primary studies - published RCT

Evaluation of positive expiratory pressure as an adjunct to chest physiotherapy in the treatment of cystic fibrosis.

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

Cross-over design. Each treatment given 4 times daily for 1 day. Randomised trial.

Participants

18 participants (12 male); mean age 22.5 years, range 13 - 37 years; mean FEV1 1.3, range 0.45 - 3.25 litres; and FVC was 2.5, range 1.1 - 5.1 litres. All participants were studied close to the end of an admission to hospital with an exacerbation of their lung infection. CF confirmed by positive sweat test, malabsorption, and chronic lung infection.

Interventions

1. PEP treatment in sitting (PEPs). Pressure 12 - 17 cm H2O using an Astra Meditec PEP mouthpiece. Seated participants exhaled 6 times through the mouthpiece, followed by relaxed breathing, 1 - 2 forced expirations (huffs) from mid to low lung volume, rel 2. PEP in postural drainage (PEPpd). The same breathing regimen was performed in (usually) two postural drainage positions chosen before the start of the study as the most appropriate from (undescribed) clinical assessment. 3. Breathing exercises in postural drainage positions (BEpd). Participants performed the same breathing and positioning regimen, but did not exhale through the PEP mask when deep breathing. In each intervention, the respiratory manoeuvres described above were continued in cycles until the participant and physiotherapist felt that forced expiration and coughing no longer resulted in expectoration. Four treatment sessions were performed per day.

Outcome measures

FEV and FVC recorded before and 30 minutes after the first treatment each day and 30 minutes after the third treatment each day. Weight of sputum during treatment and up to 30 minutes after each treatment. Weight of sputum produced in the non-treatment periods over each 24 hour period of the study (non-treatment sputum). SpO2 was recorded for 10 minutes before the first treatment each day and for 30 minutes after treatment

Main results

Treatment A consisted of breathing exercises emphasising inspiration, interspersed with the forced expiration technique in gravity assisted positions; treatment B comprised breathing exercises with positive expiratory pressure alternating with the forced expiration technique in the same gravity assisted positions; and treatment C comprised breathing exercises with positive expiratory pressure and the forced expiration technique in the sitting position. During treatment A a significantly greater quantity of sputum was produced than during treatments B and C (p less than 0.025 and p less than 0.001 respectively). Treatment B produced more sputum than treatment C (p less than 0.005). There were no significant differences in arterial oxygen saturation, FEV1 or forced vital capacity. Most adolescent and adult patients are able to carry out their treatment independently using gravity assisted positions, breathing exercises emphasising inspiration, and the forced expiration technique. Sputum clearance was less effective when positive expiratory pressure was included in the treatment regimen.

http://www.mrw.interscience.wiley.com/cochrane/clcentral/articles/365/CN-00048365/frame.html

See also

Thorax. 1986 Dec;41(12):951-4.

Keywords

Adolescent; Adult; non pharmacological intervention - devices OR physiotherapy; Positive-Pressure Respiration- PEP- pep mask; Airway clearance technique; exercise; Postural Drainage; Chest physiotherapy; Active Cycle of Breathing Technique -ACBT-; forced expiration technique;