primary studies - published RCT

Targeting aerosol deposition in patients with cystic fibrosis: effects of alterations in particle size and inspiratory flow rate.

Code: PM11035679 **Year:** 2000 **Date:** 2000 **Author:** Laube BL

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

Randomized clinical trial. Outpatient research laboratory.

Participants

9 adult patients with CF

Interventions

Patients inhaled an aerosol comprised of 3.68+/-0.04 microm saline solution droplets (two visits) or 1.01+/- 0.2 microm saline solution droplets (two visits) for 30 s, starting from functional residual capacity and breathing at a slow or faster inspiratory flow rate. On all visits, the saline solution was admixed with the radioisotope (99m)Tc. Immediately after inhalation, a gamma camera recorded the deposition pattern of the radioaerosol in the lungs. Deposition images were analyzed in terms of the inner:outer zone (I:O) ratio, a measure of deposition in an inner zone (large, central airways) vs. an outer zone (small airways and alveoli).

Outcome measures

aerosol distribution within the lungs, deposition.

Main results

For the 3.68-microm aerosol, I:O ratios averaged 2.29+/-1.45 and 2.54+/-1.48 (p>0.05), indicating that aerosol distribution within the lungs was unchanged while breathing at 12+/-2 L/min vs. 31+/-5 L/min, respectively. For the 1.01-microm aerosol, I:O ratios averaged 2.09+/-0.96 and 3.19+/-1.95 (p

Authors' conclusions

These results suggest that the targeted delivery of an aerosol to the smaller, peripheral airways or the larger, central airways of adult CF patients may be achieved by generating an aerosol comprised of approximately 1.0-microm particles and inspiring from functional residual capacity at approximately 18 L/min and approximately 38 L/min, respectively.

http://dx.doi.org/10.1378/chest.118.4.1069

See also

Chest. 2000 Oct;118(4):1069-76.

Keywords

Adult; Inhalation OR nebulised; nebuliser; non pharmacological intervention - devices OR physiotherapy;