

PERINATAL HIV TRANSMISSION UPDATE: Article Review

In the United States, approximately 6,000 HIV positive women deliver children each year. Since the development of antiretroviral therapy (ART) used to treat HIV, the use of medications such as zidovudine (ZDV/AZT) by pregnant women has been shown to successfully decrease the number of disease transmissions to their infants without harm (as first reported by the Pediatric AIDS Clinical Trial Group in 1994).

Without the use of antiretrovirals, the rate of maternal/fetal transmission in the US is between 16-30%. However, with ART, rates have been shown to reduce transmission to between 2 and 11%, and the number of transmissions decreased approximately 66% between 1993 and 1997 in the US. Of the modes of perinatal transmission, 30% of transmission occurs in utero, 70% occurs intrapartum (during labor & delivery), and 14+% occurs postpartum, through breastfeeding.

Transmission of HIV in utero occurs transplacentally. Specific risk factors that are associated with this stage in pregnancy include maternal dynamics such as illness severity and health behaviors. The severity of illness is represented by the CD4+ T-Cell count and HIV viral loading (number of copies of HIV RNA in plasma or serum). Certain health behaviors such as smoking and drug use depress immune functioning and in some cases have been found to actually replicate the virus. In addition, frequent unprotected sexual intercourse is reported as significantly correlated with contraction of other diseases such as Hepatitis and STDs, including recurrent exposure to the HIV virus. Transmission during pregnancy can also be enhanced by placental membrane inflammation (chorioamnionitis), which increases infected maternal lymphocytes in the placenta or amniotic fluid. It is also important to avoid such obstetrical practices as amniocentesis, which may heighten the likelihood of introducing the virus into the placenta. Women who are already receiving ART at the time that pregnancy is diagnosed should continue their therapy, because discontinuing the medications is likely to negatively impact their CD4/HIV RNA counts. Alternatively, if HIV is discovered early in the first trimester, ART should not begin until 14 weeks gestation, because the effects of antiretroviral drugs on the developing fetus during the first trimester are still uncertain.

The majority of maternal/fetal HIV transmissions occur during the intrapartum period (at delivery). During this time, there is a transfusion of blood or contact between the infant's skin and/or mucous membranes and the maternal blood and secretions. There is also a heightened risk with increased duration of membrane rupture (greater than 4 hours) or vaginal delivery. Thus, a HIV+ women who has had ROM needs to deliver within 4 hours, preferably via cesarean section. It is also recommended that procedures that increase the opportunity for transmission, such as fetal scalp electrode, intra-uterine pressure catheter, fetal scalp pH sampling, and forceps or vacuum extraction be avoided. Again, the severity of maternal illness (viral loading and T-Cell count) is an important factor. Various studies have unsuccessfully attempted to determine at what level maternal viral loading must be at the time of delivery for no intrapartum transmission. However, there is certainly a protective effect of ART on the risk of transmitting HIV intrapartum. Performing c-sections on HIV+ pregnant women treated with ZDV is perhaps even less risky in terms of transmission. However, it is unknown whether performing the cesarean section poses more of a threat in terms of morbidity than the vaginal delivery, since the risk of transmission through vaginal delivery (if successfully treated with ART) is so low.

During the postpartum period, the mother can transmit HIV to the baby through breastfeeding. HIV is in the breast milk and is transmitted through prolonged and frequent presence in the infant's oral and gastrointestinal tract. It is recommended that these infants be given formula, rather than breast milk.

Recent research has reported a 38% reduction in seroconversion in HIV exposed infants who were treated with prophylaxis antiretrovirals intrapartum and for one week postpartum. This indicates that the prophylaxis given to the infant creates an immune intervention during the first several weeks of life, decreasing their risk for infection. Some risk factors that were significant regardless of the prophylaxis treatment with ZDV included maternal CD4/viral loads and duration of ROM > 4 hours.

Preconception Care: The Initial Medical Assessment for the Woman with Diabetes

Preconception care for women with pre-existing diabetes the cornerstone to a successful pregnancy. Several affiliates have requested a review of the medically indicated tests a woman with preexisting diabetes should have as part of her preconception planning. The California Diabetes and Pregnancy Program *Guidelines for Care* advocates preconception counseling be accomplished using a multidisciplinary team consisting of the obstetrician, endocrinologist, internal medicine or family practice physician, nurse educator, registered dietitian, behavior medicine specialist. To assist the team in formulating the appropriate treatment goals, and education interventions the *Guidelines for Care* recommend several tests that need to be performed.

