

5-1-1999

## Screening of hepatitis C virus antibody in HIV - riskgroup: Comparison between HIV - infectedsubjects and HIV - uninfected subjects

P. Luksamijarukul

S. Tanprasert

Follow this and additional works at: <https://digital.car.chula.ac.th/clmjjournal>



Part of the [Medicine and Health Sciences Commons](#)

---

### Recommended Citation

Luksamijarukul, P. and Tanprasert, S. (1999) "Screening of hepatitis C virus antibody in HIV - riskgroup: Comparison between HIV - infectedsubjects and HIV - uninfected subjects," *Chulalongkorn Medical Journal*: Vol. 43: Iss. 5, Article 5.

Available at: <https://digital.car.chula.ac.th/clmjjournal/vol43/iss5/5>

This Article is brought to you for free and open access by the Chulalongkorn Journal Online (CUJO) at Chula Digital Collections. It has been accepted for inclusion in Chulalongkorn Medical Journal by an authorized editor of Chula Digital Collections. For more information, please contact [ChulaDC@car.chula.ac.th](mailto:ChulaDC@car.chula.ac.th).

Screening of hepatitis C virus antibody in HIV - risk  
group: Comparison between HIV - infected  
subjects and HIV - uninfected subjects

Pipat Luksamijarulkul\*

Srivilai Tanprasert\*\*

Luksamijarulkul P, Tanprasert S. Screening of hepatitis C virus antibody in HIV - risk group: Comparison between HIV - infected subjects and HIV - uninfected subjects. Chula Med J 1999 May; 43(5): 307-15

- Objective** : *To determine anti-HCV prevalence in HIV-infected subjects compared with HIV - uninfected subjects*
- Design** : *Descriptive study (two groups comparison)*
- Setting** : *Microbiology Department, Faculty of Public Health, Mahidol University and Thai Red Cross Society*
- Subjects/Methods** : *516 HIV-risk subjects from three Venereal Diseases and AIDS Centers including 151 HIV - infected subjects and 365 HIV-uninfected subjects were screened for determining anti-HCV by an EIA (the second generation method) . The results were analysed by descriptive statistics and a proportional Z test.*
- Results** : *Of 151 HIV - infected subjects, 50.99 % were anti - HCV positive, whereas 27.12 % of the 365 HIV - uninfected subjects were positive for anti- HCV,  $P < 0.001$ . Details were analysed and the prevalence of anti - HCV in the HIV - infected group was found to be significantly higher than that in the HIV - uninfected group only among subjects exposed by sexual contact (16.25 % vs 6.27 % ,  $P < 0.001$ ). It was not significant among subjects exposed by intravenous drug*

\* Department of Microbiology, Faculty of Public Health, Mahidol University, Bangkok 10400, Thailand

\*\*National blood Center, Thai Red Cross Society, Bangkok 10330, Thailand

*injections due to the high prevalence in these two groups (90.14% vs 87.23 % , P > 0.05 ).*

**Conclusion** : *The prevalence of anti-HCV in HIV - infected subjects was significantly higher than that in HIV - uninfected subjects, especially among subjects exposed by sexual contact.*

**Key words** : *Anti-HCV, HIV - infected Subjects, HIV - uninfected subjects.*

Reprint request : Luksamijarulkul P, Department of Microbiology, Faculty of Public Health, Mahidol University, Bangkok 10400, Thailand.

Received for publication. January 10, 1999.

พิพัฒน์ ลักษณะจักรกุล, ศรีวิไล ต้นประเสริฐ. แอนติบอดีต่อไวรัสตับอักเสบบี ในกลุ่มเสี่ยงต่อการติดเชื้อไวรัสเอชไอวี: เปรียบเทียบระหว่างผู้ติดเชื้อเอชไอวีและผู้ไม่ติดเชื้อ. จุฬาลงกรณ์เวชสาร 2542 พ.ศ; 43(5): 307-15

**วัตถุประสงค์การวิจัย :** เพื่อหาความชุกแอนติบอดีต่อไวรัสตับอักเสบบี ในผู้ติดเชื้อไวรัสเอชไอวีเปรียบเทียบกับผู้ไม่ติดเชื้อไวรัสเอชไอวี

