Cochrane Database of Systematic Reviews - - Cochrane Review

Airway clearance techniques compared to no airway clearance techniques for cystic fibrosis

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

Randomised or quasi-randomised clinical trials in which a form of chest physiotherapy (airway clearance technique) were taken for consideration in people with cystic fibrosis compared with either no physiotherapy treatment or spontaneous cough alone.

List of included studies (12)

Braggion 1995; Elkins 2005; Falk 1993; Jarad 2010; Mortensen 1991; Pfleger 1992; Rossman 1982; van der Schans 1991

Participants

People with CF, of any age, diagnosed on the basis of clinical criteria and sweat testing or genotype analysis.

Interventions

Chest physiotherapy

Outcome measures

Primary outcomes 1. Expectorated secretions (mucus, sputum, phlegm), dry or wet weight, or volume 2. Mucus transport rate (assessed by radioactive tracer clearance) 3. Pulmonary function tests (FEV1, FVC, FEF25â^'75)

Main results

We included 11 crossâ€•over studies (153 participants) and one parallel study (41 participants). There were differences between studies in how the interventions were delivered, with several intervention groups combining more than one ACT. One study used autogenic drainage; five used conventional chest physiotherapy; nine used positive expiratory pressure (PEP), with one study varying the water pressure between arms; three studies used oscillating PEP; two used exercise; and two used highâ€•frequency chest wall oscillation (HFCWO). Of the 12 included studies, 10 were singleâ€•treatment studies, and two delivered the intervention over two consecutive days (once daily in one study, twice daily in the second). This substantial heterogeneity in the treatment interventions precluded pooling of data for metaâ€•analysis. Blinding of participants, caregivers, and clinicians is impossible in airway clearance studies; we therefore judged all studies at unclear risk of performance bias. Lack of information in eight studies made assessment of risk of bias unclear for most other domains. We rated the certainty of evidence as low or very low due to the shortâ€•term crossâ€•over trial design, small numbers of participants, and uncertain risk of bias across most or all domains. Six studies (84 participants) reported no effect on pulmonary function variables following intervention; but one study (14 participants) reported an improvement in pulmonary function following the intervention in some of the treatment groups. Two studies reported lung clearance index: one (41 participants) found a variable response to treatment with HFCWO, whilst another (15 participants) found no effect on lung clearance index with PEP therapy (lowâ€•certainty evidence). Five studies (55 participants) reported that ACTs, including coughing, increased radioactive tracer clearance compared to control, while a further study (eight participants) reported no improvement in radioactive tracer clearance when comparing PEP to control, although coughing was discouraged during the PEP intervention. We rated the certainty of evidence on the effect of ACTs on radioactive tracer clearance as very low. Four studies (46 participants) investigated the weight of mucus cleared from the lungs and reported greater secretions during chest physiotherapy compared to a control. One study (18 participants) reported no differences in sputum weight (very lowâ€•certainty evidence).

Authors' conclusions

The evidence from this review shows that ACTs may have shortâ€•term effects on increasing mucus transport in people with CF. All included studies had shortâ€•term followâ€•up; consequently, we were unable to draw any conclusions on the longâ€•term effects of ACTs compared to no ACTs in people with CF. The evidence in this review represents the use of airway clearance techniques in a CF population before widespread use of cystic fibrosis transmembrane conductance regulator (CFTR) modulators. Further research is needed to determine the effectiveness and acceptability of airway clearance in those treated with highly effective CFTR modulators.

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See also

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Keywords

non pharmacological intervention - devices OR physiotherapy; Chest physiotherapy; Postural Drainage; Percussion; Positive-Pressure Respiration- PEP- pep mask; Active Cycle of Breathing Technique -ACBT-; forced expiration technique; exercise; High Frequency Chest Wall Oscillation -HFCWO-; VEST Airway Clearance System; oscillating devices; Acapella; flutter; Intrapulmonary Percussive Ventilation; Vibration; Autogenic drainage;