
FREQUENCY AND RISK FACTORS ASSOCIATED WITH POSITIVE CASES OF HEPATITIS B AND HEPATITIS C IN 100 DIALYSIS DEPENDENT PATIENTS.

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ABSTRACT

Objectives:

The main objective of the study was to determine the frequency of hepatitis B and hepatitis C in hemodialysis dependent patients who are positive for either type of hepatitis infection.

Methodology:

Study was conducted for duration of five months (1st Dec 2014- 23rd April 2015) at nephrology unit of Khyber teaching hospital and kidney center of Hayat Abad medical complex. Patients who were dependent on dialysis with renal failure due to any cause were targeted for the study. All patients who were found positive for either type of hepatitis infection were included in the study. All patients who were positive with hepatitis infection before the start of dialysis and those who came for the first time for dialysis were excluded from the study. A semi structured questionnaire with both open and close ended questions was used to collect the information from the patients. Written consent was taken from all the patients prior to the data collection after explaining purpose of the study. It was a cross sectional study and non-probability convenient sampling technique was adopted for the data collection. Total of hundred patients who were positive for hepatitis were taken as sample size. Patient's record was also thoroughly checked as an adding tool for data collection. Apart from patients some inquiry was also done from the concerned staff working on dialysis machines.

Results:

Results of this study show that the prevalence of hepatitis infection is more in dialysis dependent patients as compared to the general population, and that among the positive cases the frequency of hepatitis C was more than hepatitis B. Common risk factors associated with increase prevalence of hepatitis infection among hemodialysis dependent patients are frequent blood transfusion without proper screening, lack of proper sterilization of dialysis machine and environment where dialysis is carried out. Close proximity of the patients with positive cases of hepatitis positive patients, previous surgical procedures carried out, history of hepatitis infection in family and decreased immunity of the dialysis patients

Conclusions:

Frequent dialysis leads to increase frequency of hepatitis C as compared to hepatitis B and unsterilized environment of the area around the machine and unscreened blood transfusion are the major contributors.

Key words:

Dialysis, nephropathy and sterilization.

INTRODUCTION

Dialysis has been identified as a major risk factor for infection with Hepatitis B and Hepatitis

C virus with significantly higher rates of sero-conversion observed in hemodialysis patients as compared to general population.¹⁻² Hepatitis is caused by different viruses and is always a major issue in patients who are on dialysis for their survival. The basic pathology is the inflammation of liver and the patient usually

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present with the common symptoms of jaundice, malaise, fever, loss of appetite and abdominal pain.³ the common types of hepatitis infection are A, B, C and D. the main concern of this study was with hepatitis B and C, which are both blood borne infections. Dialysis is a lifesaving procedure in end stage renal disease. Major indications for dialysis are uremia caused by many conditions like electrolyte imbalance, metabolic acidosis; acute poisoning and volume overload.⁴ As compared to other types of hepatitis, the prevalence of hepatitis B and hepatitis C is more in hemodialysis patients. The different risk factors responsible are frequent blood transfusion, low level of immunity of the patient, lack of proper screening of the blood, improper sterilization of the dialysis machine and the area where dialysis is carried out, duration of dialysis and lack of expertise of the staff who are working on dialysis machines and taking care of the patients.⁵

Even with much advancement in the field of medicine Hepatitis B and C virus infection are still a major point of concern for the health care personnel who takes care of the dialysis patient. Since the introduction of precautionary measures like Introduction of HBV vaccination, isolation of HBV and HCV positive patients, use of dedicated dialysis machines and regular surveillance for these infections have significantly reduced the spread of these infections.⁶ But still even in developed countries today the level has not reached to negligible level. Still positive cases are reported in these patients and particularly more in developing countries.⁷ It has been observed in different parts of the world that the prevalence of both types of hepatitis infection not only varies between different dialysis patients of different countries but also in same country with different dialysis units.

A major risk factor for high prevalence of both hepatitis B and C is the frequent blood transfusions to these patients. Among both types, hepatitis C predominantly more prone to be transferred through blood transfusion as compared to hepatitis B, and the major factor contributing to this is the lack of proper screening of the blood.⁸ Apart from lack of screening, some blood donors may be missed by current screening procedures and these need to be reassessed.⁹ From studies it has been observed that the incidence of new cases of hepatitis are less as compared to those already diagnosed and are on maintain ace therapy. This could be due to much improved screening program than before.¹⁰ Another important finding which has been observed by different research workers is that the prevalence of both types of infection is more in patients with a history of previous renal transplant and the probable cause could be the infected donor kidney or perioperative blood transfusions. This finding forced the healthcare providers to think of better screening of the kidneys before transplant.

