Dizygotic twins discordant for HIV and hepatitis C virus

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Abstract

Twin girls were born at 37 weeks' gestation to a mother infected by HIV and hepatitis C virus. Twin 1 had symptomatic HIV infection by 9 months but was negative for hepatitis C virus antibody and RNA. Twin 2 became HIV antibody negative by 15 months but was positive for antihepatitis C virus and RNA.

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The vertical transmission of HIV is now well established. Recent work has also documented the transmission of hepatitis C virus from mother to infant. We report a set of dizygotic twins who were discordant for vertically acquired HIV and hepatitis C virus infection.

Case reports

Non-identical female twins were born at 37 weeks' gestation by spontaneous vaginal delivery. The mother was an intravenous drug user infected with HIV and hepatitis C virus. Both had neonatal jaundice requiring phototherapy. Neither were breast fed nor received blood transfusions.

TWIN 1

Twin 1 (birth weight 2180 g) developed symptomatic HIV infection at 9 months of age with persistent generalised lymphadenopathy, chronic parotitis, intermittent splenomegaly, and thrombocytopenia. Laboratory evidence included results positive for HIV p24 antigen and culture. Her CD4 counts were stable around 430 cells$\times 10^6$/l (26% T cells). Serum IgG concentration was raised at 19·6 g/l (reference range 5·0–13·0 g/l). She was negative for hepatitis C virus antibody and RNA by polymerase chain reaction (PCR) at 36 and 54 months. She is currently 6 years old and attends normal school.

TWIN 2

Twin 2 (birth weight 2160 g) became HIV antibody negative by 15 months of age, and she has remained negative for HIV p24 antigen and culture, with normal immune function. She has been positive for antihepatitis C virus antibody and RNA-PCR positive at regular intervals: at birth, 18, 30, 42, 49, 54, 62, and 70 months. Clinically she is well with normal growth and development without any signs of liver disease. Recent liver function tests, however, have shown mildly raised alanine aminotransferase values of 46 IU/l (reference range 10–40 IU/l).

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Discussion

Factors that enhance the risk of mother to child transmission of HIV include advanced maternal disease, preterm delivery, and breast feeding.[1] Although not as well documented, evidence is emerging that hepatitis C virus may also be vertically transmitted from infected mothers to their offspring.[2-6] Epidemiological factors that predispose to the acquisition of HIV and hepatitis C virus infections often coincide, especially in areas where injecting drug use is prominent. Viral coinfections may exert synergistic effects, and it has been postulated that where HIV and hepatitis C virus coinfections occur, immune suppression secondary to maternal HIV infection may result in increased hepatitis C virus replication and lead to more efficient transmission to the infant.[6]

We have shown, in this pair of non-identical twins, that HIV and hepatitis C virus are transmitted independently, as suggested by Thaler and coworkers.[3] It is unlikely that false negative results were obtained for hepatitis C virus testing in twin 1, as seroconversion was detected by two second generation antihepatitis C virus enzyme linked immunosorbent assays that used different hepatitis C virus polypeptides as antigens. The possibility of 'seronegative' hepatitis C virus infection has been ruled out by the repeated use of the PCR that failed to detect plasma viraemia. Coinfection with HIV might be expected to cause immune dysfunction, leading to enhanced hepatitis C virus replication. In contrast, twin 2, who was not infected with HIV, was persistently seropositive and viraemic for hepatitis C virus.

Discordance in HIV infection has been noted even in monozygotic twins. Insufficient information exists on the mechanism of HIV infection, with little agreement on the exact time when vertical transmission occurs. Less is known about mother to child transmission of hepatitis C virus. The observation of discordance for vertical transmission of HIV and hepatitis C virus infection in dizygotic twins suggests that other factors have not been accounted for – such as the role of the placenta, viral tropism, and host or genetic factors that might contribute to the infant's susceptibility to infection.

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