plain (for serum) and EDTA (plasma) vacutainers 5ml of blood was taken under strict aseptic precautions, centifuged and stored in aliquots at -20°C.

METHODS-HCV IgG Antibody detection was by3rd generation HCV MICROLISA-J Mitra and Co. Pvt. Ltd, Nucleic acid extraction by Spin Star Viral™ Nucleic Acid Extraction Kit 1.0 ADT BIOTECH, HCV RNA detection was done by Real star HCV RT-PCR Kit 1.0 ALTONA DIAGNOSTICS. HBV Antigen detection by HBsAG ELISA-MERIL DIAGNOSTICS.

RESULTS

Out of 60 samples tested anti HCV antibody was positive in 13 (21.66%) patients. 25(41.6%) patients were positive by HCV RT PCR. of the 60 samples tested 42 were males and 18 were females. Maximum number of males has undergone hemodialysis. Prevalence of HCV was more in the age group of 41-60years (FIGURE 1)

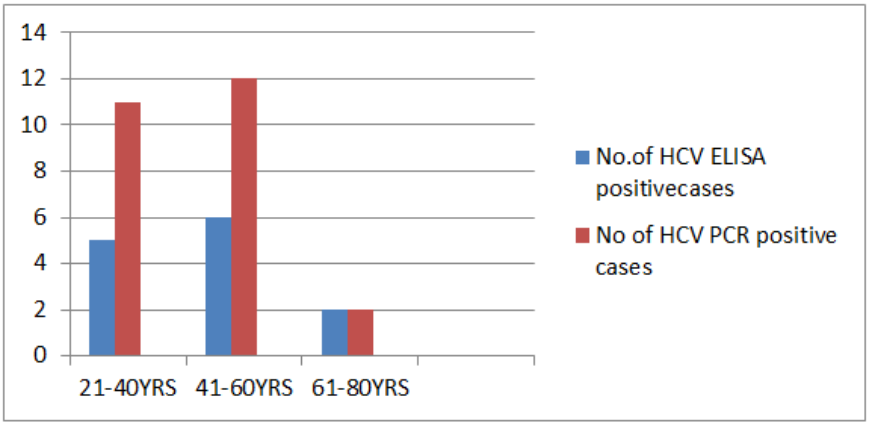

Fig-1: Age wise distribution of hcv elisa and hcv pcr positive cases

Prevalence of HCV was high among Males. Out of 25 positive cases by PCR, 20(80%) were males and 5(20%) were females (Figure 2).

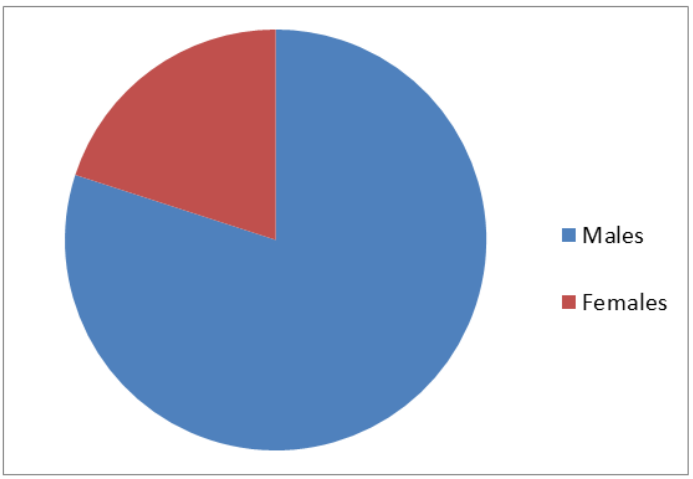

Fig-2: Sex wise prevalence of pcr positive cases

Clinicopathological details of 60 patients tested for HCV RNA shown in Table 1.

Table-1: Clinicopathological details of 60 patients included in realstar hcv rt-pcr assay

	Total (%)	RealStar HCV RT-PCR DET* (%)	RealStar HCV RT-PCR NDE** (%)	p Value
	60 (100)	0	0	
Gender				
Male	48(80%)	20(41.6)	28 (58.3)	1
Female	12(20%)	5(41.6)	7(58.3)	
Age				0.896
≤20 Years	1(1.66)	NIL (0)	1 (100)	
>20 ≤40 Years	24 (40)	11 (45.83)	13 (54.16)	
>40 ≤60 Years	30(50)	12 (40)	18 (60)	
>60 ≤80 Years	5(8.33)	2 (40)	3(60)	
Median Age				
Hemodialysis Duration				
>1 ≤ 3 Years	36 (60)	9(25)	27(75)	**0.001**
>3 ≤6 Years	24 (40)	16(66.66)	8(33.33)	
No. Of blood transfusion				
0	5(8.33)	2(40)	3(60)	0.743
1≤2	23 (38.33)	11(47.82)	12(52.17)	
>2≤3	32 (53.33)	12(37.5)	20 (62.5)	
Alanine Transaminase(ALT)				
Normal	28(46.6)	12(42.15)	16(57.14)	0.210
Elevated	2(3.3)	2(100)	Nil	
Depressed	30(50)	11(36.66)	19 (63.33)	
ESRD				
Contrast induced nephropathy	6(10)	2 (33.33)	4 (66.66)	0.922
Glomerulonephritis	11(18.33)	5 (45.45)	6 (54.54)	
HTN	18 (30)	8 (44.44)	10 (55.55)	
DM	20 (33.33)	10(50)	10 (50)	
Obstructive uropathy	5 (8.33)	3 (60)	2 (40)	
Hemodialysis in ESRD patients/week				
Twice	35(58.3)	11(31.42)	24(68.57)	**0.057**
Thrice	25(41.6)	14(56)	11(44)	

