

Intra familial transmission of hepatitis C virus infection in Iran

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ABSTRACT

Background: Hepatitis C virus (HCV) is a major cause of chronic liver disease worldwide. The role of intra familial HCV transmission is still controversial. The aim of the present study is to determine intra familial transmission (sexual and non sexual contacts) of HCV in a group of Iranian population.

Patients and methods: In this historical cohort study, 270 first degree relatives of hepatitis C patients were enrolled as the exposed group and compared to 270 first degree relatives of normal subjects (with negative HCV) as the unexposed group. Antibodies to HCV were detected by commercially available fourth-generation enzyme immunoassay. Positive serum specimens were retested using a second generation recombinant immunoblot assay. Fisher's exact test was used to detect association between the exposure and out come of the study.

Results: The mean age of exposed group was 27.1 ± 19.8 years and 38.1% were male. The mean age of unexposed group was 29.4 ± 16.7 years and 51.9% were male. Regarding gender, age, familial relation and condom use, there were not statistically significant differences between exposed and unexposed subjects. Only 2 HCV-infected subjects were detected in the unexposed group, both of whom were intravenous drug users. The frequency of positive HCV antibody among household contacts of two groups was not significantly different (NS).

Conclusion: Our results revealed that house hold contact transmission of HCV is not a significant transmission route and sexual transmission does not seem to play a role in the intra familial spread of HCV infection.

Keywords: *Intra familial transmission, Hepatitis C, Epidemiology, Iran.*
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INTRODUCTION

Hepatitis C virus (HCV) is a major cause of chronic liver disease worldwide; including cirrhosis and hepatocellular carcinoma (1). The most recent WHO estimate of the global prevalence of HCV infection is 2-3% (1-3). Although HCV infection is endemic in most parts of the world, there are significant geographical differences. Some nations in Africa and Egypt have the highest prevalence (Egypt 22%), while Europe

and Australia have a lower prevalence (0.6-1.1%)(2-5). In Iran as it is reported by Blood Transfusion Organization, the prevalence is 0.5% to 5% (with Sistan-and-Balouchestan province as the most prevalent region) (4). HCV infection has tendency to be chronic and more than 60% of the infected patients develop chronic liver disease, cirrhosis or even hepatocellular carcinoma (6-12).

The transmission of HCV infection is usually done by parenteral route; including needle sharing and occupational injuries caused by contaminated needles, tattooing and hemodialysis. However, at least 50% of all HCV positive patients do not have

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a clear history of parenteral or other risk factors (13-19). In a study in Iranian blood donors, transfusion, undergoing endoscopy, extramarital sexual activities, non-intravenous drug abuser, IV drug abuse, and receiving wounds at war were found to be independent risk factors for HCV positivity. No apparent risk factor could be demonstrated in 24.5% of the positive cases (20).

In Pakistan, however, analysis of serological markers of HCV infection in a population-based study and in hospital-based study of cases of chronic liver disease have revealed a prevalence of 6.5% and 24%, respectively. Another study in Pakistan reported 16.2% seroprevalence among family members of HCV infected patients (21,22).

Akhtar et al. assessed the prevalence and risk behaviors associated with HCV seropositive index in Karachi; Pakistan. Their study estimated 20.5% HCV seropositive prevalence among the house hold contact of HCV seropositive index and thalassemic patients. They concluded that the use of objects such as toothbrush contaminated with saliva and perhaps small quantities of blood and being bitten by the carriers represent one of the important routes of HCV transmission (21,22).

For a large proportion of HCV-infected patients who had not been exposed to any obvious risk factor, intra familial house hold contact was suspected, however, the occurrence of such transmission has been debated (23-26).

The aim of the present study is to investigate the frequency of HCV seropositivity in familial contacts of HCV-positive and -negative subjects in Arak, Iran.

PATIENTS and METHODS

For this historical cohort study, 270 first degree relatives of hepatitis C patients were enrolled as the exposed group and compared to 270 first degree relatives of normal subjects (with negative HCV) as the unexposed group. HCV-infected subjects were selected from HCV confirmed patients

referred to Arak Triangle Out-Patient Clinic, while negative HCV subjects were recruited from blood donors referred to the Regional Blood Transfusion Organization in Arak from August 2001 to August 2007.

House hold contact relatives were those who lived with the index case for at least a year in the same house. Subjects were interviewed and a prepared questionnaire was used to gather initial data including demographic and risk factors. At the same visit, a serum sample was obtained from each subject.

All blood samples were first checked with ELISA and antibodies to HCV were detected by commercially available fourth-generation enzyme immunoassay (OMEGA). Then, positive serum specimens were retested by a second generation recombinant immunoblot assay (RIBA II). Finally, all antibody-positive subjects were rechecked by HCV PCR (Roch Diagnostic Test).

The present study complied with the Helsinki declaration and was approved by the Ethics Committee in Arak University, meanwhile, participants were requested to fill a written informed consent.

Descriptive statistics were used to characterize the study population. For continuous variable, means and ranges were reported; for discrete variables, frequencies and percentages were calculated. Finally, data analysis was carried out with SPSS software (version 11.5, SPSS Inc., USA). Fisher's exact test was used to detect association between the exposure and outcome of the study.

RESULTS

Totally, only 2 HCV-infected subjects were detected in the unexposed group, both of whom were intravenous drug users.

A total of 7 (2.9%) subjects in the exposed group and 3 (1.1%) subjects of unexposed group revealed positive anti-HCV antibody with enzyme-

linked immune absorbent assay (ELISA) technique. However, during recombinant immunoblot assay (RIBA II) and PCR, only 2 of these 10 subjects, both of whom belonged to the unexposed group, were HCV-positive. The difference in frequency of positive HCV-antibody among household contacts of the two groups was not statistically significant (NS).

The proportions of household contacts of the 2 groups by age, sex and the type of relationship with index case did not differ significantly (table 1).

Table 1. Socio-demographic characteristics of exposed and unexposed groups

Variable	HCV group		P	
	Positive	Negative		
Age (yr)	27.1±19.8	29.4±16.7	0.1	
Gender	Male	103(38.1)	140(51.9)	0.1
	Female	167(61.9)	130(48.1)	
Type of relation	Spouse	67(24.8)	61(22.6)	0.5
	Non-spouse	203(75.2)	209(77.4)	
Duration of household contact	15.0±6.4	17.0±5.2	0.3	

Numbers in parenthesis are in percentage

Table 2 represents risk factors associated with HCV-positivity in exposed and unexposed groups.

Table 2. Risk factors associated with HCV seropositivity

Variable	HCV group		P	
	Positive	Negative		
Condom use in sexual contacts	5 (1.9)	3 (1.1)	0.5	
Addiction	Inhaler	14 (5.2)	9 (3.3)	0.3
	IDU	3 (94.8)	2 (96.7)	
History of Blood transfusion	19 (6.8)	20 (7.2)	0.9	
Extramarital sex contact	5 (1.8)	3 (1.1)	0.5	
Use of common personal vehicles	10 (3.6)	14 (5.0)	0.5	
History of tattooing	3 (1.1)	2 (0.7)	0.7	
HCV ELISA Positive	7 (2.5)	2 (0.7)	0.09	
RIBA and PCR Positive	0	2 (0.7)	0.3	

Numbers in parenthesis are in percentage, IDU: IV Drug User

DISCUSSION

Results revealed 2.5% HCV antibody positivity in the exposed group versus 0.7% in the unexposed group, however, none of the house hold contacts with index cases was documented by Blot or PCR.

Overall, there was no risk of intra familial transmission of HCV in our study. All of HCV antibody positive subjects in the exposed group were female and sexual partner of index cases. Two cases (0.74%) of the unexposed group were HCV positive with Blot and PCR, both of whom were IV drug users. The frequency of HCV positivity was more or less the same as the community acquired HCV in Markazi Province (less than 1%) (7).

It seems that sexual contact has no effective role on transmission of HCV to partner, but may cause the stimulation of immune system in target and causes antibody positivity. In our setting, all of the index cases of HCV positive group were IV drug users but two had history of extra family sex contact.

In this study, intra familial preventive care such as common razors and toothbrush, were satisfactory since less than 3% used common razors. In Pakistan, the use of objects such as toothbrush contaminated with saliva and perhaps small quantities of blood and being bitten by the carriers represent one of the important routes of HCV transmission (20.5% HCV seropositive among the house contact of HCV seropositive) (21).

In Iran, because of screening of blood donor with ELISA and Blot, the risk of blood transfusion induced transmission is negligible (6,7).

In contrary to ours, Eliseo Minola et al. from Italy reported that anti-HCV was detected in 2.1% of members of their original families (parents and siblings) versus 1.5% of community acquired, and in 13.8% out of 2662 sexual partners. They concluded that risk for sexual partner was significantly higher when the risk factor for the

index cases was related to intravenous drug use (25). They believed that vertical transmission is rare and the main route in original family household is related to certain habits that in the past led to the iatrogenic exposure. The highest rate of transmission emerged when the index cases HCV infection risk factor was IV drug users (IVDU) (25).

Terrault reported HCV transmission related to the type of sexual relationship, being 0.4-1.8% per year in people with multiple partners versus 0-0.6% in a year in people with long standing monogamous relationships (26). In our study, 98.2% of household contacts with index cases have had monogamous relationships.

Our study has some limitations, including the unknown duration of disease for index case and recall bias.

In conclusion, our results demonstrated that intra familial household contact with HCV positive cases has no effective role in transmission of HCV.

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