



HIV Transmission and Women: Implication for Birth and Sex

Presented by Pat Garcia MD, PhD, Professor Maternal/ Fetal Medicine Northwestern University and Tom Hope, PhD, Professor of Cell and Molecular Biology, Northwestern, December 18, 2012

Drs. Garcia and Hope presented together to demonstrate the importance of basic scientists and clinicians working in teams if we want the quickest and best outcomes for understanding and reducing the spread of HIV/AIDS in all populations.

Dr. Garcia began with some current statistics. In 1985, 7% of AIDS patients were women; in 1995 women reflected 25% of the cases. That number is beginning to stabilize but there are 9,000 new infections in adult and adolescent females each year and there has been a rise in the number of women who are HIV positive who are having babies. Today, most women who get HIV do so from sexual contact.

A surprising breakthrough occurred in the early 1990s when pregnant women who were taking AZT had had a dramatically decreased rate of infected infants. This was an experiment that really worked - it was declared "the end of the beginning"! At first, the rate of transmission of HIV from mother to infant was reduced by 2/3, however; the therapy didn't decrease the viral load of the mothers.

The determinant of transmission was affected by the amount of viral load in the mother. The greater the load, the greater the possibility of transmission. If the viral load is over 10,000, the baby has a 40% chance of perinatal transmission. The transmission could be transvaginal or transplacental. Normally an infant has a 1/3 chance of contracting HIV from an infected mother, but if anti-viral therapy is given during pregnancy and delivery, the possibility of transmission is reduced to less than 1%. The transmission is even reduced by 9 -13% if the therapy is only given during labor (and delivery). HIV positive mothers are now advised not to breast feed their babies as the virus can be transmitted through the mother's milk.

Rapid HIV testing has changed the landscape of mother to infant transmission. Since 2005, when rapid testing began in Illinois, if a pregnant woman does not know her HIV status, 100% of those women are tested using rapid testing. In Illinois in 2011, only 8 infants left the hospital not knowing their HIV status due to the adoption of Rapid Testing in all labor & delivery facilities across the state, in part due to Dr. Garcia's work on this issue.

The bottom line here is: the possibility of an AIDS free generation can be achieved if we can, ideally, prevent women from contracting the virus initially. In addition, the possibility of transmission of the virus from mother to infant can greatly be reduced if the mother consents to rapid AIDS testing and if she tests positive for the virus, she takes anti-viral therapy during her pregnancy and refrains from breast feeding her baby after delivery.

Sadly, there has not been as much progress in reducing the rate of new cases of HIV in females and ¾ of the new cases are in women of color. We do know that there is a 96% decline in transmission from male to female if the man wears a condom, is taking anti-viral microbicides, and neither person has a STD. Also, circumcised men have a lesser chance of transmitting the virus to women. These messages need to get out to all populations.

Dr. Garcia spoke about the fact that women cannot always control their partner's behavior and often have to protect themselves by using female controlled methods of protection such as the female condom. Psychological and /or physical trauma raises the chances of contracting the virus in women

by 4 times. Rates of trauma and PTSD in HIV positive women are much higher than the national average.

Dr. Tom Hope spoke on new efforts to better understand the biology of how women acquire the virus and how sexual transmission happens so they can have better control protecting themselves. He noted that the female reproductive tract is complicated with different types of epithelial cells in different sections of the tract. HIV permeates some cells greater than others and his lab, using sophisticated technology, is studying the mechanisms involved. There is recent evidence that Depovera, a popular hormonal contraceptive especially in third world countries, may make some of these cells more easily penetrated by the virus. More research is focusing on these types of contraceptives.

Scientists have found that inflammation increases the permeability of the cells to HIV. He also stated that transmission vulnerability may be different during different times of the menstrual cycle, especially during the luteal phase when there is less epithelium due to shedding of tissue leading to better access to the reproductive tract cells.

Dr. Hope talked about the role of mucus as a barrier to transmission since HIV passively enters the tissue via osmosis and there may be ways to enhance the role of mucus. He has also developed ways to track which cells of the reproductive tract contain the most viral load and it appears that it is much more widespread than originally believed. More work related to the cellular spread of the virus is being done in his lab.

Notes by Kathleen Clark & Nadia Reynolds