Seroconversion of Patients Undergoing Haemodialysis from HCV Negative to HCV Positive Status

Tayyaba Ismail 1, Khawar Batool 1, Zainab Akmal Abbasi 1, Talal Khurshid 2
1. Fourth year, Rawalpindi Medical College, Rawalpindi; 2. Medical Unit 1, Holy Family Hospital and Rawalpindi Medical College, Rawalpindi

Abstract

Background: To determine the proportion of patients undergoing hemodialysis who seroconverted from HCV negative to HCV positive status in our hospitals.

Methods: In this descriptive cross-sectional study, conducted at four tertiary care hospitals of Punjab, patients undergoing haemodialysis were included. Inclusion criterion was all those patients who were Hepatitis C negative at the initiation of dialysis and remained negative for the subsequent six months after the initiation of haemodialysis. Our exclusion criteria was all those patients who seroconverted to HCV positive with six months of initiation of haemodialysis (the period corresponding to the incubation period of hepatitis C virus) and those who were dialyzed on emergency basis. Patients who were HCV negative at baseline but later confirmed to be HCV positive, based on HCV serology were considered seroconverted.

Results: Out of 190 patients who were HCV negative at the initiation of dialysis, 93 (48.9%) patients converted to HCV positive status whereas 97 (51.05%) patients remained HCV negative throughout the study. The mean time taken for seroconversion was 18.04 months (SD ± 15.43 months). The median was 12 months, with an inter quartile range of 14 months.

Conclusion: The proportion of HCV seroconversion in our haemodialysis units is very high.

Key Words: HCV, Seroconversion, Haemodialysis.

Introduction

HCV is one of the major global health concerns, affecting an estimated 170 million people worldwide, with a prevalence rate between 0.1-12%. In Pakistan it’s prevalence rate is 4.8%. In 80-90% cases it progresses to chronic HCV infection. Chronic HCV leads to cirrhosis in 20-25% cases. Other serious complications of chronic HCV include hepatocellular carcinoma, chronic liver disease (HCV accounts for 40% of the total CLD cases and autoimmune reactions; making HCV the most frequent indication for liver transplant). Blood inoculation is considered as the most common route of HCV transmission. Renal Replacement Therapy (including hemodialysis) is a very frequent treatment option for the patients of ESRD. End Stage Renal Failure is the 5th stage of Chronic Kidney Disease in which death is likely without Renal Replacement Therapy. Global prevalence of stage 3-5 CKD is 5-7%. In Pakistan the prevalence of CKD is between 12.5-25.6%. Renal Replacement Therapy and renal transplant are the only available treatment options for the patients of end stage renal disease (ESRD). Seroconversion is defined as the change of a serologic test from negative to positive, indicating the development of antibodies in response to infection or immunization. Anti-HCV antibodies can be serologically detected, in more than 95% patients 6 months after HCV exposure. Seroconversion of HCV negative patients undergoing hemodialysis has been frequently observed in various hemodialysis units around the world. The most common risk factors associated with HCV seroconversion are male gender, increased number of blood transfusions, increased duration of hemodialysis and negligence on part of health care providers.
Rawalpindi, 47 patients from Benazir Bhutto Hospital, Rawalpindi, 47 patients from Pakistan Institute of Medical Sciences, Islamabad and 48 patients from Bahawalpur Victoria Hospital, Bahawalpur. These patients were undergoing hemodialysis in the aforementioned hospitals at the time we conducted this study, but these patients had also undergone hemodialysis from other hospitals too since the initiation of their dialysis. Sampling technique was stratified random sampling based on hospital and gender. Our inclusion criterion was all those patients who were Hepatitis C negative (determined by HCV serology, based on the principle of immunochromatography) at the initiation of dialysis and remained negative for the subsequent six months after the initiation of hemodialysis. Our exclusion criteria was all those patients who seroconverted to HCV positive within six months of initiation of hemodialysis (the period corresponding to the incubation period of hepatitis C virus,) and those who were dialyzed on emergency basis. The patients’ records were thoroughly checked and information regarding their HCV status at initiation of dialysis and HCV status in later serology tests was recorded. Patients who were HCV negative at baseline but later confirmed to be HCV positive, based on HCV serology were considered seroconverted. For continuous variables like age of patient, duration since initiation of dialysis (in months) and duration since seroconverted (in months), mode, mean along with standard deviation and medians (50th percentile) with interquartile ranges (75th percentile minus 25th percentile) were calculated. Pearsons Chi square test was applied at 5% level of significance to compare the groups based on age and gender for seroconversion . Relative risks along with 95% confidence intervals were also calculated since the data for patients was recorded and could be evaluated in the form of a historical cohort. Since the distribution of the time duration variables was not normal and standard deviations also exceeded the mean values, therefore Mann Whitney U test was applied at 5% level of significance. P values less than 0.05 were considered statistically significant.