*DET - Detected, **NDE – Not Detected

Out of 60 samples tested for HBsAg all were negative by HBsAg ELISA

DISCUSSION

In the present study, high HCV positivity was seen in the age group 41-60yrs with 46.15% by ANTI HCV ELISA. High positivity in this age group is because of high incidence of CKD which is correlating with a study done by Col Partharoy *et al.* [11](Table 2).

Table-2: Age wise prevalence of hcv infection in haemodialysis patients in various studies

AUTHOR	PLACE	YEAR	AGEGROUP	% OF HCV INFECTION
Anandh perumal *et al*. [10]	Tamilnadu	2016	31-40yrs	40%
Col Partharoy *et al*.	Pune	2019	41-60yrs	60%
PRESENT STUDY	HYDERABAD	2019	41-60yrs	46.15%

Male predominance was seen in this study with 80% of HCV positive patients being males which can be associated with higher incidence of CKD per se and in males owing to higher incidence of Diabetes and Hypertension. In this study around 20% of HCV positive patients were females, this low number could be because of high HCV clearance rate in females compared to males (Table 3) which is similar to study done by AmritDhar *et al*. [14] in which female percentage was 19%.

Table-3: Sex wise prevalence of hcv infection (rt pcr) in haemodialysis patients in various studies

AUTHOR	PLACE	YEAR	MALES	FEMALES
Surendrakumar *et al*.	Coimbatore	2011	72.2%	27.8
Shantanuprakash *et al*. [12]	Lucknow	2013	84.61%	15.39%
Anandh perumal *et al*.	Tamilnadu	2016	87%	13%
Amrit Dhar *et al*.	Jammu & Kashmir	2019	81%	19%
PRESENT STUDY	HYDERABAD	2019	80%	20%

In a study in Pakistan, by shafi *et al*. [13], prevalence of HCV was 27.2%. In a study by Fabrizi *et al*. HCV prevalence was 20%. Similarly in a study across 7 countries (DOPPS) the mean prevalence of HCV was found to be 13.5% by Fissell *et al*. Variations in results is because of various geographical regions, different time periods of study, different methods of detection and infection control practices in different countries. Compared to general population (0.5-1.5%) prevalence of HCV infection was significantly higher in the present study. In a study done by col partharoy etal positivity of anti HCV ELISA was 18.8% which is correlating with present study which is 21.6%(13/60) (Table 4).

Table-4: Prevalence of hcv infection in hemodialysis patients in various Indian studies

AUTHOR	PLACE	YEAR	TOTAL NO.OF PATIENTS	PATIENTS WITH HCV INFECTION (%)
Medhi *et al.*	Delhi	2008	250	17.2%
Jasuja *et al.*	Delhi	2009	119	27.7%
Amritdhar *et al.*	Jammu and Kashmir	2019	67	31.4%
Present study	Hyderabad	2019	60	21.66%

HCV positivity by RT PCR was 41.6% whereas by ELISA it was 21.66% which is correlating with the study done by SDatta *et al*. [16] where in prevalence was 67.4% with RT PCR in comparison with 36.48% using ELISA. In a study done by Col Partha *et al*. prevalence of anti HCV positivity was19.2% and prevalence by RT PCR was 78.7%.In another study in India anti HCV positivity was 27.07% and prevalence by RT PCR was 79.16%.(Table 5).

Table-5: Prevalence of hcv infection by pcr in various studies

Author	Year	Patients with HCV infection% (PCR)
S Jasuja *et al.*	2009	21.6%
S Datta *et al.*	2005	67.4%
Present study	2019	41.6%

In a study done in Western Europe and United States (developed countries) the prevalence of HBV infection was 0 to 6.6% which is correlating with the present study. In the present study HBs Ag prevalence was ZERO, this could be due to proper vaccination of all patients and following strict universal precautions for prevention of HBV (Table 6).

