Human Immunodeficiency Virus and Pregnancy

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INTRODUCTION
Globally, human immunodeficiency virus (HIV) is the leading cause of death in women of reproductive age. In 2008, 33.4 million individuals were living with HIV, of whom 15.7 million were women and 2.1 million were children under 15 years of age. Nearly all HIV infections in children are acquired from their mothers. Motherhood is a wonderful experience. Regardless of HIV status, anyone may want to have children. Just because a pregnant woman is HIV positive, it does not mean that her child will get infected with HIV. But for having HIV-free children, all pregnant women should receive counseling regarding the benefits and advantages of HIV screening and should be encouraged to voluntarily undertake serological testing, so that effective measures can be taken at the right time to decrease the transmission of HIV from mother to children. Immune function in pregnancy is suppressed. There is a decrease in immunoglobulin level, reduced complement level and decrease in cell-mediated immunity during pregnancy. Decreased immunological status will increase the spread of infection in the pregnant woman with HIV but prospective follow-up studies have not confirmed this.

Human immunodeficiency virus infection has little effect on pregnancy outcome in the developed world, but in developing countries like Africa, complications of both early and late pregnancy occur, which include spontaneous abortion, preterm labor, premature rupture of membranes, abruptio placenta, low birth-weight baby, still birth, ectopic pregnancy, etc. Other infections like bacterial pneumonia, urinary tract infection, etc. are more common in pregnancy with HIV seropositivity, and this leads to the deleterious effects on pregnancy outcome.

MODE OF TRANSMISSION
Human immunodeficiency virus 1 can be transmitted from mother to children in the following ways:
- In utero, through transplacental passage: 30–40%
- During labor and delivery: 50%
- Breastfeeding: 10–20%

Mode of delivery may affect the transmission rate. Prolonged rupture of membranes for more than 4 hours and exposure of fetus to the virus present in the cervicovaginal secretions during vaginal delivery will increase the risk of transmission. Cesarean section has been shown to decrease transmission in some studies.

Factors Affecting Mother to Child Transmission
- Maternal viral load: Increase viral load increases transmission. More than half of the women with viral loads of greater than 50,000 RNA copies/mL at the time of delivery have been shown to transmit the virus.
- Decreased maternal immune status (e.g. low CD4+ count) will lead to increased transmission.
- Nutritional factors like vitamin A deficiency will lead to increased transmission.
- Obstetric factors: Premature rupture of membranes; break in placental surface and chorioamnionitis will increase the risk of transmission.
- Prematurity of the fetus is associated with increased risk of transmission.
- Mode of delivery: Vaginal delivery is associated with more risk of transmission than cesarean section.

Screening
Human immunodeficiency virus screening can be done with the help of various tests:
- Enzyme-linked immunosorbent assay positive case is sent for confirmation by Western blot test
- Western blot test is the confirmatory test for HIV
- Viral load: To assess the risk of disease progression
- Assessment of other infections: Hepatitis-B surface antigen, antibody to Hepatitis-C virus should be assessed in all HIV-positive cases.

Prevention of Mother to Child Transmission
It could be facilitated with the help of the following measures wherever required:
- Termination of pregnancy
- Avoidance of unprotected sexual intercourse, drug use and smoking during pregnancy
- Antiretroviral therapy (ART), supplementation of vitamin A and treatment of associated sexually transmitted diseases.
- Obstetric intervention: Avoidance of invasive tests, birth canal cleansing and preference of cesarean delivery.
- Avoidance of breastfeeding.

Antiretroviral Therapy
All HIV seropositive mothers should be assessed for ART eligibility. A HIV seropositive pregnant woman who is not eligible for ART treatment requires antiretroviral (ARV) prophylaxis.

In pregnant women with confirmed HIV infection, the initiation of ART is recommended for all women with CD4 cell counts less than or equal to 350 cells/mm³, irrespective of the WHO clinical staging, and for all women in WHO clinical stage 3 or 4, irrespective of the CD4 cell count.
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count. In these patients, ART should be started as soon as feasible regardless of gestational age, and continue throughout pregnancy, childbirth, breastfeeding and thereafter. The first-line ART regimen should include zidovudine (AZT) + 3TC (lamivudine) combined with a non-nucleoside reverse transcriptase inhibitor (NNRTI): AZT + 3TC + nevirapine (NVP) or AZT + 3TC + Efavirenz (EFV).

Alternative recommended regimens are (Tenofovir) TDF + 3TC [or Emtricitabine (FTC)] + EFV and TDF + 3TC (or FTC) + NVP. Efavirenz should be avoided in the first trimester. Nevirapine may be used in its place.

Human immunodeficiency virus-infected women already receiving ART and who becomes pregnant should continue ART during antepartum, intrapartum and postpartum period. If a woman receiving EFV is recognized as pregnant before 28 days of gestation, EFV should be stopped and substituted with NVP or or profitability index. If a woman is diagnosed as pregnant after 28 days of gestation EFV should be continued. There is no indication for abortion in women exposed to EFV in the first trimester of pregnancy.

Human immunodeficiency virus-infected pregnant women, who are not in need for ART for their own health, require an effective ARV prophylaxis strategy to prevent HIV transmission to the infant. Antiretroviral prophylaxis should be started as early as the 14th week of gestation (second trimester) or as soon as possible when women present late in pregnancy. It is indicated even if the woman presents for the first time during labor.

Antiretroviral prophylaxis options are:

- Option A consists of:
  - Antepartum daily AZT
  - Nevirapine at the onset of labor
  - AZT + 3TC during labor and delivery
  - Twice daily AZT + 3 TC for 7 days postpartum.

- Option B should start as early as 14 weeks of gestation until 1 week after all exposure to breast milk has ended.

The recommended regimens include:

- AZT + 3 TC + lopinavir/ritonavir
- AZT + 3 TC + Abacavir
- AZT + 3 TC + EFV
- TDF + 3 TC (or FTC) + EFV

Peripartum Treatment

Any pregnant woman infected with HIV who presents in labor (irrespective of her previous HIV-positive status), has more than one treatment option available during labor, but all should include AZT infusion.

Zidovudine is given intravenously during labor as a loading dose of 2 mg/kg over 1 hour, followed by a continuous infusion of 1 mg/kg throughout labor. If the patient is having a planned cesarean delivery, the IV infusion should begin 3 hours before the procedure. Another option is AZT infusion followed by a single dose of 200 mg of NVP. This regimen should be followed by 3TC (150 mg) every 12 hours. If the latter regimen is used in pregnancy, the patient must continue AZT/3TC for at least 7 days postpartum to avoid NVP resistance. Stavudine is the only agent that can antagonize AZT and should be stopped prior to the IV infusion of AZT.

References