ORIGINAL ARTICLE

RISK FACTORS ASSOCIATED WITH HEPATITIS C VIRUS ACQUISITION IN A TERTIARY CARE SETTING

Ibrar Ahmed, Zafar Ali, Intekhab Alam, Sheikh Muhammad Nazir, Amjad Taqweem, Amjad Mahboob
Department of Medicine, Lady Reading Hospital, Peshawar, Pakistan

ABSTRACT

Background: Hepatitis C is prevalent worldwide. In Pakistan HCV infection has prevalence of about 4-6%. This study was conducted to identify the risk factors associated with positive hepatitis C status in a tertiary care setting.

Material & Methods: This was hospital-based descriptive study, carried out in medical wards of Lady Reading Hospital, Peshawar, from June 2008 to November 2010. It included 542 anti-HCV positive patients of more than 12 years age and both sexes. Patients were selected by convenient sampling technique. Various indications for HCV testing and the risk factors for its acquisition were recorded on a pre-designed Performa.

Results: Out of 542 patients, 228(42.07%) were males and 314(57.93%) females. Age ranged 14 to 90 years with mean 37.11+12.69. Re-use of syringes and therapeutic injections were reported in 433(79.88%), needle stick injuries 44(8.11%), blood transfusions 68(12.54%), dental procedures 243(44.83%), tattooing 10(1.84%), previous surgery 144(26.56%) and road traffic accidents in 16(2.95%) patients. Indications for anti-HCV testing included dilatation &/curettage in 37(11.78%), evacuation &/curettage in 41(13.05%), and antenatal checkup in 37(11.78%) female patients. Anti-HCV antibodies were detected pre-operatively in 63(11.62%), pre-endoscopy 2(0.36%), pre-vaccination against hepatitis B 14(2.58%), while donating blood in 18(3.32%), and as part of pre-employment or pre-insurance examination in 91(16.78%) patients.

Conclusion: Hepatitis C is more common in patients with unnecessary use of injections, re-use of syringes, dental procedures and unscreened blood transfusions. In most of the patients, more than one risk factor can be found.

KEY WORDS: Hepatitis C, Anti-HCV, chronic liver disease.

INTRODUCTION

Since the discovery of hepatitis C virus (HCV) in 1989 by Choo et al, it is becoming an important problem with global prevalence of 3% and more than 200 million people are infected worldwide.[1] It is a spherical, enveloped, single-stranded RNA virus belonging to the Flaviviridae family,[2] transmitted primarily by blood and blood products. Many individuals infected with HCV have no obvious risk factors.[3]

HCV accounts for 20% cases of acute hepatitis, 70% of chronic hepatitis, 40% of end stage cirrhosis, 60% of hepatocellular carcinoma (HCC) and 30% cases of liver transplants.[4] It is largely responsible for recent increase in the incidence of HCC in United States.[5]

Hepatitis C is prevalent both in industrialized as well as the developing world. In United States about 4 million people have been infected with HCV with approximately 2.7 million developing chronic infection.[6] In Pakistan HCV infection has prevalence rate of about 4-6%.[7]

Due to the high cost of treatment and absence of availability of vaccine against HCV, the main focus should be on the preventive aspect. Many patients with HCV infection are asymptomatic and are detected on evaluation for pre-employment physical examination, pre-insurance examination or as volunteer blood donations.[8]

The present study was carried out to identify the risk factors associated with positive hepatitis C virology in a tertiary care setting.

MATERIAL AND METHODS

This was hospital based descriptive study. Interviews of 542 seropositive patients of hepatitis C were conducted using a structured questionnaire covering demographics and risk factors for HCV acquisition. The study was carried out in medical wards of Postgraduate Medical Institute, Lady Reading Hospital, Peshawar, from June 2008 to November 2010.

The study included all adult patients of more than 12 years age, of both sexes, seropositive for

hepatitis C. Patients were selected by non-probability convenient sampling method. An informed consent of the patients was taken. Patients younger than 12 years were excluded from the study.