**รูปแบบการวิจัย :** การวิจัยเชิงพรรณนา (เปรียบเทียบ 2 กลุ่ม)

**สถานที่ :** ภาควิชาจุลชีววิทยา คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดลและสภากาชาดไทย

**ผู้เข้าร่วมการศึกษา และวิธีการวิจัย :** ทำการตรวจหาแอนติบอดีต่อไวรัสตับอักเสบบี ในตัวอย่างซีรัม 516 ราย รวบรวมจากศูนย์กามโรคและโรคเอดส์ 3 แห่ง แบ่งเป็นซีรัม จากผู้ติดเชื้อไวรัสเอชไอวี 151 ราย และผู้ไม่ติดเชื้อเอชไอวี 365 ราย ผลการตรวจได้นำเสนอและวิเคราะห์ข้อมูล โดยใช้สถิติเชิงพรรณนาและ Proportional Z test

**ผลการศึกษา :** ความชุกแอนติบอดีต่อไวรัสตับอักเสบบี ในผู้ติดเชื้อไวรัส เอชไอวี และในผู้ไม่ติดเชื้อเอชไอวี ร้อยละ 50.99 และ 27.12 ตามลำดับ ( $P < 0.001$ ) เมื่อวิเคราะห์ต่อ พบว่าความชุกแอนติบอดีต่อไวรัสตับอักเสบบี ในกลุ่มผู้ติดเชื้อเอชไอวีสูงกว่าในกลุ่มผู้ไม่ติดเชื้อเอชไอวี เฉพาะในผู้ที่สัมผัสจากเพศสัมพันธ์ (ร้อยละ 16.25 และ 6.27,  $P < 0.001$ ) สำหรับในผู้ที่สัมผัสจากการใช้ยาเสพติดชนิดฉีดแตกต่างกันอย่างไม่มีนัยสำคัญทางสถิติ (ร้อยละ 90.14 และ 87.23,  $P > 0.05$ ) เนื่องจากทั้ง 2 กลุ่มมีความชุกสูงมาก

**สรุป :** ความชุกแอนติบอดีต่อไวรัสตับอักเสบบี ในผู้ติดเชื้อเอชไอวีสูงกว่าในผู้ไม่ติดเชื้อเอชไอวีอย่างมีนัยสำคัญทางสถิติ โดยเฉพาะกลุ่มที่มีประวัติสัมผัสทางเพศสัมพันธ์

Hepatitis C virus (HCV) infection is an emerging disease in many countries, including Thailand.<sup>(1-6)</sup> Although, its prevalence may be lower than human immuno-deficiency virus (HIV) infection, which is a world - wide problem and attacked more than 30 million people in the year 1998,<sup>(7)</sup> the complications are quite serious and include: liver cirrhosis and hepato- cellular carcinoma.<sup>(4,8)</sup> The transmission route of both HCV and HIV are similar, via parenteral routes and via sexual contact.<sup>(2,9)</sup> A previous study showed that if HCV patients are also infected with hepatitis B virus or HIV, they will develop liver cirrhosis or liver carcinoma in a shorter time than with HCV infection only.<sup>(10)</sup> In addition, patients with sexually transmitted diseases (STDs) with HIV infection had a higher percentage of HCV infection than those without HIV infection.<sup>(9)</sup> This study screened for hepatitis C antibody in HIV - infected subjects compared with HIV - uninfected subjects in the same risk exposure. The results may be useful for planning strategies to screen HCV infection among HIV-risk groups and to help integrate the prevention and control programmes of both infections.

## Materials and Methods

### Study subjects and Laboratory methods

A laboratory screening of HCV antibody was carried out in sera from 516 HIV - risk subjects which included 165 injecting drug users with or without STDs and 351 patients attending the Venereal Diseases and AIDS Centers of Ratchaburi, Nakhonnayok and Saraburi Provinces during 1995 to 1996. The serum specimens and their records were studied at Microbiology Department, Faculty of Public Health, Mahidol University and Thai Red Cross Society. The

study specimens were classified into 2 groups depending on the result of anti-HIV antibody; 151 HIV - infected subjects ( anti- HIV positive by the gel particle agglutination and enzyme immunoassay ) and 365 HIV -uninfected subjects ( anti - HIV negative by both assays). All sera were tested for determining anti-HCV antibody by an enzyme immunoassay (EIA), the second generation method (ABBOTT). The cut-off value for anti-HCV positive followed the kit's recommendation (cut-off value = mean OD of negative control + 0.25 of mean OD of positive control). In this study, the cut - off value was OD greater than 0.365. For the assay to be valid, the difference between mean OD of positive control and mean OD of negative control was held to be 0.40 or greater. If not, the assay was repeated. Samples yielding a positive result were tested twice.

