Study suggests why HIV-uninfected babies of mothers with HIV might be more prone to infections

EurekAlert

Babies whose mothers have HIV, but who are not HIV-infected themselves, are born with lower levels of specific proteins in their blood called antibodies, which fight infection, compared with babies not exposed to HIV, a new study has found. The finding, published today in the Journal of the American Medical Association, might explain in part why uninfected babies born to women with HIV have a higher risk of illness and death early in life.

Major programmes using antiretroviral drugs have successfully reduced the rate of mother-to-child transmission of HIV from 20-30 per cent to around five per cent in some areas of South Africa and to less than one per cent in developed countries. However, HIV-uninfected infants born to HIV-infected mothers in Africa are more prone to infections such as pneumonia and meningitis, and up to four times more likely to die before their first birthday, compared with babies born to HIV-negative women. Socioeconomic factors are thought to account partially for this discrepancy but differences in the babies' immune systems might also be important.

The new study, by scientists from Imperial College London and Stellenbosch University in South Africa, found that babies born to HIV-infected mothers had significantly lower levels at birth of antibodies against a range of bacterial infections (Hib, pertussis, pneumococcus and tetanus).

Antibodies, which bind to specific pathogens and direct immune cells to attack them, are transferred from mother to child through the placenta late in pregnancy. The study found lower levels of some specific antibodies in mothers with HIV, but also that less antibody is transferred from mother to child across the placenta.

Despite their low antibody levels at birth, the babies in the study responded well to vaccination: they produced similar levels of antibody to some vaccines and higher levels to other vaccines.

"It's likely that lower antibody levels in these babies contributes to lower protection against infection before the babies have received their vaccines," said Dr Christine Jones from the Department of Paediatrics at Imperial College London, the study's first author. "Although they appear more vulnerable in the first few months of life, the good news is that these babies respond well to vaccination. We might be able to protect them even better against infections, either by vaccinating them earlier or by vaccinating the mother in pregnancy. More research will be needed to establish what the best way of protecting these babies might be."

The study involved 109 HIV-infected and uninfected mothers in a community health

centre in Khayelitsha, a rapidly-growing township in Cape Town, South Africa. The researchers measured antibody levels in the mothers at delivery and the infants at birth. They also assessed how the babies responded to routine vaccination by measuring the babies' antibody levels at four months, after they had received their routine vaccines.

Amongst the HIV-negative women in the study, a third also had low antibody levels, showing that protection against infection in their babies might also not be optimal in some women, who are otherwise perfectly healthy.

Dr Beate Kampmann, Reader in Paediatric Infection & Immunity at Imperial and the senior author of the study, said: "Around six million children under five die every year from infectious diseases, and a lot of these deaths are preventable by using existing vaccines. Studies like ours are helping us understand why certain infants might be especially susceptible to infections, and how we might tailor vaccination policies to protect vulnerable babies more effectively."

The Imperial team will soon begin a new project studying antibody levels in babies and mothers with and without HIV, among patient volunteers from Imperial College Healthcare NHS Trust. This work is funded by Imperial's Biomedical Research Centre, which was awarded by the National Institute of Health Research (NIHR).

SOURCE [1]

Links:
[1] http://www.eurekalert.org/pub_releases/2011-02/icl-ssw020811.php