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Recombinant human growth hormone in the treatment of patients with cystic fibrosis

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

Randomised controlled studies and controlled clinical studies of oscillating devices compared with any other form of physiotherapy in people with CF. Single-treatment interventions (therapy technique used only once in the comparison) were excluded.

List of included studies (39)

App 1998; Arens 1994; Braggion 1995; Darbee 2005; Davies 2012; Giles 1996; Gondor 1999; Gotz 1995; Grzincich 2008; Hansen 1990; Hare 2002; Homnick 1995; Homnick 1998; Khan 2014; Kluft 1996; Lyons 1992; Marks 2001; McIlwaine 2001; McIlwaine 2013; Milne 2004; Modi 2006a; Modi 2006b; Newbold 2005; Oermann 2001; Osman 2010; Padman 1999a; Padman 1999b; Phillips 2004; Pike 1999; Prasad 2005; Pryor 1994; Pryor 2010; van Winden 1998; Varekojis 2003a; Varekojis 2003b; Warwick 1990; Warwick 2004; West 2010

Participants

Children (aged up to 16 years) and adults (16 years and above)with any degree of disease severity,with defined CF, diagnosed clinically and by sweat or genetic testing. Trials with participants enrolled during a period of stability or during a pulmonary exacerbation were both considered.

Interventions

Flutter; IPV; Oscillating devices (OD)

Outcome measures

Days of hospitalization; Dry sputum weight [g]; FEF 25-75 (% predicted); FEF25âˆ'75 [% change from baseline]; FEF25âˆ'75 [% predicted]; FEV1 [% change from baseline]; FEV1 [% predicted]; FVC [% change from baseline]; FVC [% predicted]; Level of oxygen saturation; Level of oxygen saturation in response to treatment (SaO2); Number of hospitalizations; Oxygen saturation (SaO2) [% change from baseline]; Patient satisfaction / overall preference; Quality of Life Indices; Residual volume [% change from baseline]; Six minute walking distance [metres]; Sputum volume [g]; Sputum volume [ml]; Sputum weight (dry) [g]; Sputum weight (wet) [g]; Sputum weight [g]; Wet sputum weight [g]

Main results

The searches identified 82 studies (330 references); 39 studies (total of 1114 participants) met the inclusion criteria. Studies varied in duration from up to one week to one year; 20 of the studies were crossâ€•over in design. The studies also varied in type of intervention and the outcomes measured, data were not published in sufficient detail in most of these studies, so metaâ€•analysis was limited. Few studies were considered to have a low risk of bias in any domain. It is not possible to blind participants and clinicians to physiotherapy interventions, but 13 studies did blind the outcome assessors. The quality of the evidence across all comparisons ranged from low to very low. Forced expiratory volume in one second was the most frequently measured outcome and while many of the studies reported an improvement in those people using a vibrating device compared to before the study, there were few differences when comparing the different devices to each other or to other airway clearance techniques. One study identified an increase in frequency of exacerbations requiring antibiotics whilst using high frequency chest wall oscillation when compared to positive expiratory pressure (lowâ€•quality evidence). There were some small but significant changes in secondary outcome variables such as sputum volume or weight, but not wholly in favour of oscillating devices and due to the lowâ€• or very lowâ€•quality evidence, it is not clear whether these were due to the particular intervention. Participant satisfaction was reported in 13 studies but again with lowâ€• or very lowâ€•quality evidence and not consistently in favour of an oscillating device, as some participants preferred breathing techniques or techniques used prior to the study interventions. The results for the remaining outcome measures were not examined or reported in sufficient detail to provide any highâ€•level evidence.

Authors' conclusions

There was no clear evidence that oscillation was a more or less effective intervention overall than other forms of physiotherapy;

furthermore there was no evidence that one device is superior to another. The findings from one study showing an increase in frequency of exacerbations requiring antibiotics whilst using an oscillating device compared to positive expiratory pressure may have significant resource implications. More adequatelyâ€•powered longâ€•term randomised controlled trials are necessary and outcomes measured should include frequency of exacerbations, individual preference, adherence to therapy and general satisfaction with treatment. Increased adherence to therapy may then lead to improvements in other parameters, such as exercise tolerance and respiratory function. Additional evidence is needed to evaluate whether oscillating devices combined with other forms of airway clearance is efficacious in people with cystic fibrosis.There may also be a requirement to consider the cost implication of devices over other forms of equally advantageous airway clearance techniques. Using the GRADE method to assess the quality of the evidence, we judged this to be low or very low quality, which suggests that further research is very likely to have an impact on confidence in any estimate of effect generated by future interventions.

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See also

Pediatrics YR: 2010 VL: 126 NO: 5 PG: e1211-e1226

Keywords

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