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Unexpected Isolation of *Bordetella pertussis* from Patients with Acquired Immunodeficiency Syndrome

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We isolated *Bordetella pertussis* from three patients with acquired immunodeficiency syndrome who underwent diagnostic bronchoscopy for evaluation of respiratory symptoms. The *B. pertussis* isolates were recovered from medium (charcoal-yeast extract agar) formulated to enhance recovery of *Legionella* spp., and one of the isolates stained positively with antisera directed against *Legionella* spp.

Bordetella pertussis primarily infects and causes severe respiratory disease in young children, although it has been rarely associated with disease in adults (3, 4, 7). *B. pertussis* does not survive well in the environment and is most likely spread from patient to patient during the incubation or catarrhal phase. The organism can occasionally be recovered from nasopharyngeal swabs of asymptomatic adults who have been exposed to infected children (3, 4). The possibility of an asymptomatic nasopharyngeal carrier state in the adult remains controversial (3). We report here the unexpected isolation of *B. pertussis* from three patients with acquired immunodeficiency syndrome.

Three homosexual males underwent diagnostic bronchoscopy for evaluation of respiratory symptoms. Bronchoalveolar-lavage (BAL) and transbronchial-biopsy (TBB) specimens were examined for the presence of *Pneumocystis carinii* and were processed for bacterial, viral, chlamydial, and fungal cultures. The protocol for bacterial culturing included inoculation of charcoal-yeast extract (CYE) agar (1) as a screening method for the detection of *Legionella* spp.

Patient 1, a homosexual intravenous-drug abuser, had a medical history of hepatitis, syphilis, and oral thrush. His BAL and TBB specimens did not contain *P. carinii*; *Candida albicans*, nasopharyngeal flora, and *B. pertussis* were recovered from bacterial cultures of his BAL and TBB specimens. The *B. pertussis* grew on CYE agar as pearly white pinpoint colonies of gram-negative, oxidase-positive coccobacilli which failed to stain with any of the fluorescent antibodies (obtained from the Centers for Disease Control, Atlanta, Ga.) directed against the different serogroups of *Legionella* spp. This culture was sent to a reference laboratory (California State Department of Public Health, Berkeley), where a final identification of *B. pertussis* was made.

Patient 2, a homosexual male, was diagnosed with *P. carinii* pneumonia. Cytomegalovirus, viridans group *Streptococcus* spp., *Enterobacter aerogenes*, *Neisseria* spp. (pharyngitidis group), *Chlamydia trachomatis*, and *B. pertussis* were recovered from viral, chlamydial, and bacterial cultures of his BAL and TBB specimens. *B. pertussis* was recovered from the inoculated CYE agar, and the biochemical identification was confirmed by direct fluorescent-antibody staining.

Patient 3, a homosexual male with Kaposi's sarcoma and a history of *P. carinii* pneumonia, had a sudden onset of respiratory distress. BAL and TBB failed to reveal *P. carinii*. Chlamydial culture was not performed. No viruses were recovered; viridans group *Streptococcus* sp. and numerous *B. pertussis* were recovered from bacterial culture of his BAL specimens. *B. pertussis* was recovered as an oxidase-positive, catalase-positive, gelatin-negative, nonmotile, gram-negative rod from the CYE agar and did not react with the pooled *Legionella* antiserum obtained from the Centers for Disease Control. However, this isolate stained positively with polyvalent *Legionella* antiserum directed against groups 1 through 6 and *Legionella micdadei* (obtained from Zeus, Raritan, N.J.). The isolate was identified as *B. pertussis* by the California State Department of Public Health, Berkeley; it stained positively with *B. pertussis* antiserum (Difco Laboratories, Detroit, Mich.) and stained weakly with *L. pneumophila* type 4 antiserum (obtained from the Centers for Disease Control). Patient 3 responded to erythromycin therapy; however, numerous *B. pertussis* colonies were recovered from a BAL specimen taken 13 days after the first BAL.

The isolation and identification of *B. pertussis* by our laboratories were entirely accidental in case 1 and unexpected in cases 2 and 3. We initially thought we had isolated a *Legionella* sp., since the CYE agar on which the *B. pertussis* grew was specifically designed as an enrichment medium for the isolation of *Legionella* species (1). However, an enriched charcoal-containing medium for the transport and isolation of *B. pertussis* has been previously described (2, 5). It must be emphasized that both genera will grow on CYE agar (6); however, colonial morphology will differ. Also, *B. pertussis* is a minute coccobacillus, and *Legionella* spp. are rods 2 to 20 μm long.

Microbiologists need to be aware of the potential for confusing *Bordetella* and *Legionella* spp. if fluorescent-antibody staining is used as the final identification step, since cross-reacting antigens may be present, as in the case of patient 3.

It is well known that adults can be infected with *B. pertussis*, even after successful childhood vaccination (3). The concurrent isolation of oropharyngeal flora in these patients argues against pulmonic infection and instead demonstrates oropharyngeal carriage of and infection with *B. pertussis*. It is tempting to attribute at least some of the respiratory symptoms of patients 1 and 2 to infection with *B. pertussis*. Since patient 3 had no other identifiable pathogen and responded clinically to erythromycin therapy, it is more likely that *B. pertussis* was the cause of his respiratory distress.

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The recovery of *B. pertussis* raises the general issue of prevalence of this organism in the population with or at risk for acquired immunodeficiency syndrome. An estimate of the prevalence is not possible, as bronchoscopy is not the ideal diagnostic technique by which to obtain specimens for isolation of *B. pertussis*. The route of transmission of *B. pertussis* to these patients with acquired immunodeficiency syndrome is unknown, but it must be assumed that patient-to-patient contact occurred. No contact with an infected child or adult was mentioned in the chart; however, it was not clear if such direct questions were asked during the initial patient interview.

From an infection control point of view, patients with *B. pertussis* infection should be isolated to prevent transmission of the infection to susceptible children and adults. Since the culture results for patients 1 and 2 were not known until after patient discharge, neither patient was isolated or treated specifically for *B. pertussis* infection during his hospital stay. Patient 3 was initially empirically treated with erythromycin before *B. pertussis* was isolated and identified.

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