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Case report

Transmission of dengue virus from deceased donors to solid organ transplant recipients: case report and literature review

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ABSTRACT

Dengue fever is a vector-transmitted viral infection. Non-vectorial forms of transmission can occur through organ transplantation. We reviewed medical records of donors and recipients with suspected dengue in the first post-transplant week. We used serologic and molecular analysis to confirm the infection. Herein, we describe four cases of dengue virus transmission through solid organ transplantation. The recipients had positive serology and RT-PCR. Infection in donors was detected through serology. All cases presented with fever within the first week after transplantation. There were no fatal cases. After these cases, we implemented dengue screening with NS1 antigen detection in donors during dengue outbreaks, and no new cases were detected. In the literature review, additional cases had been published through August 2017. Transmission of Dengue virus can occur through organ donation. In endemic regions, it is important to suspect and screen for dengue in febrile and thrombocytopenic recipients in the postoperative period.

Background

The most common mechanism of transmission of dengue virus is via *Aedes aegypti* mosquitoes. There are few reports of other routes of transmission such as percutaneous transmission, blood transfusion[1] or bone marrow and solid organ transplantation.[2,3]

The risk of virus transmission by donating blood or organs is related to the presence of asymptomatic carriers and the short incubation period that precedes viremia. There is insufficient data to allow an accurate estimation of the incidence of dengue transmission through transplanted organs in developing tropical countries, as diagnostic tests for detecting infected donors is not routinely performed.

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This article describes four cases of solid organ recipients with signs and symptoms of dengue infection in the postoperative period following transplantation, in whom the probable transmission mechanism was the graft.

Materials and methods

This is a description of dengue virus infection in four recipients of solid organ grafts taken from donors with dengue infection. All cases received care at Fundación Valle del Lili (FVL) in Cali, Colombia. The Institutional Committee of Ethics in Biomedical Research approved this study.

The diagnosis of dengue in donors and recipients was made by detecting IgM and IgG antibodies and antigenemia (NS1).[4] In recipients, Reverse Transcriptase Polymerase Chain Reaction (RT-PCR)[5] for dengue was also carried out, in the Microbiology Laboratory of the Universidad Del Valle. In 2007, a rapid chromatographic immunoassay was used for the qualitative detection of IgG and IgM antibodies against dengue virus in human blood (ACON®). In 2010, NS1Ag + AB SD BIOLINE (Standard Diagnostic®) immunochromatography test was used to detect the virus NS1 antigen and antibodies (IgM and IgG) in serum. A review of the literature on non-vectorial transmission due to organ transplantation, using Mesh terms is presented.

Results

Cases 1 and 2

In 2007, cases 1 and 2 received a heart and liver transplant, respectively, from the same deceased donor, who died of an intracranial hemorrhage secondary to a hypertensive emergency in Medellin, Colombia. After the transplant, the institution that rescued the organs notified our hospital that the donor had consulted a week before his death with fever and mild thrombocytopenia. Due to the epidemic season of dengue, we tested the donor samples and were positive for dengue IgM and IgG.

Recipient 1

A 41-year-old male, was a recipient of a heart transplant due to dilated cardiomyopathy (Table 1). After transplantation, he was put on immunosuppression with methylprednisolone, cyclosporine, and mycophenolate. On the third postoperative day, the patient developed myalgia, arthralgia, and general discomfort associated with thrombocytopenia, and lymphopenia, which did not improve by decreasing the dose of mycophenolate. Subsequently, there was an elevation of transaminases, bilirubin, and alkaline phosphatase. Positive IgM for dengue was detected (Fig. 1) and RT-PCR was positive for DEN 3. On the sixteenth day after surgery, the patient developed dengue shock syndrome (DSS), severe thrombocytopenia, and a transesophageal echocardiogram showed a cardiac tamponade. A pericardiocentesis drained 1530 mL of hemorrhagic fluid. Endomyocardial biopsies showed no rejection. The bacterial cultures of the pericardial fluid were negative. Three weeks after the start of these symptoms, lymphopenia, and thrombocytopenia improved, the dose of mycophenolate was increased, and the patient was discharged.

Table 1 – Clinical characteristics of transplanted patients with dengue virus infection.

Patient	Donor	Age (yr)/gender	Clinical manifestations	Organ	Days of onset	Mortality	Test results
Recipient 1	A	41/male	Myalgia, arthralgia. Thrombocytopenia, lymphopenia DSS	Heart	8	Alive	IgG– IgM+ RT-PCR+ (DEN3)
Recipient 2		53/male	Fever, transient encephalopathy. Thrombocytopenia, lymphopenia, anemia. Hepatitis.	Liver	2	Alive	IgG– IgM+ RT-PCR+ (DEN 3)
Recipient 3	B	31/female	Fever, vomiting, diarrhea, jaundice. Thrombocytopenia, lymphopenia. Hepatitis.	Kidney	8	Alive	IgG+IgM+ NS1+RT-PCR+ (DEN4)
Recipient 4		48/female	Fever	Kidney	4	Alive	IgG– IgM+ NS1– PCR–
Donor A	–	40/male	Mild fever, thrombocytopenia, lymphopenia	–	–	Death intracranial hemorrhage	IgM+ IgG+
Donor B	–	32/male	Asymptomatic	–	–	Death traumatic brain injuries	IgG– IgM– NS1+

+, Positive result; –, Negative result; CRD, chronic kidney disease; DSS, dengue shock syndrome.