## Data analysis

Data were expressed by using percentage and other descriptive statistics. The proportional Z test was applied for significant differences of HCV antibody positive rates between the two groups. The critical level of  $\alpha = 0.05$  was used for statistical significance.

## Results

Some characteristics of the studied subjects

Almost 51 % of the HIV - infected subjects and 40.82 % of the HIV - uninfected subject aged 21- 30 years. The sex ratios (male/female) for the two groups were 1.07 : 1 and 0.93 :1 respectively. Approximately 43 % of the first group and 57 % of the second group were single and more than 50 % of both groups had studied only in primary school. About

48 % of the first group and 35 % of the second group were prostitutes. Most of them (52.98 % of the HIV - infected subject and 74.25 % of the HIV - uninfected subjects) had their main exposures by sexual contact. Details are shown in Table 1.

Screening of anti - HCV in the studied subjects  
Of the 151 HIV-infected subjects, 77(50.99%) were anti-HCV positive, whereas 99 of the 365 HIV - uninfected subjects (27.12 % ) were positive for anti-HCV. The prevalence of anti-HCV in the HIV - infected

**Table 1.** Some characteristics of studied HIV - infected subjects and HIV - uninfected subjects.

	Characteristics of studied subjects	HIV - infected subjects (N = 151)	HIV - uninfected subjects (N = 365)
		No. (%)	No. (%)
Age (years)	≤ 20	24 (15.89)	41 (11.23)
	21 - 30	77 (50.99)	149 (40.82)
	31 - 40	45 (29.80)	139 (38.08)
	≥ 41	5 (3.32)	36 (9.87)
Sex	Male	78 (51.66)	176 (48.22)
	Female	73 (48.34)	189 (51.78)
Marital status	Married	34 (22.52)	83 (22.74)
	Single	65 (43.04)	210 (57.53)
	Separated	52 (34.44)	72 (19.73)
Education	Primary school	81 (53.64)	207 (56.71)
	Secondary school	61 (40.40)	135 (36.99)
	Vocational education and higher	9 (5.96)	23 (6.30)
Occupation	Unemployed	12 (7.95)	24 (6.58)
	Employee	40 (26.49)	144 (39.45)
	Private business	20 (13.25)	56 (15.34)
	Prostitute	73 (48.34)	127 (34.79)
	Others	6 (3.97)	14 (3.84)
Main exposure	Intravenous drug injection	71 (47.02)	94 (25.75)
	Sexual contact	80 (52.98)	271 (74.25)

group was significantly higher than that in the HIV - uninfected group,  $P < 0.001$  (Table 2). Details were analysed and it was found that the anti-HCV positive rate in the HIV - infected group was significantly higher than the rate in the HIV - uninfected group only among

subjects exposed by sexual contact (16.25 % vs 6.27 %,  $P < 0.001$ ). This finding was not found in subjects exposed by intravenous drug injection (90.14 % vs 87.23 %,  $P > 0.05$ ). the data are shown in Table 3.

**Table 2.** Screening of anti-HCV in studied HIV - infected subjects compared with HIV - uninfected subjects.

Studied subjects	No. of tested	Anti - HCV positive results	
		(No.)	(%)
HIV - infected subjects	151	77	50.99*
HIV - uninfected subjects	365	99	27.12*
<b>Total</b>	516	176	34.11

\*Statistically significant difference by proportional Z test;  $P < 0.001$

**Table 3.** Comparison of anti - HCV positivity between HIV - infected subjects and HIV - uninfected subjects classified by main exposure.

