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How should we evaluate organ donors with active or prior infections?

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1. Introduction

The spectrum of infections that infect the immunocompromised organ transplant recipient is a reflection of the degree of immune deficits of these hosts [1]. Infections that are derived from the donor tissues and activated in the recipient are among the most common and important exposures in transplantation. Some of these are latent while others are the result of bad timing – active infection transmitted at the time of transplantation. The pre-transplant assessment of a potential organ donor is aimed at minimizing the risk of transmission of such infections to the compromised recipient. This is particularly important in liver transplantation, where infections have an important impact on success of transplantation [2]. This summary focuses on the liver donor, however, the principles outlined are also valid for other solid organ donors.

2. Categories of donor-derived infections

A number of types of infection merit consideration [3]: (1) Donors who are bacteremic or fungemic at the time of donation – these are often due to nosocomial pathogens, are often line-related, and include vancomycin, linezolid- and quinupristin–dalfopristin-resistant enterococci, methicillin-resistant staphylococci, pneumococus, *Salmonella*, *Pseudomonas*, *Escherichia coli*, fluconazole-resistant *Candida* species or *Aspergillus* species. These organisms tend to "stick" to anastomotic sites (vascular, urinary) and colonize fluid collections (e.g., hematomas) to form abscesses or mycotic aneurysms. Also in this group are the common causes of meningitis: meningococcus, pneumococcus and *Hemophilus influenzae*. (2) Donors that are actively viremic (often asymptomatic) at the time of donation – including HIV, West Nile virus, rabies, herpes simplex virus, respiratory viruses, lymphocytic choriomeningitis virus (LCMV) and hepatitis viruses (A, B, and C, possibly E). (3) Latent viral infections commonly transmitted

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Abbreviations: CMV, cytomegalovirus; EBV, Epstein Barr virus; HBsAg, hepatitis B surface antigen; HBcAb, hepatitis B core antibody; HBsAb, hepatitis B surface antibody; WNV, West Nile virus; LCMV, lymphocytic choriomeningitis virus.

Table 1
Infectious disease syndromes in organ donors: exclusion criteria[a]

Untreated pneumonia
Active tuberculosis
SARS
Untreated bacterial or fungal sepsis (e.g., candidemia)
Active infection due to endemic fungi (*Blastomyces*, *Coccidioides*, *Histoplasma sp.*)
Untreated syphilis
Multi-system organ failure due to overwhelming sepsis, Gangrenous Bowel
Potential CNS infections:
Unknown infection of central nervous system (encephalitis, meningitis)
Untreated bacterial meningitis (need proof of cure or adequate Rx)
Herpes simplex encephalitis or other encephalitis
History of JC virus infection
West Nile virus infection
Rabies
Creutzfeldt-Jacob disease
Other fungal or viral encephalitis
Cryptococcal infection of any site
Active viremia: herpes viruses (HSV, CMV, VZV), acute EBV (mononucleosis)
Active hepatitis (exclude hepatitis A, use organs with HBV or HCV by informed consent)
Serologic or molecular evidence of HTLV-I/II
Infection with HIV (serologic or molecular)
Untreated parasitic infection: *Trypanosoma cruzi*, *Leishmania*, *Strongyloides*, *Toxoplasmosis*

[a] Testing cannot be performed for all of these conditions prior to organ procurement or transplantation. These conditions are a possible basis for exclusion if diagnosed at the time of procurement.

with the graft and activated later including cytomegalovirus (CMV) and Epstein–Barr virus (EBV). This may also include any of the other human herpes viruses including HHV 6, 7, and 8 (Kaposi's sarcoma-associated herpesvirus). These are associated with particular syndromes and morbidity in the immunocompromised population. The greatest risk is from primary infection – organ recipients who are seronegative (immunologically naïve) receiving infected grafts from seropositive donors (latent viral infection). (4) Late, latent infections including tuberculosis – which may activate early or many years after initial exposures. The treatment of disseminated mycobacterial infection is often complicated by drug interactions or toxicities in the transplant recipient.

Given the risk of transmission of infection from the organ donor to the recipient, certain infections should be considered absolute or relative contraindications to organ donation. As transplantation is, in general, semi-elective surgery, it is reasonable to avoid donation from individuals with unexplained fever, rash, neurologic syndromes, or other active infectious syndromes. This

Table 2A
Pre-transplant laboratory evaluation

Test	All patients	Patients in endemic area
Serologies		
CMV	√	
HSV	√	
VZV	√	
EBV	√	
HIV	√	
HBV: HbsAg	√	
anti-HBs	√	
HCV	√	
Treponema pallidum	√	
Toxoplasma gondii		√ (all hearts)
Strongyloides stercoralis		√
Leishmania spp.		√
Trypanosoma cruzi		√
Histoplasma capsulatum		√
Coccidioides immitis		√
Stool ova & parasites		
Strongyloides stercoralis		√
Urine ova & parasites/Cystoscopy		
Schistosoma spp.		√ (endemic kidney transplants)

Table 2B
Vaccinations to consider *prior to transplantation*

Measles/mumps/rubella (MMR)
Diphteria/tetanus/pertussis (DTP) (or update tetanus)
Poliovirus (inactivated)
Varicella zoster (if seronegative)
Hepatitis B (consider Hepatitis A in travelers)
Pneumococcal vaccine every 5 years
Influenza (usual indications)- yearly
Haemophilus influenzae B and meningococcus (splenectomy, plasmapheresis)