Other Reviews - - Other Review

A network meta-analysis of the efficacy of inhaled antibiotics for chronic Pseudomonas infections in cystic fibrosis.

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Study design (if review, criteria of inclusion for studies)

Randomised controlled trials (RCTs) that compared inhaled tobramycin, colistin, aztreonam lysine for inhalation, amikacin or ciprofloxacin to each other or placebo in patients with cystic fibrosis aged at least six years with chronic P. aeruginosa infection, were eligible for inclusion. Studies had to use an approved antibiotic formulation, and the licensed dose, for inhalation (detailed in the paper).

Participants

CF patients with chronic Pseudomonas aeruginosa lung infection. Across the studies, the mean age ranged from 11 to 32 years, mean baseline FEV1% predicted ranged from 49.9% to 63.6% and half the studies recruited treatment-naïve populations.

Interventions

Inhaled antibiotics tobramycin, colistimethate sodium (colistin) and aztreonam lysine

Outcome measures

Percent change from baseline in forced expiratory volume in 1 second (FEV1)% predicted and P. aeruginosa sputum density; proportion of patients with use of additional anti-P. aeruginosa antibiotics and respiratory hospitalisations.

Main results

Eleven RCTs were included (2,197 participants; range 32 to 520); eight compared to placebo and three to active comparators. Of the 11 RCTs, eight were double-blind and three were open label. Nine RCTs analysed the treated population, five with no imputation of missing data, three used last observation carried forward, and one didn't report on imputation; two RCTS used a per protocol population. Duration of follow-up ranged from 4 to 24 weeks. The base case analysis included a network of seven RCTs; four RCTs were excluded due to a lack of chronic infection in all patients, differing naïve/exposed status, and patients only with mild FEV1 impairment. Tobramycin (powder or 300mg solution in 4 or 5ml), colistin and aztreonam lysine all showed improvement in the change from baseline in FEV1% predicted at four weeks over placebo, tobramycin powder and 300mg in 5ml solution significantly so. The tobramycin preparations, colistin and aztreonam lysine showed comparable improvements in efficacy at four weeks. The difference for tobramycin powder was -0.55 (95% CrI -3.5 to 2.4) compared to the 300mg in 5ml solution, -0.64 (95% CrI -7.1 to 5.7) compared to the 300mg in 4ml solution, 3.64 (95% CrI -1.0 to 8.3) compared to aztreonam lysine, and 5.77 (95% CrI -1.2 to 12.8) compared to colistin. Results for the other comparisons and a range of scenario analyses were also reported. Results for P. aeruginosa sputum density at four weeks were variable and subject to high degrees of uncertainty. There were insufficient data to produce reliable results for percentage change from baseline in FEV1% predicted at 20 weeks, P. aeruginosa sputum density at 20 weeks, respiratory hospitalisation and anti-P. aeruginosa antibiotic use at 24 weeks.

Authors' conclusions

Inhaled tobramycin (powder or solution), colistin and aztreonam lysine were comparable in their effectiveness for treating chronic Pseudomonas aeruginosa lung infection in people with cystic fibrosis. The limitations of the review, uncertainty around trial quality and the small number of trials informing the network meta-analysis, means the conclusions should be treated with caution.

http://onlinelibrary.wiley.com/o/cochrane/cldare/articles/DARE-12012044823/frame.html

See also

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Keywords

Anti-Bacterial Agents; Bacterial Infections; Infection; Inhalation OR nebulised; nebuliser; pharmacological_intervention; Pseudomonas

aeruginosa; Pseudomonas; Respiratory Tract Diseases; Respiratory Tract Infections; Aztreonam; Colistin; Tobramycin; Exacerbation; Aminoglycosides; Monobactams; other anti-bacterial agents;