

## **Early Diagnosis of HIV in Infants by Proviral DNA PCR test – Sh. Nilica Devi**

It is a fact that women living with HIV infection can give birth to infants infected with HIV. Mother-to-child transmission accounts for the vast majority of all HIV-infected children below the age of 15. This transmission occurs during pregnancy, labour and delivery, or postpartum via breastfeeding. In the absence of treatment, the transmission rate between a mother and her child during pregnancy, labour and delivery is about 25%. In infants who acquire HIV at the time of delivery, various complications multiply at a rapid rate in the first few months often leading to death within the first year itself. Without appropriate treatment, half of children with HIV die from an HIV-related cause by their second birthday.

### **TESTING NEWBORNS FOR HIV CAN SAVE LIVES**

Early diagnosis and treatment for HIV-infected newborns can increase the rates for survival by up to 75 per cent. When an infected child receives anti-retroviral therapy (ART), adjunctive therapy and prophylaxis for opportunistic infections during the critical first 3-6 months, there is a significant improvement in the chances for long and healthy survival. Other benefits of early diagnosis include opportunities for undertaking routine immunisations, provisions for medical and social support and, monitoring of nutritional status. Affordable ART and treatment for opportunistic infections are now easily available but they are of little benefit to infants unless they can be diagnosed early. Early diagnosis also enables identification of those infants who are HIV-exposed but uninfected, facilitating follow-up care and other preventive measures to ensure that they remain uninfected. For uninfected infants and children, early diagnosis improves their psychological well-being by reducing potential stigma, discrimination and psychological distress and also increases the chances of adoption for orphans.

Interventions through ART and other antenatal care programmes in HIV-infected pregnant women help to ensure that most infants born to these women are uninfected. In the absence of interventions, about 5-20% of infants become infected through breastfeeding alone. An HIV-positive mother with an HIV-uninfected infant can be counselled and supported to stop breastfeeding if replacement feeding is available. This is where early diagnosis helps in decision-making on breastfeeding.

### **ROLE OF PROVIRAL DNA PCR TEST**

Conventional antibodies-specific methods for diagnosing HIV infection have limited utility in infants below 18 months of age born to HIV-infected mothers due to the presence of passively acquired maternal antibodies. The maternal HIV antibody can persist for as long as 18 months from birth although it usually clears from its blood by 9-12 months. Hence, the standard serological assays carried out in adults are not suitable for these infants where the chances for positivity are high because of the presence of maternal antibody in their blood. Because positive antibody results alone do not establish infection in these infants, the more precise option is the antigen-specific DNA polymerase chain reaction (PCR) test which detects HIV-1 proviral DNA. It is the most widely used initial assay for early HIV detection in infants the world over and is generally considered the standard method. HIV proviral DNA PCR is a qualitative test, which means it gives a yes/no diagnosis for HIV infection. The presence of HIV-1 proviral is detected by a PCR test when a segment of the highly

conserved HIV-1 *gag* gene is targeted. Clinical studies have indicated that detection of HIV-1 proviral DNA in whole blood specimens by PCR is highly sensitive (>95%) and specific (>98%) for the presence of HIV-1 in infants less than 2 years of age.

#### **GUIDELINES AS PER THE NATIONAL AIDS CONTROL ORGANISATION (NACO)**

According to the NACO programme, for children below 18 months, both breastfed and non-breastfed, born to HIV-infected mothers, the following strategies should be adopted:

- The first HIV DNA PCR test shall be conducted at 6 weeks of age. If the PCR test is positive, the test is to be repeated immediately (or as early as possible for confirmation).
- If the first PCR test is negative in a non-breastfed baby, confirm with a second PCR test at 6 months.
- If the child is breastfed and initial PCR test at 6 weeks is negative, PCR testing should be repeated at 6-8 weeks after cessation of breastfeeding to rule out HIV infection.
- In case of mixed feeding, the same strategy is to be applied as in a breastfed baby.
- A report of "HIV-positive" is given when 2 PCR tests are positive; and a report of "HIV-negative" is given when 2 PCR tests are negative.

#### **THE MANIPUR SCENARIO**

Manipur is one of the six states in India with the highest HIV prevalence rates and accounts for almost 8% of the country's total HIV cases. The number of HIV-positive children in the state till January 2011 is 2578 (*Epidemiological Analysis of HIV/AIDS in Manipur, January 2011, MACS*); the prevalence of pregnant HIV-infected women attending antenatal care is also high. When one considers the poor healthcare facilities in the interior and hill areas and the social stigma associated with HIV, we realise that the official statistics do not tell the entire story. There will surely be many more unreported cases and uncovered areas.

#### **LABORATORY TESTING FACILITIES FOR PROVIRAL HIV DNA PCR**

In India, besides National Institute of Cholera and Enteric Diseases (NICED), Kolkata and a few NACO-designated laboratories, BABINA Diagnostics, Imphal is equipped with facilities for proviral HIV DNA PCR testing. Starting from August 2010, the total number of proviral HIV DNA PCR tests conducted till April 2013 in BABINA Diagnostics is 234. However, considering the high prevalence of HIV-infected pregnant women coupled with the lack of awareness of the efficacy of this test, we are still miles away from effectively carrying out early diagnosis of all HIV-exposed infants and children in Manipur.

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