

Cystic Fibrosis Research News

Title:

Ceftaroline Pharmacokinetics and Pharmacodynamics in Patients with Cystic Fibrosis

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What was your research question?

Is a ceftaroline dose of 15 mg per kg (up to a maximum of 600mg) every eight hours adequate to treat methicillin-resistant *Staphylococcus aureus* (MRSA) infection in a person with cystic fibrosis (CF)?

Why is this important?

MRSA is a common bacteria in people in the US with CF and is associated with worse respiratory outcomes. Unfortunately, current therapies for MRSA have important limitations, such as toxicity to the kidneys. Ceftaroline is a newer antibiotic that can treat MRSA. While people with CF are known to require higher doses of many antibiotics because they process the antibiotics more quickly, there are currently minimal data regarding what dose of ceftaroline should be used in people with CF.

What did you do?

We conducted a prospective study to determine if the current dose of ceftaroline that we are using in our hospital, which is higher than the dose used in the non-CF population, is appropriate for the treatment of people with CF. We enrolled seven children and adults

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with CF for a total of 10 treatment courses, when they were hospitalized for pulmonary exacerbations and receiving ceftaroline to treat their MRSA infections. We collected up to eight blood samples for each treatment course and measured ceftaroline levels. We looked at the levels of ceftaroline in the blood and how fast people with CF clear ceftaroline from the blood to determine if the antibiotic dosing was adequate to kill the MRSA bacteria.

What did you find?

We found that people with CF process ceftaroline more quickly than has been shown in studies of people who don't have CF. A dose of 15 mg per kg (up to a maximum of 600mg) every eight hours, which is higher than the dose used in non-CF patients, was adequate. In other words, the dose was sufficient to kill the MRSA bacteria and therefore, appears to be an appropriate dose for people with CF. We did not detect any adverse events of the medication in any individual.

What does this mean and reasons for caution?

This study included only a few people and was a preliminary study to explore the appropriate dosing of this medication in people with CF. It suggests that people with CF likely need a higher dose of ceftaroline than the non-CF population, but this finding should be confirmed in a study with a larger number of patients. In addition, this study did not evaluate how well ceftaroline treats pulmonary exacerbations.

What's next?

Next steps might include a larger study to confirm the findings, as well as a study exploring how effective ceftaroline is in improving lung function in people with CF and MRSA infection, ideally in comparison to other antibiotics that treat MRSA such as vancomycin.

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