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Pseudomonas Cross-Infection from Cystic Fibrosis Patients to Non-Cystic Fibrosis Patients: Implications for Inpatient Care of Respiratory Patients

P. Robinson,[1]* R. Carzino,[1] D. Armstrong,[2] and A. Olinsky[1]

Cystic Fibrosis Unit, Department of Respiratory Medicine, Royal Children's Hospital,[1] and Department of Respiratory and Sleep Medicine, Monash Medical Centre,[2] Melbourne, Australia

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A 14-year-old boy with bronchiectasis secondary to chronic aspiration developed multiresistant *Pseudomonas aeruginosa* lower respiratory disease following several inpatient periods where accommodation and physiotherapy services were shared with cystic fibrosis (CF) patients known to be infected with the genetically identical strain of *P. aeruginosa*. Cross-infection with *P. aeruginosa* between CF patients and non-CF patients has not previously been described, and this finding raises significant issues relevant to the treatment of patients with non-CF suppurative lung disease.

Recently, several cystic fibrosis (CF) centers have reported outbreaks of infection with epidemic strains of *Pseudomonas aeruginosa* (1, 2). The recent report from our center described an epidemic *P. aeruginosa* strain that was associated with widespread cross-infection between CF patients (1). As a result, cohort segregation was introduced to prevent further hospital-based cross-infection. Recently, we have identified a patient with non-CF bronchiectasis who became colonized with our epidemic strain of *P. aeruginosa* after inpatient contact with CF patients infected with this organism. The infection has been associated with a significant deterioration in his respiratory status. This finding raises implications for the treatment of non-CF individuals with underlying lung disease.

Case report. A 14-year-old boy with a history of long-segment esophageal atresia repair complicated by long-standing esophageal dysmotility was found by a high-resolution computed tomography scan, at 9 years, to have regional bronchiectasis involving the right middle and lower lobes bilaterally. The bronchiectasis was associated with an increased number of respiratory exacerbations requiring periods of hospitalization for intravenous antibiotic therapy and aggressive chest physiotherapy. At 9 years, his first admission for treatment of a respiratory exacerbation was to a general medical ward. No CF patients were nursed on this ward. He received six more treatment periods on this ward over the next 2 years. Sputum culture grew *Streptococcus pneumoniae* on one occasion. No other bacterial pathogens were identified. At age 12.3 years, he was admitted to the adolescent ward for a further period of in-hospital treatment. Sputum culture on admission did not grow any bacterial pathogens. During this admission, he was nursed in a six-bed room in which four patients with CF were being nursed. All four CF patients had our epidemic strain of *P. aeruginosa* in their sputum. He attended physiotherapy with these CF patients. He was readmitted for a further period of in-hospital treatment 6 weeks later. On admission, *P. aeruginosa* was recovered from his sputum, subsequently shown by bacterial genotyping to be identical to the epidemic strain previously reported in our CF population (1). A sweat test performed was normal, and analysis of his blood for the 17 commonest CF genes found in the Australian population did not identify any CF genes. Since the identification of *P. aeruginosa* in his sputum, he has struggled to maintain his baseline lung function and respiratory status and has had frequent admissions for intravenous antibiotic therapy and physiotherapy. At his last admission in Feb 2003, his forced expiratory volume in the first second was 23.8% predicted. He is currently being evaluated for lung transplantation.

Implications for patient care. The recent ability to identify, through DNA typing, the passage of bacterial pathogens, in particular *P. aeruginosa*, between patients with CF has led to a major alteration in clinical practice in many CF centers. Infection control practices have led to cohorting at various clinical levels, including inpatient housing and physiotherapy sessions as well as outpatient-based services such as outpatient clinics and educational sessions. This present report suggests that in centers where epidemic strains of *P. aeruginosa* may be present, these cohorting practices may need to be extended to include the larger group of respiratory patients with underlying suppurative lung disease. Pediatric respiratory medicine involves the care of patients with chronic lung disease from various causes, such as bronchiectasis from recurrent aspiration and inhalation burns as well as generalized conditions including inherited or medically induced immune suppression states. Traditionally, *P. aeruginosa* is an uncommon lower airway pathogen in these persons. This present report, however, suggests that cross-infection from *P. aeruginosa*-positive CF patients to patients with underlying non-CF lung disease can occur in the presence of an epidemic strain of *P. aeruginosa*.

* Corresponding author. Mailing address: Department of Respiratory Medicine, Royal Children's Hospital, Parkville 3052, Victoria, Australia. Phone: 61-3-9345 5818. Fax: 61-3-9349 1289. E-mail: philrob@rch.org.au.

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