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Prevalence of hepatitis B and C in pregnant women who are infected with human immunodeficiency virus

Patricia Santiago-Munoz, MD,* Scott Roberts, MD, MS, Jeanne Sheffield, MD, Barbara McElwee, BSN, RNC, WHCNP, George D. Wendel Jr, MD

Department of Obstetrics and Gynecology, The University of Texas Southwestern Medical Center, Dallas, TX

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KEY WORDS
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Objective: The purpose of this study was to evaluate the prevalence of hepatitis B and hepatitis C virus co-infection among pregnant women who are infected by human immunodeficiency virus and who attend an obstetric complications prenatal clinic.

Study design: A de-identified research obstetric human immunodeficiency virus database was reviewed regarding patient demographic characteristics, risk factors for infection, history of sexually transmitted diseases, and initial CD4 count.

Results: Four hundred fifty-five women who are infected with human immunodeficiency virus with 572 pregnancies were delivered over 11 years. The overall prevalence of human immunodeficiency virus and hepatitis B or C virus co-infection in our population was 6.3%. More specifically, 1.5% was co-infected with hepatitis B virus, and 4.9% was co-infected with hepatitis C virus. Patients with hepatitis virus were more likely to use intravenous drugs (52% vs 18%; $P < .01$) and alcohol (38% vs 5%; $P < .01$). Co-infected patients were older (28 vs 25.6 years; $P = .04$), but there were no racial differences. Median baseline CD4 counts in hepatitis B virus co-infected patients were significantly lower (310 cells/mm^3) than those in either hepatitis C virus co-infected patients (453 cells/mm^3) or patients who were not co-infected with human immunodeficiency virus (414 cells/mm^3).

Conclusion: One of 16 pregnant women who were infected with human immunodeficiency virus was co-infected with hepatitis B or hepatitis C virus. Hepatitis B co-infections appear to be associated with more compromised immune status in our cohort.

Estimates for the prevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) infections in the United States are 0.4% and 1.8%, respectively.[1,2] Data are limited regarding the estimates of these prevalences in pregnancy: 0.5% to 1.5% for HBV and 1% for HCV.[3,4] Absent from the obstetric literature is a description of HBV and HCV prevalence in pregnant women who are infected with human immunodeficiency virus (HIV) in the United States.

The HIV-infected pregnant cohort represents a unique population. Risk factors that are associated with HIV infection are also associated with HBV and HCV infection. One study from sub-Saharan Malawi, Africa, described the prevalence of persistent HBV as

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* Reprint requests: Patricia Santiago-Munoz, MD, Department of Obstetrics and Gynecology, University of Texas Southwestern Medical Center, 5323 Harry Hines Blvd, Dallas, TX 75390-9032.

E-mail: PSANTI@parknet.pmh.org

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13% and HCV as 16.5% in HIV-infected pregnant women. In this region, HBV and HCV are highly endemic and are not associated with HIV co-infection.[5] These prevalences were in agreement with other reports from highly endemic areas.[6-9]

The aim of this study was to describe the seroprevalence of HBV and HCV co-infections in HIV-infected pregnant women who attended an inner city obstetric complications clinic in the United States. Liver disease that is caused by chronic HBV and HCV is currently an important cause of morbidity and death among HIV-infected patients.[10]

Material and methods

Study population

Patients who were eligible for this study were drawn from an obstetric complications clinic that specializes in infectious diseases. Participation in this clinic includes all patients in the Parkland Health and Hospital System who were known to be HIV-infected before or during pregnancy. The prevalence of HIV infection in our general obstetric population is approximately 0.4% to 0.5%. Parkland Hospital, which is a county-supported tertiary care center in Dallas County, Tex, delivers approximately 15,000 to 16,000 women annually, and serves a predominantly young, indigent Hispanic population. Institutional Review Board approval was obtained before this study was performed.

Our study cohort consisted of all HIV-infected pregnant women who were followed in this prenatal clinic over the course of 11 years. The study involved 455 individual patients consecutively who were seen from January 1, 1993, to December 31, 2003, some of whom had >1 delivery during this time period. Patients with HIV infection who were cared for in the infectious disease clinic followed an evidence-based treatment protocol. In addition to routine prenatal laboratory evaluations, pregnant HIV-infected patients were tested for HBV and HCV infection at the initial visit. At intake, CD4 cell count, HBV surface antigen (HBsAg), HBV anti-core antibodies (anti-HBc immunoglobulin G and M), and HCV antibodies were obtained. If hepatitis serologic test results returned positive, the appropriate confirmatory tests were ordered. HIV viral loads were not collected consistently until the latter part of this longitudinal study and were not included in our final analysis. Demographic information and details concerning risk factors for infection such as alcohol abuse, intravenous drug use, and history of sexually transmitted diseases were collected. All pregnant women who were found to be infected with HBV or HCV underwent appropriate counseling and treatment, if warranted.

Laboratory tests

Presence of anti-HIV antibodies was determined by enzyme-linked immunosorbent assay screen (Abbott Laboratories, Abbott Park, Ill). All positive tests were retested in duplicate and confirmed by indirect immunofluorescence assay (Fluorognost HIV-1; Sanochemia Pharmazeutika, Vienna, Austria). This test is an in vitro, qualitative assay for the detection of antibodies to HIV-1 in human serum or plasma and has been found to be highly concordant with the Western blot. It is $>99.98\%$ specific and $>99.7\%$ sensitive in the detection of anti–HIV-1. There is no stated false-positive rate for indirect immunofluorescence assay.[11] HBV surface antigen and HBV core immunoglobulin G and immunoglobulin M antibodies were determined by enzyme-linked immunosorbent assay. HCV antibody was identified by enzyme-linked immunosorbent assay.

For the purpose of this study, we defined asymptomatic HBV carriage as having a reactive HBsAg, reactive anti-HBc immunoglobulin G, and non-reactive anti-HBc immunoglobulin M. HBV natural immunity was defined as nonreactive HBsAg, and a reactive anti-HBc immunoglobulin G. Positive HCV status was defined as having a reactive anti-HCV result. No co-infection was defined by the absence of anti-HCV and anti-HBsAg.

Statistical analysis

All data for the study, including both demographic characteristics and laboratory results, were abstracted from a de-identified research HIV database that was reviewed for the purpose of documenting the prevalence of HBV or HCV infection in this population of pregnant patients. A de-identified database is one in which a particular patient cannot be recognized because key identifying characteristics, such as name and medical record numbers have been removed. Continuous data were analyzed with the Student t and Wilcoxon rank sum tests. Discrete data were analyzed with chi-square tests. Risk factors for chronic HBV, HCV, and a history of HBV infection were analyzed with logistic regression.

Results

Between January 1, 1993, and December 31, 2003, a total of 455 women with HIV infection were followed and were delivered of 572 pregnancies through the infectious disease complications clinic. All of these women were included in our study cohort. The overall prevalence of HIV and HBV or HCV co-infection among pregnant women tested in this population was 6.3% (29/455 women). More specifically, 1.5% (7/455 women) were co-infected with HBV, and 4.9% (22/455 women) were co-infected with HCV. No women were