mg/dL to 2.1±0.2 mg/dL at week 3 and 2.4±0.2 mg/dL at week 6, although 24-hr urine magnesium excretion decreased by approximately 25% from weeks 3 to 6. There was no significant change in serum creatinine, blood urea nitrogen, or creatinine clearance with magnesium supplementation, and no reduction in antihypertensive drug requirements or in systolic or diastolic blood pressure was seen. Complications of magnesium therapy in 13 patients included loose stools, greater than 3 per day, or frank diarrhea (*5*). Thus, clinical magnesium supplementation has no obvious beneficial effect on renal parameters, although no histologic data are available. On the other hand, the practicality of chronic magnesium supplementation is questionable, because gastrointestinal side effects during magnesium therapy seem frequent.

LEENDERT C. PAUL
Department of Nephrology
Leiden University Medical Center
The Netherlands

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Legionnaires' Disease in a Renal Transplant Recipient: Nosocomial or Home-Grown? Transplantation 2002; 74: 890.

A. Sax, S. Dharan, D. Pittet

LEGIONNAIRES' DISEASE IN A TRANSPLANT RECIPIENT ACQUIRED FROM THE PATIENT'S HOME: IMPLICATIONS FOR MANAGEMENT

In this issue of *Transplantation*, Sax et al. (*1*) present an instructive case of Legionnaires' disease in a renal transplant recipient. The patient had been in the hospital for 16 days when he presented with hospital-acquired pneumonia. Microbiologic studies were unrevealing for standard bacterial pathogens, but direct fluorescent antibody on bronchoalveolar lavage fluid was positive for *Legionella* pneumophila serogroup 1. The diagnosis was further confirmed by a positive urinary antigen assay. Because the incubation period for Legionnaires' disease is thought to be from 2 to 10 days, this case was understandably considered as acquired from the hospital. An extensive epidemiologic and environmental investigation failed to reveal *L. pneumophila* in any water specimens taken from the hospital. However, the patient had gone home on day 13 and returned shortly thereafter. Environmental cultures of his home revealed *L. pneumophila* taken from the potable water supply. Molecular subtyping by pulsed-field electrophoresis and fragment length polymorphism showed that the patient isolate and the isolate obtained from his home were identical.

The authors emphasize that the patient had taken a shower and so presumably that was the source of the organism. However, it is not well known that aspiration is the most common mode of transmission in hospital-acquired Legionnaires' disease, not aerosolization (*2*). We, in collaboration with the Centers for Disease Control and other investigators, first reported an association with showering in 1981, but subsequent case control studies at our institutions failed to confirm this association (*3*). Numerous prospective studies have subsequently shown that showering is not a risk factor, and in two prospective studies, a history of showering proved to be a protective factor (*4–7*)! The reason for this apparent paradox is that the patients who are ambulatory are more likely to take showers and are less likely to be in circumstances leading to aspiration.

The attack rate for hospital-acquired Legionnaires' disease is especially high in transplant recipients (*8*, *9*). The reason is that the risk factors for aspiration occur in transplant recipients, including intubation, immunosuppression including corticosteroids, and often times chronic lung disease associated with cigarette smoking. Heart transplant recipients are at highest risk (*10*), whereas bone marrow transplant recipients have the lowest risk. Most cases of Legionnaire's disease in surgical patients occur in the early postoperative period consistent with aspiration as the mode of transmission (*11–13*). Given the fact that the drinking water in many hospitals is colonized with *Legionella*, endotracheal intubation and surgery involving general anesthesia could lead to aspiration from colonization of the oropharynx or from aspirating contaminated water. Contaminated water might also be delivered into the lung via rinsing of respiratory tract equipment or aerosolization via respiratory tract devices (*14*, *15*). Saravolatz et al. (*16*) have shown that 3% of renal transplant recipients had positive DFA stains for *Legionella* from their oropharyngeal secretions, suggesting the possibility of colonization, although demonstration of oropharyngeal *Legionella* colonization using cultures has been difficult (*17*).

Routine environmental cultures of the hospital water supply for *Legionella* are mandated for hospitals in Pittsburgh, Maryland, Spain, Denmark, and France (*18*). The CDC has recommended the use of environmental cultures in hospitals performing bone marrow transplants (*19*). It is unclear why the same recommendation was not extended to solid organ transplants.

Legionella species have been isolated from homes in numerous surveys (*20–22*) and linked to commu-

[1]VA Medical Center and The University of Pittsburgh, Pittsburgh, PA.
[2]Address correspondence to: Victor L. Yu, M.D., VA Medical Center, Infectious Disease Section, University Drive C, Pittsburgh, PA. E-mail: vly+@pitt.edu.

nity-acquired Legionnaires' disease (*23*, *24*). The authors suggest that the home water supplies of transplant recipients be routinely cultured, as is currently the policy for many hospitals. Effective disinfection methods exist for homes. Modular ultraviolet light and thermal eradication (superheat and flush) have been used successfully in homes, although long-term evaluation has not been conducted (*25*, *26*). However, we have not advocated routine culturing for *Legionella* in the home because water sources are ubiquitous and patients can visit many other buildings and be exposed to contaminated water.

We now recommend that all immunosuppressed patients boil and store water to be used for drinking, as is currently done in many developing nations. This recommendation is not as radical as it seems. In many U.S. cities, patients with human immunodeficiency virus and other immunosuppressed patients are advised to boil their water as a precaution against waterborne pathogens. Infections caused by *Cryptosporidium*, *Giardia lamdia*, *Pseudomonas aeruginosa*, *Stenotrophomonas maltophilia*, *Mycobacterium avium-intracellulare*, *Fusarium*, and even *Aspergillus fumigatus* have been transmitted from drinking water to immunosuppressed patients (*27–30*),

NINA SINGH[1]
JANET E. STOUT[1]
VICTOR L. YU[1,2]

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