The distribution of HBV worldwide is approximately 350 million people and HCV is 170 million people.¹¹ the prevalence of HBV is 2.4% while it is 3% for hepatitis C in Pakistan.¹¹ the prevalence rate is quite high in dialysis dependent patients and almost reaches to around 10 – 15%. In Pakistan according to researches carried out. The prevalence in some countries of the Asia it reaches to around 22.9% the prevalence of hepatitis B in dialysis dependent patients is much lesser than C and ranges between 2.1% and 4.6% in Western countries.¹² In Pakistan a study was conducted regarding the prevalence of hepatitis B and C in four hemodialysis centers on dialysis dependent patients and was found to be 8.1% and 22%. Respectively.¹³ Another study was conducted in Libya in 2012 on 831 patients, in which 7% patients were infected with HCV while 1%

with HBV.¹⁴ result of these studies shows that the prevalence rate of infection in Pakistan, among patients on dialysis is consistently higher than in healthy populations, suggesting that dialysis patients may be at higher risk of acquiring both types of infections. The purpose of this study is to determine the frequency of different types of hepatitis in hemodialysis dependent patients and to identify different causes that led to these infections in such cases. This will be a sort of unique study of its type in Peshawar as no previous research has been conducted and will help us to prevent the occurrence of both types of hepatitis in community in general and particularly in patients who are on dialysis for their survival.

METHODOLOGY

Approval was taken from department of community medicine and ethical committee of university. It was a cross sectional study conducted for duration of 5 months i.e. from 1st December 2014 to 23rd April 2015. All the patients admitted in tertiary care hospital (Khyber Teaching Hospital and Kidney Center) was targeted. Hemodialysis dependent patients were taken as study population. All hemodialysis patients of KTH and kidney center having positive history of HBV and HCV were included in the study while Patients having hemodialysis for first time were excluded from the study. 100 dialysis dependent patients who were HBV or HCV positive were included in the study through non probability convenient sampling technique. A semi structured questionnaire was designed having both open and closed ended questions. Responses were taken after informed consent. A pilot study was conducted on 10% sample size in order to check the feasibility .applicability and analysis of results. Data collected was presented in the form of tables and graphs. Data analysis was carried out through flow sheet.

RESEARCH VARIABLES

Dependent variable: HBV and HCV positive dialysis dependent patients.

Independent variables: Dialysis, Blood transfusions, Environment of dialysis area, Family history of HBV and HCV, Surgical procedures

Confounding variables: Lack of proper sterilization of machines, Close contact with positive cases, Intravenous drug abusers, multiple sex partners, Vaccination against hepatitis, Lack of proper screening of blood.

RESULTS

During the study, 100 patients from Khyber Teaching Hospital and Kidney Center were included. Out of 100 patients 62 were male and 38 female (table # 1.1). Among these positive cases, 12 were infected with HBV while 88 were infected with HCV which is shown in (table # 1.2). In order to study the risk of HBV and HCV infection, we examined the time on hemodialysis, 18 patients who were diagnosed with HBV and HCV infection, were on hemodialysis for less than a year while 82 patients who had the infection, were on hemodialysis for more than a year. This is presented in (table# 1.3). 15 of the patients got the virus in less than 6 months after the start of hemodialysis. 49 patients got it in 6 to 12 months after the start of hemodialysis. 31 patients were infected after 1 to 3 years and 5 patients got it after 3 to 5 years. Table # 1.5 show surgical procedures done in the patients before diagnosis, 15 patients have undergone surgery. In these 15 patients, 4 had kidney transplants (table # 1.6). 15 patients out of 100 had family history of hepatitis

(table # 1.7). Table # 1.8 shows the indications for hemodialysis. Most of the patients were admitted due to hypertension and uremia.

1.1: gender wise distribution of patients with HBV and HCV.

Gender	Frequency	Percentage
Male	62	62.0
Female	38	38.0
Total	100	100.0

1.2: Frequency of Hemodialysis Patients diagnosed as HBV or HCV:

	Frequency	Percentage
HBV	12	12.0
HCV	88	88.0
Total	100	100.0

1.3: Length of Hemodialysis:

	Frequency	Percentage
< 1 year	18	18.0
> 1 year	82	82.0
Total	100	100.0

1.4 Frequency of patients who underwent surgical procedures:

	Frequency	Percentage
Yes	15	15.0
No	85	85.0
Total	100	100.0

1.5 Frequency of patients with renal transplants

	Frequency	Percentage
Yes	4	4.0
No	96	96.0
Total	100	100.0

1.6: Frequency of patients with family history of hepatitis:

	Frequency	Percentage
Yes	15	15.0
No	85	85.0
Total	100	100.0

1.7: Indications for hemodialysis

	Frequency	Percentage
Nephropathy	16	16
Volume Overload	11	11
Hypertension	23	23
Uremia	26	26
Electrolyte Imbalance	1	1
TOTAL	100	100.0

DISCUSSION

This study shows a high prevalence of HBV and HCV infection in patients dependent on hemodialysis. The frequency of HBV and HCV in hemodialysis was found to be higher than the general population. Out of the 100 positive patients, 12 were infected with HBV while 88 were infected with HCV. This observation is in agreement with a previous study from Libya showing that the highest prevalence of HCV was observed in HD patients than HBV.

