

HEPATITIS C VIRUS INFECTION IN PATIENTS ON LONG TERM HEMODIALYSIS

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ABSTRACT

Background: Hepatitis C infection is frequently noticed in patients on hemodialysis. This study was conducted to estimate the frequency of hepatitis C virus infection in patients on long term hemodialysis and to determine its risk factors.

Material & Methods: It was a cross-sectional analytical study conducted at Sandeman Provincial Hospital, Quetta from January 2006 to June 2007. Patients on long-term hemodialysis in Nephrology unit were studied. Their medical records were reviewed for the presence of anti-HCV antibodies and any risk factors.

Results: Ninety-seven patients on hemodialysis were included. Out of these, 23 (23.7%) were found to be anti-HCV positive. The mean age of these patients was 55.2 ± 15.5 years while for anti-HCV negative patients 54.9 ± 15.1 . There were 18(78.3%) males in the HCV positive group while 46(62.2%) males in HCV negative group. The mean duration of dialysis among HCV positive patients was 2.9 ± 2.7 years while 1.51 ± 0.86 years for HCV negative ones. Anti-HCV positive group had significantly greater proportion of patients with dialysis for more than 2 years (43.5% vs 9.5%). No significant difference was found in other risk factors. When years of dialysis were treated as categorical variable, significant difference between anti-HCV positive and negative groups was found. The risk of getting HCV infection was significantly associated with increasing years of dialysis (p-value 0.002).

Conclusion: Patients on hemodialysis has 23.7% positivity for anti-HCV in our setup and history of dialysis for more than two years is a significant risk factor for it.

Key words: Hemodialysis. Anti-HCV, Hepatitis C.

INTRODUCTION

Hepatitis C virus (HCV) infection has assumed pandemic proportions. Its high prevalence and incidence in Pakistan poses a public health challenge. HCV infection has been frequently noticed in hemodialysis patients.^{1,2} Various risk factors are involved, which include multiple transfusions, nosocomial contamination and others.^{1,3,4} When HCV infection develops in patients on hemodialysis, it results in chronic liver disease with cirrhosis in a significant number of patients and is likely to develop complications if they have renal transplantation, as immuno-suppressive therapy is required for prevention of rejection.¹

With frequent screening for hepatitis B, the infected patients and carriers with hepatitis B have been identified and isolated over the past 20 years. This has resulted in decrease in the prevalence of hepatitis B virus infection in dialysis patients.² However, hepatitis C continues to be highly prevalent

and it has ranged from as low as 5% to as high as 83% in different centres. High incidence of HCV has been noted in some countries like India where 83% prevalence is reported in dialysis patients.³ Seventy-one percent prevalence has been noted in Venezuela⁴ and 46% in Saudi Arabia,⁵ while a low prevalence of 5.72% was noted in Switzerland.⁶ Sixty-eight percent patient from a dialysis unit in Lahore were found to be positive for HCV.⁷ Many patients on dialysis have been noted to become positive in higher numbers with the passage of time.⁸

The aim of this study was to find out the prevalence of HCV infection in patients on hemodialysis in our set up and to study its various risk factors.

PATIENTS AND METHODS

Patients on long-term hemodialysis attending Sandeman Provincial Hospital Quetta, from

January 2006 to June 2007, were included in the study. Presence or absence of anti-HCV antibodies was noted. Demographic characteristics of study participants were noted. Information was collected from the study participants with regard to risk factors including years of dialysis, history of transplant, transfusions, surgery and intra-muscular injections.

Anti-HCV was performed by ELIZA method (AXYEM, Abbott Laboratories, North Chicago, IL, USA) in all the patients. Some patients also had HCV RNA by PCR using Amplicor Version II (Roche Diagnostics, Basel, Switzerland).

All data was entered in statistical software package SPSS 10 (SPSS Chicago, USA) for analysis. Student t-test was applied to compare the mean values of quantitative variables among anti-HCV positive and negative patients. Crude odds ratio and 95% confidence intervals (CI) were obtained to assess the strength of association with regard to various risk factors among anti-HCV positive and negative patients. Binary logistic regression analysis was performed to test the association of anti-HCV positivity with various risk factors taking account of confounding. Adjusted odds ratios and 95% CI were obtained. Treating years of dialysis as categorical variable, Chi-square test was done to test its association with anti-HCV positivity. A p-value of <0.05 was considered as significant.

RESULTS

Among 97 patients on hemodialysis, 23 (23.7%) were found to be anti-HCV positive. The mean age of HCV positive patients was 55.2±15.5 years while that of the anti-HCV negative ones was 54.9±15.1 years. There were 18 (78.3%) males in

the HCV positive group while 46 (62.2%) males in HCV negative group.

The mean duration of dialysis among HCV positive patients was 2.9±2.7 years while in HCV negative patients it was 1.51±0.86 years, which was statistically significant. Anti-HCV positive patients (n=23) were compared with anti-HCV negative patients (n=74) with regard to various risk factors such as history of dialysis of more than 2 years, history of transplant, history of transfusions and history of injections. Anti-HCV positive group had significantly greater proportion of patients with a history of dialysis for more than two years (43.5% vs 9.5%), crude odds ratio being 0.14 (95% CI: 0.04-0.42).

No significant difference was found between the two groups with regard to other risk factors. (Table-1) When Binary logistic regression analysis was done, taking account of the confounding factors, the adjusted odds ratio and 95% CI for the association of anti-HCV positivity and history of dialysis of more than two years, it came out to be 0.45 (0.27-0.75).

