Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV Transmission in the United States

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Intrapartum Antiretroviral Therapy/Prophylaxis

Women Who Have Received Antepartum Antiretroviral Drugs

Use of Intravenous Zidovudine During Labor

The PACTG 076 zidovudine regimen included a continuous intravenous (IV) infusion of zidovudine during labor for all women. Antiretroviral therapy (ART) regimens are now recommended for all pregnant women regardless of CD4 T lymphocyte (CD4) cell count and HIV viral load for treatment of HIV and prevention of perinatal transmission of HIV; the additional benefit of IV zidovudine in women receiving combination regimens has not been evaluated in randomized clinical trials.

The French Perinatal Cohort evaluated transmission in more than 11,000 pregnant women with HIV receiving antiretroviral (ARV) drugs (10% zidovudine alone, 18% dual ARV, and 72% triple ARV) who delivered between 1997 and 2010, stratified by viral load at delivery; 95% received IV intrapartum zidovudine.\(^1\) The overall rate of perinatal transmission was 0.9% (95/10,239) with IV zidovudine and 1.8% (9/514, \(P = .06\)) without IV zidovudine. Among women with HIV RNA <1,000 copies/mL at delivery, no transmission occurred among 369 who did not receive IV zidovudine compared to a rate of 0.6% (47/8,132, \(P > .20\)) among those receiving IV zidovudine. Among women with HIV RNA >1,000 copies/mL, the risk of transmission was increased without IV zidovudine (10.2%) compared to 2.5% with IV zidovudine (\(P < .01\)) if neonates received only zidovudine for prophylaxis, but was no different (4.8% vs. 4.1%, \(P = .83\)) without or...
with intrapartum zidovudine if the neonate received intensified prophylaxis with 2 or more ARV drugs. In a cohort of 717 women delivering between 1996 and 2008 in Miami, the majority of whom were receiving an ART regimen and had HIV RNA <1,000 copies/mL at delivery, lack of receipt of IV zidovudine during labor was not associated with an increased risk of transmission. Among a European cohort of infants considered at high risk of transmission, lack of IV zidovudine in labor was associated with transmission on univariate analysis but was not significantly associated once adjusted for maternal HIV RNA and other factors (adjusted odds ratio with IV zidovudine 0.79; 95% CI, 0.55–1.15; \( P = 0.23 \)). In a cohort of Irish women receiving ART for at least 4 weeks before delivery with HIV RNA <1,000 copies/mL, no transmission occurred among 61 who received either no zidovudine in labor or <4 hours of IV zidovudine.

Based on these studies, IV zidovudine should continue to be administered to women with HIV RNA >1,000 copies/mL near delivery (or for women living with HIV with unknown HIV RNA levels), regardless of antepartum regimen. While IV zidovudine is not required for women with HIV receiving ART with HIV RNA ≤1,000 copies/mL in late pregnancy and/or near delivery with no concerns about adherence to or tolerance of their ART regimens, many experts feel that there are inadequate data to determine whether administration of intrapartum IV zidovudine to such women provides any additional protection against perinatal transmission. They recommend intrapartum IV zidovudine administration to women with RNA levels in this range, as the transmission risk is slightly higher (approximately 1% to 2%) when HIV RNA is in the range of 50 to 999 copies/mL compared to <50 copies/mL (1% or less). However, regardless of viral load, in these circumstances the clinician may elect to use or not use intrapartum IV zidovudine based on clinical judgment.

In women with HIV RNA >1,000 copies/mL undergoing a scheduled cesarean delivery for prevention of transmission, IV zidovudine administration should begin 3 hours before the scheduled operative delivery. This recommendation is based on a pharmacokinetic (PK) study of zidovudine given orally during pregnancy and as a continuous infusion during labor. Maternal zidovudine levels were measured at baseline, after the initial IV loading dose, and then every 3 to 4 hours until delivery, and in cord blood. Systemic and intracellular zidovudine levels increased from baseline but appeared to stabilize after 3 hours of infusion; cord blood zidovudine levels were associated with maternal levels and maternal infusion duration. If cesarean delivery is being performed for other indications and maternal viral load is ≤1,000 copies/mL near the time of delivery, administration of IV zidovudine is not required.