Our study reveals that there is increased transmission of HBV and HCV infections during hemodialysis of chronic kidney diseases (CKD) patients and most possible causes could be blood transfusions, lack of proper sterilization of the hemodialysis machine and environment, family and surgical history. A potential contributor to the blood transfusion phenomenon is that significant cellular immune disturbances typically occur in hemodialysis patients. Other sources of infection like renal transplants reuse of dialyzers and cross infection may also contribute to some extent. Globally the prevalence of HCV among patients receiving HD varies from as low as 6.1% in Germany to as high as 76% in Casablanca¹⁵. The prevalence of both types of hepatitis is high in Middle East and North America in general population and in hemodialysis dependent patients. Studies conducted before show the prevalence of hepatitis in hemodialysis dependent in Saudi Arabia as high as up to 50%, in 42% in Tasmania and around 20.2% in turkey. In contrast, the observed prevalence of HBV infection (2.6%) is similar to the general population and similar to that reported in HD patients in other regions including Europe (4.1%), Japan (2.2%) and the USA (2.4%). In a study conducted on a sample of 8615 dialysis dependent patients from 308 dialysis centers in Europe and United States reported that the prevalence of hepatitis B in these patients was up to 6.6%. While studies conducted in less developed countries shows that the prevalence rate is up to 20%.¹⁶ the results of this study also reflects the prevalence rate in general population as well as the quality of health care facilities in a community and the standards of infection control practices in hemodialysis units.

Initially when proper blood screening program was not introduced in HD unit's positive history of blood transfusions and number of blood transfusions was found to be strongly associated with HBV or HCV infection and was considered as one of the major cause of transmission of infection in these patients. A large proportion of patients had previously received blood transfusions. It has been confirmed that though administration of blood products is the main risk factor for developing HBV and HCV, duration of hemodialysis is also an independent risk factor which could be due to patient to patient transmission during hemodialysis.¹⁶ Another factor responsible for transmission of infection in hemodialysis dependent patient is the history of renal transplant. In such cases the transmission occurs from infected donor.¹⁷ so proper screening of the kidneys for positive cases are also required for prevention of infection. Another concern raised by this study is that HBV or HCV infection was associated with a history of HD in another center.¹⁷ further duration of dialysis is another factor associated with transmission of infection. Those with longer duration are more prone to get the infection. The principal of this transmission is the nosocomial transmission related to dialysis since longer duration of dialysis represents a longer period at risk of acquiring an infection. Similar observations have been reported by other authors. Out of 100 patients studied,

the present results showed there were 62 males and 38 females. This is in accordance with two studies done before which also showed the more frequency of male patients getting HBV and HCV infections through dialysis; one study showed out of 108 patients screened during the study period of three months, 83.03% were males and 16.7% were females¹⁸, and another conducted in Basra showed out 122 patients studied, the present results showed that 70(57.4%) were males with significantly elevated ($P < 0.01$) than 52(42.6%) females¹⁸. Several limitations of this study should be conceded. Medical records were often incomplete and additional clinical information was frequently obtained by interviewing staff and patients. The reuse and proper sterilization of the dialyzers is also a potential risk factor for the spread of HBV and HCV. Most of the patients got the virus after the start of hemodialysis. As routes of transmission are still unclear, detection of all infected patients is mandatory for HBV and HCV prophylaxis in hemodialysis patients.

CONCLUSIONS

The prevalence of HBV and HCV infection is more in hemodialysis patients as compared to general population. Risk of getting HCV from dialysis machine is more than HBV. Common risk factors associated with spread of HBV and HCV are:

1. improper sterilization of dialysis machine and environment
2. Improper screening of blood
3. Positive family history of HBV and HCV
4. Surgical history
5. Unsterilized instruments

RECOMMENDATIONS

The dialysis unit and machines should be properly sterilized. Proper screening of blood should be done for HBV, HCV and HIV. Encourage to patients to have donors of their own family. Surgical instruments should be properly sterilized. All patients of CKD should be vaccinated against Hepatitis B by following the standard vaccination norm. Blood screening methods needs further improvements and newer techniques like PCR, ID-NAT, etc.

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