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Recommendations for screening of donor and recipient prior to solid organ transplantation and to minimize transmission of donor–derived infections

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Abstract

In the context of solid organ transplantation, screening of recipients and organ donors is crucial, and should be performed with great rigour to minimize the reactivation or the risk of transmission of certain infectious processes. This review aims to update understanding of the possible pathologies involved, as well as of emerging infections that, as a result of globalization, are gaining increasing prominence on a daily basis.

Keywords: Donation, donor, donor derived infection, transplantation, transmission recipient, screening
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Hot topics

- Each combination of donor and recipient should be assessed individually.
- Active infections in donors do not necessarily preclude organ donation. Donors with certain infections may be suitable for donation on the basis of close monitoring and preemptive or prophylactic measures.
- Nucleic acid testing (NAT) should routinely be used to test human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infection in high-risk donors.
- Origin and travel history of both donor and recipient is of paramount importance in order to screen for geographically restricted infections.

Introduction

Infectious complications continue to be the primary cause of morbidity and mortality after organ transplantation. Many of these complications have an exogenous origin, including those caused by pathogens transmitted by the transplanted organ. Sometimes, it is the recipient who previously has a chronic or latent infection that can reactivate after the procedure. Rigorous screening of the recipient and the donor for latent and active infections is essential for optimizing outcomes after transplantation and serves to prevent the inadvertent use of unsuitable organs and prompt targeted anti-infective prophylaxis or preemptive therapy or infection surveillance measures post-transplantation. The evidence for recommending inter-

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ventions in this field is based on case reports and series and cohort studies. In addition to national guidelines, local epidemiology should always be considered before taking any decision regarding the risk of transmission of an infectious disease.

For this chapter the authors propose the Alliance-O [1] classification of risk levels regarding disease transmission, in addition to the Infectious Diseases Society of America grading system for ranking recommendations [2], as follows:

1. Unacceptable risk (RL1): absolute contraindication, with the exception of some life-saving transplantation procedures in the absence of other therapeutic options on a case-by-case basis.
2. Increased but acceptable risk (RL2): includes cases where transmissible microorganisms or diseases are identified during the evaluation process of the donor, but organ utilization is justified by the specific health situation of the recipient or the severity of their clinical condition.
3. Calculated risk (RL3): includes all cases where, even in the presence of transmissible diseases, transplantation is allowed for recipients with the same disease or with a protective serological status, in cases with broad-spectrum antibiotic therapy of a minimum duration (24 h) and those with documented bacteraemia who have started targeted antibiotic therapy.
4. Not assessable risk (RL4): includes cases where the evaluation process does not allow an appropriate risk assessment for transmissible diseases.
5. Standard risk (RL5): includes cases where the evaluation process did not identify a transmissible disease.

Screening of Potential Recipient and Donor for Latent Infection

All infection screening begins with thorough medical and social histories and physical examination. In this section we include serological and microbiological testing of donors and recipients as summarized in Table 1.

TABLE 1. Recommended infection screening of potential donor and recipient

Test or study	Donation if test positive
Medical evaluation and studies	
Medical and social history*	
Physical examination*	
Chest radiograph*	
Bronchoscopy with bronchoalveolar lavage**	Not contraindicated. Individual evaluation in the case of multidrug resistance, and fungal and mycobacterial colonization. Treat the recipient.
Tests for bacterial infection	
Rapid plasma reagin (RPR) or other serological test for syphilis*	Not contraindicated but treat the recipient
Tuberculin skin test***	
Blood cultures†	Not contraindicated but treat the recipient. Individual decision in the case of MDR bacteria.
Tests for viral infection	
HIV 1/2 antibody*	Contraindicated but considered for HIV-positive recipient
Cytomegalovirus IgG antibody*	Not contraindicated but essential to define prophylactic strategy after procedure depending on recipient serology
EBV IgG antibody*	Not contraindicated but essential to monitor EBV-negative recipients, especially children
HBsAg*	Contraindicated but considered for HBsAg+ recipients or HBV protective immunity
HBcAc/'HBc alone'*	Not contraindicated but consider antiviral prophylaxis for liver and HBV non-immune recipients
HCV antibody*	Contraindicated but considered for HCV+ recipients
Tests for parasitic infection	
Toxoplasma IgG antibody‡	Not contraindicated but consider prophylaxis for heart transplant

*, test recommended for both donor and recipient;
**, test recommended for lung donor and recipient;
***, test recommended for recipient;
†, test recommended for donor;
‡, test recommended for heart donor and recipients, especially in areas of high endemicity.
HIV: human immunodeficiency virus; EBV: Epstein-Barr virus; HBsAg: hepatitis B virus antigen; HBV: hepatitis B virus; HBcAc: hepatitis B total core antibody; HCV: hepatitis C virus
Extended information in the text.

Human immunodeficiency virus

Donor. The transmission of HIV by organ transplantation is well documented (RL1). Many countries have policies and regulations that prohibit organ donation from HIV-infected persons, although recently, utilization of HIV-infected organs for HIV-infected kidney recipients has been carried out in South Africa [3]. An enzyme-linked immunoassay (EIA) for both antibodies and antigen for HIV-1/2 is the preferred initial test, and repeatedly reactive results are confirmed by Western immunoblot assay. In case of a high-risk donor (a drug addiction during the past 2 years, either intravenous or intranasal, frequently changing sexual partners during the past 6 months, sexual partners of people with viral infections such as hepatitis B virus (HBV), HCV, HIV or human T lymphotrophic virus (HTLV)-I/II, or imprisoned during the past 3 months), extended screening by NAT is highly recommended.

Recipient. Although recipients must also be screened for HIV, due to the efficacy of current antiretroviral therapy, HIV infection is no longer a contraindication for transplantation. Currently, organ transplantation is performed in patients with HIV infection with no detectable viral replication, a CD4+ lymphocyte count above 200/μL and therapeutic reserve.

Recommendations.

- Both donor and recipient should be tested for HIV infection by EIA. Grade: AII.

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