

A Study to Determine the Incidence and Prevalence of Newly Discovered Human Immunodeficiency Virus Infection During the Prenatal Care Period

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ABSTRACT

Objectives: This study asked the following questions: 1) Does HIV testing in pregnancy identify women who previously were not known to be HIV positive? 2) When in pregnancy are women identified as HIV infected? 3) Does HIV seroconversion occur during the prenatal care period?

Methods: Medical records of 97 women from two primarily indigent care hospitals in Houston, TX who were found to be HIV positive at delivery were reviewed to determine if they had tested positive during the prenatal care period. Demographics and time of gestation of the prenatal testing also were recorded. The outcome measures were: 1) number of women found positive during prenatal care; 2) week of gestation at discovery of HIV positivity; and 3) number of women seroconverting between the initiation of prenatal care and delivery.

Results: Thirty women were known to be HIV positive prior to pregnancy. Fifty-six women were found to be positive during prenatal care and the seropositivity of 44 was discovered before the 34th week of pregnancy. Ten women were found to be positive at their first prenatal visit, which occurred after the 34th week. Date of testing was unknown for two women. Eleven women who received no prenatal care were found to be HIV positive at delivery. There were no seroconversions while women were under prenatal care.

Conclusions: HIV testing at delivery did not find any HIV-positive women who had tested negative during prenatal care. Testing is very important for women who do not receive prenatal care. Making certain that high-risk women get into prenatal care also is very important. *Infect. Dis. Obstet. Gynecol.* 8:172–175, 2000. © 2000 Wiley-Liss, Inc.

KEY WORDS

HIV/AIDS; pregnancy; HIV testing

The American College of Obstetricians and Gynecologists, in a joint statement with the American Academy of Pediatrics, has recommended universal, voluntary counseling and testing for the human immunodeficiency virus (HIV)

for all pregnant women at their first prenatal visit.¹ The United States Public Health Service also endorsed this recommendation.² Prenatal testing for HIV also has been recommended as a means of reducing legal liability.³

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These recommendations were based on the ability to prevent mother-to-child transmission of HIV. The ACTG 076 trial demonstrated a two-thirds reduction of mother-to-child transmission of the human immunodeficiency virus (HIV) can be achieved by initiating AZT therapy prior to the 34th week of pregnancy, by giving this drug intravenously during labor, and by giving the child AZT following delivery.⁴ Another study has demonstrated that administration of zidovudine to the mother alone in the last few weeks of pregnancy can reduce the rate of transmission by approximately 50%.⁵ It also has been shown that giving a single dose of nevirapine to women at the onset of labor and to their infants shortly after birth will reduce the rate of vertical HIV transmission.⁶ Obstetrical interventions also may reduce transmission. A meta-analysis showed that the rate of transmission can be reduced further by cesarean section.⁷ It also has been shown that having an extended period of time between the performance of amniotomy and delivery increases the risk of maternal-fetal transmission of HIV.⁸

An argument can be made for a second screening for HIV infection at delivery because there is a 14% risk of transmission by breastfeeding.⁹ Therefore, knowing that a woman has seroconverted during the prenatal care period would allow her physician to recommend against breastfeeding. In addition, if a woman who tested negative during the prenatal period were found to be positive at delivery, she would have been recently infected. Many experts advocate treatment early in infection in order to contain viral replication in the lymphoid tissue.¹⁰ Therefore early detection of seroconversion may have substantial benefit for the mother. However, the case for conducting HIV testing both at first prenatal visit and at delivery depends on the likelihood of seroconversion during the prenatal care period.

This study was conducted to determine if previously undiscovered HIV infection could be found by testing during the prenatal care period. The study also examined whether HIV infection was being discovered before the 34th week of gestation. Discovery before this time would allow full implementation of the ACTG 076 protocol and/or sufficient time for antiretroviral therapy to reduce viral load to a level that reduced the probability of vertical transmission. In addition, the study exam-

ined the risk of seroconversion between prenatal testing and delivery.

