

## PREVALENCE OF ANTI-HEPATITIS C ANTIBODY IN HIV-1 POSITIVE PREGNANT WOMEN IN JOS.

•L. Nimzing<sup>1</sup>, P.M. Lar<sup>2</sup>, K.G. Nimchak<sup>2</sup>, P.H. Daru<sup>3</sup>

<sup>1</sup>Departments of Medical Microbiology, <sup>2</sup>Microbiology, <sup>3</sup>Obstetrics and Gynaecology, University of Jos.

•Corresponding Author

### SUMMARY

Hepatitis C with a global spread is the second emerging disease after the Human Immune Deficiency virus (HIV). The virus is an important cause of chronic liver disease and hepatocellular carcinoma. The risk of vertical transmission appears to be greater in women with high viraemia or HIV co-infection. This study was undertaken to determine the prevalence of antibody to hepatitis C and possible risk factors to infection in HIV-1 positive pregnant women in Jos.

Ninety one (91) sera samples were collected from confirmed HIV -1 positive pregnant women attending the Antenatal and Special Treatment Clinics of the AIDS Preventive Initiative in Nigeria (APIN), Jos University Teaching Hospital for the detection of anti-hepatitis C antibodies using an immunoassay. (BIOMEDA™. HCV Kit, California, USA) Twenty (20) of 91 HIV-1 positive women screened for anti-HCV antibodies were seropositive giving a co-infection rate of 21.9%. Previous blood transfusion, previous surgery and education level

of the women were found to be associated with HCV infection ( $P < 0.05$ ). However, husband's occupation and parity of the women were not associated with HCV infection ( $P > 0.05$ ). The high HCV and HIV co-infection rate observed may reflect the situation in the general population and indicates danger of vertical transmission. To prevent new HCV infections, further studies in a larger population of women are required to ascertain the risk factors and burden of the disease in different settings in Nigeria.

**KEY WORDS:** Anti-Hepatitis C antibodies, HIV-1 positive pregnant women, Jos.

### INTRODUCTION

Hepatitis C is a serious growing problem. Hepatitis C virus is a blood borne pathogen that poses a significant threat to public health worldwide[1]. Globally an estimated 170 million people or 3% of the world's population may be infected with hepatitis C[2]. Data on estimated prevalence of HCV in Nigeria showed 2.1% in the general population, 3.6-8.0% in blood donors, 5.1-8.2% in

HIV individuals, 14% in accident and emergency patients[3,4,5,6,7]. Numerous risk factors promote HCV acquisition[8] HCV is common in HIV-infected individuals and can be a particularly serious problem[9]. Co-infection with HIV produces an accelerated course of HCV disease[10]. HCV co-infection increases mortality in HIV-infected patients in the highly active anti-retroviral therapy (HAART) era[11]. HIV coinfection may enhance the sexual transmission and vertical transmission of HCV[12]. Studies have since shown that HCV is transmissible from the infected mother to her offspring. Before adolescence the infection is transmitted mostly by perinatal exposure of an infected mother or by transfusion[13]. Perinatal transmission from mother to fetus or infant is also relatively low. The risk is probably less than 5 %[14, 15] Vertical transmission of HCV is not uncommon in the setting of high maternal viral titers or in the presence of HIV infection[16, 17,18,19]. Regardless of the low percentages, mother to infant transmission can still be a significant worldwide predicament particularly for the developing world as education and treatment programs for HIV are being scaled up. This study was undertaken to determine the prevalence of antibody to hepatitis C and possible risk factors to infection in HIV-1 positive pregnant women in Jos.

## **METHODOLOGY**

**Subjects:** Ninety one (91) women of ages 18-42 attending the Antenatal and

Special Treatment Clinics of the AIDS Preventive Initiative in Nigeria (APIN), Jos University Teaching Hospital whose HIV status were determined as HIV-1 positive were recruited for the detection of anti-hepatitis C antibodies and possible risk factors to infection after obtaining ethical clearance and informed consent of patients.