Table-6: Prevalence of hbv infection in patients undergoing haemodialysis

AUTHOR	PLACE	YEAR	HBsAg PERECNTAGE
Shantanuprakash *et al.*	Lucknow	2013	3.23%
Kranthikosaraju *et al.*	Karnataka	2013	1.52%
Mdjamil *et al*.	Shillong	2016	2.17%
PRESENT STUDY	HYDERABAD	2019	0

CONCLUSION

Risk of exposure to hepatitis viruses is maximum in patients on maintenance Haemodialysis and with increased number of dialysis sessions. Hence use of dedicated dialysis machines , screening of patients for viral infections once in every 3 months and training of staff is recommended .To reduce the risk of complications these patients need to be actively intervened. In present study duration of dialysis, number of blood transfusions was considered as significant risk factors for acquiring viral infections. HBV prevalence was zero in the present study because of strict adherence to universal precautions for the prevention of infection and vaccination of all patients on maintenance haemodialysis. Screening for HCV antibodies alone does not exclude infection with HCV in patients on hemodialysis. Hence molecular detection of HCV may be useful for identifying antibody negative HCV infected patients on hemodialysis.

REFERENCES

1. Salou M, Sabi KA, Tevi A, Ekouevi K, Dossim S, Lack F, Kolou M, Dagnra YA. Prevalence and Factors Associated with Hepatitis B Virus Surface Antigen and Human Immunodeficiency Virus Antibodies in Chronic Hemodialysis Patients Followed-Up in Lomé, Togo. Open Journal of Medical Microbiology. 2019 Jan 28;9(1):16-27.
2. Al Zabadi H, Rahal H, Fuqaha R. Hepatitis B and C prevalence among hemodialysis patients in the West Bank hospitals, Palestine. BMC infectious diseases. 2015 Dec;16(1):41.
3. Abumwais JQ, Idris OF. Prevalence of hepatitis C, hepatitis B, and HIV infection among haemodialysis patients in Jenin District (Palestine) *Iranian Journal of Virology*. 2010;4(2):38-44.

4. Bhaumik P, Debnath K. Prevalence of hepatitis B and C among haemodialysis patients of Tripura, India. Euroasian Journal of Hepato-Gastroenterology. 2012;2(1):10–13.
5. Reddy GA, Dakshinamurthy KV, Neelaprasad P, Gangadhar T, Lakshmi V. Prevalence of HBV and HCV dual infection in patients on haemodialysis. Indian Journal of Medical Microbiology. 2005;23(1):41–43
6. Sanjay Kumar. Hemodialysis patients treated for Hepatitis C a sofosbuvir –bases regimen. KidneyInt Rep. 2017: 831-835
7. Bhattacharya PK, Roy A. Management of hepatitis C in the Indian context: an update. J Liver. 2015;4(187):2167-0889.
8. Telaku S, Fejza H, Elezi Y, Bicaj T. Hepatitis B and C in dialysis units in Kosova. Virol J. 2009;6:72.
9. Mittal G, Gupta P, Thakuria B, Mukhiya GK, Mittal M. Profile of hepatitis B virus, hepatitis C virus, hepatitis d virus and human immunodeficiency virus infections in hemodialysis patients of a tertiary care hospital in uttarakhand. J ClinExpHepatol. 2013;3(1):24–8.
10. Perumal A, Ratnam PV, Nair S, Anitha P, Illangovan V, Kanungo R. Seroprevalence of hepatitis B and C in patients on hemodialysis and their antibody response to hepatitis B vaccination. Journal of Current Research in Scientific Medicine. 2016 Jan 1;2(1):20.
11. Roy P, Patel A, Lole K, Gupta RM, Kumar A, Hazra S. Prevalence and genotyping pattern of hepatitis C virus among patients on maintenance hemodialysis at five centers in Pune, India. Medical Journal Armed Forces India. 2019 Jan 1;75(1):74-80.
12. Reddy GA, Dakshinamurthy KV, Neelaprasad P, Gangadhar T, Lakshmi V. Prevalence of HBV and HCV dual infection in patients on haemodialysis. Indian journal of medical microbiology. 2005 Jan 1;23(1):41.
13. Waheed Y, Shafi T, Safi SZ, Qadri I. Hepatitis C virus in Pakistan: a systematic review of prevalence, genotypes and risk factors. World journal of gastroenterology: WJG. 2009 Dec 7;15(45):5647.
14. Dhar A, Chandail VS, Sambyal V, Jamwal V. Prevalence of hepatitis C in patients with chronic kidney disease at a tertiary care hospital in north India: a retrospective analysis. International Journal of Research in Medical Sciences. 2019 Jun;7(6):2198.
15. Jasuja S, Gupta AK, Choudhry R, Kher V, Aggarwal DK, Mishra A, Agarwal M, Sarin A, Mishra MK, Raina V. Prevalence and associations of hepatitis C viremia in hemodialysis patients at a tertiary care hospital. Indian journal of nephrology. 2009 Apr;19(2):62.
16. Datta S, Goel N, Wattal C. Utility of routine real time quantitative PCR monitoring of HCV infection in haemodialysis patients. Indian journal of medical microbiology. 2015 Feb 1;33(5):106.