FREQUENCY OF VARIOUS MODES OF TRANSMISSION OF HCV INFECTION IN RURAL SINDH

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ABSTRACT

Objective: *To determine the frequency of various modes of transmission for HCV infection in rural Sindh.*

Material and Methods: *This prospective cross-sectional study was carried out from August 2006 to June 2008 at Research Medical Center LUMHS Jamshoro, Departments of Pathology, Nawabshah Medical College Nawabshah and Department of Biotechnology, University of Karachi. Study included 344 patients (239 men and 105 women with ages range 18–55 years) having positive HCV-PCR with different genotypes. All patients went for presence of HCV antibodies by ELISA and HCV RNA by Real Time PCR. Patients were asked to complete a questionnaire of clinical and epidemiological data to determine the various modes of transmission.*

Results: *Among 344 patients, 226 (77.32%) were exposed to single risk factor, 69 (20.05%) to more than one risk factor, where as 9 (2.61%) patients never encountered any risk factor. Parental transmission of infection was the most common mode of transmission (n=143;41.56%) followed by surgical history in 74 (21.51%), blood transfusion in 66 (19.18%), needle accident in 43 (12.5%), exposure to barber in 42 (12.2%), promiscuous sex act history in 18 (5.23%), I/V drug users in 13 (3.77%), and tattoo marks in 5 (1.45%) patients. However no patient was found with positive history of prenatal, and inhalational drug route of transmission.*

Conclusion: *'Parental route' found to be the most common mode of transmission of HCV infection. The rate of HCV infection in the society may be controlled/ reduced by taking safety measures in various routes of transmission.*

Key Words: *HCV, RNA, Mode of Transmission.*

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INTRODUCTION

The story of hepatitis C began a little more than two decades ago, when researchers transmitted non-A, non-B hepatitis from patients with transfusion associated hepatitis to chimpanzees, demonstrating that the disease resulted from a transmissible agent. The discovery of HCV only became possible with the use of modern techniques of molecular biology and cloning, and a major break through came in 1989 with the cloning of the hepatitis C virus (HCV) genome[1], shortly after the discovery of HCV, it became apparent that this newly identified virus is the principal causal agent for non-A, non-B hepatitis[2]. Hepatitis C virus (HCV) is a major cause of liver disease and viral Hepatitis around the world.[3] It is the most common chronic blood borne infection and accounts for almost half of all patients in the United States with chronic liver disease[4] and approximately 180 million people or 3% of world population is infected with the virus[5] and represents a viral pandemic and has five times more widespread infection as with the human immunodeficiency virus type 1(HIV-1).[6]

Hepatitis C can be transmitted through various routes, like blood transfusion, recycling and reuse of syringes, unnecessary and unsafe injections, use of multi dose vial injection, organ transplantation, tattooing, body piercing, prenatal transmission, sexual exposure, house hold contacts, contaminated instruments i.e. endoscopes, traditional medicine, ear and nose piercing and sharing razors, particularly in rural areas. These

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routes of transmission are not much documented but are important in a developing country like Pakistan and other regions of Asia.[7,8] There is no epidemiologic or experimental evidence for transmission by an insect vector, although it remains theoretically possible.[9]

Keeping all these above facts in view, this study was conducted to determine the frequency of various modes of transmission for HCV infection in rural Sindh. Although this is not a true representation of the population, still it is first ever attempt to determine the frequency of various modes of transmission for HCV infection in rural Sindh as the cases were collected from all the teaching hospitals attached with all the medical colleges of Sindh.

MATERIAL AND METHODS

This study was conducted at Research Medical Center LUMHS Jamshoro, Pathology Department Nawabshah Medical College for Girls Nawabshah and Department of Biotechnology, University of Karachi during August 2006 to June 2008.

This study was a multi centric study covering all the interior of Sindh. The blood samples from 344 patients were collected from various medical wards of Liaquat University Hospital Jamshoro and Hyderabad, Nawabshah Medical College Hospital Nawabshah, Chandka Medical College Hospital Larkana, Civil Hospital Sukkur and Muhammad Medical College Hospital Mirpurkhas. The patients included in the study were having ages between 18-55 years, with persistent abnormal alanine aminotrasferase levels, and evidence of presence of HCV-RNA in serum by RT-PCR (Real time - polymerase chain reaction).

