Original Paper

Hepatitis 'B' and Hepatitis 'C' Virus Infection in Haemodialysis Patients

Rahman AKMM

Abstract

Introduction: Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infection are important causes of morbidity and mortality amongst haemodialysis (HD) patients.

Objective: Study was conducted to investigate clinical, laboratory parameters of HCV and HBV infection at nephrology and dialysis centre, Combined Military Hospital, Dhaka, Bangladesh.

Methods: It was an cross-sectional study. One hundred and twenty one end stage renal disease (ESRD) patients on maintenance HD, 88 male, 33 female, mean age 51.88 years (range 14–85 years) were included in this study. Clinical and laboratory data such as age, sex aetiology of End Stage Renal Disease (ESRD), HBsAg and anti HCV, HBeAg, PCR for HCV RNA, serum bilirubin, ALT, AST, albumin were examined.

Results: The t–test and Chi-Square Tests were used to analyse the significance of the results. Among HD patients HBsAg and anti HCV prevalence rate was 9.1% and 27.3% respectively. Diabetes mellitus and hypertension were common causes of ESRD.

Conclusion: Prevalence of HBV and HCV infection is quite high in our HD patients, data emphasise need for strict adherence to infection control, barrier precaution and preventive behaviours.

Key-words: Hepatitis B, hepatitis C, haemodialysis.

Introduction

Viral hepatitis complicating haemodialysis (HD) has been recognized from the earliest days of this therapy. While the introduction of vaccination programs and stringent infection control measures have succeeded in limiting the spread of hepatitis infection within dialysis facilities outbreaks continue to occur periodically and prevalence rates remain unacceptably high. As such Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infection in dialysis patient present a distinct clinical problem in view of the immunosuppressive effect of renal failure, the susceptibility for de- novo infection and nosocomial transmission and the long term implications on morbidity and mortality[1].

HBV infection is a substantial global health problem. It is estimated that more than two billion people worldwide have serological evidence of current or historical infection[2]. There are considered to be more than 350 million people worldwide with chronic HBV infection[3], in the Asia – Pacific region more than 8% of the population are chronic carriers[4]. HBV is highly infectious compared with other blood borne viruses: an untreated percutaneous exposure to an infected source carries a risk of seroconversion of up to 30%. By contrast, the risk for HCV is 1.8%[5] Prevalence of HBV across dialysis facilities in Western Europe, Japan and the USA is about 0-6.6%[6], between 1.3 % and 14.6% in Asia-Pacific countries[7], 13.3% in Turkey, 2.4-10% in Brazil[8,9].

It has been demonstrated that HD patients are more likely to become chronic carries of HBV than members of general population[10]. Up to 80% of acutely infected dialysis patients may become chronic carriers[11]. The prevalence of HCV infection in the HD population varies from 1% to more than 70%, highly variable between units within the same country. Liver disease caused by HBV and HCV causes significant morbidity and mortality among patients with end stage renal disease (ESRD) treated with HD[12].

Lt Col A K M Mijanur Rahman, MBBS, MCPS, FCPS (Medicine), FCPS (Nephrology), Classified Specialist in Medicine, Combined Military Hospital, Dhaka.

Materials and methods

It was an cross-sectional study conducted among 121 ESRD patients who were on maintenance haemodialysis at Nephrology centre, Combined Military Hospital (CMH), Dhaka. Study period was 06(six) months from January' 2013 to June' 2013. Clinical data such as age, sex, aetiology of kidney disease, duration of dialysis, number of blood transfusion were noted. HBsAg, HBeAg, Anti HCV antibody, PCR for HCV RNA, serum bilirubin, ALT, AST, albumin, ferritin were examined. Serological test for HBsAg and antibodies to HCV were performed using ELISA method. The t-test, Chi-Square Tests was used to analyse the significance of the results. Tests were carried at Armed Forces Institute of Pathology, Dhaka, Banladesh.