Detailed history regarding age, sex, address, marital status, occupation, socioeconomic and educational status of the patients; duration of illness, past history of jaundice, family history of hepatitis, vaccination against Hepatitis B, alcohol intake and history of diabetes mellitus.

Injectable drug users, therapeutic injections and intravenous drips, re-use of syringes, needle stick injuries, unscreened blood transfusions, dental procedures, tattooing, history of surgery in the past, and road traffic accidents were specifically asked as a possible cause of HCV acquisition. To know about indications for anti-HCV testing inquiry was made regarding dilatation/evacuation and curettage, episiotomy, antenatal checkup, pre-operative, pre-endoscopy, pre-vaccination, blood donation, routine medical checkup, Spouse came to hospital for consultation, and as part of the pre-employment or pre-insurance examination.

Anti-HCV antibodies were tested by Immunochromatographic testing (ICT) /ELISA method. HCV-RNA was performed using polymerase chain reaction (PCR) technique with Amplicor version II (Roche diagnostics, Switzerland, Pleasanton, Calif). Alanine aminotransferase levels with values greater than 40 u/l considered abnormal. Diabetes mellitus defined as fasting blood sugar level > 126 mg/dl, post prandial blood sugar level >200mg/dl). Fasting blood sugar tested by Elitech kit method. All information was recorded on a predesigned proforma.

Descriptive statistical analysis was employed to describe data. Data storage, processing and analysis was done utilizing SPSS version 15.

RESULTS

Out of 542 patients included in the study, male patients were 228 (42.07%) and females 314 (57.93%), with male to female ratio of 1:1.37. other demographic features (like marital status, address and occupation) of the study population are described in Table 1.

Age of the patients ranged from 14 to 90 years with mean age of 37.11+12.69 and a median age of 42 years. Three hundreds and sixty two patients (66.8%) were in the age range of 14–40 years, 166 patients (30.6%) were in the age range of 41-60 years, 14 patients (02.6%) were in the age range of 61–90 years. Majority of the patients (95.7%) were below 60 years of age.

Table 1: Demographic features of the study population (n=542).

Sex	
Males	228 (42.07%)
Females	314 (57.93%)
Marital status	
Married	470 (86.71%)
Single	66 (12.17%)
Widowed	06 (01.10%)
Occupation	
Govt: servants	31 (13.59%)
Own business	43 (18.85%)
Labourers	67 (29.38%)
Farmers	17 (07.45%)
Students	19 (08.33%)
Housewives	294 (93.63%)
Address(**zone wise)	
Zone 1	94 (17.34%)
Zone 2	263(48.52%)
Zone 3	85 (15.68%)
Zone 4	62 (11.43%)
Zone 5	16 (02.95%)
Afghanistan	22 (04.05%)

**zone 1 included Parachinar, Bajawar, Mohmand and Waziristan agencies,

zone 2 included Peshawar, Nowshera, Mardan, Charsadda, Swabi,

zone 3 included Malakand, Swat, Buner, Batkhela and Dir,

zone 4 included Kohat, Karak, Bannu, Dera Ismail Khan,

zone 5 included Mansehra, Abbottabad.

All of the patients were reported positive on anti-HCV antibodies testing. Polymerase chain reaction (PCR) for HCV RNA was performed and detected in 114 (21.03%) patients. Alanine aminotransferase levels ranged from 11-789 u/l with mean value of 88.64 + 90.20. Normal values (<40u/l) were found in 113 (20.84%) patients. Elevated levels (> 40 u/l) were found in 429 (79.15%) patients. More than 3 fold elevation (>120 u/l) were found in 101 (18.63%) patients.

Past history of jaundice was present in 129 (23.80%) patients, family history of hepatitis in 164 (30.25%), history of diabetes mellitus in 35 (6.45%) patients. Vaccination against Hepatitis B virus was done by 49 (09.04 %) patients. None of the patients gave history of alcohol Consumption.

Different risk factors frequencies are shown in the table number 2.Injectable drug users, therapeutic injections and re-use of syringes were re-

Table 2: Frequency of risk factors for Anti-HCV.