The suspected patients of chronic hepatitis were informed about the study, they signed a consent form and ELISA test for the presence of HCV antibodies[10] was performed by ELISA kit of Biokit Spain. The anti-HCV positive patients were asked to complete a questionnaire composed of clinical and epidemiological data to determine the various modes of transmission of hepatitis C virus infection.

RESULTS

In this prospective study (Table-I) a total of 344 HCV-PCR positive patients with different genotypes were evaluated (239 men and 105 women). Their ages ranges from 18-55 years with a mean age of 35.14 years. The duration of infection was evaluated in all the patients; it was below 2 years in 140 (40.69%), between 3 and 5 years in 196 (56.9%) and above five years in 8 patients (2.32%). The age at infection was below 20 years in 42 (12.20%) patients, between 21 & 40 years in 221 (64.25%) and above 40 years in 81 patients (23.55%).

CHARACTERISTICS OF THE STUDY POPULATION

Study Design	
Type	Prospective, cross-sectional and observational
Chronic Hepatitis C patients	344
With +ve HCV-PCR & genotype	
Mean Age	35.14 years
Sex	
Men	239 (69.47%)
Women	105 (30.52%)
Age at Infection	
≤ 20 years	42 (12.20%)
21-40 years	221 (64.25%)
> 40 years	81 (23.55%)
Duration of infection in year	
≤ 2 years	140 (40.69%)
3-5 years	196 (56.9%)
> 5 years	08 (2.32%)

Table I

CLINICAL PRESENTATION OF 344 CASES OF CHRONIC HEPATITIS C

Clinical Features	Number of cases	Percentage
Jaundice	185	53.77
Loss of Appetite	179	52.03
Hepatomegaly	175	50.87
Bodyache	164	47.67
Anemia	127	36.91
Fever	120	33.88
Nausea	65	18.89
Oedema	63	18.31
Loss of weight	58	16.86
Vomiting	25	7.26
Bleeding	07	2.03
Diarrhoea	07	2.03

Table II

ROUTES OF TRANSMISSION OF 344 CASES OF CHRONIC HEPATITIS-C

Route of Transmission	Number of cases	Percentage
Parental History	143	41.56
Surgical History	74	21.51
Blood Transfusion	66	19.18
Needle accident	43	12.5
Barbar History	42	12.2
Promiscuous sex act	18	5.23
Unknown	9	2.61
Tatoo marks	5	1.45
Perinatal	Nil	Nil
Inhaled drug users	Nil	Nil
Single route	266	77.32
Double route	69	20.05

Table III

Clinical manifestations of chronic hepatitis:

The clinical presentation (symptoms and signs) of chronic hepatitis patients is shown in Table-II. Out of 344 patients, 179 (52.03%) patients were complaining of loss of appetite followed by bodyache in 164 (47.67%), fever in 120 (34.88%) nausea in 65 (18.89%), loss of weight in 58 (16.86%) vomiting in 25 (7.26%), bleeding in 7 (2.03%) and diarrhoea in 7 (2.03%) cases. On examination the clinical jaundice was positive in 185 (53.77%) anemia in 127 (36.91%), oedema in 63 (18.31%) and hepatomegally in 175 (50.87%) cases.

Routes of Transmission:

As described in Table-III out of 344 patients of chronic hepatitis-C, 226 (77.32%) were exposed to single risk factor, 69 (20.05%) to more than one risk factor, where as 9 (2.61%) patients never encountered any risk factor. 143 (41.56%) patients has parental history of transmission of infection which was found to be the most common mode of transmission, followed by surgical history in 74 (21.51%) patients, blood transfusion in 66 (19.18%) patients, needle accident in 43 (12.5%) patients, history of exposure to barber in 42 (12.2%) patients, promiscuous sex act history in 18 (5.23%) patients, I/V drug users in 13 (3.77%), and tattoo marks in 5 (1.45%) patients, however no patient was found with positive history of prenatal, and inhatatory drug route of transmission.

DISCUSSION

WHO has estimated that at least 12 billion syringes are sold each year for injection purposes and out of those, approximately one billion injections are given yearly in course of child hood vaccination programme[11]. Many injections are given using non sterile syringes and annually cause 12-18 million HBV infections, 2.3-2.7 million HCV infections and 80-160000 HIV infections[9] in the world and particularly in Pakistan. The number of injections per person per year was estimated for thirteen countries representing five regions of developing world as classified by World Bank. The average number of injections ranged 0.9-8.5 per person per year. With a median of 1.5 injections per person per year, the highest prevalence was found for Pakistan and Acuador[9].

