Report documents organ transplantation as source of fatal rabies virus case

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An investigation into the source of a fatal case of raccoon rabies virus exposure indicates the individual received the virus via a kidney transplant 18 months earlier, findings suggesting that rabies transmitted by this route may have a long incubation period, and that although solid organ transplant transmission of infectious encephalitis is rare, further education to increase awareness is needed, according to a study in the July 24/31 issue of *JAMA*.

The rabies virus causes a fatal encephalitis (inflammation of the brain) and can be transmitted through tissue or organ transplantation. "Unique rabies virus variants, distinguishable by molecular typing methods, are associated with specific animal reservoirs. Globally, an estimated 55,000 persons die of rabies every year, with most transmission attributable to dog bites. Approximately 2 human rabies deaths are reported in the United States every year and during 2000 through 2010, all but 2 domestically acquired cases were associated with bats. Despite raccoons being the most frequently reported rabid animal in the United States, only l human rabies case associated with the raccoon rabies virus variant has been reported," according to background information in the article. In February 2013, a kidney recipient with no reported exposures to potentially rabid animals died from rabies 18 months after transplantation.

Neil M. Vora, M.D., of the Centers for Disease Control and Prevention, Atlanta, and colleagues conducted a study to determine whether organ transplantation was the source of rabies virus exposure in the kidney

recipient, and to evaluate for and prevent rabies in other transplant recipients (n = 3; right kidney, heart, and liver) from the same donor. Organ donor and all transplant recipient medical records were reviewed. Laboratory tests to detect rabies virus-specific binding antibodies, rabies virus neutralizing antibodies, and rabies virus antigens were conducted on available specimens, including serum, cerebrospinal fluid, and tissues from the donor and the recipients.

The researchers found that in retrospect, the kidney donor's symptoms prior to death were consistent with rabies (the presumed diagnosis at the time of death was ciguatera poisoning [a foodborne illness]). Subsequent interviews with family members revealed that the donor had significant wildlife exposure, and had sustained at least 2 raccoon bites, for which he did not seek medical care. Rabies virus antigen was detected in archived autopsy brain tissue collected from the donor. The rabies viruses infecting the donor and the deceased kidney recipient were consistent with the raccoon rabies virus variant and were more than 99.9 percent identical across the entire N gene, thus confirming organ transplantation as the route of transmission.

The 3 other organ recipients did not have signs or symptoms consistent with rabies or encephalitis. They have remained asymptomatic, with rabies virus neutralizing antibodies detected in their serum after completion of postexposure prophylaxis.

"This transmission event provides an opportunity for enhancing rabies awareness and recognition and highlights the need for a modified approach to organ donor screening and recipient monitoring for infectious encephalitis. This investigation also underscores the importance of collaboration between clinicians, epidemiologists, and laboratory scientists," the authors write.

More information: *JAMA*. 2013;310(4):398-407