MATERIALS AND METHODS

The study was conducted at two teaching hospitals in Houston, Texas. One hospital is a nonprofit, private, general hospital, which delivered over 7,000 infants in 1995 and 1996. Seventy percent of these patients were indigent patients or Medicaid patients that were serviced by the university-based obstetrical service. The second hospital is operated by the county government and serves an exclusively indigent and Medicaid population. All women delivering at this institution were delivered in the university-based practice. There were over 11,000 deliveries at this hospital in 1995 and 1996. It is not known how many women were tested during the course of the study. However, during 1995, the majority of women who delivered at the two hospitals were offered HIV testing at delivery. This was almost universal in the university-based practices but was less likely to be done on the private service at the private hospital during 1995. However, the State of Texas passed a law requiring that, beginning January 1, 1996, all pregnant women be offered HIV testing both at their first prenatal visit and at delivery.¹¹ Therefore, HIV testing at delivery was offered to all women during 1996 at both hospitals. No records were kept of the number of women refusing testing at delivery.

Inpatient and clinic medical records of all women who tested positive at delivery (defined as having a repeatedly reactive ELISA confirmed by a Western blot) were reviewed and data on demographics, prenatal care, prenatal HIV testing, and HIV status were abstracted from these records. To answer the question of whether previously undiscovered HIV-positive women were identified during prenatal care, data were collected on whether an HIV test was performed during prenatal care and whether the patient was known to be HIV positive before pregnancy. Information about the dates of prenatal care and prenatal HIV testing also was collected in order to determine if the first HIV test was conducted before 34 weeks of gestation so as to initiate the maximally effective antiretroviral treatment regimen. In addition, the records were examined to determine if any of the women who tested positive at delivery had tested negative for HIV during prenatal care. This was done in order

TABLE 1. Characteristics of study population

Race (number of subjects)	
African-American	83
Hispanic	7
White	5
Asian	1
Not specified	1
Age (in yrs)	
Mean	24.3
Range	14–41
Reported gravidity	
Mean	3.6
Range	1.0–26.0
Prenatal care (number of subjects)	
Some	86
None	11

to determine if seroconversion occurred during pregnancy.

The study was approved by the Committee for the Protection of Human Subjects at The University of Texas—Houston Health Science Center.

RESULTS

One hundred and one women tested HIV positive at delivery during the period of 1995 to 1996. For four of these women, records were incomplete and were excluded from the study. The characteristics of the 97 study subjects are shown in Table 1.

Eighty-six of the 97 women who tested positive at delivery received prenatal care. Of these, 30 were known to be HIV-infected prior to their pregnancies so prenatal testing did not provide any new information. Eleven women did not receive prenatal care and their HIV status was first made known to their obstetrical care providers as a result of the testing that was done at delivery. Two of the women who did not receive prenatal care had their HIV infection discovered through HIV testing that was done for medical rather than obstetrical reasons. These test results were not available to their obstetricians prior to delivery.

Of the 56 women who were tested for HIV during prenatal care and whose HIV positivity was not known prior to their pregnancies, 10 received the results of their HIV test after the 34th week of pregnancy. For all of these women, the testing was done at the first prenatal visit. Forty-four women were tested before the 34th week, which allowed them to receive the full benefit of antiretroviral therapy. No patient seroconverted between prenatal testing and delivery. Table 2 summarizes these data.

TABLE 2. Results of testing for HIV in pregnancy

	Number of subjects
Discovery of HIV infection	
Known before prenatal care	30
Identified in prenatal care	56
Diagnosed at delivery	11 ^a
Timing of HIV discovery during prenatal care	
Known before prenatal care	30
Before 34 weeks gestation	44
Between 34 weeks gestation and delivery	10
Date of test not recorded	2
No prenatal care	11
Effects of testing at delivery	
Women testing positive who were known to be positive before delivery	86
Newly discovered—No prenatal care	11 ^a
Tested positive at delivery but tested negative during prenatal care	0

^aIncludes two women who were identified as positive while receiving care for medical reasons. The prenatal providers did not know this information.

DISCUSSION

The results of this study suggest that HIV screening in pregnancy in this population will yield a substantial number of HIV-positive women whose infection was previously undetected. However, it is notable that 30 of 97 (31%) women who tested positive at delivery were already known to be positive prior to receiving prenatal care.

The finding that there was no seroconversion during the time from the beginning of prenatal care and delivery suggests seroconversion might be an infrequent event. The women in this study were from two of the three major hospitals serving the highest risk women in Harris County (Houston). The HIV-seropositivity rate of women delivering children in Harris County was 3 per 1,000 deliveries in 1997 and is the highest in the State of Texas.¹² The rate at the two hospitals was approximately 6 per 1,000 during the study period. Therefore, if women from this population are not converting from HIV negative to positive between receiving prenatal care and delivery, it is even less likely that seroconversion is occurring in other populations.

