Seroprevalence occurrence of viral hepatitis and HIV among hemodialysis patients

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Abstract. Patients with chronic renal failure (CRF) were on maintenance invasive haemodialysis (HD) procedure. This procedure by itself affects immunity of the patients and became more susceptible to viral infections to investigate the occurrence of HBV HCV and HIV infections in patients with hemodialysis. A retrospective study of 430 end stage renal failure patients referred to hemodialysis department at Al-Kindy Teaching Hospital Baghdad Iraq from January 2015 to January 2017. Patients were investigated for HBsAg using enzymelabeled antigen test (ForesightEIA USA) HCV Abs (IgG) specific immunoglobulin using a HCV enzymelabeled antigen test (ForesightEIA USA) and anti HIV Abs (IgG) using enzymelabeled antigen test (ForesightEIA USA). The frequency of HBV infection in the first year was not significant between males (111%) and females (000%) (P= 0.295). About HCV also there are no significant differences between males (1263%) and females (931%) (P=0.347). After one year of follow up the frequencies of HBV and HCV were not significant between two sexes. Additionally no any one of the patients had HIV infection. This study brings a light on that HBV and HCV were having the same frequencies in both genders and lower occurrence with time. Furthermore HIV was not detected in those patients.

Key words virus, haemodialysis, infection.

1 Introduction

One of the treatments of chronic renal failure (CRF) is maintenance invasive hemodialysis (HD) procedure. This procedure by itself affects innate immunity like changes in chemotactic factor for leukocytes phagocytic function of neutrophils and monocytes and natural killer cell (1, 2 and 3). Moreover adaptive immunity is affected for example defect in proliferation of T lymphocytes and down regulation of phosphorylation pathways of lymphocytes (4, 5 and 6). Therefore HD patients are more susceptible to blood born viral infection like hepatitis B virus (HBV) hepatitis C virus (HCV) and Human immunodeficiency virus (HIV) due to disturbance in immune system (7).

Infection with these viruses is the main reason of morbidity in HD patients. However precautions’ must be taken to prevent disseminations of viruses in the unit like available treatments and vaccines (8). In USA after acquiring viruses like HBV in HD patients 60% of them become chronic carriers while in the general population was 5% of them became chronic carrier (9). A study showed that chronic HBV infection had a relation with mortality (10). Additionally there are 170 million hepatitis C virus carriers.
worldwide and one of the risk group is HD patients and the risk of death was 157 times more than others in association with liver cirrhosis and hepatocellular carcinoma (1112).

Subsequently infection of liver with viruses was fatal for patients on HD and constitutes 19% of all deaths (13) Additional virus that is important in HD patients is HIV The prognosis of this virus was changed significantly due to administration of Highly Active AntiRetroviral Therapy (HAART) stage of HIV disease at time of dialysis start and T helper (CD4+) lymphocyte count (14, 15 and 16).

The goal of the present study is to investigate the occurrence of viral infection like HBV HCV and HIV in patients with the end stage renal failure on hemodialysis.

2 Patients and methods

A retrospective study of 430 end stage renal failure patients referred to hemodialysis unit of Al-Kindy Teaching Hospital Baghdad Iraq from January 2015 to January 2017 All patients were subject to the process of hemodialysis

Hemodialysis patients were a case for the study if their serum tested positive for HBV HCV and HIV in contrast the patients receiving hemodialysis were considered as a control if their serum tested negative for those three viruses for every case one age and gendermatched control receiving haemodialysis was selected.

The Broad of Medical Ethics has been approved for these patients and accepted their review of Al-Kindy College of Medicine and Al-Kindy Teaching Hospital The knowledgeable permission was obtained from patients Data collected from both groups including demographic information age sex marital status occupation residential status onset of renal failure and hemodialysis history.

Serological testing A 430 patients were investigated for HBsAg using enzymelabeled antigen test (ForesightEIAUSA) HCV Abs (IgG) specific immunoglobulin using a HCV enzymelabeled antigen test (ForesightEIAUSA) and anti HIV Abs (IgG) using enzymelabeled antigen test (ForesightEIA USA) The principle for detection antibodies in the serum are illustrated as follows using leaflet kit.

The microwells are coated with Ags then the serum will be added that contains Abs lead to formation a complex After incubation washing was done and enzyme conjugated with Abs was added After incubation and washing were done substrate A and B were added The color was formed and the reaction was stopped by sulfuric acid The results were interpreted after reading with micro plate reader at 450nm within 30 minutes Samples with optical density below the cutoff were recorded as negative those with optical densities (< 10% > 10%) of the cutoff were equivocal and all others were positive The sample was retested when the absorbance was within 10% of the cutoff level.

Statistical analysis

- Data were analyzed statistically using
- Descriptive statistics frequencies mean and standard deviation
- Inferential statistics Chisquare tests and fisher exact test

All of these were done using Mini Tab statistical software program 1320 A P value ≤ 005 was considered to be significant

3 Results

A total of 430 patients with chronic kidney disease (renal failure) were on hemodialysis during the study period The proportion of males 269 (6255%) was more than that of female 161(3744%). Their ages ranged from 16 to 76 years (median=35) (312 ±080). The frequency of HBV infection in the first year was not significant between males (111%) and females (900%) (P= 295) as shown in Table 1. About HCV also there is no a significant difference between males (1263%) and females (931%)(P=0347). After one year of follow up the frequency of HBV and HCV was also not significant between two sexes as was reported in (Table 2) HIV was not affecting any of HD patients There was a
significant reduce in the frequency of infection with HCV while occurrence of HBV was not changed (Table3).

