RISK FACTORS FOR TRANSMISSION OF VIRAL HEPATITIS B AND C IN HEMODIALYSIS PATIENTS

Mufti Baleegh-Ur-Rehmeem Mahmood¹, Ahmad Zeb Khan¹, Zahidullah Khan², Tariq Ikram³, Muhammad Kashif⁴, Shahid Zia⁵

ABSTRACT

BACKGROUND: Viral hepatitis has high prevalence among hemodialysis dependent patients. We aimed to study the common risk factors for viral hepatitis in hemodialysis dependent patients.

OBJECTIVE: The objective of this study was to determine the frequency of common risk factors for transmission of viral hepatitis B and C in patients on maintenance hemodialysis.

MATERIAL & METHODS: It was a descriptive cross-sectional study of the hemodialysis patients at the Institute of Kidney Diseases and Khyber Teaching Hospital Peshawar, Pakistan, conducted from December 2015 to February 2016. Fifty HBV or HCV positive hemodialysis dependent patients were selected randomly and were asked to fill a questionnaire asking about the risk factors for acquisition of viral hepatitis.

RESULTS: Of the 50 HBV & HCV positive patients, 38 patients were positive for anti-HCV Antibody (M: F=1:1.2), 08 patients were HBsAg positive (M: F=1:6.1) and 04 patients were positive for both anti-HCV Ab and HBsAg (M: F = 3:1). Their mean age was 43.8 years (SD ±16.16, Range 18-80 years). Around 42 (84.0%) patients had acquired viral hepatitis after initiation of hemodialysis therapy. Around 47.6% of these patients were found to be positive within 06 months of initiation of dialysis and a total of 69.0% patients had acquired the viral infection within the first year after initiation of dialysis. The mean duration of dialysis at the time of diagnosis of viral infection was 10.4 months (SD ±12.1, Range 1-50). Around 35 (70%) patients reported a history of transfusion of blood or blood products, 19 (38%) of these patients reported dialysis at multiple centers, 10 (20%) patients reported positive history of surgical procedures. Only 01 (2%) patient reported needle sharing and 04 (8%) patients had an infected close relative. Only Ten (20%) patients were vaccinated against hepatitis B. Only 07 (14%) patients had received antiviral therapy in the past.

CONCLUSION: A great majority of our patients acquired infection after starting hemodialysis and most of the patients became infected within the first year after starting dialysis. Blood product transfusion was the commonest risk factor for the transmission of viral hepatitis followed by multicenter dialysis. Very few patients were ever vaccinated against HBV. The patients were not commonly offered antiviral therapy for treatment of viral hepatitis.

Key Words: Hemodialysis, End Stage Renal Disease, Chronic Kidney Disease, Viral hepatitis, Hepatitis B, Hepatitis C.

INTRODUCTION

Infection caused by hepatitis B and C viruses is common in patients undergoing Hemodialysis. These viral Hepatitides have been reported to adversely affect the prognosis of dialysis dependent patients. International data from Europe and America suggests the prevalence of Hepatitis B in hemodialysis dependent patients to be around 3.0% and that for Hepatitis C to be around 13.5%. Centers from our part of the world where viral hepatitis is more prevalent in the general population are expected to have a higher prevalence of viral Hepatitis in hemodialysis patients. Khokar et al found HBV Antigenemia in 12.4% of their Pakistani hemodialysis patients.

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The prevalence of Hepatitis C has been reported to range from 23.7% to 68% in Pakistani End Stage Renal disease patients (ESRD) on maintenance hemodialysis. These numbers are higher than those for our general population. This is because the Hemodialysis dependent patients are continually exposed to the risk factors for transmission of viral Hepatitis. These risk factors include frequent use of Intravenous injections, blood transfusions, attending more than one dialysis unit, duration of hemodialysis, surgical interventions, and poor sterilization and sanitation practices of hemodialysis centers.

This study is aimed to assess the frequency of common risk factors for the transmission of viral hepatitis among our patients undergoing maintenance Hemodialysis. The results of this study can help identify the common risk factors for the transmission of viral hepatitis in our setup and can help to devise measures to reduce the transmission of viral hepatitis in our hemodialysis dependent patients. The objectives of this study were to determine the frequency of common risk factors for transmission of viral hepatitis B and C in...
patients on maintenance hemodialysis.

