CHRONIC ILLNESS AND DISABILITY

Chronic Illness and Disability, Case #7

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During routine screening at 14 weeks gestation, the mother of one of your patients is found to be HIV antibody positive. What interventions can be done to minimize perinatal transmission? After delivery, how would you confirm or exclude HIV infection in the infant?

Definitions for Specific Terms:

14 weeks gestation- How much will the baby have developed so far/how big is it? What evaluations can be done at this stage of pregnancy?
This is the second trimester, which begins after the completion of 12 weeks. The pregnant woman likely can feel fetal movement at this stage. The fetus is about 3.5 inches long and is beginning to grow lanugo. The liver begins secreting bile, the spleen produces red cells and meconium and urine are excreted. The eyes, ears, external genitalia and CNS are continuing to develop. Doppler heart monitors will detect the fetal heartbeat by 10 weeks of gestation. Ultrasound is reliable at 14 weeks. It is probably too early for amniocentesis if indicated; 18 weeks is the ideal timing for that procedure although it may be done earlier. Chorionic villus sampling can be done at this stage if a chromosomal disorder is suspected.

Perinatal- Assess that the students know the difference between prenatal, perinatal and antenatal. Most vertical transmission of HIV is truly perinatal rather than prenatal, although 10% of cases are acquired in utero.

HIV antibody- Understanding of the methods of testing for HIV antibody positivity is critical to the management of this case. Who is screened for HIV? What tests are actually done?
Screening of pregnant women is recommended for all women at the first prenatal visit. A second HIV antibody screening is recommended for selected populations during the third trimester. Many states have "opt out" laws that require HIV testing of all pregnant women unless the woman specifically asks not to be tested. When blood is drawn for HIV testing, it is first tested by ELISA which is a highly sensitive test (very few false negatives) but not as specific as needed. However, an ELISA is quick and relatively inexpensive. Samples that test positive by ELISA are then subjected to a Western Blot, a very specific test that looks for antibodies against particular HIV epitopes. Most laboratories do not report HIV test results until the Western Blot confirmation is done, but other laboratories may report a positive ELISA in certain circumstances, especially when a woman is in labor. It is important to know whether the diagnosis has been confirmed by Western blot before talking to the mother. When patients are found to be HIV seropositive, (with confirmation) the next level of testing is often a quantitative PCR to determine the viral load.
Review of important concepts:

Historical Points

- If you were meeting with this mother to establish care for her expected child, what historical information might you want to ask about?
- You may want to explore her risk factors for HIV acquisition, such as drug use, which may impact her child in utero if ongoing.

- You may want to explore the social situation – Does mom have support? Her partner(s) will need to be tested as well.
- The mother needs ongoing care – Does she have health insurance and a care provider?

Clinical Reasoning

1. At birth, what will the results be on this infant's HIV ELISA?
   An HIV ELISA or Western Blot will be positive on any infant born to an infected mother because of placentally transmitted antibody. Therefore, finding a positive antibody test on an infant does not mean the infant is itself infected.

2. How can a baby be tested to see if they are infected?
   a. Viral detection testing such as a qualitative PCR is done to evaluate infants born to HIV infected women. There should not be any detectable virus; any level of positivity is likely to reflect vertical infection.
   b. Testing is usually done at birth – This will be negative unless the child acquired infection in utero. It is usually repeated at subsequent visits; generally, a negative PCR at 4 months of age is considered good evidence that the child is uninfected. Rare infants have been described who remained PCR negative until somewhat later.
   c. The antibody tests will remain positive for a year, sometime as long as 18 months – This is because the tests are highly sensitive so it takes several half-lives for it to "wear off."

3. How do infants who get infected acquire the infection?
   a. Most infants are infected during parturition, through exposure to infected maternal secretions and blood.
   b. Approximately 10% of infected infants appear to acquire the infection in utero through hematogenous spread.
   c. A small percentage are infected postnatally, usually through breastmilk.
   d. In some cultures, pre-chewing an infant's food may be common, exposing the infant to an additional source of possible infection.
   e. Sadly, some children are also infected via sexual abuse.

4. How can transmission risk be decreased?
   a. The key thing is to decrease the possibility of exposure to the virus. In the US, breastfeeding is generally discouraged – in other parts of the world the risk of HIV transmission must be balanced with the risk of diarrheal illness due to contaminated water sources for reconstituting formula.
   b. HIV infected pregnant women should all receive antiretroviral treatment, regardless of their viral load or CD4 count. Although transmission is more likely with a high viral load, babies have been infected after delivery to untreated women with very low levels of viremia. Treatment should be tailored to best address the woman's health, and should always be multidrug (highly active antiretroviral therapy or HAART) but ideally should include zidovudine. Typically, if a woman is not already on medications, therapy is started in the second trimester and continues throughout pregnancy.
   c. IV zidovudine is given during labor and delivery, and then the infant remains on therapy for the first 6 weeks of life. Zidovudine alone is used for prophylaxis of many HIV exposed infants, but the decision is based on maternal and infant characteristics and should be determined in concert with a pediatric HIV specialist.

d. Controversy still exists about the role of Cesarean section in these cases, but generally if a woman is adequately treated with good viral suppression and delivery proceeds quickly, vaginal delivery is safe. Women who are untreated or who have prolonged rupture of membranes are offered Cesarean section. Without any treatment, the rate of transmission is approximately 25% whereas most US centers now see transmission rates below 2%.

Diagnosis:

Congenital HIV exposure, at risk for vertical transmission

Suggestions for Learning Activities:

- Assign the student some tasks ahead – for instance, the questions in the "definitions" section above. You may also have them review the resources below before discussing this case.
- Ask the student(s) the questions listed under "clinical reasoning" to probe their knowledge about the case
- Role play – have the students explain to you as the "expectant mother" what the plans for following the baby will be and what the mom can do to prevent transmission.
- A basic science objective could be linked to this case: "Describe the difference between a qualitative PCR (HIV DNA PCR) and quantitative PCR (HIV RNA PCR) in the diagnosis and management of HIV infection in children"

Other Resources:

- "HIV Testing and Prophylaxis to Prevent Mother-to-Child Transmission in the United States" Pediatrics 2008;122:1127-34
- A short review of this topic: http://www.cdc.gov/hiv/topics/perinatal/resources/factsheets/perinatal.htm
- The full prophylaxis guidelines, 156 pages: http://aidsinfo.nih.gov/contentfiles/PerinatalGL.pdf
- Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health-Care Settings
- http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5514a1.htm