Cochrane Database of Systematic Reviews - - Cochrane Review

Nebulised hypertonic saline for cystic fibrosis

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

Controlled trials assessing HS compared to placebo or other mucolytic therapy, for any duration or dose regimen in people with CF (any age or disease severity).

List of included studies (24)

Adde 2004; Amin 2010; Ballmann 1998; Cardinale 2003; Chadwick 1997; Dentice 2016; Elkins 2006a; Eng 1996; Laube 2009; Mainz 2015; Riedler 1996; Robinson 1996; Robinson 1997; Robinson 1999; Rosenfeld 2012; Suri 2001; Weller 1980

Participants

People of all ages and of both sexes with CF diagnosed clinically or by sweat and genetic testing, including all degrees of disease severity.

Interventions

Hypertonic saline; Hypertonic saline 3% to 7%

Outcome measures

Adverse events; Average number of hospital admissions per participant; Average number of visits; Change in log10 colony forming units (CFU)/g from baseline at final visit; Delivery time (mins); Exercise tolerance - FCS; Exercise tolerance - oxygen saturation; Exercise tolerance - VAS for breathlessness; Improvement in FEV1 >10%; Mean percentage change in FEV1; Mean percentage change in FVC; Mean percentage change in quality of life score; Mucociliary clearance measured as area under the curve; Percentage change in FEV1; Percentage change in FVC; Quality of life, change from baseline; Radiolabelled isotope clearance at 60 mins; Visual analogue scale, feeling of cleared chest

Main results

We included 24 trials (1318 participants, aged one month to 56 years); we excluded 29 trials, two trials are ongoing and six are awaiting classification. We judged 15 of the 24 included trials to have a high risk of bias due to participants' ability to discern the taste of the solutions. - Hypertonic saline 3% to 7% versus placebo (stable disease) We are uncertain whether the regular use of nebulised hypertonic saline in stable lung disease leads to an improvement in forced expiratory volume in one second (FEV1) % predicted at four weeks, (mean difference (MD) 3.30%, 95% confidence interval (CI) 0.71 to 5.89; 4 trials, 246 participants; very lowâ€•certainty evidence). In preschool children we found no difference in lung clearance index (LCI) at four weeks, but a small improvement after 48 weeks of treatment with hypertonic saline compared to isotonic saline (MD â€•0.60, 95% CI â€•1.00 to â€•0.19; 2 trials, 192 participants). We are also uncertain whether hypertonic saline made a difference to mucociliary clearance, pulmonary exacerbations or adverse events compared to placebo. Hypertonic saline versus control (acute exacerbation) - Two trials compared hypertonic saline to control, but only one provided data. There may be little or no difference in lung function measured by FEV1 % predicted after hypertonic saline compared to isotonic saline (MD 5.10%, 95% CI â€•14.67 to 24.87; 1 trial, 130 participants). Neither trial reported any deaths or measures of sputum clearance. There were no serious adverse events. - Hypertonic saline versus rhDNase Three trials compared a similar dose of hypertonic saline to recombinant deoxyribonuclease (rhDNase); two trials (61 participants) provided data for inclusion in the review. We are uncertain whether there was an effect of hypertonic saline on FEV1 % predicted after three weeks (MD 1.60%, 95% CI â€•7.96 to 11.16; 1 trial, 14 participants; very lowâ€•certainty evidence). At three months, rhDNase may lead to a greater increase in FEV1 % predicted than hypertonic saline (5 mL twice daily) at 12 weeks in participants with moderate to severe lung disease (MD 8.00%, 95% CI 2.00 to 14.00; lowâ€•certainty evidence). We are uncertain whether adverse events differed between the two treatments. No deaths were reported. - Hypertonic saline versus amiloride One trial (12 participants) compared hypertonic saline to amiloride but did not report on most of our outcomes. The trial found that there was no difference between treatments in measures of sputum clearance (very lowâ€•certainty evidence). - Hypertonic saline compared with sodiumâ€•2â€•mercaptoethane sulphonate (MistabronÂ®) One trial (29 participants) compared hypertonic saline to sodiumâ€•2â€•mercaptoethane sulphonate. The trial did not measure our primary outcomes. There was no difference between treatments in any measures of sputum clearance, courses of antibiotics or adverse events (very lowâ€•certainty evidence). - Hypertonic saline versus mannitol One trial (12 participants) compared hypertonic saline to mannitol, but did not report lung function at relevant time points for this review; there were no differences in sputum clearance, but mannitol was reported to be more 'irritating' (very lowâ€•certainty evidence). - Hypertonic saline versus xylitol Two trials compared hypertonic saline to xylitol, but we are uncertain whether there is any difference in FEV1 % predicted or median time to exacerbation between groups (very

lowâ€•certainty evidence). No other outcomes were reported in the review. - Hypertonic saline 7% versus hypertonic saline 3% We are uncertain whether there was an improvement in FEV1 % predicted after treatment with 7% hypertonic saline compared with 3% (very lowâ€•certainty evidence).

Authors' conclusions

There is evidence to show that, compared with placebo, therapy with dornase alfa may improve lung function in people with cystic fibrosis in trials lasting from one month to two years. There was a decrease in pulmonary exacerbations in trials of six months or longer, probably due to treatment. Voice alteration and rash appear to be the only adverse events reported with increased frequency in randomised controlled trials. There is not enough evidence to firmly conclude if dornase alfa is superior to other hyperosmolar agents in improving lung function.

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See also

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Keywords

hydration; Hypertonic Solutions; Inhalation OR nebulised; nebuliser; non pharmacological intervention - devices OR physiotherapy; pharmacological_intervention; Airway clearance drugs -expectorants- mucolytic- mucociliary-; Respiratory System Agents;