primary studies - published RCT

Reduced effect of inhaled beta 2-adrenergic agonists on lung mucociliary clearance in patients with cystic fibrosis.

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

double-blind, randomized cross-over trial.

Participants

10 young patients with CF were studied; three were heterozygous for deletion of the phenylalanine at position 508 (delta F508), and seven were delta F508 homozygous.

Interventions

Inhalation of 1 mg of terbutaline (4 puffs) and placebo via a metered-dose inhaler by spacer.

Outcome measures

The largest differences in tracheobronchial retention (percent) in the whole lung and regional lung zones were generally observed within 1 h after terbutaline and placebo treatment

Main results

whole lung (mean +/- SD), 60 +/- 22 percent and 63 +/- 20 percent; central zone, 41 +/- 19 percent and 50 +/- 25 percent; midzones, 65 +/- 27 percent and 63 +/- 19 percent; and peripheral zones, 77 +/- 28 percent and 72 +/- 28 percent, respectively [p > 0.1]. Whereas none of these differences was statistically significant, subanalyses suggested an improvement in mucociliary clearance by terbutaline in the three delta F508 heterozygous patients but not in the seven delta F508 homozygous patients. One minute of voluntary coughing resulted in clearance of less than 8 percent of the initial radioactivity, with a trend of more peripheral zone clearance after terbutaline compared with placebo. A small significant decrease in airway resistance was detected 3 h after terbutaline.

Authors' conclusions

1 mg of terbutaline did not improve mucociliary clearance significantly in the patients with CF. Also, the effect of terbutaline was much less than demonstrated earlier in healthy subjects. This is consistent with earlier findings of a lack of beta-adrenergic modulation of Cl- transport in CF. Thus, no rehydration of the dry mucus in CF is expected, and a possible beta 2-agonist-induced increase in ciliary beating would have only a minor effect on overall mucociliary clearance.

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See also

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Keywords

Adolescent; Adrenergic beta-Agonists; Airway clearance technique; Child; Inhalation OR nebulised; non pharmacological intervention - devices OR physiotherapy; pharmacological_intervention; placebo; Terbutaline; Airway clearance drugs -expectorants- mucolytic-mucociliary-; Bronchodilator Agents; Respiratory System Agents;