

## September 2014 Phoenix Pulmonary Journal Club: Inhaled Antibiotics

The September 2014 pulmonary journal club focused on the utilization of inhaled antibiotics in non-cystic fibrosis (CF) bronchiectasis.

A total of four papers were reviewed, inhaled tobramycin (1), inhaled gentamicin (2), inhaled colistin (3) and Inhaled aztreonam (4). Each of the trials were randomized, placebo-controlled trials with small sample sizes. An aggregate sample size from all four trials totaled 255 patients in the treatment arms. The largest sample size was seen in the aztreonam trial with 134 patients in the treatment group vs. 132 in the placebo group while the smallest was in the inhaled tobramycin, with 16 patients in the treatment arm vs. 15 in placebo. The inhaled tobramycin and gentamicin studies looked at reduction in bacterial colony forming units and sputum density, whereas the inhaled colistin and aztreonam studies incorporated time to exacerbations and quality of life indicators. None of the studies incorporated an airway clearance modality.

The results of the studies were not impressive. In the tobramycin and gentamicin trials the primary endpoints of a reduction of bacterial load and sputum density were reached but the effects were only sustained while on therapy. The colistin trial was the most promising as it showed that a > 80% adherence to inhaled therapy resulted in reduction in *Pseudomonas* bacterial load, improved quality of life and a delay in time to the first exacerbation. The aztreonam study was the largest of the four trials and looked at quality of life as its primary endpoint but failed to achieve its goal.

In the four trials the medications were well tolerated with main side effects being airway irritation and bronchospasm. There were no systemic side effects and the use of inhaled therapy did not change the bacterial resistance pattern.

The role of inhaled antibiotics in non-CF bronchiectasis remains unknown as the data is lacking. Translating what we know about CF bronchiectasis and applying it to non-CF bronchiectasis has not been successful. Future trials need to incorporate an airway treatment protocol such as flutter valve or chest vest therapy, and continue to use varying doses durations of therapy. The mechanism of action on the meds vary from bactericidal (colistin, aztreonam) to bacteriostatic (gentamicin, tobramycin), perhaps looking at a combination inhaled therapy for synergy is warranted? For now all we know from inhaled antibiotic therapy in non-CF bronchiectasis is that it's fairly well tolerated with no significant systemic toxicity but its efficacy is unproven.

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### *References*

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