

Impact of Donor Bacteremia on Outcome in Organ Transplant Recipients

Clinical significance of donor-unrecognized bacteremia in the outcome of solid-organ transplant recipients. *Lumbreras C, Sanz F, Gonzalez A, Perez G, Ramos MJ, Aguado JM, et al.* Clin Infect Dis 2001;33:722-726. (Reprinted with permission.)

Abstract

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Comments

An estimated 5% of the organ donors have been shown to be bacteremic at the time of organ procurement.^{1,2} Although bacteremia and bacterial infections in the donor pose a potential risk for the transmission of infection to the recipient, discarding life-saving organs from such donors could further compromise the already limited donor pool and aggravate the organ donor shortage. Therefore, discerning whether organs from bacteremic donors can be safely used for transplantation and the appropriate management of the recipient have significant clinical implications.

The risk of donor-transmitted infection varies with the type of bacteria causing the infection. Bacteremia caused by gram-negative bacilli in the donor has been shown to pose a greater risk for transmission and is associated with poorer outcomes than that caused by gram-positive bacteria.³ Infectious complications occurred in two of three recipients who received hearts from donors who had gram-negative bacteremia as compared with none of the 16 in the patients whose donors had gram-positive bacteremia.³ Donor bacteremia caused by *Serratia* and *Escherichia coli* resulted in mediastinitis and sepsis in these two recipients in the aforementioned study and was associated with death in one.³

In the context of gram-positive bacteria, a low risk of transmission and infection with relatively avirulent bacteria, e.g., *Staphylococcus epidermidis* is not surprising. *S.*

aureus on the other hand, is a highly virulent bacteria. Mortality rate in bacteremic organ transplant recipients with deep-seated *S. aureus* infections is in excess of 80%. However, bacteremia caused by *S. aureus* in the donor has also not been shown to be associated with a greater frequency of adverse outcome in the recipient as compared with other bacteria.^{1,2} Apart from direct transmission of infection, donor bacterial infection via release of endotoxin or other bacterial products has also been proposed to contribute to primary nonfunction of the allograft.⁴

Two recent studies comprising a large number of patients have shown that donor bacteremia did not portend a higher risk of infectious complications or compromise graft or patient survival.^{1,2} The most frequent cause of the donor bacteremias in these studies was gram-positive bacteria, of which *S. aureus* was the predominant pathogen. A vast majority of the recipients of organs retrieved from bacteremic donors in the aforementioned studies had received antimicrobial therapy. In the study by Lumbreras et al,¹ specific antibiotics were administered to the recipient for 7 to 10 days on receipt of donor blood culture results. In the report by Freeman et al, 91% of the recipients had received antibiotics for a mean of 3.8 days.² These data suggest that with appropriately administered antibiotic therapy, organs from bacteremic donors can be successfully transplanted without incurring an additional risk for infection or allograft dysfunction in the recipient.

Existing data show that in up to one fourth of the donors with bacteremia, the organs are procured after the date of first positive blood culture.² The results of blood cultures in the donor may therefore frequently be unavailable at the time of harvesting of the organs. When characteristics of donors who were ultimately found to be bacteremic were compared with those without bacteremia, only fever in the 24 hours before harvesting was significantly predictive of bacteremia in the donor.¹ Nevertheless, with appropriate administration of antibiotics in the recipients, the outcome was uniformly satisfactory. Interestingly, however, fewer organs per donor are recovered from bacteremic than abacteremic donors.² It has also been shown that no particular organ from bacteremic donors was more likely to transmit bacteria.²

A similar dilemma exists regarding the feasibility of using organs from donors with bacterial meningitis. Navidad et al⁵ described the outcome in 16 recipients who had received organs from five patients with bacterial meningitis. The pathogens included *Neisseria meningitidis*, *Streptococcus pneumoniae*, and *E. coli*.⁵ With

antibiotic administration ranging from 5 to 10 days, infection caused by the aforementioned bacteria were not documented in any of the recipients. Thus, patients with brain death attributable to bacterial meningitis caused by these bacteria can also be suitable organ donors if the donor and the recipient receive appropriate antibiotic therapy.

An exception, however, is donors with a less commonly encountered bacterial infection, i.e., *Mycobacterium tuberculosis*. Unrecognized active *M. tuberculosis* infection in the donor can be efficiently transmitted to the recipient with deleterious sequelae.⁶ Tuberculosis involving the allograft was documented 35 and 39 days, respectively, after renal transplantation in two recipients of renal allografts transplants from the same donor who had died of hypoglycorrhachic lymphocytic meningitis of unknown etiology.⁷ Culture of the donor's cerebrospinal fluid ultimately yielded *M. tuberculosis* 3 weeks after the death of the donor.⁷ One of the recipients of a renal allograft from this donor died of disseminated tuberculosis. The second recipient recovered; however, rejection secondary to antituberculosis therapy necessitated allograft nephrectomy.⁷ Tuberculosis involving the hepatic allograft was documented in a pediatric liver transplant recipient who had received a living-related lateral segment hepatic transplant.⁸ Right upper-lobe pulmonary tuberculosis was detected concomitantly in the patient's mother, who had donated the segmental hepatic allograft.⁸ The sole site of *M. tuberculosis* in the patient was a tuberculous abscess in the hepatic allograft, suggesting that donor transmission was highly probable. Untreated donors with active

tuberculosis therefore should not be considered suitable for organ donation.

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