

Longitudinal analysis of human immunodeficiency virus type 1 RNA in breast milk and of its relationship to infant infection and maternal disease

Abstract:

Transmission of human immunodeficiency virus type 1 (HIV-1) via breast-feeding can occur throughout lactation. Defining both fluctuation in breast-milk virus level over time and how breast-milk virus correlates with mother-to-child transmission is important for establishing effective interventions. We quantified breast-milk HIV-1 RNA levels in serial samples collected from 275 women for up to 2 years after delivery. Higher maternal plasma virus load, lower maternal CD4 T cell count, and detection of HIV-1 DNA in maternal genital secretions were significantly associated with elevated breast-milk HIV-1 RNA. Within women who breast-fed, median virus load in colostrum/early milk was significantly higher than that in mature breast milk collected 14 days after delivery ($P < 0.004$). Breast-feeding mothers who transmitted HIV-1 to their infants had both significantly higher breast-milk viral RNA throughout lactation and more-consistent viral shedding, compared with mothers who did not transmit HIV-1. In breast-feeding women, a 2-fold-increased risk of transmission was associated with every 10-fold increase in breast-milk virus load (95% confidence interval, 1.3-3.0; $P < 0.001$). These results indicate that the risk of infant infection from breast-feeding is influenced by breast-milk virus load, which is highest early after delivery.