**Collection of specimens:** Between March and May, 2004, five milliliters (5ml) of venous blood was collected from each HIV-1 positive pregnant woman recruited for this study using a sterile syringe. Each specimen collected was allowed to clot and centrifugation done at 1500 rpm for 5 minutes to obtain serum. All sera obtained were stored at -20<sup>o</sup>c until ready for use. A structurally designed questionnaire was used to obtain information from each patient concerning age, previous blood transfusion, previous surgery, educational level, husband's occupation and parity.

**Anti-HCV Detection:** Each serum sample was diluted 1 in 2 before testing for the anti-HCV antibodies. An enzyme linked- immunosorbent assay kit (BIOMEDA <sup>TM</sup> HCV Kit Foster City: California, USA) was used for testing of specimens as specified by the manufacturers.

## **RESULTS:**

Of the 91 HIV-1 positive pregnant women screened for the anti-HCV antibodies, 20 were positive giving a co-infection rate of 21.9% HCV

infection was reported in all the age groups studied (Table 1). The likely risk factors for the HCV infection in the HIV-1 pregnant women tested were previous blood transfusion (Table 2), previous surgery (Table 3) and educational level ( $P < 0.05$ ). The HIV-1 pregnant women with higher rate of seropositivity were those who have received blood transfusions, had surgery and less educated. HCV infection was found to decrease proportionally with the educational level; with the women in the lowest educational status (illiterate/primary education) having the highest prevalence of HCV. Of the 3 women in the illiterate/primary education status category screened, 1(33.3%) was positive, of the 42 of the secondary screened, 10(23.8%) were positive and

of the 46 tertiary screened 9 (19.6%) were positive. Other parameters studied such as husband's occupation and parity of the women were not associated with HCV infection in the HIV-1 positive pregnant women studied ( $P > 0.05$ ). Anti-HCV antibodies among the HIV-1 pregnant women in relation to husband's occupation shows that of the total of the 36 patients screened as civil servants 8(22.2%) were positive, 42 of the business men, 7(20.6%) were positive; 19 of unskilled workers, 5(26.4%) were positive and of 2 of the unemployed tested none 0(0.0%) was positive.

## DISCUSSION

In this study, the prevalence of anti-HCV antibodies in the HIV-1 positive

**Table 1: Anti-HCV Antibodies in HIV-1 Positive Pregnant Women in Relation to Age.**

Age -group	Number of Patients Screened	Number/Percentage Positive for anti-HCV by ELISA
18-24	20	5(25.0%)
25-30	44	6 (13.6%)
31-36	19	7(36.8%)
37-42	8	2(25.0%)
	91	20(21.9%)
$X^2=2.65$	DF=1	P=0.103

**Table 2: Anti-HCV Antibodies in HIV-1 Positive Pregnant Women in Relation to Previous Blood Transfusion.**

<b>Previous blood Transfusion</b>	<b>Number of patients Screened</b>	<b>Number/Percentage positive for anti-HCV by ELISA</b>
Yes	7	5(71.4%)
No	84	15(17.8%)
	91	20(21.9%)
$X^2=5.05$	DF=1	P=0.024

**Table 3: Anti-HCV Antibodies in HIV-1 Positive Pregnant Women in Relation to Previous Surgery.**

<b>Previous Surgery</b>	<b>Number of Patients Screened</b>	<b>Number/Percentage Positive for anti-HCV ELISA</b>
Yes	16	10(62.5%)
No	65	10(15.4%)
	91	20(21.9%)
$X^2=7.60,$	DF=1,	P=0.005

pregnant women was 21.9%. This contrasts other studies in Nigeria which showed prevalence rates ranging from 5.1%-8.2% in HIV infected individuals[3,6]. The prevalence of HCV infection in HIV individuals can be high as 40% but this varies substantially among different risk groups[20,21,22]. Figures from epidemiological studies in different regions have shown variance in HCV prevalence patterns[1, 24, 25]. Estimates

of the prevalence of HCV infection in pregnant women vary widely among studies, ranging from 0.1%-4.5 % [22, 23,26]. Co-infection of HCV in HIV pregnant women is common, presumably due to shared routes of transmission of these viruses[20]. The high co-infection rate of 21.9% may reflect the situation in the general population and constitute an important epidemiological problem as HCV infection of the HIV-1 pregnant women

indicates the danger of vertical transmission.

