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Prevalence and Rate of Seroconversion of Hepatitis C in Hemodialysis Patients

Salman T. Shafi, Rizwan ul Haq and Tahir Shafi
Department of Nephrology, Shaikh Zayed Hospital, Lahore.

SUMMARY

Hemodialysis patients are at high risk of acquiring hepatitis C infection. Prevalence of anti HCV antibodies was determined by 3rd generation ELISA among 122 (69 males, 53 females) patients undergoing hemodialysis. Out of 122 patients, 69 (56.6%) patients were found to be antiHCV positive. Anit HCV antibodies were positive in 24 (19.7%) patient before starting hemodialysis. During hemodialysis, 45 (45.9%) patients became anti HCV positive. Mean duration of dialysis of sero-positive patients was 29.3±24.8 months, where as that of sero-negative patients was 14.7±19.8 months. This difference was statistically significant. Frequency of seropositivity was found to be 4.5%, 22.6%, 46.3%, 66%, 74.1% and 89.5% after 6 months, 1 year, 2 years, 3 years, 4 years and 5 years of hemodialysis respectively. Annual rate of seroconversion was found to be 32.2%, 28.4% and 34.4% in years 2000, 2001 and 2002 respectively. We recommend strict application of universal infection control measures to limit transmission of hepatitis C in hemodialysis units.

INTRODUCTION

In the past, hepatitis B was the major cause of acute hepatitis in end stage renal disease[1]. However, with imposition of protective measures like screening of patients and staff for hepatitis B, vaccination of patients and staff, use of separate machines for hepatitis B surface antigen positive patients and use of standard barrier precautions, spread of hepatitis B has reduced considerably among hemodialysis patients[1,2]. In comparison, liver disease caused by hepatitis C virus is still a significant cause of morbidity and mortality among hemodialysis patients. The prevalence of anti HCV antibodies is consistently high among hemodialysis patients suggesting that hemodialysis patients are at higher risk of acquiring hepatitis C infection. The prevalence of anti HCV antibodies not only varies among different countries but also varies among different dialysis units and geographical regions within the same country[3,4].

We conducted a study to determine the prevalence and rate of seroconversion of hepatitis C in our hemodialysis unit.

PATIENTS AND METHODS

One hundred and twenty two cases records of patients who are currently undergoing hemodiaysis in our hemodialysis unit for at least 3 months was retrospective analyzed. These patients were tested for anti HCV antibodies before starting dialysis and were regularly tested subsequently at 3-6 months interval. Third generation ELISA was used to detect anti HCV antibodies.

RESULTS

Mean duration on dialysis of these patients was 38.6±22.9 months. Demographic features of these patients are shown in Table 1.

Out of these 122 patients, 69 (56.6%) were found to be currently positive for anti HCV antibodies, while 53 (43.4%) patients were anti HCV negative. Before starting hemodialysis, 24 patients (19.7%) were anti HCV positive, where as 98 (80.3%) patients were anti HCV negative. Anti HCV antibodies turned positive in 45 patients (45.9%) during hemodialysis, where as 53 (54.1%)

patients remained anti HCV negative. These results are summarized in Table 2.

Table 1: Demographic features of patients.

Age (Years)	No.	Percent
11 – 20	12	9.7
21 – 30	8	6.5
31 – 40	25	20.2
41 – 50	31	16.9
51 – 60	34	27.4
61 – 70	31	16.9
71 – 80	3	2.4
Sex		
Male	69	56.6
Females	53	43.4

Table 2: Anti HCV status before and after hemodialysis.

Age (Years)	Positive	Negative
Current Anti HCV status		
Males	41 (59.4%)	28 (52.8%)
Females	28 (40.6%)	25 (47.2%)
Total	69 (56.6%)	53 (43.4%)
Anti HCV status before starting hemodialysis		
Males	14 (58.3%)	55 (56.1%)
Females	10 (41.7%)	43 (43.9%)
Total	24 (19.7%)	98 (80.3%)
Change in Anti HCV status during hemodialysis		
Males	27 (60%)	28 (52.8%)
Females	18 (40%)	25 (47.8%)
Total	45 (45.9%)	53 (54.1%)

Table 3: Frequency of sero-positive patients in relation to duration on hemodialysis.

Duration on Dialysis	Frequency of sero-positive patients
6 months	4.5%
1 year	22.6%
1.5 years	34%
2 years	46.3%
3 years	66%
4 years	74.1%
5 years	89.5%

Mean duration on dialysis (before seroconversion) of patients who became sero-positive was found to be 29.3±24.8 months. While mean duration on dialysis of sero-negative patients was 14.7±19.8 months. This difference of mean duration between sero-positive and sero-negative patients was statistically significant (p value <0.05).

Frequency of sero-positive patients in relation to duration on dialysis is shown in Table 3.

We also calculated rates of seroconversion of hepatitis C in last 3 years. Rates of seroconversion were found to be 34.4% in 2002, 28.4% in 2001 and 32.2% in 2000. These rates of seroconversion are shown in Figure 1.