MATERIALS AND METHODS
Study design: Descriptive cross-sectional study.
Study Setting: This study was performed at the Institute of Kidney Diseases, Hayatabad Medical complex, Peshawar and Khyber Teaching Hospital Peshawar. These two centers are the largest public sector hemodialysis centers in the province providing services to non-infected as well as HCV and HBV positive patients.

Study Duration: This study was conducted over a period of 03 months from November 2015 to February 2016 after the approval by the research and ethical committee.

Sample Size: Out of the total HBV, HCV positive patients undergoing hemodialysis at IKD and KTH, 50 patients (25 male and 25 female) were randomly selected for this study.

Sampling technique: Consecutive, non-probability sampling.

Sample selection
Inclusion criteria:

1. All patients with CKD on maintenance hemodialysis above the age of 18 years and hepatitis B and C Positive.
2. Both genders.

Exclusion criteria:
1. Patients not on maintenance hemodialysis.

Data collection procedure
Approval was obtained from the hospital research and ethical committee. The selected hepatitis B and hepatitis C positive patients on maintenance hemodialysis were asked to fill a Questionnaire asking about the risk factors for the acquisition of viral hepatitis. Prior consent was obtained from each patient before obtaining this information.

RESULTS
Among the patients known to be positive for Hepatitis B surface antigen (HBsAg) and /or Anti Hepatitis C antibody (Anti-HCV Ab), 50 patients (25 male and 25 female) were randomly selected. There mean age was 43.8 years (SD ±16.16, Range 18-80 years). Thirty-eight patients were positive for Anti-HCV Ab (M: F=1:1.2). Eight patients were HBsAg positive (M: F=1.6:1). 04 patients were positive for both HCV and HBsAg (M: F = 3:1).

Table 1. Genderwise distribution of the patients screened for risk factors

<table>
<thead>
<tr>
<th>GENDER</th>
<th>HCV positive</th>
<th>HBV positive</th>
<th>HBV &amp; HCV double positive</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>17</td>
<td>5</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>FEMALE</td>
<td>21</td>
<td>3</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>TOTAL</td>
<td>38</td>
<td>8</td>
<td>4</td>
<td>50</td>
</tr>
</tbody>
</table>

A total of 42 (84.0%) patients had acquired viral hepatitis after initiation of hemodialysis therapy. Figure1. This trend of acquisition of infection after initiation of Hemodialysis was consistent in HCV, HBV and double positive patients Table 2.

Table 2. Timing of Infection

<table>
<thead>
<tr>
<th></th>
<th>BEFORE HD</th>
<th>AFTER HD</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCV</td>
<td>5 (13.2%)</td>
<td>33 (86.8%)</td>
<td>38</td>
</tr>
<tr>
<td>HBV</td>
<td>2 (05.3%)</td>
<td>06 (75.0%)</td>
<td>8</td>
</tr>
<tr>
<td>HCV &amp; HBV</td>
<td>1 (25.0%)</td>
<td>03 (75.0%)</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>8 (16.0%)</td>
<td>42 (84.0%)</td>
<td>50</td>
</tr>
</tbody>
</table>
Of the 42 patients who had acquired viral hepatitis after initiation of hemodialysis, 47.6% patients were found to be positive within 06 months of initiation of dialysis and a total of 69.0% patients had acquired the viral infection within one year after initiation of dialysis. The mean duration of dialysis at the time of diagnosis of viral infection was 10.4 months (SD ±12.1, Range 1-50). (Figure 2).

**FIGURE 2. RELATION OF INFECTION TO THE DURATION OF HEMODIALYSIS.**

<table>
<thead>
<tr>
<th></th>
<th>&lt; 6 MTHS</th>
<th>6-12 MTHS</th>
<th>1-3 YRS</th>
<th>&gt; 3 YRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCV &amp; HBV</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>HBV</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>HCV</td>
<td>15</td>
<td>7</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>

**RISK FACTORS FOR ACQUISITION OF VIRAL HEPATITIS:**
These 50 patients were asked specific questions regarding the risk factors for transmission of viral hepatitis. Thirty-five (70%) patients reported a history of transfusion of blood or blood products. Nineteen (38%) patients reported that they were dialyzing at multiple centers. Ten (20%) patients reported positive past history of surgical procedures. Four (8%) patients had an infected close contact and Only 01 (2%) patient reported needle sharing.

Only 10 (20%) patients reported that they were vaccinated against hepatitis B. Of the 12 patients who were positive for HBV (alone or in combination with HCV), only 02 patients reported that they were vaccinated against hepatitis B while the remaining 10 patients were never vaccinated. Only 07 (14%) patients had received antiviral therapy in the past.