Studied subjects	No. of tested	No. (%) of Anti - HCV Positivity		
		High level	Moderate level	Total
Main exposure: Sexual Contact				
HIV - infected subjects	80	10 (12.50)	3 (3.75)	13 (16.25) <sup>a</sup>
HIV - uninfected subjects	271	7 (2.58)	10 (3.69)	17 (6.27) <sup>a</sup>
<b>Sub - total</b>	351	17 (4.84)	13 (3.70)	30 (8.55) <sup>b</sup>
Main exposure: Intravenous				
Drug Injection				
HIV - infected subjects	71	46 (64.79)	18 (25.35)	64 (90.14) <sup>c</sup>
HIV - uninfected subjects	94	57 (60.64)	25 (26.60)	82 (87.23) <sup>c</sup>
<b>Sub - total</b>	165	103 (62.42)	43 (26.06)	146 (88.49) <sup>b</sup>
<b>Total</b>	516	120 (23.26)	56 (10.85)	176 (34.11)

<sup>a</sup>Significant difference by proportional Z test;  $P < 0.001$

<sup>b</sup>Significant difference by proportional Z test;  $P < 0.001$

<sup>c</sup>Non - significant difference by proportional Z test;  $P > 0.05$

High level:  $OD \geq 1.665$ ; Moderate level:  $0.365 < OD < 1.665$

## Discussion

The current method for screening for HCV infection is based on the detection of antibodies against HCV in serum using EIA. The second generation EIA test is considered most useful for screening due to the high sensitivity and specificity of the test.<sup>(11)</sup> However, it is not possible to determine whether an anti - HCV positive individual is an HCV carrier or has recovered from a past infection. A previous study showed that the range of HCV carrier rates in anti-HCV positive individuals was 25.9 % in anti - HCV positive blood donors to 92 % in anti - HCV positive hemophiliacs.<sup>(12)</sup> Another study revealed that approximately 70-80 % of samples with positive for repeated anti-HCV EIA (second generation) were confirmed as positive by immunoblot assay depending on the different HCV genotypes.<sup>(13)</sup>

In Thailand, the prevalence of HCV antibody in blood donors ranged from 1.5 % to 4.5 % depending on the studied regions.<sup>(14-16)</sup> A study in Chiangmai revealed that HIV - infected female sex workers had a higher percentage of anti-HCV than HIV-uninfected female sex workers.<sup>(17)</sup> This study found that the anti-HCV positive rate in HIV - infected subjects was significantly higher than that in HIV - uninfected subjects, especially among risk subjects exposed by sexual contact (16.25 % vs 6.27 %,  $P < 0.001$ ). However, this finding was not significant in risk subjects exposed by intravenous drug injection because of the high prevalence of anti-HCV in both groups. A previous study in Austria found that the presence of anti-HIV was one of predictors for anti-HCV positivity among patients attending sexually transmitted disease clinics.<sup>(9)</sup>

The higher prevalence of anti-HCV in subjects exposed by intravenous drug injection and the lower prevalence in subjects exposed by sexual contact supports the belief that the major transmission of HCV is via the parenteral route and the minor transmission is via sexual contact. At present, there is no effective vaccine for HIV or HCV infections. To reduce the parenteral transmission, the injecting drug users should be educated about use of disposable needles or syringes, or using antiseptics before subsequent uses. To reduce the sexual transmission, an intensive 100 per cent condom use policy should be emphasized and the information for both infections should be integrated. Although a 100 per cent condom use policy seems to reduce HIV infection, there are some practical problem reported.<sup>(18)</sup> Therefore, health education for preventing HIV/HCV infections should be emphasized, not only for 100 per cent condom use, but also for avoidance of pre-marital or extra-marital sex relations by using life skill education.<sup>(18)</sup>

## Acknowledgements

The authors grateful acknowledge the kind help of the directors of the venereal Diseases and AIDS Centers in Ratchaburi Saraburi and Nakhonnayok Provinces and their staffs during the period of the study.