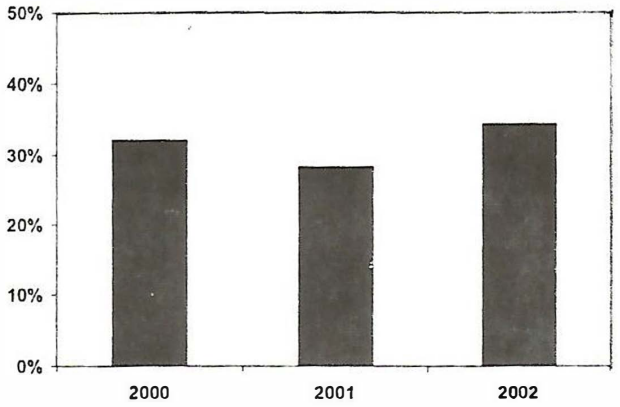

Fig. 1: Annual rate of seroconversion of hepatitis C

DISCUSSION

Hepatitis C is a common problem among hemodialysis patients. Our study shows that prevalence of anti HCV antibodies is 56.6% among hemodialysis patients. During hemodialysis, 45.9% patients became sero-positive. This prevalence is much higher as compared to that of developed nations like 19% in USA[5,6], 13.5-28% in Italy[7,8] and 42 % in France[9]. Our results are comparable to that of developing nations like 53.7% in Saudi Arabia[10], 49% in Syria[11] and 75% in Moldavia[12].

Duration of hemodialysis is an important risk factor for acquiring hepatitis C virus. Our study showed that mean duration of dialysis of sero-positive patients is significantly higher as compared to that of sero-negative patients. Also frequency of

sero-positive patients increased with increasing duration on hemodialysis. After 6 months of hemodialysis, only 4.5% patients were sero-positive. Patients who were on hemodialysis for 2 years, 46.3% were anti HCV positive. Out of those patients who had undergone hemodialysis for 5 years, 89.5% patients were anti HCV positive.

Blood transfusion is an important mechanism of transmission of hepatitis C infection. Other possible modes of transmission include transmission by needle stick injury, sharing of dialysis machines and break down in standard infection control practices like sharing of multidose heparin vials between patients with and without hepatitis C infection and failure to change gloves between patients while performing hemodialysis. Sexual transmission, IV drug abuse and organ transplantation are among non nosocomial modes of transmission.

Use of dedicated machines and isolated areas for anti-HCV positive patients has shown variable results in literature. Several reports have linked high incidence of HCV infection in dialysis patients who shared dialysis machines in hemodialysis units[13-15]. But a multicenter study from Belgium and another study have questioned the benefit of using dedicated machines[16,17]. Overall, current data suggest that hemodialysis machines do not have a significant role in the nosocomial transmission of hepatitis C infection. In our hemodialysis unit, use of dedicated machines for last 2 years hasn't changed the annual rate of seroconversion of hepatitis C. It is likely, that hepatitis C transmission principally results from environmental contamination and horizontal, patient to patient transmission. Following measures are recommended to limit transmission of hepatitis C in hemodialysis units:-

- Strict ban on use of blood transfusion to correct anemia and in case blood transfusion is needed, donor blood should be carefully and effectively screened for anti HCV antibodies.
- Hemodialysis staff should be educated regarding hemodialysis related infection control practices that prevent transmission of HCV and other blood borne pathogens[18]. These include:-
    1. Patients should have specific dialysis station assigned to them, and chairs and beds should be cleaned after each use.
    2. Sharing among patients of ancillary supplies such as trays, blood pressure cuffs, clamps, scissor and other non-disposable items should be avoided.
    3. Non-disposable items should be cleaned or disinfected appropriately between uses.
    4. Medications and supplies should not be shared among patients and medication carts should not be used.
    5. Medications should be prepared and distributed from a centralized area.
    6. Gloves should be used before touching blood, body fluids, secretions, excretions or contaminated items.
    7. Gloves should be used before touching patients or hemodialysis equipment.
    8. Clean and contaminated areas should be separated (e.g. handling and storage of medications and hand washing should not be done in the same or adjacent area to that where used equipment or blood samples are handled.

CONCLUSION

Prevalence of anti HCV antibodies is 56.6 % in our hemodialysis unit. Duration of hemodialysis is a significant risk factor for acquiring hepatitis C infection. Annual rate of seroconversion hasn't improved in last 3 years despite use of dedicated machines and limitation of blood transfusions. Therefore, we recommend strict application of universal infection control measures to reduce transmission of hepatitis C infection in our hemodialysis unit.

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The Authors:

Salman T. Shafi,
House Officer,
Department of Nephrology,
Shaikh Zayed Hospital, Lahore.

Rizwan ul Haq
Trainee Registrar
Department of Nephrology,
Shaikh Zayed Hospital, Lahore.

Tahir Shafi
Professor & Head of Division of Medicine,
Department of Nephrology,
Shaikh Zayed Hospital,
Lahore.

Address for Correspondence:

Tahir Shafi
Professor & Head of Division of Medicine,
Department of Nephrology,
Shaikh Zayed Hospital,
Lahore.