

Pneumonia associated with a dental unit waterline

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In February, 2011, an 82-year-old woman was admitted to the intensive care unit with fever and respiratory distress. She was conscious and responsive. Chest radiography showed several areas of lung consolidation. She had no underlying disease. Legionnaires' disease was promptly diagnosed by *Legionella pneumophila* urinary antigen test; a bronchial aspirate was taken for microbiological examination. Oral ciprofloxacin (750 mg every 12 h) was started immediately. Nevertheless, the patient developed fulminant and irreversible septic shock and died 2 days later. An investigation to find the source of *L pneumophila* infection was initiated.

During the incubation period (2–10 d) our patient had not been exposed to any obvious risk for legionella infection; she left her house only to attend two appointments at a dental practice. Samples were taken from the tap and the high-speed turbine of the dental unit waterlines, from the dental practice's taps, and from the patient's home (taps and shower) to investigate possible *L pneumophila* contamination. All samples from her home were negative on culture, but those from the dental practice were positive for *L pneumophila*. The sample from the dental practice's cold-water tap contained $1 \cdot 5 \times 10^3$ CFU/L, the sample from the tap of the dental unit waterline 4×10^3 CFU/L, and the sample from the high-speed turbine of the dental unit waterline $6 \cdot 2 \times 10^4$ CFU/L. *L pneumophila* serogroup 1 was isolated from these samples as well as from the patient's bronchial aspirate. Three different typing methods showed the clonal relation between the clinical and environmental strains: monoclonal antibody typing ascribed all the strains to subgroup Benidorm, one of the most virulent; sequence-based typing¹ showed the same rare sequence type (ST 593); amplified fragment length polymorphism typing² showed identical genomic patterns. After the environmental investigation, the dental unit waterline, already disinfected with 12% hydrogen peroxide, was additionally treated with shock chlorination, and *L pneumophila* contamination control was achieved (<100 CFU/L). No other case of Legionnaires' disease or Pontiac fever related to this source among dental surgery staff or other patients was identified by epidemiological investigation.

L pneumophila is a Gram-negative bacterium ubiquitous in natural water environments and found also in man-made water systems; it can infect people by inhalation or microaspiration of aerosolised water causing a severe pneumonia known as Legionnaires' disease, mainly affecting elderly and immune-compromised patients, or

a flu-like disease, known as Pontiac fever. Sources of infection have been shown to be primarily air-conditioning systems, hot-water systems, spas, and fountains.³ Significant contamination of dental unit waterlines with legionella has been widely documented.⁴ Serological studies have also shown a higher prevalence of antibodies to *L pneumophila* in dentists and dental practice staff, suggesting a potential health risk for these workers.⁴ However, as far as we are aware, no case of Legionnaires' disease has been associated with this source of infection. The case here shows that the disease can be acquired from a dental unit waterline during routine dental treatment. Aerosolised water from high-speed turbine instruments was most likely the source of the infection. Legionella contamination in dental unit waterlines must be minimised to prevent exposure of patients and staff to the bacterium. We suggest several control measures: use of anti-stagnation and continuous-circulation water systems; use of sterile water instead of the main water supply in the dental unit waterline; application of discontinuous or continuous disinfecting treatment; daily flushing of all outlets and before each dental treatment; use of filters upstream of the instruments; and annual monitoring of the waterline. Further useful procedures to prevent legionellosis within dental surgeries can be obtained from a dedicated guideline.⁵

Contributors

MLR and MS set up the study, interpreted the results, and wrote the report; SF and FP contributed to the subtyping and genotyping of strains; MABS contributed to the collection, cultivation, and identification of environmental strains; EF contributed to the collection of epidemiological data; MFP isolated and identified legionella from respiratory secretions; and PF cared for the patient and provided clinical data.

Acknowledgments

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