TECHNICAL NOTE

Evaluation of bacterial infections in organ transplantation

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Infections are one of the major causes of mortality in the first year after organ transplantation (1). Bacterial infection is the most frequent type of infection. Chang et al. found that 82% of fever episodes in the first two years after liver transplantation were nosocomial infections; bacterial infections were found in 62% of cases (2).

Approximately half of bacterial infections occur within two weeks after liver transplantation. The following risk factors related to these infections were identified: 1. Immunosuppression; 2. Recipient characteristics; 3. Procedural characteristics; and 4. Donor characteristics. Organ transplant donors are exposed to several situations that are associated with a risk of infection; therefore, donors have the potential to transmit microorganisms to organ transplantation recipients (1).

Transmission through the graft is well described for some infections, such as toxoplasmosis in heart transplantation and mycobacteriosis in liver, kidney and lung transplantation (3,4). Virus transmission is also well documented. Donors are typically screened for the following viruses: human immunodeficiency virus (HIV), hepatitis B and C viruses, EBV, CMV and human T-cell lymphotropic virus (HTLV). The transmission of HTLV in this manner has not been documented but is highly probable (5).

Bacteria and fungi can be transferred to the allograft by contamination during the recovery, preservation or handling of the organ or at the time of transplantation. Contamination from a donor infection is most likely the most critical because a large inoculum of microorganisms can be transmitted. Information regarding nosocomial infection (fungal and bacterial) retrieved from donor organs, however, is limited. The donor-to-host transmission of bacterial infection has been documented in some case reports and large series. In Canada, one donor transmitted methicillin-resistant Staphylococcus aureus (S. aureus) to two kidney recipients and one cornea recipient (6). Organ contamination by Pseudomonas aeruginosa, S. aureus and Candida species at the time of harvesting has been reported in kidney transplantation. The agents were isolated from donor fluids and graft preservation fluid, and the recipients developed serious infections (7).

Several studies have reported a low risk of recipient infection when the donor had bacteremia and both donor and recipient were treated. Four studies analyzed the outcome of solid organ transplantation when there was documented bacteremia in the donor (7-10). Lumbreras et al. identified bacteremias in 5% of liver and heart donors (10). The most common agent was S. aureus. The majority of recipients received treatment for agents isolated in the donor blood cultures; there was no negative impact on the survival of the graft or of the patient. Freeman et al. analyzed the outcome of 212 patients who received organs from 95 donors with bacteremia (11). Surprisingly, none of the recipients developed infections caused by the agents found in the donors.

The organs of donors with bacterial meningitis can be transplanted without increasing the risk of infection in recipients. Lopez-Navidad et al. (12) reported on 16 recipients who received organs from donors diagnosed with meningitis. All of the recipients were treated post-operatively for the same microorganism as isolated from the donors, and no patient developed an infection. In another series, 33 liver transplants from donors with meningitis were described; there were no cases of transmission to a recipient. In this study, both donors and recipients had been treated for the isolated agents (13). These data suggest that it is safe to transplant organs from donors with bacterial infection if the donors do not have signs of sepsis, the causative agent of the infection is identified, and the recipients receive the appropriate treatment immediately post-transplantation. However, infections that are not correctly identified may be transmitted. Hypothetically, the risk is
higher for microorganisms resistant to the prophylaxis regimen routinely used in transplant care units.

Approximately 5% of donors have positive blood cultures at the time of transplantation, but some studies report this figure to be as high as 20% (11,14). The international consensus is that systematic blood culturing should be performed for all transplanted organs. There is no current recommendation in Brazil.

Considering the risks for bacterial infection and the potential benefits of knowing the microbiological status of the donor organ, we propose that systematic cultures of donor materials should be performed. Blood cultures should be performed for all organ transplantations and bronchoalveolar fluid culture should be performed in all cases of lung transplantation (Figure 1).

The primary goal of standardization is to provide important infectious and microbiological information (Figure 1), which could be helpful in determining the appropriate prophylactic and therapeutic measures for use in transplant recipients.

**APPENDIX**

**AVALIACÃO DE INFECCÕES BACTERIANAS EM DOADORES DE ÓRGÃOS**

As infeccões constituem-se em uma das principais causas de morbi-mortalidade no primeiro ano após o transplante de órgãos (1), sendo mais frequentes as infeccões bacterianas. Chang et al. demonstraram que 82% dos episódios de febre em dois anos de seguimento após transplante de figado são de origem hospitalar, e desses 62% são de origem bacteriana (2).

Cerca de metade das infeccões bacterianas ocorre em até duas semanas após o transplante. Alguns fatores de risco foram identificados como determinantes na incidência dessas infeccões: 1. Fatores relacionados à imunossupressão; 2. Fatores relacionados ao receptor; 3. Fatores relacionados ao procedimento, e 4. Fatores relacionados ao doador. Devido às condições clínicas dos doadores, estes estão submetidos a vários fatores de risco para infeccões nosocomiais, com potencial de transmissão para o receptor (1).

Algumas infeccões já foram bem definidas como passíveis de serem adquiridas do enxerto, como toxoplasmose em transplantados de coração e mico bacteriose em transplantados de rim, figado e pulmão (3,4). A transmissão de infeccões por vírus também é bem documentada. Pesquisam-se os seguintes vírus, rotineiramente, no doador: vírus da imunodeficiência humana (HIV), vírus das hepatites B e C, EBV, CMV e vírus humano linfotrópico de células T (HTLV), este último sem transmissão documentada, porém altamente provável (5).

Poucas informações existem, entretanto, sobre a possibilidade de transmissão de agentes de infecção hospitalar (bactérias e fungos) através do enxerto. No Canadá, foi descrita a transmissão de Staphylococcus aureus (S. aureus) resistente a oxacilina de um doador para dois receptores de rim e um de córnea (6). Descreveu-se, em transplante de rim, contaminação do enxerto durante a retirada e preservação do órgão. Os agentes identificados foram Pseudomonas

**Figure 1 - Evaluation of Bacterial Infection in Organ Donors.**
Evaluation of donor infections  
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Conflicts of interests: Edson Abdala - speaker of Bago, clinical research with Bristol. Tania Mara Varejão Strabelli - speaker of Novartis, works with Novartis, clinical research with Merch. Pedro Enrique Dohlhac Llacer - clinical research with Novartis, BMS and Pfizer.

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