HCV coinfection rate of 20% has been reported in mothers infected with HIV. Variable rates for vertical transmission of the HCV have been reported from one study to another probably due to varying risk of transmission in different populations. Mother to infant transmission of HCV is not common in most studies, with only 5% of infants born to infected women become infected[14,15,26]. The fact that blood transfusion was associated with risk of HCV infection warrants consistent and proper supervision of the instituted screening policies for blood supply and blood products in the different set-ups in the country. HCV has been reported to spread primarily by contact with blood and blood products. Blood transfusion still remains the main source of HCV in developing countries[2,4,27]. The presence of association between previous surgery and HCV infection could suggest lack of proper sterilization of surgical equipments and careful attention to universal precautions for surgical procedures. It is well documented that inadequate sterilized equipment and lack of disposable needles and syringes cause transmission of hepatitis C[27].

The educational level of the women was associated with anti HCV. This may be an important risk factor and reflects inadequate knowledge on the mode of transmission of the virus and suggests other risk factors for infection. Husband's occupation and parity of women seemed not to have influenced the HCV seropositivity. This probably

suggests that sexual activity is not a high risk factor for HCV. In this study, parity of the women depicts the number of deliveries and is associated with more sexual activities. The role of sexual contact as a mode of transmission is hotly debated at present. The relative risk of sexual transmission and by what means remains controversial[28]. The rate of sexual transmission of HCV is low (5%) however the rate will increase in a setting of co-infection with HIV[29].

To prevent new HCV infections, more detailed further studies in a larger population of women are required to ascertain the risk factors and burden of the disease with HCV in different settings in Nigeria.

## REFERENCES

1. Jean N, Oliver GP, Berfield M. Phylogenetic Analysis of HCV Isolates Indicates A unique Pattern of Endemic Infection in Cameroon. *Journal of Gen.Virol.* 2003;84: 2333-2341.
2. Kane A, Lloyd J, Zaffran M. Transmission of hepatitis B, hepatitis C and Human Immunodeficiency Viruses through unsafe injections in the developing world. Model – based regional estimates. *Bull. World Health Organization* 1999; 77(10):801-807.
3. Madhava V, Burgess C, Drucker E. Epidemiology of chronic hepatitis C virus infection in sub-Saharan Africa *Lancet Infect. Dis.* 2002; 2:293-302.

4. Egah ZD, Mandong MB, Iya D *et al.* Hepatitis C Virus Antibodies Among Blood Donors in Jos, Nigeria. *Annals of African Medicine* 2004; 3:35-37
5. Oni AQ, Harrison TJ. Genotypes of hepatitis C virus in Nigeria *J. Med Virol* 1996;49:178-86.
6. Agwale SM, Tanimoto L, Womack C, Odama L *et al.* Prevalence of HCV-Co-infected HIV-infected individuals in Nigeria and characterization of HCV genotypes. *Journal of Clinical Virology* 2004;31S: S3-S5.
7. Halim NK, Madukwe U, Saheen BD, Airauh LU. Hepatitis C Virus Antibody and Hepatitis B. Surface Antigen among Accident and Emergency Patients in Benin City, Nigeria. *East Afr. Med. Journal* 2001;78 (9): 480-483.
8. Rochelle SC, Zobair MY. How great is the risk of transmitting the hepatitis C Virus sexually? HCV is sexually transmitted but the risk is low. *Cleveland Journal of Medicine*.2004;71 (2):160—161
9. Tracy S. Research and Policy Recommendation for HCV/HIV Coinfection. Critical issues from Tag's forth coming HCV/HIV Coinfection Report, Version 2.0 Treatment Action Group, New York USA, February 2003. p. 1-47
10. Bica I, McGovern B, Dhar R *et al.* Increasing mortality due to end – stage liver diseases in patients with human immunodeficiency virus infection *Clin. Infect, Dis* 2001;32(3): 492-497
11. Anderson KB, Guest JL, Rimland D *et al.* Hepatitis C virus coinfection increases mortality in HIV-infected patients in the Highly Active Anti Retroviral therapy Era; Data from the HIV Atlanta UA Cohort study *Clinical Infectious Diseases* 39 (10); 1507 - 1513, November 15, 2004.
12. Hershov RC, Riester KA, Lew J *et al.* Increased vertical transmission of human immunodeficiency virus hepatitis C virus- coinfecting mothers. *Women and Infants Transmission Study. J Infect Dis*, 1997 : 176(2); 414-20.
13. Infections Diseases and Immunization Committee, Canadian Pediatric Society (CPS). Vertical transmission hepatitis C virus. *Knowledge and issue Pediatrics and Child Health* 1997; 2(3):227-231.
14. Thomas DL. Hepatitis C and human immunodeficiency virus infection. *Hepatology* 2002; 36(5): S201 – S209.
15. Zanetti AR, Tanzi E, Newell MI. Mother-to-Infant Transmission of Hepatitis C Virus. *J. Hepatol.* 1999;31 Suppl.1:96-100.Review.