When years of dialysis were treated as categorical variable, significant difference between anti-HCV positive and negative groups was found. The risk of getting HCV infection was found to be significantly associated with increasing years of dialysis (adjusted p-value 0.002). (Table-2)

Chi-square test was used to test the association; adjusted for history of transplant, transfusions, surgery and injections. Anti-HCV positive patients had a greater proportion of those with history of dialysis for more than two years. 43.5% anti-HCV positive patients had a history of dialysis for more than two years as compared to 9.5% anti-HCV negative patients who had such a history.

Table-1: Comparison of risk factors among HCV positive and negative patients on hemodialysis.

Risk Factors	HCV positive odds ratio No & Percentage	HCV negative odds ratio No & Percentage	Crude (n=23) (95% CI)	Adjusted* odds ratio (95% CI)
H/O dialysis for more than 2 years	10 (43.5%)	07 (9.5%)	0.14 (0.04-0.42)	0.45 (0.27-0.75)
H/O transplant	3 (13%)	10 (13.5%)	0.96 (0.24-3.8)	0.17 (0.02-1 .36)
H/O transfusions	8 (34.8%)	13 (17.6%)	2.3 (0.88-7.12)	2.49 (0.48-12.3)
H/O surgery	10 (43.5%)	23 (31.1%)	1.71 (0.65-4.45)	1.41 (0.35-5.31)
H/O injections	17(73.9%)	40 (54.1%)	2.41 (0.85-6.79)	1.82 (0.47-7.31)

*Adjusted for history of dialysis, transplant, transfusions, surgery and injections.

Table-2: Association of HCV positivity with years of dialysis.

Years of Dialysis	Anti-HCV Positive (n=23) No. & percentage	Anti-HCV Negative (n=74) No. & percentage
Less than 2 years	6 (26.1%)	48 (64.9%)
2 years	7 (30.4%)	19 (25.6%)
More than 2 years	10 (43.5%)	7 (9.5%)

DISCUSSION

Our figures showed that anti-HCV prevalence was 23.7% in patients on long-term hemodialysis. Dialysis outcomes and practice patterns study (DOPPS) from dialysis units from United States, Europe and Japan reported an HCV prevalence rate from 2.6 % to 22.9 %.⁹ This figure falls in lower end of the range as in some other countries like India where a figure of as high as 83% has been noted in hemodialysis patients,³ with 32.6% in Tunisia™ and 46% in Saudi Arabia.⁵ Our figures are certainly far higher than more developed countries like Switzerland where the prevalence has been about 5%.⁶

Other local studies show much higher HCV positivity in hemodialysis patients. Sixty-eight percent of 50 patients studied at Sheikh Zayed Postgraduate Medical Institute, Lahore, were found to be anti-HCV positive.⁷ However, another study from Lahore showed 24.7% patients on hemodialysis to be anti-HCV positive,⁸ which is similar to our results. Also, a study from Jinnah Postgraduate Medical Center, Karachi showed 28.7% patients on hemodialysis to be anti-HCV positive.¹¹ However, this study reported that percentage of HCV positive patients increased with duration of dialysis.¹¹

Various factors have been present in patients who developed hepatitis C. Patients with renal failure and those who have dialysis have multiple transfusions and history of surgeries, and multiple injections. Moreover, nosocomial spread has been important and significant factor in these patients.⁶ Nosocomial spread with contaminated equipment and patient to patient exposure has been significant factor in patients with renal failure and dialysis.¹² In our cases, multiple risk factors were found to be present in these patients of hemodialysis, however, only long duration of dialysis was noted to be associated with increased presence of anti-

HCV in these patients, as has been reported in other studies.^{9,10}

Although HCV patients on long-term hemodialysis have been noted to have mild and non-progressive disease, presumably due to virus particle destruction on the dialyser membrane,¹³ these patients show poor biochemical indicators and have increased problems with transplantation.¹⁴ Thus, it is important that all necessary precautions should be taken to prevent the acquisition of HCV infection in patients on hemodialysis. HCV infection in hemodialysis patients has been reduced significantly with reduction in the number of blood transfusions,¹⁵ by isolating the patients in hemodialysis unit and using dedicated machine for seropositive patients,¹⁶ as has been achieved in European centers^{17,18} Application of universal precautions in the dialysis units has helped very much in this regard.¹⁹ Improved staffing in the dialysis units²⁰ and use of oxidative disinfectants has been advocated²¹ to decrease the occurrence of HCV infection in hemodialysis patients.

As patients with chronic renal failure on dialysis may not have proper production of antibodies and our figures may be an under-estimation of the prevalence of HCV, as has been noted in earlier studies.²² Any how, a prevalence of 23.7% in our hemodialysis unit and a 68% prevalence in other units of our country suggest that there is a need for important precautions in the dialysis units where the development of HCV infection should be prevented. In this way, a significant liver disease can be prevented from developing as it causes many difficulties in further management of these patients.

CONCLUSION

Patients on hemodialysis has 23.7% positivity for anti-HCV in our set up. The risk of acquiring HCV infection is significantly associated with increasing duration of dialysis.

Attention should be given to strict adherence to infection control measures in dialysis setting. All dialysis units should apply universal precautions and use dedicated dialysis equipment for anti-HCV positive patients.

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