**DISCUSSION**
The aim of this study was to find the common risk factors for transmission of viral hepatitis in our hemodialysis dependent patients. The general belief that viral infection is transmitted from the blood circuit of hemodialysis machine is not valid. Most of the blood circuit used in hemodialysis machine is disposable. Viral transmission through the internal effluent pathways is also mostly impossible considering that the effluent dialysate is drained, and never comes in contact with other patients. Therefore with single-pass machines, the risk of transmission of infection is minimal.

Contrary to the common belief, other external factors (and not the dialysis machine) play a more important role in the transmission of viral hepatitis.

Around (84%) of our patients acquired hepatitis infection after initiation of hemodialysis suggesting that factors related to dialysis (but not necessarily to the dialysis machine) were particularly important in spread of infection. Thus the generally higher prevalence of viral hepatitis in our population is not solely responsible for the higher prevalence of viral hepatitis in our hemodialysis patients. Interestingly a great majority (69%) patients contracted infection within the first year of initiation of hemodialysis. The mean duration of hemodialysis at which the patients were found to be positive was 10.4 months. This suggests that the factors responsible for the transmission of infection are so prevalent in our setup that our patients acquire infection very early soon after initiation of hemodialysis. This is in contrast to international studies which have recognized the increasing time duration on hemodialysis as a risk factor for transmission of infection.

In our study a great majority (70%) of virus infected patients reported blood or blood product transfusion in the past. There is no formal data regarding the blood transfusion practices in our setup. Idrees et al reported that 10.2% of their total hemodialysis dependent patients had a history of blood transfusion. General clinical observation suggests that most patients at our centers are anemic and undergo regular blood transfusions. This is due to multiple factors including under-dialysis, inflammation, malnutrition and unaffordability of Erythropoietin. A recent study in Iran found blood transfusion to be a significant risk factor in transmission of viral hepatitis. In this study around 72% HCV positive patients had blood transfusions as opposed to only 34.8% of HCV negative dialysis patients. This association however was not as strong for HBV as it was for HCV infection. Thus our study is in confirmation with findings of other studies and suggests that blood transfusion could be the single most significant factor responsible for transmission of viral hepatitis.

A round 38% patients reported going to multiple dialysis centers. This in our view is a risk factor not only for the spread of infection but also results in shortcomings in other aspects of management of ESRD patients. As patients going to a single center are managed by a single team who know
the patients well and are accustomed to seeing the patients, while patients dialyzing at multiple centers usually consult clinicians off and on when they need dialysis and are not under regular management by nephrologists. Other researchers have also found multi-center dialysis behavior of patients to be a risk factor for transmission of infection.17

Twenty percent patients reported to have undergone some sort of surgical procedure in the past which might also have contributed to the higher rate of viral infection. Only 4 (8%) patients had an infected close family member which again is probably under reported. Only one patient admitted to sharing needles. Such a low percentage might be an understatement by the patients due to the social stigma. Other studies have suggested that the significant risk factors for transmission of viral hepatitis include history and number of blood transfusions, duration of hemodialysis, multiple HD centers, and having HBV positive sexual partner.2

In our study we also asked about a few management patterns of nephrologists that could contribute to the high prevalence of viral hepatitis in our patients. Center for Disease Control United states of America (CDC) recommends vaccination against HBV in all CKD patients preferably before the initiation of hemodialysis. In our study Only 10 (20%) patients were ever vaccinated against HBV infection. This means that the remaining 80% of our patients always remained at the risk of acquisition of hepatitis B infection. This confirms the general trend at our centers of not vaccinating dialysis patients against HBV infection. This can be a significant contributor to the spread of HBV infection and is a major area which needs improvement.

Only 14% patients had ever received antiviral therapy in the past. In our setup, ESRD patients are generally not offered treatment with antiviral therapy, considering their poor long term survival and poor tolerance of the conventional interferon based treatment regimens. The situation is expected to change with the arrival of newer treatment modalities such as direct acting antivirals (DAAs).

CONCLUSION
Our patients are acquiring viral hepatitis very early after starting Hemodialysis and were exposed to multiple risk factors for transmission of infection especially multiple blood transfusions, utilizing multiple centers for hemodialysis and lack of vaccination. LIMITATIONS
The major limitation of our study was that only patients infected with viral hepatitis were enquired about the risk factors. The addition of a control group of non-infected hemodialysis dependent patients could have offered a better comparison between the two groups.

REFERENCES