Health care professionals must be informed about the appropriate medical management of HCV infected patients, known and potential risks for infection, need to identify risk factors in their patients, appropriate evaluation of high risk patients, and recommendations for prevention. All anti-HCV positive patients should be considered infectious and informed about possibility of transmission to others, even though no reliable tests are available to determine infectivity.[12,13] HCV is not spread by kissing, hugging, sneezing, soughing, food or water, sharing eating utensils or drinking glasses, or casual contact. Hepatitis C virus-positive persons should not be excluded from work, school, play, child-care, or other settings on the basis of their HCV infection status.[13]

The parental route is the most commonly recognized and best characterized transmission mode of HCV worldwide[15]. In current study 143 (41.56%) patients gave history of parental transmission of infection which is in consistent with various other studies conducted in Pakistan and other parts of the world.[7,9,14-20]

In our study surgical history was present in 74 (21.51%) patients, but it was not confirmed that the infection was transmitted by the health care workers or by other means during surgery and stay in the hospital. There is no any study in the literature showing such a high results, because the national and international data reveals that the transmission of hepatitis C from health care workers is very low[21-23], so in our study it is likely to be multifactor, the other involved factors includes reluctance in consultant's gloves, frequent use of multi dose vial and reuse of syringes. In addition to this, out break of hepatitis C infection is linked to medical procedures and interventions, including the gynecological[24] and endocrinological procedures, orthopedic procedures[25], open heart surgery[26], endoscopy[27], colonoscopy[28], organ transplantation[29] and contaminated immunoglobulin preparation[30]. Some if not most of these instances of HCV transmission, mostly represent cross contamination due to at least in part to inadequate infection control procedures or inadequate disinfection devices or both[28].

In developed countries and many Asian countries the screened blood is not considered as a primary risk factor for HCV transmission and the incidence of associated hepatitis is estimated as 0.01% to 0.001% per unit transfused.[31] In Japan the incidence of post transfusion hepatitis is reduced to 0.137%[32], but transmission of HCV through blood transfusion is a major cause of (30-50%) of all chronic HCV infection in Asian region[9], 6.9% in India and 12.5% in Taiwan.[8] In Pakistan there is variability in different studies; 38% in Rawalpindi[33] and 25% in general population.[34] These studies show that blood transfusion particularly the unscreened blood may be responsible for the transmission of associated chronic liver disease. In our study 66 (19.18%) patients give history of blood transfusion, which is a little bit low inspite the facility of safe screened blood is available in very few areas of interior of Sindh.

The most frequent type of exposure resulting in HCV transmission is a needle stick with hollow bore injection style needle, contaminated with blood from infected persons, anti HCV seroconversion after accidental exposure to needle sticks/sharps averaged only 1.8% (range 0.6-6.6%)[35]. In our study we noted needle accident in 43 (12.5%) patients.

The HCV transmission by sexual contact is not as efficient as HIV and HBV[36]. The high prevalence of HCV transmission is mostly seen in high risk group e.g. sex workers, men who have sex with men, persons with multiple sex partner, partner of HCV infected persons and patients who visit sexually transmitted disease clinic.[37] According to Center for Disease Control and Prevention, approximately 18% of the cases occur in person with no risk factor other than exposure to infected sexual partner or exposure to multiple sex partners[38]. In Pakistan the true prevalence of sexually transmitted HCV infection cannot be determined because of religious and socio-cultural reasons, but with the background of international studies, the transmission must be high in high-risk groups like male transvestites and female prostitutes[9]. The current study also highlights the importance of promiscuous sex act by HCV infected victims in the society; we got 18 (5.23%) patients who gave history of promiscuous sexual act.

CONCLUSION

The present study highlights the various sources of transmission of hepatitis C in the society. Any behavior, occupation or medical condition that results in frequent percutaneous, per mucous or intravenous exposure to blood or infected material, presents the risk for acquiring hepatitis C. The parental route was found to be the most common mode of transmission of HCV infection. The rate of HCV infection in the society may be controlled/ decreased by taking safety measures in various routes of transmission mentioned in the study.

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CONFLICT OF INTEREST

Authors declare no conflict of interest