If zidovudine was not used in the antenatal ART regimen because of known or suspected zidovudine resistance, intrapartum use of the drug is still recommended in women with HIV RNA >1,000 copies/mL near delivery, except in women with documented histories of hypersensitivity. This intrapartum use of the drug is recommended because of the unique characteristics of zidovudine and its proven record in reducing perinatal transmission, even in the presence of maternal resistance to the drug (see Antiretroviral Drug Resistance and Resistance Testing in Pregnancy).

In some international studies, oral (rather than IV) zidovudine has been administered during labor. Data are limited on the PKs of oral versus IV zidovudine during labor. In studies of oral dosing in labor, levels were lower than with IV dosing, and PK parameters suggested erratic absorption during labor.

Therefore, in women with HIV RNA >1,000 copies/mL near delivery for whom zidovudine is recommended, IV would be preferred to oral administration in the United States; in situations where IV administration is not possible, oral administration of zidovudine using a 600-mg loading dose and 400 mg every 3 hours can be considered.

Continuation of Antenatal Antiretroviral Drugs during Labor

Women who are receiving an antepartum ART regimen should continue that regimen on schedule as much as possible during the intrapartum period to provide maximal virologic effect and to minimize the chance of development of drug resistance. If the woman is to receive IV zidovudine and oral zidovudine is part of the antepartum regimen, the oral zidovudine component of the regimen can be held while she receives IV zidovudine. When cesarean delivery is planned, oral medications can be continued preoperatively with sips of water. Medications requiring food ingestion for absorption can be taken with liquid dietary supplements, contingent on consultation with the attending anesthesiologist in the preoperative period. If the maternal ARV

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drug regimen must be interrupted temporarily (meaning for <24 hours) during the peripartum period, all drugs should be stopped and reinstituted simultaneously to minimize the chance that resistance will develop.

**Women Who Have Received Antepartum Antiretroviral Drugs but Have Suboptimal Viral Suppression Near Delivery**

Women who have received ART regimens may not achieve complete viral suppression by the time of delivery because of factors such as difficulty with adherence, viral resistance, or late entry into care. Regardless of the reason, all women who have HIV RNA levels >1,000 copies/mL or presumed >1,000 copies/mL near the time of delivery should be offered a scheduled cesarean delivery at 38 weeks, which may significantly reduce the risk of transmission (see Transmission and Mode of Delivery).

Women with HIV RNA levels above 1,000 copies/mL at the time of delivery should receive IV zidovudine along with their other ARVs orally, as described above. While additional maternal ART, such as single-dose nevirapine, is not recommended, in certain high-risk situations, additional medications for prophylaxis in infants may be warranted, such as in cases where maternal HIV RNA levels are high at or near the time of delivery, especially if delivery is not a scheduled cesarean (see Infant Antiretroviral Prophylaxis and Table 8).

**Women Who Have Not Received Antepartum Antiretroviral Drugs**

**Women Who Present in Labor without Documentation of HIV Status**

All women without documentation of HIV status at the time of labor should be screened for HIV with expedited testing unless they decline (i.e., “opt-out” screening). Expedited repeat HIV testing is also recommended for women presenting in labor who tested negative for HIV in early pregnancy, but are at increased risk of HIV infection and were not retested in the third trimester. Factors that may increase risk of infection include diagnosis of a sexually transmitted disease, illicit drug use, exchange of sex for money or drugs, multiple sexual partners during pregnancy, a sexual partner at risk of or with known HIV infection, signs/symptoms of acute HIV infection, or living in a region with an elevated incidence of HIV in women of childbearing age. Initial testing for HIV should be done with a Food and Drug Administration (FDA)-approved antigen/antibody combination immunoassay that detects HIV-1 and HIV-2 antibodies, and an HIV RNA assay to screen for both acute and established HIV-1 infection. No further testing is required for specimens that are nonreactive on the initial immunoassay. Women with positive initial antigen/antibody combination immunoassay result should be tested with an FDA-approved antibody immunoassay that differentiates HIV-1 antibodies from HIV-2 antibodies. Reactive results on the initial antigen/antibody combination immunoassay and the HIV-1/HIV-2 antibody differentiation immunoassay should be interpreted as positive for HIV-1 antibodies; HIV-2 antibodies; or HIV antibodies, undifferentiated (see Revised Recommendations for HIV Testing in Adults, Adolescents, and Pregnant Women in Health-Care Settings and the resource page for laboratory testing for HIV). Those with high HIV-1 RNA and a negative confirmatory HIV assay most likely have acute HIV infection.