Results:

Amongst the 190 patients included in the study, 133 (70%) were males while 57 (30%) were females. Mean age of study participants was 43.68 years (SD ± 14.33 years; Range:14-86 years). Above 40 years of age were 89(46.8%). (The mean duration since initiation of dialysis in patients was 25.46 months (SD ± 19.34 months). At the baseline that is at the time of initiation of dialysis in patients, none of the patient was hepatitis C positive but later, 93 of these 190 patients (48.9%) were observed to have been diagnosed as Hepatitis C positive. So the conversion rate was 48.9% (Table 1). The risk of conversion from negative HCV to positive HCV was 1.34 times more in males as compared to females (95% CI=0.91-1.85) but this difference was not statistically significant. However the risk was almost same in both age groups (RR 0.93, 95% CI= 0.70-1.25) and this was also not statistically significant. Amongst 93 patients, who converted to HCV positive, the mean duration since initiation of dialysis till day of inclusion in study was 32.64 months (SD ± 21.21 months). The mean duration in months since when patients were confirmed to have been converted from HCV negative to HCV positive till day they were included in study was 14.59 months (SD ± 15.81 months). The median was 11 months, with an inter quartile range of 21 months. The difference of both these variables was computed and it was found that mean duration taken for conversion from HCV negative to positive test (i.e. duration from the day of initiation of dialysis till seroconversion confirmed for first time) diagnosed was 18.04 months (SD ± 15.43 months). The median was 12 months, with an inter quartile range of 14 months. The comparison of duration taken for conversion to positivity in these 93 patients, both male patients (median=12 months, IQR=11.5 months, mean =17.89±16.90 months) and female patients (median=18 months, IQR=14 months, mean =18.52±9.99 months) (Figure 1). The difference between this duration in both males and females was not statistically significant.

Table 1. Seroconversion in study participants based on gender and age distribution(n=190)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Categorias</th>
<th>Converted to HCV positive</th>
<th>CHI Stastic p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Upto 40 Years</td>
<td>45(50.6%)</td>
<td>44(49.4%)</td>
</tr>
<tr>
<td></td>
<td>Above 40 Years</td>
<td>48 (47.5%)</td>
<td>53 (52.5%)</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>70 (52.6%)</td>
<td>63 (47.4%)</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>34 (49.4%)</td>
<td>34 (50.6%)</td>
</tr>
</tbody>
</table>
when Mann Whitney U test was applied (p-value = 0.41)

Figure 1. Comparison of duration taken for conversion from negative to positive test after initiation of dialysis, based on gender groups (n=190).

Figure 2: Comparison of duration of conversion from negative to positive test, based on age groups (n=190).

The difference of time taken in conversion between patients up to 40 years of age (median = 14 months, IQR = 18.5 months, mean = 17.04 ± 9.87 months) and those above 40 years of age (median = 12 months, IQR = 11.5 months, mean = 18.98 ± 19.31 months) was statistically significant with a p value of 0.96 (Figure 2).

**Discussion**

Hepatitis C virus infection is highly prevalent in Pakistan and can lead to debilitating conditions like decompensated chronic liver disease (DCLD) and hepatocellular carcinoma. The mean proportion of patients who seroconverted in study was 48.9%. This was significantly higher than studies carried out in Iran, Egypt and Africa that showed the seroconversion proportion to be 3.95%, 14%, and 25%, respectively. This increased proportion of HCV seroconversion in our setup may be attributed to various genetic, social and medical factors. The mean duration of seroconversion in our study was 18.04 months (SD ± 15.43 months). The median was 12 months, with an interquartile range of 14 months.

In a study carried out by Liu YB et al., the prevalence of hepatitis C in hemodialysis patients was more among men as compared to women (0.28 in men vs 0.23 in women). In our study, the comparison of duration taken for conversion to positivity in male patients (median = 12 months, IQR = 11.5 months, mean = 17.89 ± 16.90 months) and female patients (median = 18 months, IQR = 14 months, mean = 18.52 ± 9.99 months) was not statistically significant when Mann Whitney U test was applied (p-value = 0.41).

The strength of our study is that it is the first of its kind in Pakistan. The weakness of our study is that we did not take into consideration the confounding factors leading to HCV seroconversion (such as blood transfusions, history of dental and surgical procedures, family history of hepatitis C, I/V drug use and shaving habits of patients etc.) So we cannot say for sure that hemodialysis was the cause of hepatitis C in these patients. But we are hopeful that this study would pave the way for further studies aimed at pinpointing the exact source of HCV seroconversion in hemodialysis patients.

**Acknowledgements**

We are highly grateful to Dr. Faiza Aslam, Research Coordinator, RMC for her persistent help and encouragement throughout the study.

**References**


