Concomitant Pneumocystis and cytomegalovirus infections in immunocompromised patients: An under-explored but emerging infectious disease challenge

Mahboob Qureshi

Touro University Nevada, USA, E-mail: Mahboob.Qureshi@tun.touro.edu

Abstract

Immunocompromised individuals including AIDS patients, solid organ and bone-marrow-transplant recipients, and patients receiving cytotoxic chemotherapies often suffer from Pneumocystis jirovecii (PJ) and/or Cytomegalovirus (CMV) infections. Nosocomial Pneumocystis pneumonia (PCP) is not uncommon in transplant units and is particularly observed among the kidney transplant recipients, one of the most commonly transplanted solid organs. PCP is rather commonly encountered in the AIDS (Acquired Immunodeficiency Syndrome) patients; whereas, CMV infections are most frequently encountered among the bone marrow transplant recipients; albeit at a lesser frequency among the solid organ transplant (SOT) recipients. CMV infection in immunocompromised individuals involves reactivation of the latent infections. Of note, most of us have this virus in a latent form, a characteristic feature of all herpes virus. On the other hand, PJ is ubiquitous in the environment and easy to acquire. Even though almost all of us become seropositive for PJ by 2-3 years of age; the immunity is dependent on competent cell-mediated immunity at the time of infection. In recent years, PCP has been encountered as a relatively common cause of pneumonia among SOT recipients as solitary infection as well as a comorbidity with CMV infections. These patients often have been reported to suffer from underlying lung diseases and/or concomitant infections with tuberculosis, Streptococcus pneumoniae, Hepatitis C and CMV. It is worth mentioning that CMV has been identified as a clear risk factor for developing PCP among the SOT recipients. Even though an emerging challenge in the infectious disease world, concomitant infections with PJ and CMV is an underexplored topic. With enforcement of prophylaxis, the incidence of PCP has been reduced significantly in the AIDS patients; but not among transplant recipients. On the other hand, the incidence of CMV pneumonia among transplant recipients and CMV retinitis among the AIDS patients are still common due to ineffective guidelines for prophylaxis. Patients suffering from concomitant PCP and CMV pneumonia often have a poor clinical outcome, which warrants a clear insight of the pathogenesis of this dual infection. We have studied the dynamics of concomitant PJ and CMV infections and examined how the co-existence of this dual infection effects the disease process and clearance of each organism. Understanding the complex phenomenon of host immune responses to the co-infection will elucidate the underlying components responsible for hindering the clearance of one or both infections; which will help developing novel clinical approaches for managing these severely ill patients with immunocompromised conditions.

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