Risk factors	Number of patients	Percentage
Re-use of syringes	433	79.88
Needle stick injuries	44	08.11
Blood transfusions	68	12.54
Dental procedures	243	44.83
Tattooing	10	01.84
Past surgery	144	26.56
Road traffic accidents	16	02.95

ported in 433 (79.88%) patients; needle stick injuries in 44 (8.11%); blood transfusions received in past in 68 (12.54%); dental procedures in past in 243 (44.83%); and tattooing/ body piercing in 10 (1.84 %) patients. History of surgery in the past was present in 144 (26.56 %) patients and road traffic accidents in 16 (2.95%) patients.

Single risk factor for positive HCV was present in 108 (19.92%). More than one potential exposure to HCV was reported in 412 (76.01%) patients. Among these, 2 risk factors were present in 174 (32.10%), 3 risk factors in 134 (24.72%), 4 risk factors in 71 (13.09%), 05 or more risk factors in 33 (6.08%). No obvious risk factor was identified in 22 (4.05%) of patients.

Indications for anti-HCV testing included dilatation/ and curettage in 37 (11.78%) females; evacuation and curettage in 41 (13.05%); episiotomy in 5 (01.59%); and antenatal checkup in 37 (11.78%) female patients.

Anti-HCV antibodies detected pre-operatively in 63 (11.62%) patients; pre-endoscopy in 2 (0.36%); pre-vaccination (against hepatitis B virus) in 14 (2.58%); while donating blood (as voluntary blood donors) in 18 (3.32%) patients.

Eighteen (3.32%) patients, were found anti-HCV positive during routine medical checkup. Spouse came to hospital for consultation, was the cause of anti-HCV testing in 15 (2.76%) patients. Ninety one (16.78%) patients were detected positive for anti-HCV antibodies as part of the pre-employment or pre-insurance examination.

DISCUSSION

A number of studies have been published regarding prevalence of HCV in Pakistan. Various studies have shown seroprevalence in Pakistan ranging from 0.7% to 20%.[9] However, the prevalence of HCV infection varies throughout the world.[10,11]

Out of 542 patients included in the study, male patients were 228 (42.07%) and female patients were 314 (57.93%), with an overall female to male ratio of 1.37: 1.

Age of the patients ranged from 14 to 90 years with mean age of 37.11+12.69 and a median age of 42 years. Majority of the patients (95.7%) were below 60 years of age. In the United States 65% of persons with HCV infection are aged 30-49 years.[5] Those who acquire the infection at a younger age have a somewhat better prognosis than those who are infected later in life. [5]

All of the patients were reported positive on anti-HCV antibodies testing. Polymerase chain reaction (PCR) for HCV RNA was performed and detected in (21.03%) patients. With the use of more sensitive assays, such as PCR, Stramer et al, reported that the risk of acquiring HCV from blood transfusions is estimated to be 1 in 230,000 donations.[12]

Alanine aminotransferase levels ranged from 11-789 u/l with mean value of 88.64+90.20. Normal values (<40u/l) were found in 113 (20.84%) patients. Elevated levels (>40 u/l) were found in 429 (79.15%) patients. Normal ALT levels were found in 56% individuals who were positive for anti-HCV in a study by Perisco et al. Normal ALT is shown to be related with slow progression to liver fibrosis.[13]

Family history of hepatitis was present in 164 (30.25%) patients and past history of jaundice in 129 (23.80%). Seoprevalence of HCV in household contact is demonstrated to be higher.[14] History of diabetes mellitus was present in 35 (6.45%) patients. Vaccination against Hepatitis B virus was done by 49 (9.04%) patients. None of the patients gave history of alcohol Consumption.

Injectable drug users, therapeutic injections and re-use of syringes were reported in 433 (79.88%) patients. Frank et al reported that Egypt has the highest number of reported infections, largely attributed to the use of contaminated parenteral antischistosomal therapy.[15] This has led to a mean prevalence of HCV antibodies in persons in Egypt of 22%.

