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Antibiotic treatment for nonâ€•tuberculous mycobacteria lung infection in people with cystic fibrosis

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

Any randomized controlled trials comparing nontuberculous mycobacteria antibiotics to no antibiotic treatment, as well as one nontuberculous mycobacteria antibiotic regimen compared to another nontuberculous mycobacteria antibiotic regimen, in individuals with cystic fibrosis.

Participants

Adults and children diagnosed with CF who have NTM pulmonary infection (at least one respiratory specimen positive by culture for NTM)

Interventions

antibiotics to treat NTM pulmonary infections. NTM antibiotics vs no antibiotic treatment as well as one NTM antibiotic regimen compared to another NTM antibiotic regimen. Single or multiple, oral, inhaled or intravenous antibiotics.

Outcome measures

Primary outcomes: 1. Lung function (FEV1, FVC, FEF25â^'75); 2. Pulmonary exacerbations; 3. Adverse events.

Main results

Due to a lack of studies of the types planned, we were only able to include a single retrospective case review, which presented data as the change from baseline for some outcomes. It was conducted in Sweden in 2003 and included 11 participants with CF and NTM infection (three males) aged between 10 and 36 years. The study identified the specific cystic fibrosis transmembrane conductance regulator (CFTR) mutation for 10 participants. All participants were chronically colonised with Pseudomonas aeruginosa; 10 participants had been vaccinated with the Bacillus Calmetteâ€•GuÃ©rin vaccine. Antibiotic selection differed amongst participants and was determined according to in vitro susceptibility testing. Antibiotics included isoniazid, ethambutol, rifampicin (or rifabutin), amikacin, clarithromycin, ciprofloxacin, streptomycin and clofazimine. Of note, at the start of the study, isoniazid was the standard treatment for NTM, and three participants received this drug; however, investigators stated that following severe adverse effects, the drug was excluded in the latter part of the 1980s. Investigators reported data for lung function, weight and adverse events one year before NTM diagnosis, at baseline, at completion of therapy and at the latest followâ€•up (ranging from one to 14 years). Treatment was considered effective if NTM was cleared and cultures remained negative throughout treatment; it was considered to have failed if there were continued or sporadic positive cultures. Authors graded all the evidence as very low and are very uncertain of the effects of the different antibiotic regimens on any of the outcomes reported. The study reported that in 10/11 participants, microbiological cultures turned negative. They also stated that five participants reported adverse events; three reported photosensitivity to ciprofloxacin, while each of the following events was reported by one of the five participants: impaired hearing, convulsions, neuropathy and lupus erythematous. There was no consistent effect on lung function. Investigators reported that forced expiratory volume in one second increased by between 1% predicted and 46% predicted in six participants, decreased between 2% predicted and 31% predicted in four participants and remained the same in one participant. They also reported that forced vital capacity increased in eight participants by between 3% predicted and 53% predicted, and decreased in three participants by between 4% predicted and 21% predicted. Two participants died as a result of progression of CF respiratory disease two years after completion of therapy. A further participant died of gastrointestinal bleeding and renal insufficiency eight years after lung transplant which followed clearance of NTM infection (negative NTM cultures were maintained until death). Eight participants gained weight (range 3.30 kg to 14.00 kg), while three participants lost weight (range â^'0.90 kg to â^'6.00 kg). Investigators additionally reported body mass index values in three participants, which decreased minimally in two participants and increased slightly in the third participant.

Authors' conclusions

The very lowâ€•certainty evidence identified in this review suggests that antimicrobial treatment may lead to sputum clearance of NTM in people with CF, but may result in variable clinical response in terms of lung function. Very lowâ€•certainty evidence also suggests that adverse events may be common, necessitating close monitoring. This review highlights the need for larger, more standardised studies in order to make meaningful comparisons between treatment regimens. Although microbiological clearance seems feasible, studies should be powered to detect relevant clinical outcomes as well.

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See also

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Keywords

Adult; Aged; Bacterial Infections; Infection; Mycobacteriosis; pharmacological_intervention; Respiratory Tract Diseases; Respiratory Tract Infections; Anti-Bacterial Agents;