Cystic Fibrosis Research News

Title:
STRUCTURED SURVEILLANCE OF ACHROMOBACTER, PANDORAEA AND RALSTONIA SPECIES FROM PATIENTS IN ENGLAND WITH CYSTIC FIBROSIS

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What was your research question?
We set up a surveillance study to assess the appearance (incidence) of Achromobacter, Pandoraea and Ralstonia among people with CF in England, as these may be bacteria emerging in people with CF. We also wanted to examine shared strains/types in CF clinics and to find out information about resistance to antibiotics in these bacteria.
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Why is this important?
As a reference laboratory we test for bacterial species that are difficult for hospitals to identify. However, we only receive samples from some hospitals, making it difficult to evaluate how common certain CF bacteria are. A structured surveillance approach meant that participating hospitals sent us a single sample of any Achromobacter, Pandoraea and Ralstonia species from each person with CF collected during the survey period. We were then able to assess how common these bacteria were, and whether people attending the same hospital had different strains/types of these bacteria.

What did you do?
We asked 13 hospitals in England to send one bacterial sample per person of Achromobacter, Pandoraea and Ralstonia over the seven-month study period to our reference laboratory in Public Health England. We identified the samples using a technique to look at the DNA of the bacteria, called “DNA sequencing”, and used “DNA fingerprinting/molecular typing” to look at the range of different strains/types. We also put together the information on antibiotic susceptibility testing (a procedure used to determine which antibiotics a specific organism or group of organisms are susceptible to) provided by the hospitals to examine how easy or difficult these infections might be to treat.

What did you find?
Our study showed that of 176 samples tested, 78.4% were Achromobacter, 16.5% were Pandoraea and only 5.1% were Ralstonia. We identified several examples of what are likely to be new Achromobacter and Pandoraea species. Pandoraea were found to be particularly resistant to antibiotics. Comparison of DNA fingerprints for each bacterial sample found that individuals mostly had their own individual strain/type. Two small “clusters” of highly similar strains of Achromobacter and one of Pandoraea were found. In a small number of cases this may have been due to cross-infection between patients, but for other examples no patient link could be found.

What does this mean and reasons for caution?
Our survey showed us that by including six hospitals that do not normally send us these bacteria we could identify potentially new species of Achromobacter and Pandoraea species, which may help us to develop a better understanding of any differences between these species for CF people in the future. DNA fingerprinting suggested that most individuals have their own unique bacterial strain, and that cross-infection within clinics was relatively limited. The provision of data from hospitals relating to antibiotic resistance suggested that
Pandoraea was particularly resistant, however, testing methods differed between hospitals making it difficult to accurately evaluate this.

**What’s next?**
A structured surveillance approach highlighted the existence of likely new species, revealed information about antibiotic testing and resistance, and detected some “clusters” of similar strains that might otherwise not have been found. We hope to conduct further surveillance studies in the future, working closely with clinical colleagues to investigate bacteria that may be particularly relevant to those with CF.

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