Results

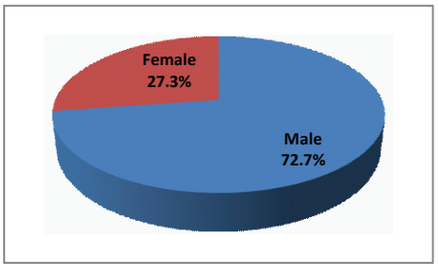
Among 121 patients about 75% patients were between age 40 and 70, only 8.3% were below 30 years. Age ranged from 14-85 years with mean age was 51.88 years. 88 (72.7%) of them were male, 33 (27.3%) were female (Table-I and II).

Table-I: Age distribution of the study population (n=121).

Age in years	Frequency	Percent
< 20 yrs	03	2.5
21-30 yrs	07	5.8
31-40 yrs	14	11.6
41-50 yrs	27	22.3
51-60 yrs	42	34.7
61-70 yrs	22	18.2
> 70 yrs	06	05.0
Total	121	100.0
Mean ±SD	51.88(±13.46)	Range 14-85 years

Table-II: Sex distribution of the study population (n=121).

Sex	Frequency	Percent
Male	88	72.7
Female	33	27.3
Total	**121**	**100.0**



Main primary aetiology of ESRD included diabetes mellitus 30(24.8%) Hypertension 30 (24.8%), chronic glomerulonephritis 25(20.7%), unknown 25(20.7%), Urological causes, hereditary and connective tissue diseases together comprised about 9%, others (drugs, stone disease, pyelonephritis, rhabdomyolysis) accounted for 7.4 % of the aetiology (Table-III).

Table-III: Distribution of aetiology of kidney disease in haemodialysis population.

Aetiology	Frequency	%
Diabetes mellitus	30	24.8
Hypertension	30	24.8
Chronic glomerulonephritis	25	20.7
Urological diseases	06	05.0
Hereditary diseases	04	03.3
Connective tissue diseases	01	0.8
Other	09	07.4
Unknown	25	20.7

In this study 8 patients (6.6%) were HBsAg positive, 30 patients (24.8%) were Anti HCV positive, 03 patients were positive for both HBsAg and Anti HCV. Among total 11 patients who were HBsAg positive, 9(81.8%) were found HBeAg positive. HCV RNA were detected in 25/33 patients (75.7%) by PCR technique (Table-IV).

Table-IV: Frequency of hepatitis B & C among dialysis patients.

	Number	%
Hepatitis B (n=121/8)	08	6.61
Hepatitis C (n=121/30)	30	24.79
Hepatitis B+ C (n=121/3)	03	2.48
HBeAg positive (n=11/9)	09	81.81
HCV RNA positive (n=33/25)	25	75.7

Significant correlation was found between HCV infection and duration of dialysis ($p<0.001$), number of blood transfusion ($P<0.001$), serum bilirubin ($p=0.01$), serum ALT ($p=0.003$), serum AST ($P<0.01$). No correlation was found with serum albumin, ferritin, (Table-V). In Hepatitis B positive correlation was found with serum ALT only ($p=0.04$) (Table-V, and VI).

Table-V: Correlation of HCV with different variables (n=121).

	Hepatitis C			
	Positive	**Negative**	**Correlation**	**p value**
Duration of dialysis (months)	68.0(±35.98)	44.11(±26.98)	-0.342	<0.001*
Number of blood transfusion (Unit)	29.96(±21.63)	11.83(±16.74)	-0.414	<0.001*
Bill (mg/dl)	0.61(±0.33)	0.48(±0.18)	-0.245	0.01*
ALT (U/L)	45.75(±32.11)	29.66(±21.75)	-0.284	0.003*
AST (U/L)	42.36(±30.67)	22.69(±16.55)	-0.385	<0.001*
Albumin (gm/L)	38.37(±35.80)	33.73(±11.27)	-0.098	0.315
Ferritin (ng/ml)	1431.37(±1593.59)	1105.30(±1178.24)	-0.114	0.265

Table-VI: Correlation of HBV with different variables (n=121).

