

SEXUAL TRANSMISSION OF HEPATITIS C VIRUS IN MONOGAMOUS MARRIED COUPLES

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ABSTRACT

Objectives: To evaluate sexual transmission of Hepatitis C virus in monogamous married couples in our local set-up.

Material and Methods: This long term prospective cross-sectional cohort study was conducted as outpatient at a private clinic at Peshawar from January 2000 to December 2010. The risk of sexual transmission of Hepatitis C virus (HCV) infection was evaluated among 334 monogamous married patients whose partners were not infected with chronic HCV. These patients were serologically tested for HCV using a third generation Enzyme linked immunosorbent assay (ELISA). Positive results were then confirmed by reverse transcriptase polymerase chain reaction (RT-PCR). In patients positive for both HCV antibodies and HCV RNA, HCV genotyping was performed. A questionnaire comprising detailed history, duration of marriage, sexual behavior and contraception techniques, was completed by all couples. Statistical analysis of the results was performed with SPSS version 19.

Results: Amongst 334 chronic HCV infected patients, 190 were male and 144 female. All these patients had strict monogamous status and their ages ranged from 30 to 57 years with mean age of 41 ± 5 years. Their marital duration lasted 8-24 years with mean marital duration 16 ± 9 years. HCV associated antibodies and HCV RNA were detected in spouses of 14 (4.20%) of these 334 patients during study. HCV genotyping revealed discordance in 10 (2.99%) couples and concordance (genotype 3) in only 4 couples, indicating risk of sexual transmission in 1.20% in strict monogamous married couples.

Conclusion: The risk of sexual transmission of HCV within monogamous married couples is extremely low. HCV positive spouses can be counseled about their normal marital life and sexual relationship.

Keywords: Hepatitis C virus, sexual transmission, monogamous married couples.

INTRODUCTION

Hepatitis C virus is an RNA virus of the family flaviviridae and was discovered by Choo and coworkers in 1989¹. Approximately 170 million people i.e about 3% of the global population have been infected with chronic HCV^{2,3}. This virus can be grouped into at least six genotypes in different geographical areas of the world⁴. These different genotypes infections may affect the clinical outcome and response to treatment⁵. HCV is transmitted by direct exposure to infected blood products such as transfusion of blood or blood products, intravenous drug abuse, occupational needle stick injuries, hemodialysis and organ transplantation^{6,7}. Parenteral transmission is well established and accounts for the high rates of HCV among hemophilic patients and intra venous (I/V) drug users⁸. In about 30 to 40% of HCV cases, the route of

HCV transmission is unclear^{9,10}. To establish the mode of transmission, the identification of common strains of HCV can be performed by various methods e.g., HCV genotyping and polymorphism analysis, direct sequencing of the genome and phylogenetic analysis¹¹.

Sexual transmission of chronic HCV- unlike other viruses such as HBV and HIV is not well established and several studies addressing this problem yielded conflicting results¹². The rate of HCV infection in sexual partners of chronic HCV patients ranged between very low to as high as 30%^{13,14}. These variable findings may partly be explained by the confounding effect of non-sexual transmission routes such as unrecognized parenteral transmission due to sharing of tooth brushes, miswaks, razors, needles and syringes^{15,16}. Moreover, most of these studies were based on prevalence data reflecting accumulative incidence of infection over time, so it does not offer an accurate relationship in time between viral exposure and the acquisition of infection¹⁷. Prospective studies represent the most adequate tool to directly assess the actual risk of infection in a given setting¹⁸. Very few prospective data are available on this topic and that too from Western world¹⁹. The aim of our study is to

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prospectively evaluate the risk of sexual transmission of HCV among monogamous married couples in our setting in a period spanning ten years.

MATERIALS AND METHODS

This prospective cross-sectional cohort study was conducted in Peshawar, Khyber Pukhtoonkhwa, as outpatient in a private clinic setup from January 2000 to December 2010. The risk of sexual transmission of HCV infection was evaluated among 334 monogamous married patients. These patients comprised of one partner positive for anti-HCV antibody and HCV RNA (index patient) and other partner negative for HCV markers. The Inclusion criteria were: Index patients with reactive anti HCV antibody assay by third generation ELISA and detectable HCV RNA viral load according to the manufacturer instruction, Age above 18 years irrespective of gender, patients having strict monogamous marital status, patients not practicing any form of barrier contraception, treatment naïve patients before enrollment as far as antiviral treatment is concerned, patients without stigmata of chronic liver disease before enrollment, patients exhibiting non-reactive antibody assay to HIV, HBV and non-reactive IgM antibodies to CMV and EBV, utilizing commercially available kit, time since diagnosis, at least more than two months. The exclusion criteria were: known or obvious pre-existing liver disease, ongoing interferon therapy, HBsAg positive, HIV positive, patients having extra-marital relationship.