Table 1 Frequency of viral infection in patients in the first year of hemodialysis

| Viral markers | HD Patients positive for the viruses males | HD Patients negative for the viruses males | HD Patients positive for the viruses females | HD Patients negative for the viruses females | P value |
|---------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|---------|
|               | No | %  | No | %  | No | %  | No | %  |                   |
| HBsAg         | 3  | 111| 266| 9888| 0  | 0  | 161| 100| 0295*              |
| Anti HCV Abs  | 34 | 1263| 235| 8736| 15 | 931| 146| 9068| 0347*              |
| Anti HIV Abs  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | Not significant    |

Table 2 Frequency of viral infection in patients in the second year of haemodialysis

| Viral markers | HD Patients positive for the viruses males | HD Patients negative for the viruses males | HD Patients positive for the viruses females | HD Patients negative for the viruses females | P value |
|---------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|---------|
|               | No | %  | No | %  | No | %  | No | %  |                   |
| HBsAg         | 0  | 0  | 269| 100| 0  | 0  | 161| 100| 100*               |
| Anti HCV Abs  | 15 | 557| 254| 9442| 9  | 559| 152| 944| 100*               |
| Anti HIV Abs  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | Not significant    |

Table 3 Comparison of viral infection in hemodialysis patients in two years of follow up

| Viral markers | HD Patients positive for the viruses 2015 | HD Patients positive for the viruses 2016 | P value |
|---------------|------------------------------------------|------------------------------------------|---------|
|               | No | %  | No | %  |                   |
| HBsAg         | 3  | 0697| 0  | 0  | 0248*              |
| Anti HCV Abs  | 49 | 1139| 24 | 558| 0002               |
| Anti HIV Abs  | 0  | 0  | 0  | 0  | Not significant    |
4 Discussion

Chronic renal failure patients receiving hemodialysis are often acquiring blood borne viral infection over their long treatment period like HBV, HCV and HIV. In our study HD patients had HBV and HCV infection and after follow them the percentage of HBV decreased. Additionally HCV still in the same percentage. There was no significant difference regarding gender in the frequency of these viruses. There was a significant reduce in the frequency of infection with HCV table3 with time. A study done in Canada demonstrated that two patients (08%) were positive for HBsAg and 9 (38%) had viral HB DNA by PCR (17). This is in agreement with our study (11%) in 2015 and then (00%) in 2016, therefore, the molecular investigation that detects HBVDNA using nested PCR is helpful for patients with anti HB core Ab positive negative for HBsAg and antiHBs Abs (18). It is recommended to analyze HBVDNA annually and biopsy from liver (19). Additional study done in Madhav Nagar city reported that the frequency of HBV and HCV infections in HD patients was 152% and 111% respectively (20, 21). In India the occurrences of HBV were 34% to 42% which is higher than found in our study (22, 23). The lower occurrence of HBV in this study may be caused by sample size method used for detection the virus less blood transfusion and blood products for the patients and screening of blood for bloodborne viral infections before transfusion. The availability of erythropoietin leads to lowering blood transfusion times to the patients. The only three patients with HBsAg positive were treated and recover from the disease. Consequently HBV did not detect after one year of follow Management patients with HBV vaccine separation of infected patient on separate machine and habitual surveillance for HBV infected patients in the hospitals leads to lower rates of infection with HBV. Regarding the frequency of HCV infection was higher than HBV in our study while other studies reported less prevalence of HCV infection in HD patients like Spain (24) and Brazil (25). This may be due to sample size method of detection and screening blood for antibodies against HCV with control measures in hospitals Double infection with two viruses (HBV and HCV) in same patient were not detected in our study while in other studies were 44% (26, 27). The lower number of the patients who were positive for anti HCV after one year of follow-up was due to their deaths.

About HIV infection there were no cases of this virus in HD patients in our study due to control measures of this disease. The prevalence of this virus varies in different countries depending on district of the countries (28, 29). Within USA about 1% of HD patients had HIV due to HIV associated nephropathy (30). HD patients should be investigated by ELISA Western blot and serum HIVRNA for positive cases. The prognosis of HIV infected HD patients has considerably better by using Highly Active AntiRetroviral Therapy (HAART)(31) stage of HIV disease at initiation of dialysis (32) and The CD4+T helper count (33). Infections with these viruses are important cause of death following cardiovascular diseases in HD patients. Thus many safety measures must do to limit the dissemination of these viruses (34). There is a need for treatment of HCV endstage renal disease patients and sustained systematic immunization campaigns for HBV infection (35). Investigating hemodialysis patients for antiHBc is important to show latent HBV infection (36). Thus early vaccination and better nutritional conditions improves antiHBV response (37).

5 Conclusions

This study brings a light on that HBV and HCV infections were in the same in both genders though less common with time HIV was not detected in HD patients.

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