Pseudomonas: is chronic infection behind acute exacerbations in COPD?

Approximately half of acute exacerbations of chronic obstructive pulmonary disease (AECOPD) are associated with bacterial infection, and Pseudomonas aeruginosa is increasingly recognised as an important pathogen. Up to 13% of AECOPD are associated with P. aeruginosa in patients with severe airflow obstruction. Whether chronic infection with P. aeruginosa predisposes to AECOPD is not entirely clear.

Sputum samples positive for P. aeruginosa taken from 13 patients with AECOPD were compared with blood samples from 10 patients with acute baceraemia. Eight of the patients with COPD had sequential positive samples of P. aeruginosa at other AECOPD. Samples were molecularly typed and production of virulence factors, mutation rates and motility were investigated.

Each of the eight patients with COPD with sequential infections had established P. aeruginosa clones. There was no indication of transmission of these clones between patients. These strains showed aspects of the characteristic evolution of chronic P. aeruginosa infections seen in patients with cystic fibrosis (CF). Unsurprisingly, recurrent infections were linked with bacteria which were hypermutable and displayed increasing antibiotic resistance. When compared with the P. aeruginosa isolates from blood, those from the lung produced more biofilm and were less cytotoxic and motile.

The authors have shown that expression of virulence factors differs in acute and chronic P. aeruginosa infection. This study therefore supports others in demonstrating that P. aeruginosa can cause a chronic infection in COPD similar to that seen in patients with CF. Using data from CF studies may provide important information on the management of this process.