Sodium Chloride (Saline) Inhalation for the Treatment of Cystic Fibrosis

Context
Cystic Fibrosis (CF) is an inherited genetic disease affecting the secretory glands — the glands that produce sweat and mucous. CF causes problems with the lungs, pancreas, liver, intestines, and other organs, but the primary difficulty for patients with CF is clearing purulent secretions from their respiratory tract. Pulmonary treatments have the goal of helping clear the thick mucous from the airways of patients with CF, and to reduce inflammation. In 2010, 3,849 Canadians were reported to have CF; of those individuals, 117 were newly diagnosed in that year. It’s estimated that one in 25 Canadians is a carrier for the condition.

Technology
Hypertonic saline (HTS) is a solution that contains a higher percentage of sodium chloride (3% and 7%) compared with “normal saline” that contains 0.9% sodium chloride. It is a mucoactive agent — a medication used to improve the clearance of airway secretions. Inhalation therapy with 3% and 7% HTS solutions is used in patients with CF who are six years of age or older to decrease the thickness of mucous and to increase sputum production (the coughing up and clearing of mucous from airways) in an effort to increase lung function and decrease the number of lung infections. Alternatives to HTS inhalation therapy include inhalation with normal (or isotonic) saline or treatment with a medication called rhDNase — used to decrease the thickness of mucous to help with sputum production.

Issue
There is uncertainty about the clinical and cost-effectiveness of HTS treatment in children and adults with CF and whether there is consistency in the recommendations for its use in evidence-based clinical guidelines.

Methods
A limited literature search was conducted of key resources, and titles and abstracts of the retrieved publications were reviewed. Full-text publications were evaluated for final article selection according to predetermined selection criteria (population, intervention, comparator, outcomes, and study designs).

Key Messages
- HTS inhalation therapy is recommended in a clinical guidelines document, and the evidence, although mixed, shows limited improvement of pulmonary functions in patients with CF compared with isotonic saline therapy.
- HTS inhalation therapy may not be as effective as treatment with rhDNase, but differences in outcomes between the two therapies may not be significant.
- HTS may be less cost-effective than rhDNase therapy in children, based on one study.

Results
A total of 132 citations were identified, with 24 potentially relevant articles retrieved for a full-text review. An additional three citations identified from the grey literature search were added. Of the 27 articles, 20 did not meet the inclusion criteria, leaving seven articles included in the review.