History of needle stick injuries was recorded in 44 (08.11%). The chance of acquiring HCV after a needle stick injury involving an infected patient is 1.8% (range 0-7%),[16-18] but according to Rischitelli et al, HCV prevalence among health care workers is similar to that of the general population.[19]

Although blood transfusion was previously reported to account for 40% of patients who re-

ceived transfusions in the study by Khattak et al.[20] The high prevalence of hepatitis C can be attributed to the sub-optimal blood transfusion practices, intravenous medications, and traditional medical practices. Many facilities do not screen the blood donors properly or raise awareness in recruiting more volunteer donors.[21] Several of blood banks have not had adequate screening for HCV, HBV or HIV. History of blood transfusions received in past was present in only 68 (12.54%) of patients in our study, which may be due to improved screening of blood and blood products.

Previous studies from Pakistan have shown that the small pox eradication programs conducted in Pakistan from 1964 to 1982 had given rise to an increased occurrence of positive serology from anti-HCV. They were noted to be 15.9% in Lahore and 23.8% in Gujranwala.[22] This also could be attributed to the increased number of injections used in many healthy individuals for minor problems. A study from Northern Pakistan had shown that those individuals who had received therapeutic injection in the previous 10 years had increased occurrence of positivity of HCV.[20]

History of dental procedures in past was recorded in 243 (44.83%); dental procedures carried out in patients with chronic hepatitis stresses the importance of ineffective infection control method practiced by dentists. [23] Tattooing/ body piercing in 10 (1.84%) patients. Sun et al, reported cosmetic tattooing as an important risk factor for HCV acquisition.[24] History of surgery in the past was present in 144 (26.56%) patients and road traffic accidents in 16 (2.95 %) patients. In the study by Jaffery et al, previous history of surgery was present in 38.7% cases.[25]

Indications for anti-HCV testing included dilatation/ and curettage in 37 (11.78%) females; evacuation and curettage in 41 (13.05%); episiotomy in 5 (1.59%); and antenatal checkup in 37 (11.78%) female patients. In the study by Jaffery et al, previous history of curettage was present in 9.7% cases.[26]

Anti-HCV antibodies detected pre-operatively in 63 (11.62%) patients; pre-endoscopy in 2 (0.36%); pre-vaccination (against hepatitis B virus) in 14 (2.58 %); while donating blood (as voluntary blood donors) in 18(3.32%) patients.

Eighteen (3.32%) patients, were found anti-HCV positive (as chance detection) during routine medical checkup. Spouse came to hospital for consultation, was the cause of anti-HCV testing in 15 (2.76%) patients. Ninety one (16.78%) patients were detected positive for anti-HCV antibodies as part of the pre-employment or pre-insurance examination.

Single risk factor for positive HCV was present in 108 (19.92%). More than one potential exposure to HCV was reported in 412 (76.01%) patients. Among these, 2 risk factors were present in 174 (32.10%), 3 risk factors in 134 (24.72%), 4 risk factors in 71 (13.09%), 05 or more risk factors in 33 (6.08%). No obvious risk factor was identified in 22 (4.05%) of patients. Most patients (80%) reported more than one potential exposure to HCV.[26] Numerous risk factors promote HCV acquisition, and multiple risk factors may be present in a single individual. Infected persons cannot be dichotomized into “injection drug users” and “blood product recipients;” many in each group may have other risk factors as well. The recognition of the potential presence of multiple risk factors may have important implications in the approach to HCV surveillance.

CONCLUSION

In this study, hepatitis C was more common in patients with unnecessary use of injections, reuse of syringes, dental procedures and unscreened blood transfusions. In most of the hepatitis patients, more than one risk factor was found.

As HCV is assuming epidemic proportion in our country, we need to address the blood bank practices by appropriate screening of voluntary blood donors by sensitive methods. Limiting the use of therapeutic injections, use of disposable needles and compliance with universal precautions for infection control should be emphasized. All individuals who have ever received a blood transfusion or multiple therapeutic injections should be screened for Hepatitis B and C infection.

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Corresponding author:

Dr. Ibrar Ahmed

Medical B Unit

Postgraduate Medical Institute

Lady Reading Hospital

Peshawar, Pakistan

E-mail: