Hepatitis Monthly 2009; 9(1): 66-69

BRIEF REPORT

Relationship between Antibodies to Hepatitis C Virus and Human Immunodeficiency Virus among Thai Selected Groups

Pipat Luksamijarulkul [1*], Somporn Kantharadussadee Triamchaisri [2]

[1] Department of Microbiology, Faculty of Public Health, Mahidol University, Bangkok, Thailand
[2] Department of Public Health Nursing, Faculty of Public Health, Mahidol University, Bangkok, Thailand

Background and Aims: **Hepatitis C virus (HCV) and human immunodeficiency virus (HIV) infections are major public health problems world-wide. This study attempted to analyze the relationship between positive antibodies to HCV (anti-HCV) and antibodies to HIV (anti-HIV) in Thai selected groups.**

Methods: **A retrospective analysis of subject profiles including: demographic parameters, the main risk behavior and results of anti-HCV and anti-HIV tests perfomed on 165 injecting drug users (IDUs), 400 sexually transmitted disease (STD) patients, and 2,529 of the general population (2,167 blood donors and 362 premarital check-up individuals) was carried out.**

Results: **History profile analysis showed high positive rate of anti-HCV in IDUs with and without anti-HIV (90.14% vs. 87.23%). In STD patients, the precentages were 13% and 5.67% respectively, and those in the general population were 22.22% and 2.55%, respectively. Results revealed significant relationships between positive anti-HCV and anti-HIV in STD patients (P=0.0283; relative risk=2.29) and the general population (P< 0.0001; relative risk=8.72), but no significance was observed in IDU patients (P=0.7392; relative risk=1.03).**

Conclusions: **There were significant relationships between anti-HCV and anti-HIV among STD patients and the general population, however none was observed in the IDU group.**

Keywords: **Anti-HCV, Anti-HIV, Sexually Transmitted Disease, Injecting Drug Users**

Introduction

Hepatitis C virus (HCV) and human immunodeficiency virus (HIV) infections are major public health problems worldwide, and Thailand is no exception [1-4]. The morbidity and mortality associated with HIV infection is largely a consequence of T helper dysfunction [5]. In 2002, HIV infection had affected more than 40 million people globally, whereas, the prevalence of HCV infection was documented 4 times more than HIV infection [1, 3, 6]. Moreover, the complications from HCV are quite serious, *i.e.* 10-40% will develop chronic hepatitis which will gradualllly progress to liver cirrhosis and hepatocellular carcinoma, one of the most common cancers worldwide, particularly in Southeast Asian regions [7-9]. The transmission route of HIV includes the parenteral route, sexual contact and vertical transmission, whereas, the major route of HCV transmission is via the parenteral route with a minority contacting the virus through sexual contact [3, 4, 9, 10]. Although the vertical transmission route seems lower than that of HIV infection (approximately 10 %), a study in infants infected with HCV has shown that infants who were HIV-infected were at least 8 times more likely than HIV-uninfected infants to be vertically infected with HCV [11]. In addition, previous studies showed that HIV infection had major effects

**** Correspondence:***
Pipat Luksamijarulkul, Department of Microbiology, Faculty of Public Health, Mahidol University, Bangkok 10400, Thailand.

Tel: *+66(0) 2354 8538*
Fax: *+66(0) 2640 9835*

E-mail: *phpls@mahidol.ac.th*

Received: *9 Sep 2008* ***Revised:*** *10 Jan 2009*
Accepted: *17 Jan 2009*

Hep Mon 2009; 9 (1): 66-69

on HCV viral load and disease progression in HCV patients [12-14]. Another study in Austria found that the presence of antibodies to HIV (anti-HIV) was one of the predictors for antibodies to HCV (anti-HCV) positivity among patients attending sexually transmitted disease (STD) clinic [9]. The estimation of HIV and HCV co-infection is around 4-5 million individuals worldwide [15]. This retrospective study attempts to analyze the relationship between anti-HCV and anti-HIV positivity among some Thai selected groups. The results may be useful for supporting a strategic plan to screen HCV infection among high risk Thai people and to prevent and control both HIV and HCV infections.

Materials and Methods

Study design and study subject profiles

A retrospective analysis on relationship between HCV and HIV antibody positivity was carried out in history profiles of 165 injecting drug users (IDUs), 400 sexually transmitted disease (STD) patients and 2,529 general population including 2,167 blood donors and 362 premarital check-up individuals from the HCV antibody surveillance projects (2000-2005) at the Microbiology Department, Faculty of Public Health, Mahidol University. The author has reviewed and analyzed the subjects' history profiles which included demographic parameters (age, gender and education level), the main risk behavior or risk exposure, and laboratory results of anti-HCV and anti-HIV antibodies.

The presence of anti-HIV was screened by an immunochromatography (Bioline HIV 1/2, Immuno Chemical LAB, Bangkok) with more than 99% sensitivity and specificity when compared with an enzyme immunoassay (EIA) and confirmed by an EIA (Enzygnost Anti-HIV 1/2 plus, Behring Diagnostics, Marburg, Germany) with 100% sensitivity and 99.8% specificity. For a specimen to be considered anti-HIV positive, both the immunochromatography and EIA had to be positive. Anti-HCV antibody testing was followed by ABBOTT HCV EIA, the third generation methods with more than 99% sensitivity and specificity. Samples yielding a positive result were tested twice.

Data analysis

The Chi-square test was used to assess the relationship between positive anti-HCV and anti-HIV among each studied group. A P-value of less than 0.05 was considered statistically significant.

Results

Socio-demographic characteristics of the studied subject profiles

The history profiles showed that most studied subjects were aged 21-30 years. Male subjects were more prevalent than females, except in STD patients. More than 50% of the studied subjects had secondary level and lower education only. The occupation was mostly laborer, worker and officer, rather than more specialized occupations. Among HIV-risk groups, the intravenous route was the main risk exposure route in IDUs, whereas sexual contact was the mail risk behavior of method of exposure in an overwhelming 98.50% of STD patients. For general population, approximately 3% of blood donors and pre-marital check-up individuals had sexual contact as their main risk behavior or risk exposure. About 0.83-1.38% of blood donors and pre-marital check-up persons had intravenous routes as their main risk behavior or risk exposure and within the category was: injection as a method for drug use and receiving blood or blood products.

The relationship between anti-HCV and anti-HIV positivity

Among HIV-risk groups, the anti-HCV positive rates in IDUs with and without anti-HIV were 90.14% and 87.23%, respectively. Whereas, those in STD patients with and without anti-HIV were 13% and 5.67%, respectively. In the general population, 22.22% and 2.55% of individuals with and without anti-HIV were anti-HCV positive. The relationship between positive anti-HCV and anti-HIV among 3 different selected groups revealed that the anti-HCV positivity was significantly related with the positive anti-HIV among STD patients (P=0.0283) and general population (P<0.0001). However, there was no relationship between positive anti-HCV and anti-HIV among IDUs (P=0.7392). Details are presented in Table 1.

Additionally, the relative risks for HCV with HIV among the studied groups were 1.03 in IDUs, 2.29 in STD patients and 8.72 among the general population. These showed statistical significance among STD patient group (P=0.0283) and general population (P<0.0001). Details are shown in Table 2.

Discussion

HCV antibody testing by the third generation of EIA is considered useful for screening HCV infection due to the high sensitivity and specificity

Table 1. Relationship between anti-HCV and anti-HIV positivity among some Thai selected groups.

Studied groups	Results of anti-HIV	No. of studied	No. (%) of anti-HCV Positive	Negative	P-value from χ^2 test
HIV-risk group					
IDUs	Positive	71	64 (90.14)	7 (9.86)	0.7392
	Negative	94	82 (87.23)	12 (12.77)	
	Total	165	146 (88.49)	19 (11.51)	
STD patients	Positive	100	13 (13.00)	87 (87.00)	0.0283*
	Negative	300	17 (5.67)	283 (94.33)	
	Total	400	30 (7.50)	370 (92.50)	
General population (Blood donors and Pre-marital check-up persons)	Positive	18	4 (22.22)	14 (77.78)	<0.0001*
	Negative	2,511	64 (2.55)	2,447 (97.45)	
	Total	2,529	68 (2.69)	2.461 (97.31)	

* Significant relationship between positive anti-HIV and anti-HCV at α= 0.05

Table 2. Relative risk for HCV with HIV among some Thai selected groups.

Studied subjects	% Anti-HCV positive	Relative risk for HCV with HIV (95% C.I. of RR and P-value)
HIV-risk group		
IDUs: Anti-HIV positive	90.14	1.03
Anti-HIV negative	87.23	(0.93-1.15, P=0.7392)
STD patients: Anti-HIV positive	13.00	2.29
Anti-HIV negative	5.67	(1.16-4.55, P= 0.0283*)
General population		
Blood donors and premarital		
Check-up: Anti-HIV positive	22.22	8.72
Anti-HIV negative	2.55	(3.55-21.39, P<0.0001*)

* Statistical significance at α= 0.05

of the test. However, the false positive may be found in low prevalence populations, therefore, RIBA test could be used for confirmation. This retrospective study attempted to analyze the relationship between positive anti-HCV and anti-HIV among 3 Thai selected groups. The findings showed that the highest anti-HCV positive rate was found in IDUs (88.49%) and the lowest was found in the general population (2.69%). The anti-HCV positive rate in STD patients was 7.5%. The higher prevalence of anti-HCV in IDUs (88.49%) and the lower prevalence in STD patient group (7.50%) supports the belief that the major transmission of HCV is via the parenteral route and the minor transmission is via sexual contact [1, 4, 7, 9]. In Thailand, the prevalence of anti-HCV antibody in the general population, especially blood donors, ranged from 1.5% to 4.5% depending on the studied regions [16-18]. The risk groups of HCV infection were similar to HIV infection, such as IDUs and female sex workers (FSWs) or commercial sex workers (CSWs) [10, 19, 20].

A previous review study has revealed that patients with co-infection of HCV and hepatitis B virus or HIV have developed liver cirrhosis or hepatocellular carcinoma in a shorter time than those who are infected with HCV alone. Additionally, alcohol has a harmful effect on persistent HCV infection [21]. This present study found that 0.16% (4/2,529 cases) of general population, 3.25% (13/400 cases) of STD patients, and 38.79% (64/165 cases) of IDUs were co-infected with HIV and HCV. Moreover, the previous study of high risk behaviors to sexually transmitted diseases and blood-borne infections in Thai pre-married and married couples showed 15.3% alcohol consumption (23.8% in males and 6.8% in females) [4]. These co-infected individuals might be at a higher risk of liver cirrhosis and/or hepatocellular carcinoma than individuals infected with HCV alone.

The present study analyzed the relationship between positive anti-HCV and anti-HIV antibodies among 3 different selected groups and found significant relationship between positive anti-HCV and anti-HIV in STD patients (P=0.0283) and among the general population (P<0.0001). It could be suggested that the STD patients or individuals with anti-HIV positive titers might also be positive for anti-HCV. This relationship was supported by the significant relative risk for HCV with HIV in the STD patient group (RR=2.29, 95% CI=1.16-4.55, P=0.0283) and in the general population (RR=8.72, 95% CI=3.55-21.39, P<0.0001). The findings supported the study conducted by Stary *et al.* in 1992 [9] which found that the presence of anti-HIV was a predictor of HCV infection in patients attending STD clinics. This relationship was not found in IDUs (P=0.7392) because of the high prevalence of anti-HCV in anti-HIV positive and anti-HIV negative IDUs (90.14% and 87.23%, respectively).

Therefore, individuals who are positive for either anti-HIV or anti-HCV, should be screened for the other one because of the significant relationship between positive anti-HCV and anti-HIV and the high prevalence of anti-HCV among the IDU group.

Acknowledgements

The authors would like to thank our five-year study team including Miss Somporn Plucktaweesak, Mrs Atiporn Daengbubpha, Mrs Porntip Khemnak and Miss Nanthaporn Thammata and also extends its thanks to all participants' whose history profiles were used.

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