Expedited HIV testing should be available on a 24-hour basis at all facilities with a maternity service and/or neonatal intensive care unit (NICU). Statutes and regulations regarding expedited testing vary from state to state (see http://nccc.ucsf.edu/clinical-resources/hiv-aids-resources/state-hiv-testing-laws for a review of state HIV testing laws). Current information about testing also should be available at all facilities with a maternity service and/or NICU.

Women who test positive on the initial test should be presumed to have HIV until follow-up testing clarifies their infection status. IV zidovudine should be started immediately in all women with positive initial HIV tests in labor to prevent perinatal transmission of HIV, as discussed below. Women with positive initial testing should not initiate breastfeeding until HIV infection is definitively ruled out.

In the postpartum period, along with following-up on confirmatory HIV-1/HIV-2 antibody differentiation immunoassay and HIV-1 RNA testing, these women should receive appropriate assessments as soon as possible to determine their health status, including CD4 cell count, and HIV genotype for resistance.
Arrangements also should be made for establishing HIV care and providing ongoing psychosocial support after discharge. The infant should receive enhanced prophylaxis as outlined in the section on Infant Prophylaxis. If the follow-up antibody testing is negative, results of the HIV RNA test should be reviewed to rule out acute infection as a cause of the initial positive test before ART is stopped (see Acute Infection in Pregnancy).

Choice of Intrapartum/Postpartum Antiretroviral Regimen for Women without Antepartum Antiretroviral Therapy

All women with HIV who have not received antepartum ARV drugs should have IV zidovudine started immediately to prevent perinatal transmission of HIV. Although intrapartum/neonatal ARV medications will not prevent perinatal transmission that occurs before labor, most transmission occurs near to or during labor and delivery. Pre-exposure prophylaxis for the fetus can be provided by giving mothers a drug that rapidly crosses the placenta, producing fetal systemic ARV drug levels during intensive exposure to HIV in maternal genital secretions and in blood during birth. In general, zidovudine and other nucleoside reverse transcriptase inhibitors, non-nucleoside reverse transcriptase inhibitors, and the integrase inhibitor raltegravir cross the placenta well, whereas protease inhibitors do not (see Table 9). A small PK study and placental perfusion data suggest moderate to high placental transfer of elvitegravir. Limited data from case reports and placental perfusion models also suggest moderate to high transplacental transfer of dolutegravir.

A large international trial (NICHD-HPTN 040/PACTG 1043) demonstrated that adding ARV agents to the neonatal portion of the intrapartum/neonatal zidovudine regimen can further reduce perinatal transmission of HIV for mothers who have received no antepartum ARV drugs (see Infant Antiretroviral Prophylaxis). In this study, women who had not received antepartum ARV drugs received IV zidovudine if they were identified in labor or no zidovudine when diagnosed immediately postpartum; their infants received either 6 weeks of zidovudine alone or zidovudine in combination with other agents. The combination infant regimens resulted in a 50% reduction in transmission compared with zidovudine alone. Therefore, based on the efficacy of the neonatal regimen and no benefit seen with the addition of maternal single-dose nevirapine to a regimen of maternal short-course zidovudine and infant single-dose nevirapine in the Mashi trial by Shapiro et al. in Botswana, intrapartum maternal single-dose nevirapine is not recommended for a woman in this situation. The efficacy of newer drugs such as integrase inhibitors in this situation has not been evaluated. In the United States, where replacement feeding is affordable, feasible, acceptable, sustainable, and safe, women diagnosed with HIV infection during labor or the early postpartum period should be counseled against breastfeeding.

References