	Hepatitis B			
	Positive	**Negative**	**Correlation**	**p value**
Duration of dialysis (months)	62.18(±28.80)	49.62(±31.66)	-0.116	0.21
Number of blood transfusion (Unit)	18.0(±14.0)	17.0(±20.60)	-0.015	0.87
Bill (mg/dl)	0.54(±0.19)	0.52(±0.25)	-0.027	0.78
ALT (U/L)	49.63(±35.21)	32.90(±24.77)	-0.194	0.04*
AST (U/L)	32.66(±16.97)	27.59(±23.54)	-0.066	0.53
Albumin (gm/L)	31.70(±7.74)	35.53(±22.93)	0.051	0.60
Ferritin (ng/ml)	831.45(±549.60)	1248.62(±1376.54)	0.101	0.32

* Correlation is significant at the 0.05 level (2-tailed).

Discussion

In patients on maintenance HD, the risk of hepatitis is still a serious problem. Available data suggests that HCV has become the most common cause of hepatitis[13]. In this study prevalence of HBsAg was 9% (11/121), anti HCV antibody was 27.3% (33/121). Bangladesh has an intermediate prevalence of hepatitis B infection with a 4% HBsAg positive population[14]. HBsAg prevalence rate was similar as in Asia – Pacific countries[15], higher than a study conducted by IPGMR (presently BSMMU), Dhaka in 1995. Rahman et al in that study found 10% and 2.5% of their HD patients were positive for anti HCV and HBsAg respectively[16]. Anti HCV antibody prevalence was 69% in another study conducted by Ahmed et al in 2003 at BSMMU, Dhaka[17]. In another study in Bangladesh around 12% of all patients on maintenance haemodialysis were found serologically positive for HBV[18]. Prevalence of HCV among HD patient in Asia was found 17-51%[19]. In a study in India, HBV prevalence was 14.2% in dialysis patients[20]. Amongst HBsAg positive (total=11) 9 (81.8%) were found HBeAg positive, indicating very high infectivity and chronicity in HD patients. HCV RNA were detected in 25 (75.7%) out of total 33 Anti HCV antibody positive patients.

Blood and its components (plasma, serum, albumin etc) are the main source of HCV infection. In recent years, an increasing role has been assigned to hospital transmitted infections (nosocomial)[21]. The main reasons for high prevalence of HCV infections are lack of standard infection precautions and lack of effective vaccination, inadequate disinfection of dialysis machines and to the medical equipments as well as infection transmission from patient to patient, especially in dialysis centre with high percentage of infected patients[22].

Anti HCV antibody positive patients had been on dialysis for 68 (±35.9) months, got 29.96 (± 21.63) units of blood transfusion. There was significant correlation between HCV positivity and duration of HD and number of blood transfusion (P<0.001). Study result is similar to the study of Souza et al and Chawla et al[23,24].

Serum alanine amino transferase (ALT), aspartate amino transferase (AST) was found significantly elevated in HCV positive patients (p=0.003, <0.001 respectively). Findings are similar to study of Khan et al[25]. However significant correlation could be detected in HBV infection with serum ALT only (p=0.04). The age of the study patients ranged between 14 and 85 years with mean±SD 51.88± 13.46. In this study about 73% dialysis patient are male, as because this is a military hospital, Military mostly constitutes male personnel. Study found that main underlying causes of renal failure were DM (24.8%), HTN (24.8%), chronic glomerulonephritis (CGN) (20.7%), and unknown (20.7%). Age range and aetiology is almost similar to other study[16,17,18].

Conclusion

Hepatitis B and Hepatitis C Virus infections remain a major health issue in ESRD population having significant impact on overall morbidity and mortality. Despite the introduction of effective infection control measures to minimize patient-to-patient transmission and Hepatitis B vaccine, occasional outbreak occurs in dialysis units, usually because of lapses in effective infection control practice. In absence of effective vaccine for preventing HCV infection, prevalence of it is consistently higher than in general population. The course of HBV infection is different in patients with dialysis dependant renal failure. Choosing which patient to treat with antiviral therapy, when and with which drugs, a subject to uncertainty at present, therefore standard precautionary measures must be rigorously followed.

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