Infection in Solid Organ Transplant Recipients

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Although the recent advancement in post-transplant immunosuppressive therapy has increased the incidence of graft survival, it has also led to an increased incidence of opportunistic infections, particularly by fungi and viruses, creating a series of previously unrecognized problems. The relative absence of clinical signs and symptoms along with muted radiologic findings in immunosuppressed patients, can pose a significant challenge in diagnosing infection, leading to critical delays in medical intervention, morbidity and mortality. Other factors that may also complicate diagnosis include post surgical alteration of anatomy, and noninfectious causes of fever such as graft rejection, drug reactions, and autoimmune disorders, which may mimic infection.

In the past, post-transplant infections occurred in “predictable” timeline patterns, which helped guide clinicians in their diagnostic considerations; however, the evolution of immunosuppressive agents and prophylactic antimicrobial therapy has altered this classic “pattern” of infections. As a result, the epidemiology of transplant-related infections has changed. Clinicians should be aware of this changing scope to provide cautious evaluations of potential infections in transplant recipients, deliver early and specific microbiologic diagnoses and offer rapid treatment. Enhanced microbiological diagnostic techniques have allowed early diagnosis, facilitated the recognition of previously undiagnosed infections and are now used routinely in pre-transplant screening as well as post-transplant management.

The risk for infection is determined by 2 factors; (1) epidemiologic exposures (donor- or recipient-derived infections, community-acquired infections, and nosocomial infections) (2) a complex function of all factors that contribute to the patient’s risk of infection known as ‘‘the net state of immunosuppression.’’ The timeline of infection is determined by the nature and intensity of an individual’s risk factors after transplantation.

Previously, common infections were primarily caused by cytomegalovirus or *Pneumocystis jiroveci*. The incidence of such infections has been reduced by the introduction of routine antimicrobial prophylaxis. Furthermore, prolonged nosocomial exposure, of donor or recipient, has contributed to the emergence of resistant bacterial pathogens and viruses. During the first month post-transplant (early period), nosocomial pathogens predominate and could be either donor-or recipient-related (e.g., *Clostridium difficile*, MRSA, VRE, or *Aspergillus*). Reactivation of latent infections may also be observed including *Mycobacterium tuberculosis*, *Trypanosoma cruzi*, *Leishmania* spp, *Strongyloides stercoralis*, *Cryptococcus neoformans*, *Histoplasma capsulatum*, *Coccidioides* and *Paracoccidioides* spp.

After the first month, viral infections predominate, notably in patients receiving antimicrobial prophylaxis with trimethoprim-sulfamethoxazole which prevents infections caused by PCP, *Listeria monocytogenes*, *Toxoplasma gondii* and *Nocardia species*. More than 6 months post-transplant (late period), community-acquired respiratory infections that tend to be more severe or prolonged than in normal hosts predominate. PTLD and skin cancers may also occur.

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