A gynecological exam which includes a Pap smear should be performed to identify treat any previously undetected infections, abnormalities and infertility. In addition to the gynecological exam, a general physical exam should be performed.

Blood pressure should be assessed and evaluated further if equal to greater than 140/90. If the woman has previously documented hypertension, and is being treated with medication, medications have to be changed to avoid teratogenic effects. In addition to the evaluation of blood pressure, for women who have diabetes for ten or more years require a full cardiovascular assessment including an EKG and may include a treadmill test.

A dilated retinal exam should be performed by an ophthalmologist with an expertise in diabetic eye disease. Detection, stabilization, and treatment of retinopathy and/or macular edema should ideally occur prior to pregnancy. In addition, a neurological examination including an assessment of the lower extremities is performed to detect peripheral and autonomic changes, infections or deformities.

The Guidelines for Care also identifies Laboratory testing that should be part of the preconception screening. The initial lab test should include a Hemoglobin A1c which is the essential measure of the average glucose over the prior 4-6 weeks. The goal of preconception care is to normalize Hemoglobin A1c prior to conception. The guidelines for care emphasize that if the Hemoglobin A1c is repeated every one to three months, it assists in determining improvement in glycemic control, and (with the addition of daily blood glucose results) help indicates when glycemic control is optimal for conception. An elevated Hemoglobin A1c in the first trimester of pregnancy are associated with an increased incidence of congenital malformations and spontaneous abortions. Further screening tests include CBC, Hepatitis B and Rubella screening (if results are unknown), STD, and HIV testing. To screen for cardiovascular disease a lipid panel is required. . To screen for underlying renal disease serum creatinine and microalbumin should be performed. Urine culture and sensitivity are important to detect and treat urinary tract infections. Women with type 1 diabetes are more likely to develop thyroid disease, therefore a serum thyroid stimulating TSH hormone level, free T-4 levels and anti-microsomal antibodies should be done.

The above medical assessment provides a guide for the necessary medical and educational intervention to provide successful and appropriately focused preconception care.

The 2001 revision of the California Diabetes and Pregnancy Program *Guidelines for Care* will be available later this year. For a copy of the California Diabetes and Pregnancy Program *Guidelines for Care*, contact the office at (858) 467-4990.

Perinatal HIV

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One should not test an infant for HIV using an antibody test (the test normally done for children and adults), because for the first 15 to 18 months the baby may have the mother's antibodies, which may create a false positive or an indeterminate test for HIV. The HIV exposed infant should instead be tested using a HIV DNA polymerase chain reaction (PCR) at birth, 1-2 weeks, and every month for first 6 months. This test reduces the time of diagnosis to as early as the first few weeks of life.

The Centers for Disease Control* recommends the following pharmacological treatment guidelines for preventing perinatal HIV transmission:

WHEN	WHO	WHAT
Prior to 14 weeks gestation	HIV + pregnant women who has been diagnosed with the virus prior to pregnancy and already on ART	Zidovudine (ART dependent upon: status of disease, past medications, resistance profile)
14 weeks gestation until labor	HIV + pregnant woman who has recently been diagnosed with HIV	Zidovudine (ART dependent upon: status of disease, past medications, resistance profile)
Labor	HIV + pregnant woman	IV Zidovudine Infusion Loading Dose: 2 mg/kg of body weight for one hour followed by: Continuous Dose: 1 mg/kg of body weight per medications)
Postpartum	HIV exposed infant	Clean newborn <u>prior</u> to Vitamin K injection Hgb/Hct should be drawn - If Hgb < 13.5 gm or Hct < 40%, start iron at 2-4 mg/kg/day (AZT known to cause anemia) ZDV/AZT suspension: 10 mg/ml starting within 12 hours of delivery - Dose: 2 mg/kg every 6 hours for 6 weeks Infant discharge with AZT supply No breastfeeding

*Centers for Disease Control. Public Health Service Task Force Recommendations for the Use of Antiretroviral Drugs in Pregnant Women Infected with HIV-1 for Maternal Health and for Reducing Perinatal HIV-1 Transmission in the United States. MMWR, January 30, 1998, 47(RR-2);1-30.

Reviewed Article: **Fowler, M.G., Simonds, R. J., & Roongpisuthipong, A. (2000). Update on Perinatal HIV Transmission. HIV/AIDS in Infants, Children, and Adolescents, 47 (1), 21-38.**

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