16. Ohto H, Okamoto H, Mishiro S. Vertical transmission of hepatitis C virus (Letter) *New England Journal of Medicine* 1994; 331:400.
17. Lin HH, Kao JH, Hsu HY *et al.* Possible role of high titer maternal viraemia in perinatal transmission of hepatitis C virus. *J. Infect. Dis.* 1994; 169:638 – 641.
18. Thomas DL, Villano SA, Ries ter KA, *et al.* Perinatal transmission of hepatitis C from human immunodeficiency virus type –1 infected mothers. *J. Infect. Dis.* 1998; 177:1480 – 1488.
19. Yeung LFT, King SM, Roberts EA (concise review) Mother to infant transmission of hepatitis C virus. *Hepatology.* 2001, 34(2):223-227.
20. Reinus JF, Leikein EI, Alter H, Failure to detect vertical transmission of hepatitis C virus. *Ann. Intern. Med.* 1992; 117:881-886.
21. Moriya T Sasaki F, Mizui M. Transmission of hepatitis C virus from mothers to infants; its frequency and risk factors revisited *Biomed Pharmacother* 1995; 49: 59 – 64.
22. Floreani A, Paternoster D, Zappaelae F *et al* HCV infection in pregnancy. *British Journal of Obste, and Gynecology* 1996; 103:325-326
23. Marranconi F, Fabris P, Stecca C *et al.* Prevalence of anti-HCV and risk factors for hepatitis C virus infection in healthy pregnant women. *Infection.* 1994; September–October, 22(5): 333-337.
24. Dale MN, Xiao-hong W, Shruit HM *et al.* Hepatitis C Virus Core Antigen Assay to Detect on going HCV Infection in Thai Injection Drug Users. *Journal of Clin. Microbiol.* 2003; 42(4): 1631-1636.
25. Zhi L, Dale NM, Quing M *et al.* Accurate Representation of the HCV Quasispecies in 5.2 – Kilobase Amplicons. *Journal of Clin. Microbiol.* 2004;42(9):4223-4229
26. World Health Organization (WHO) Global surveillance and control of Hepatitis C. Report of a WHO Consultation organized in collaboration with the Viral Hepatitis Prevention Board, Antwerp, Belgium *J. Viral Hepat.* 1999; 6:35-47
27. Centers for Disease Control and Prevention. Public health service inter-agency guidelines for screening donors of blood, plasma, organs, tissues and semen for evidence of hepatitis is B and hepatitis C. *MMWR.* 1991; 40 (NO.RR-4): 1-17

28. Alter MJ. Prevention of spread of hepatitis C. *Hepatology*. 2002; 36 (5) ( suppl) S93 - S98.
29. Thomas DL, Zennilman JM, Alter HJ, et.al Sexual transmission of hepatitis C Virus among patients attending sexual transmitted diseases clinics in Baltimore .An analysis of 309 sex partnerships *J. Infect. Dis.* 1995;171: 768- 775.