

Molecular study of Cytomegalovirus infection among children with end stage renal diseases undergoing dialysis: Pilot study

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Abstract

Cytomegalovirus is considered as an opportunistic infection affecting immunocompromised patients. Children with end stage renal diseases requiring dialysis is among affected population by this virus. The aim of the present study was to detect and compare the seroprevalence of CMV and CMV antigen pp65 with real time polymerase chain reaction (PCR) among children with end stage renal diseases undergoing dialysis. The study is a prospective case-control study. 41 patients included in the study were registered in the hospital for regular dialysis waiting for renal transplantation. The study included 41 healthy controls with same age and gender distribution. Blood samples were obtained from studied children and subjected for determination of specific immunoglobulin M and G for CMV (IgM-CMV, IgG-CMV) by Elecys. system and CMV-DNA determination by real time polymerase chain reaction (PCR) and for PP65 antigenemia test by light diagnostic CMVpp65. CMV IgM was significantly detected frequently ($P=0.0001$) in 12.2% of the patients and in 2.4% of the control children. Moreover, IgG-CMV was significantly more frequently detected in patients ($P=0.0001$) than in control (90.2% and 31.7%, respectively). CMV-DNA was significantly ($P=0.0001$) detected in 12 patients (29.3%) compared to the control (2.4%), while CMV-pp65 was detected among 4 children (9.8%) compared to one child in the control group. The comparison between IgM-CMV and real time PCR revealed that 30.7% of positive samples by PCR had positive IgM-CMV, while IgG-CMV was associated with 84.6% of positive PCR. CMVpp65 correctly identified all negative samples compared to PCR, while the majority of negative PCR was also negative for IgM-CMV (98.6%). Moreover, all negative children for CMVpp65 was also negative by PCR (100%). For the validity of different CMV markers, IgG-CMV was the most sensitive test (84.7%), CMVpp65 was the most specific test (100%). From this study, we concluded that CMV is a common viral infection among children with end stage renal diseases requiring dialysis. The diagnostic performance of real time PCR is the gold standard technique in diagnosis of this infection. CMVpp65 antigenemia is a specific accurate test for laboratory diagnosis however, it lacks sensitivity. Specific IgG for CMV is good screening diagnostic test.

Introduction

Infected people may shed cytomegalovirus in their urine or saliva intermittently. The virus is also excreted in mucus in the cervix (the lower part of the uterus), semen, stool, and breast milk. Thus, the virus is spread through sexual and nonsexual contact. If a pregnant woman is infected, the fetus may acquire the infection during the pregnancy, or the baby may acquire the infection during delivery. CMV infection may develop in people who receive a transfusion of infected blood or an infected organ transplant. People who have received an organ transplant are particularly susceptible to CMV infection because they are given drugs that suppress the immune system (immunosuppressants) to prevent rejection of the transplant.

Infection with CMV, like that with Epstein-Barr virus (EBV, a type 4 herpesvirus), can cause a type of infectious mononucleosis in adolescents and young adults. Both CMV and EBV mononucleosis cause fever and fatigue. But EBV also causes a severe sore throat. CMV does not. An uninfected person who receives a transfusion of blood containing CMV and becomes infected can have a fever, and sometimes liver inflammation develops 2 to 4 weeks later. In people with a weakened immune system, CMV can cause serious disease or death. In people with AIDS, CMV infection is a common viral complication. The virus can infect the retina of the eye. This infection (CMV retinitis) can cause blindness. Infection of the brain (encephalitis), pneumonia,

or painful ulcers of the intestine or esophagus may also develop. In newborns, urine culture, Blood tests. In people with a weakened immune system, often biopsy Cytomegalovirus infection may not be recognized immediately. Diagnosis of CMV infection is often unnecessary in healthy adults and children because treatment is unnecessary. However, doctors consider the possibility of CMV infection in the following people: Otherwise healthy people who have fever and fatigue. People who have a weakened immune system and an eye, a brain, or a gastrointestinal infection. Newborns who seem sick: Once CMV infection is suspected, a doctor conducts tests to detect the virus in body fluids or tissues. In newborns, the diagnosis is usually made by sending a sample of urine to a laboratory to grow (culture) and identify the virus. Blood tests that detect antibodies to CMV can confirm a new infection. (Antibodies are produced by the immune system to help defend the body against a particular attacker, such as CMV.) But these tests cannot confirm whether disease is present. For instance, disease can be caused by reactivation of the virus, as in people with a weakened immune system. In these people, a biopsy of affected tissues is often necessary to confirm CMV disease. When the infection threatens life or eyesight, an antiviral drug (valganciclovir, ganciclovir, cidofovir, foscarnet, or a combination) may be given. These drugs may be given by mouth or by vein. When CMV retinitis is very severe, the drugs may also be injected directly into the eye.