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Hepatitis C Virus and Hepatitis B Virus Infection in Patients and Staff of Haemodialysis Unit - A Report from Chennai

M.P. Saraswathy[1], Santhosh B. Patil[1], Baskaran[1], U.M. Dhanalekshmi* and H. Shankar Narayana[1]

[1]Department of Microbiology, Melmaruvathur Adhiparasakthi Institute of Medical Sciences & Research, Melmaruvathur - 603 319, India.
*Bio Organic Lab, CLRI, Adyar, Chennai - 60 020, India.

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HCV and HBV are most problematic infections in haemodialysis patients. The cause and source of infection is multiple in haemodialysis patients. Blood transfusion, contaminated equipment and patient to patient transmission are the potential source of infection. Our aim is to find out the prevalence of these infections in our haemodialysis centre. This study was carried out between June to November 2011. A total of 60 end stage renal disease (ESRD) patients who are on dialysis and 15 technical staff were enrolled in cross sectional study to determine prevalence, risk factor and consequences of HCV infection. Serum samples were tested for anti-HCV and HBsAg by immunochromatography test. Subsequently anti HCV positive samples were analysed with third generation anti HCV test-ECLIA. Prevalence of anti-HCV was 8.3% and HBsAg was 1.66%. Both the tests were negative in staff. The HCV infection has correlation with male gender, long term HD and units of blood transfusion. Overt liver disease rarely occurs in patients with ESRD. In our study, Chronic liver disease with elevated liver enzymes, were detected in 40% of HCV patients. The prevalence of HCV and HBV infections are low in our setup. It requires stringent adherence to all universal precautions to decrease the infection rate.

Key words: Haemodialysis, HCV, HBV, Infections, Patients, Immunochromatography.

The haemodialysis (HD) patients are among the highest risk groups for the acquisition of HCV infection[1]. Liver disease caused by HCV produces significant morbidity and mortality among patients with end stage renal disease (ESRD) treated with haemodialysis[2]. A number of risk factors have been identified for HCV infection among dialysis patients, which include number of blood transfusions, duration of end stage renal disease, mode of dialysis and concurrent prevalent of HCV infection in the dialysis unit[2]. The widespread usage of vaccination had reduced the incidence of HBV infection among HD patients. Introduction of sensitive tests for screening blood donors, prescription of erythropoietin reduced the risk of transfusion associated infections. In this study, we aimed to determine HCV, HBV infections in patients with chronic renal failure who are on haemodialysis and staff in dialysis unit.

Methodology

In a prospective study, clinical data and samples were collected from about 60 patients and 15 staff members from June to November 2011. All patients with end stage renal disease on haemodialysis were enrolled in the study after getting a written informed consent. The following history was reviewed from patient's blood transfusion, hospitalization, and high risk

* To whom all correspondence should be addressed.
Mob.: +91-9840523496;
E-mail: drmpsaraswathy@gmail.com

behaviour such as injecting drug use and unit practices. All the samples were screened for HCV antibodies, HBsAg by using immunochromatography test. Consecutively, samples with positive result were tested by third generation ECLIA test using cobas e411 Roche. In addition monthly ALT testing was also done.

Since contact transmission plays a major role in spreading of blood borne pathogens among health care workers, All staff members (no:15) have been screened for these viruses. Ethical committee clearance was obtained from institutional ethical committee.

RESULTS

Of 60 ESRD patients (47 males and 13 females) enrolled in the study, HCV & HBsAg were positive in 8.33% (5/60) and 1.66% (1/60) patients respectively. HCV antibodies have been detected in 4(80%) males & 1 (20%) female (Table 1). About 60% (3/5) of the HCV infection had occurred in elderly patients above 50 years of age. The HCV infection was reported from patients who were on chronic dialysis for more than 2 years (80%). HD needed twice a week in 3(60%) persons and thrice a week in 2 (40%) persons. A positive history of blood transfusion was present in all HCV positive patients in 34 nonreactive patients. Erythropoietin injection has been given in 3 of 5(60%) patients. Hepatitis B vaccination was completed in 59 patients including 5 HCV positives. One non responder had been vaccinated with second series. Fifteen staff members were screened for HBsAg, Anti HCV and Anti HIV using immunochromatography. All were found negative for the same.