## References

1. Chen DS, Wang JT, Chen PJ, Wang TH, Sung JL. Hepatitis C virus infection in Taiwan. *Gastroenterol Japonica* 1991 Jul ;26(Suppl 3): 164 - 6



2. Donahue JG, Nelson KE, Munoz A, Vlahov D, Rennie LL, Taylor EL, Saah AJ. Antibody to hepatitis C virus among cardiac surgery patients, homosexual men, and intravenous drug users in Baltimore, Maryland. *Am J Epidemiol* 1991 Nov 15; 134(11): 1206-11
3. Nishioka K. Hepatitis C virus infection in Japan. *Gastroenterol Japonica* 1991 Jul; 26(Suppl 3): 152-5
4. Hadziyannis SJ, Giannoulis G, Hadziyannis E, Kalamani E, Alexopoulou A, Dourakis S. Hepatitis C virus infection in Greece and its role in chronic liver disease and hepatocellular carcinoma. *J Hepatol* 1993; 17(Suppl;13): 572-7
5. Chainuvati T, Poovorawan Y, Luengrojanakul P. The prevalence of hepatitis C virus antibody in high risk group of Thai children and adults. *Gastroenterol Japonica* 1991 Jul; 26(Suppl 3): 176-8
6. Luksami jarulkul P, Plucktaweesak S. High hepatitis C sero-prevalence in some Thai intravenous drug abusers and qualitative risk analysis. *Southeast Asian J Trop Med Public Health* 1996 Dec; 27(4): 654-8
7. MacNeil JM, Anderson S. Beyond the dichotomy: linking HIV prevention with care. *AIDS* 1998; 12 (Suppl 2) S19 - S 26
8. Tanikawa K. Relationship between hepatitis C and alcoholic liver disease. *Asian Med J* 1994; 37(3): 165-70
9. Stary A, Kopp W, Hofmann H, Heller - Vitouch C, Kunz C. Seroepidemiologic study of hepatitis C virus in sexually transmitted disease risk groups. *STDs* 1992 Sep - Oct; 19 (5): 252-8
10. Chen DS, Kuo CC, Sung JL, Lai MY, Shen JC, Chen PJ, Yang PM, Hsu HM, Chang MH. Hepatitis C virus infection in an area hyperendemic for hepatitis B and chronic liver disease. The Taiwan experience. *J Infect Dis* 1990 Oct; 162(4): 817-22
11. Poovorawan Y, Theamboonlers, Chumderpadetsuk S, Thong CP. Comparative results in detection of HCV antibodies by using a rapid HCV test, ELISA and immunoblot. *Southeast Asian J Trop Med Public Health* 1994 Dec; 25(4): 647-9
12. Francois M, Dubois F, Brand D, Bacq Y, Guerois C, Mouchet C, Tichet J, Goudeau A. Prevalence and significance of hepatitis C virus (HCV) viremia in HCV antibody – positive subjects from various populations. *J Clin Microbiol* 1993 May; 31(5): 1189-93
13. Kanistamon D, Neelamek M, Dharakul T, Songsivilai S. The immunoreactivity profile of different HCV genotypes on immunoblot assay and its implications in the development of diagnostic assays. *Asia Pac J Allerg Immunol* 1997 Sep; 15(3): 133-40
14. Nuchprayoon T, Somjitta S, Adulwijit S, Chumni jarakij T. Hepatitis C virus antibody in blood donors. *Chula Med J* 1993 Jul; 37(7): 443-9
15. Boonmar S, Sawanpanyalert P, Miyamura T. Risk factors for hepatitis C virus infection among blood donors in an HIV- epidemic area in Thailand. 13 th National Seminar on Epidemiology, Bangkok, Thailand 1995; 146-7
16. Songsivilai S, Jinathongthai S, Wongsena W, Tiangpitayakorn C, Dharakul T. High

- prevalence of hepatitis C infection among blood donors in northeastern Thailand. *Am J Trop Med Hyg* 1997 Jul; 57(1): 66-9
17. Natpratan P, Apichaartplyakul C, Bordwansin S, Natpratan C, Fain J. Prevalence of HIV and HCV antibodies among commercial sex workers in Chiangmai, Thailand in 1996. ABSTRACTS, The 7 th Soientific Anual Meeting, The Virological Association Thailand. 15 Dec 1997, Bangkok, Thailand 1997; C(P) 126:160
18. Luksamijarulkul P, Daengbubpha A. Insufficient condom use among some groups of female sex workers: Quantitative and qualitative study. (Impressed in *Thai J Epidemiol* 1999)