Common strain of bacteria found in patients with cystic fibrosis in Canada

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A common transmissible strain of the bacteria *Pseudomonas aeruginosa* has been identified among cystic fibrosis (CF) patients in Canada, suggesting that cross-infection has occurred widely between CF centers in the United Kingdom and Canada, according to a study in the November 17 issue of *JAMA*. Infection with this strain among Canadian CF patients has been associated with an increased risk of death or lung transplantation.

There is variability in the type and timing of outcome among CF patients who are infected with *P aeruginosa*; some patients experience a rapid decline in pulmonary function after infection and others harbor the organism for extended periods without any obvious adverse effects. The marked difference in prognosis among patients with *P aeruginosa* has not been adequately explained, but it may be due in part to differences among infecting strains, according to background information in the article.

Shawn D. Aaron, M.D., of Ottawa Hospital Research Institute, Ottawa, Ontario, Canada, and colleagues conducted a study to determine whether patients with CF in the province of Ontario were infected with transmissible strains of *P aeruginosa*, and if so, to determine the prevalence of infection and the incidence rates of new infection with these strains. Transmissible strains of *P aeruginosa* have not previously been described in North American patients with CF. The study included adult patients cared for at cystic fibrosis clinics in Ontario, with enrollment from September 2005 to September 2008. Sputum was

collected at the beginning of the study, 3 months, and yearly thereafter for 3 years, and *P aeruginosa* isolates were genotyped. Vital status (death or lung transplant) was assessed for all enrolled patients until December 31, 2009.

The researchers found that of the 446 patients with cystic fibrosis studied, 102 were discovered to be infected with 1 of 2 common transmissible strains of *P aeruginosa* at study entry. "Sixty-seven patients were infected with strain A (15 percent), 32 were infected with strain B (7 percent), and 3 were simultaneously infected with both strains (0.6 percent). Strain A was found to be genetically identical to the Liverpool epidemic strain [a strain first identified in 1996] but strain B has not been previously described as an epidemic strain. The incidence rate of new infections with these 2 transmissible strains was relatively low. Compared with patients infected with unique strains of *P aeruginosa*, patients infected with the Liverpool epidemic strain (strain A) and strain B had similar declines in lung function," the authors write.

Death or lung transplant occurred at twice the rate in patients (n = 13) infected with *P aeruginosa* strain A (18.6 percent), compared to patients (n = 19) infected with unique strains (8.7 percent). "Infection with *P aeruginosa* strain A was associated with a greater 3-year risk of death or lung transplantation compared with patients infected with unique strains. Infection with *P aeruginosa* strain B was not significantly associated with a greater 3-year risk of death or lung transplantation compared with patients infected with unique strains," the researchers note.

"The results of our study indicate that a sizable minority of adult Canadian patients with CF living in the province of Ontario are infected with 1 of 2 common strains of *P aeruginosa*. The most prevalent transmissible strain found was the Liverpool epidemic strain, which was found to infect more than 15 percent of Ontario patients. This same strain is known to infect approximately 11 percent of patients with CF

who receive their care in 1 of 15 CF clinics in England and Wales. Our study is the first report to suggest that common strains of *P aeruginosa* are shared among patients located on different continents. Our data suggest that cross-infection with *P aeruginosa* has occurred widely both within Ontario and between CF centers in the United Kingdom and Canada."

The authors add that cross-infection with transmissible strains of *P aeruginosa* may be resulting from close patient-to-patient contact among infected and noninfected patients, including from airborne transmission of *P aeruginosa* via coughing.

It is currently unknown if infection with the Liverpool epidemic strain or with other transmissible strains of *P aeruginosa* is prevalent among U.S. patients with CF.

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