Table 1. Base Line Data of HD Patients

	HCV			
	Positive (5)	%	Negative (55)	%
Gender				
Male	4	80	43	78
Female	1	20	12	22
Age				
18-30 years	-	-	6	11
31-50	2	40	17	31
51-70	3	60	32	58
HD duration				
<1 yrs	1	20	10	18.5
1-2	-	-	20	37
2-3	1	20	9	17
3-4	1	20	05	09
4-5	-	-	04	07
>5	2	40	07	12
Frequency of HD per week				
1/wk	-	-	01	02
2/wk	3	60	48	87
3/wk	2	40	06	11
Blood transfusion in last one year	5	100	34	62
Erythropoietin injection	3	60	27	49
Diabetic	2	40	21	38
HBvaccination				
Done once	-	-	2	04
Twice	-	-	3	05
Completed one series	5	100	49	89
Completed 2 series	-	-	01	02

DISCUSSION

HCV infection remains highly prevalent both in developed[3] and developing countries[4]. In spite of considerable decline in the incidence and prevalence of HCV infection among HD patients in many countries, this infection still remains a major problem among patients on maintenance HD.

HCV is the leading cause of liver disease in patients on HD[5-8]. The risk of acquiring post transfusion HCV infection has significantly declined primarily because of availability of better screening test for HCV and erythropoietin[9]. The CDC recommends that special precautions be observed in dialysis units including the wearing and changing of gloves and water proof gowns between patients, systematic decontamination of the equipment, circuits and surfaces after each patient treatment; no sharing of instruments or multiuse vials of medications among patients[10-12]. But universal precautions may not always be possible to implement in all the centres due to economical reasons[13].

The prevalence of HCV in HD centres varies geographically, both within and between countries[14]. Prevalence of HCV is lower in our study (8.3%) than in other studies. Joukar *et al.,* reported 11.9% [15], Teluku *et al.,* showed seroprevalence of 43%[16], but in the present study, no impact of dialyzer reuse in our centre and it was a routine practice followed. HCV positive patients undergo HD at end of the day on single machine. . As per the CDC recommendations, there is no practice of dedicated machine for HCV positive patients.

The duration of HD was found to have significant impact on anti HCV positive patients[17-22]. 80 % of patients (4/5) were on HD over 2 years. Alanine transaminase (ALT) levels were significantly high in anti-HCV positive patients. About 40% had elevated ALT for > 6 months duration. Frequency of HD was high (minimum twice weekly) in HCV population, compared to other HD patients. All HCV positive patients had history of blood transfusion in last one year. Three of five patients (60%) had shared multidose injection vials. There was no significant influence of diabetic status on HCV infection. Most of our patients come from poor economical backgrounds and they are self funded. This leads to compromise in optimum dialysis and erythropoietin dose. Since these patients were exposing to too many risk factor at a time, determining a single cause is difficult in our setup. HCV, HBsAg were negative in staff members. Seroprevalence of HBsAg in our HD centre was 1.6% (1/60) which is similar to the Joukar *et al.*, study[15]. That could be credited to early vaccination before HD and isolation of patients. Anti-HBsAg was tested after 3rd dose of vaccine and single non responder received second series of vaccination.

CONCLUSION

Prevalence of HCV & HBV was low in our centre. Duration of HD, sharing multidose vials & elevated ALT levels are found to be important risk factors. Treatment of most of HCV infected patients with interferon alpha can significantly contribute to decrease the infection. Implementation of surveillance systems & continuing education of HD unit's staff are necessary to control infections.

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