APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Mar. 1982, p. 725-726
0099-2240/82/030725-02$02.00/0
Vol. 43, No. 3

Isolation of Pittsburgh Pneumonia Agent from a Hospital Shower

ARNOLD BROWN,[1,2,3,4]† VICTOR L. YU,[1,3,4] MARGARET H. MAGNUSSEN,[1] RICHARD M. VICKERS,[2] GEORGE M. GARRITY,[1] AND ELAINE M. ELDER[2]

Infectious Disease[1] and Microbiology[2] Sections, Veterans Administration Medical Center; Department of Medicine, University of Pittsburgh School of Medicine[3]; and Department of Public Health Microbiology, Graduate School of Public Health, University of Pittsburgh,[4] Pittsburgh, Pennsylvania 15240

Received 30 March 1981/Accepted 2 November 1981

Tatlockia (Legionella) micdadei, the Pittsburgh pneumonia agent, was isolated from a hospital shower. Although it was not possible, at the current time, to establish an epidemiological link to disease acquisition, this information may be significant because it provides further evidence that a water-associated reservoir of this organism exists within the hospital.

Legionella pneumophila has been isolated from a number of water-associated environments (3–6, 9, 14). From these sources, the organism may be aerosolized, leading to disease in susceptible individuals. Within the hospital environment, we and others (4, 14) have isolated *L. pneumophila* from shower heads and mixing valves. We also reported the isolation of *Tatlockia (Legionella) micdadei*, the Pittsburgh pneumonia agent (PPA), from the couplant-fluid compartment of ultrasonic nebulizers in three hospitals (8). Other environmental reservoirs for PPA have not been reported, and the mechanism by which this organism is spread is unknown. We now report the isolation of PPA from sediment obtained from a hospital shower.

Twenty-five showers on 10 wards at the Pittsburgh Veterans Administration Medical Center were sampled. Sediment was scraped with a sterile Dacron swab from the shower head and mixing valves. All recovered sediment was suspended in 10 ml of buffered yeast extract broth. A 0.1-ml amount of each suspension was plated directly onto buffered charcoal-yeast extract agar (11), onto the same medium containing 0.001% bromcresol purple and 0.001% bromthymol blue (15), and onto sheep blood agar plates. Cultures were incubated aerobically at 35°C and were observed daily. Suspicious colonies were restreaked onto each medium and were tested for oxidase, catalase, and gelatinase activities (7). Pigment production was determined on charcoal-free yeast extract (7) containing 2.5 mM tyrosine (1). Starch hydrolysis was determined iodometrically on charcoal-free yeast extract agar containing 0.15% soluble starch (3). The identity of isolates was confirmed by direct fluorescent-antibody staining, using polyvalent (serogroups 1 to 4) *L. pneumophila* antiserum obtained from the Centers for Disease Control and *T. micdadei* (PPA) antiserum prepared in our laboratory, and by DNA homology (7).

Whereas several of the samples contained *L. pneumophila* as reported previously (4), one shower head sample contained a gram-negative rod which grew on the supplemented yeast extract agars but not on sheep blood agar. On the dye-containing buffered charcoal-yeast extract agar, it grew as a blue-gray, nonfluorescing colony, typical of *T. micdadei*. This organism was weakly positive for oxidase activity, strongly positive for catalase activity, negative for gelatinase activity, failed to hydrolyze starch, and produced no brown pigment after incubation for 5 days on the tyrosine-supplemented medium. The organism did not react with fluorescein-conjugated polyvalent anti-*Legionella* serum, but it did react with conjugated antibody to *T. micdadei*. When DNA of this isolate was reacted with DNA from a known *T. micdadei* strain (Tatlock), a high level of homology was seen at both 64°C (87%) and 75°C (80%), confirming the identity of this isolate. No significant homology (<3%) was seen with DNA from *L. pneumophila* Philadelphia 1, *Fluoribacter bozemanae* (*Legionella bozemanii* WIGA), *F. dumoffii* NY-23, or *F. gormanii* LS-13 (2, 7).

PPA is a newly recognized cause of pneumonia (12) which, to date, has only been reported as causing nosocomial infection (10, 13). In addition to our previously reported isolation of PPA from ultrasonic nebulizers, we now report the isolation of this organism from a shower head within our hospital. Although four patients acquired culture-positive PPA pneumonia at our hospital, no link could be established between these patients and the contaminated shower.

† Address reprint requests to: Arnold Brown, Associate Chief of Staff, Research and Development, W. J. B. Dorn Veterans' Hospital (544/151), Columbia, SC 29201.

However, we believe that the isolation of this organism from shower heads may be clinically significant because it provides further evidence that a water-associated reservoir exists within the hospital. In addition, since an aerosol is produced by showering, this is a plausible source for the transmission of an organism producing pneumonia.

This work was supported in part by the General Medical Research Service of the Veterans Administration.

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