The fact that 11 women who did not receive prenatal care were identified as HIV positive by screening at delivery emphasizes the importance of carrying out HIV testing at delivery for women who

are not tested during the prenatal period. It also would suggest that rapid HIV testing be made available routinely in early labor to women who have not had prenatal care. Otherwise, these women's seropositivity will be discovered too late to use antiretroviral therapy in labor or to avoid early rupture of membranes to prevent maternal-fetal transmission. In the study hospitals, test results usually were not available until after delivery but were always available before discharge. However, even if test results can not be made available in early labor, there is still value to HIV testing at delivery. Women who are found to be HIV infected can be referred for care of the HIV infections. These women also can be advised not to breastfeed their children and thereby prevent transmission by that route. The children of these women can be closely monitored and will have the opportunity to be placed on antiretroviral therapy as soon as possible if they are found to be infected. In addition, early identification of HIV-positive women also may prevent transmission to their future sexual or needle-sharing partners.

It is a matter of concern that ten other women did not have the infection discovered until after the 34th week of pregnancy. As mentioned previously, the results of the ACTG 076 protocol are based on starting zidovudine therapy before the 34th week.

This study demonstrates the limits of legislation such as the Texas law or the various guidelines, which mandate or recommend the offering of HIV testing to pregnant women. While these can be first step, there are a large number of women for whom this testing will come too late to achieve the goal of the laws or recommendations. For example, in this study, 21 of 67 women whose HIV infection was not known prior to pregnancy did not receive any prenatal care or received prenatal care so late in pregnancy that maximally effective therapy could not be utilized. Therefore, making certain that women are receiving prenatal care as early as possible is an extremely important factor in determining whether or not HIV transmission in pregnancy is reduced to its lowest possible level. This means that additional efforts must be devoted to making certain that prenatal services are easily accessible for pregnant women who are at high risk for HIV infection. In addition, community education pro-

grams that encourage high-risk women to seek prenatal care at the earliest possible time in pregnancy need to be developed or enhanced. Otherwise, the potential for reduction of maternal-fetal transmission of HIV infection will only be partially realized.

REFERENCES

1. The American Academy of Pediatrics—The American College of Obstetricians and Gynecologists. Joint statement on human immunodeficiency virus screening. Washington, DC: The American College of Obstetricians and Gynecologists, August, 1995.
2. Centers for Disease Control and Prevention. U.S. Public Health Service recommendations for human immunodeficiency virus counseling and voluntary testing for pregnant women. *MMWR* 1995;44(RR7):1–15.
3. Grimes RM, Richards EP, Helfgott AW, Erikson NL. Legal considerations in screening pregnant women for human immunodeficiency virus. *Am J Obstet Gynecol* 1999;180:259–64.
4. Conner EM, Sperling RS, Gelber R, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type I with zidovudine treatment. *N Engl J Med* 1994;331:1173–1180.
5. Centers for Disease Control and Prevention. Administration of zidovudine during late pregnancy and delivery to prevent perinatal HIV transmission. *MMWR* 1998;47:151–154.
6. Guay LA, Musoke P, Fleming T, et al. Intrapartum and neonatal single-dose nevirapine compared with zidovudine for prevention of mother-to-child transmission of HIV-1 in Kampala, Uganda: HIVNET 012 randomized trial. *Lancet* 1999;354:795–802.
7. The International Perinatal HIV Group. The mode of delivery and the risk of vertical transmission of human immunodeficiency virus type 1—a meta-analysis of 15 prospective cohort studies. *N Engl J Med* 1999;340:977–987.
8. Landesman SH, Kalish LA, Burns DN, et al. Obstetrical factors and the transmission of human immunodeficiency virus type 1 from mother to child. *N Engl J Med* 1996;334:1617–1623.
9. Dunn DT, Newell ML, Ades AE, Peckham CS. Risk of human immunodeficiency virus type 1 transmission through breastfeeding. *Lancet* 1992;340:585–588.
10. Centers for Disease Control and Prevention. United States Public Health Service guidelines for the use of antiretroviral agents in HIV infected adults and adolescents. *MMWR* 1998;47(RR-5) 1–43.
11. Grimes RM, Helfgott AW, Watson JR, Erikson NL. For children's sake: New law mandates HIV testing of pregnant patients. *Tex Med* 1996;40:36–40.
12. Bureau of HIV and STD Prevention, Texas Department of Health. www.tdh.state.tx.us/hivstd/stats/cbw.