HCV negative partners of chronic HCV patients were informed of the possible routes of HCV transmission including that of sexual transmission. The HCV negative spouses were then invited to enter in a follow up protocol consisting of every six months clinical visits for a prospective evaluation of the risk of acquiring HCV infection. At each such visit, liver function tests and HCV antibody were performed and spouse showing seroconversion to anti HCV or with elevated ALT levels were further assayed for HCV RNA. If HCV RNA detected, then HCV genotyping were performed utilizing a line probe assay. HCV sequencing and phylogenetic assays were not performed due to non-availability of these tests in Pakistan at the moment. All the information was collected in a designed questionnaire. Follow-up duration of our study was 10 years. Participants of the study were strongly advised not to share personal hygiene items such as tooth brushes, miswaks, razor blades and nail clippers in order to control these confounding factors.

RESULTS

A total of 375 spouses of HCV infected patients were consecutively identified and tested for HCV antibody. Thirty one (31) out of these 375 (8.3%) were anti HCV reactive and so excluded from the study, while

10 (2.7%) anti-HCV negative spouses were excluded because they either did not complete the questionnaire or were lost to follow-up. Thirty (96.8%) out of those 31 spouses found anti HCV antibody reactive at the base line, reported major risk factors for HCV transmission e.g., history of blood transfusion, surgery, IV drug abuse or injections and IV drips. HCV genotype of one spouse with no apparent risk factors except to live together with infected partner was discordant to index patient. Our study documented gender distribution of 190 (56.89%) males and 144 (43.11%) females. Mean age at enrollment was 41 ± 5 years and the mean duration of marriage was 16 ± 9 years. All the index patients and their spouses were found negative for HBV, HIV 1 and 2 antibodies, IgM anti CMV and IgM anti EBV antibodies. One hundred ninety-one index patients (57.2%) underwent alpha-interferon therapy during follow up and amongst them, 81 (42.4%) achieved sustained virological response. Spouses of these index patients were excluded from the analysis as they were no longer at risk of HCV exposure. Taking this fact into consideration, 253 (75.75%) partners completed the 10 years follow up. All couples denied anal intercourse, sex during menstruation and use of contraceptive techniques.

Fourteen spouses (5.5%) acquired HCV infection in the course of follow-up period corresponding to prevalence of 5% among spouses. All these patients then performed HCV genotyping. Members of 10 couples (3.95%) showed discordant genotypes while only 4 couples (1.5%) shared concordant genotypes.

DISCUSSION

Our study provides strong evidence that sexual transmission of HCV infection among strict monogamous married couples is very rare. The literature review available on sexual transmission of HCV varies considerably and the numbers reported range from zero to 27%²⁰. However, majority of the studies have documented rates of between zero to 3%²¹. These low rates suggest that sexual transmission in HCV infection presents a minimal or negligible risk. The controversy in those previous reports is probably due to the small sample size of many studies investigating heterogeneous groups at varying risk, the sensitivity and specificity of early assays, absence of genotyping, lack of control, difficulty of excluding other routes of transmission and geographic differences²².

The highest rates were documented in studies from Far East and Southeast Asia, citing a risk of 17% to 27% for heterosexual transmission²³. The prevalence of HCV is much higher in Southeast Asia and common external sources such as dentistry, quack practices, acupuncture or medical injections may affect interspousal transmission of concordant

genotypes^{23,24}. In western world, there is little evidence in favor of sexual transmission of HCV²⁵. The few studies from western societies documenting high rates of 11% to 14% were actually performed on small sample size and unreliable screening methods (first generation ELISA)²⁶. The findings of our study are consistent with those of Williams et al (1.8%), Boonyarad V et al (1.90%), but much higher than that of Vendilli et al (0.12%)^{9,16}. Vendilli et al utilized HCV genome sequencing and phylogenetic assays for concordant genotyping¹⁹.

Differences in the magnitude of risk of acquiring HCV among sexual partners reported in different studies may indeed reflect differences in sexual risk behavior or differences in the rates of exposure to non sexual sources of HCV infection²⁷. It has been documented that HCV infection among spouses is more likely associated to a common exposure to HCV infection risk factors rather than to sexual transmission.^{28,29} In a study conducted by Stroffolini T⁹, exposure to a common percutaneous risk factor (such as sharing personal hygiene items and glass syringes) was estimated to be 12.4 times higher among couples with both partners infected with HCV as compared to those with only one infected partner. His study suggests that modes of viral transmission other than the sexual route may play a key role in the intraspousal spread of HCV infection.

CONCLUSION

Heterosexual transmission of HCV among monogamous married couples is very low. HCV positive spouses can be counseled about their normal marital relationship.

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