[Evidence-Based Medicine]

CHEST

Treating Cough Due to Non-CF and CF Bronchiectasis With Nonpharmacological Airway Clearance

CHEST Expert Panel Report

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BACKGROUND: In bronchiectasis due to cystic fibrosis (CF) and other causes, airway clearance is one of the mainstays of management. We conducted a systematic review on airway clearance by using non-pharmacological methods as recommended by international guidelines to develop recommendations or suggestions to update the 2006 CHEST guideline on cough.

METHODS: The systematic search for evidence examined the question, "*Is there evidence of clinically important treatment effects for non-pharmacological therapies in cough treatment for patients with bronchiectasis?*" Populations selected were all patients with bronchiectasis due to CF or non-CF bronchiectasis. The interventions explored were the non-pharmacological airway clearance therapies. The comparison populations included those receiving standard therapy and/or placebo. Clinically important outcomes that were explored were exacerbation rates, quality of life, hospitalizations, and mortality.

RESULTS: In both CF and non-CF bronchiectasis, there were systematic reviews and overviews of systematic reviews identified. Despite these findings, there were no large randomized controlled trials that explored the impact of airway clearance on exacerbation rates, quality of life, hospitalizations, or mortality.

CONCLUSIONS: Although the cough panel was not able to make recommendations, they have made consensus-based suggestions and provided direction for future studies to fill the gaps in knowledge.

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KEY WORDS: bronchiectasis; cough; cystic fibrosis; evidence-based medicine; guidelines

ABBREVIATIONS: ACBT = active cycle breathing technique; CCPT = conventional chest physiotherapy techniques; CF = cystic fibrosis; HFCWO = high-frequency chest wall oscillation; PEP = positive expiratory pressure; PICO = Population, Intervention, Comparator, Outcome

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Summary of Suggestions

1. For children and adults with productive cough due to bronchiectasis related to any cause, we suggest that they be taught airway clearance techniques by professionals with advanced training in airway clearance techniques. (Ungraded Consensus-Based Statement)

2. For children and adults with productive cough due to bronchiectasis related to any cause, we suggest that the frequency of airway clearance should be determined by disease severity and amount of secretions. (Ungraded Consensus-Based Statement)

3. For children and adults with productive cough due to bronchiectasis related to any cause, we suggest that airway clearance techniques are individualized as there are many different techniques. (Ungraded Consensus-Based Statement)

Remarks: These suggestions are based on clinicians' expertise in managing non-CF and CF bronchiectasis because there is a lack of large and/or high quality randomized controlled trials.

The costs can vary depending on the modality of airway clearance used. In European studies, the least expensive method, the active cycle breathing technique (ACBT) with or without postural drainage is used first line.[1] Other methods are considered if there is inability to carry out ACBT with or without postural drainage or there is a clinical deterioration necessitating alternative airway clearance techniques.

In bronchiectasis due to cystic fibrosis (CF) and other causes, treatment of respiratory infections and airway clearance techniques are mainstays of management. The aims of airway clearance are to mobilize secretions from the airways and provide some control of cough. In clinical practice, there are a variety of techniques: active cycle breathing with or without the assistance of postural drainage; positive expiratory pressure (PEP); flutter-type devices; airway oscillation; respiratory muscle training; coached coughing; huffing; cough assist device (insufflation/exsufflation); assisted coughing (eg, quad coughing); functional electrical stimulation; high-frequency chest wall oscillators; and general exercise. The aims of treatment are to clear the airways of tenacious secretions, reduce cough and sputum production, improve functional and health status, and reduce the frequency and/or severity of exacerbations. The current expert panel report focuses on airway clearance as recommended by international guidelines.[1-5] We present evidence-based reviews for the key question developed on using non-pharmacological airway clearance techniques for the management of people with bronchiectasis, summary of the evidence, and the formulated suggestions based on these findings using CHEST's cough guidelines methods and framework.[6]

Methods

The methods of the CHEST Guideline Oversight Committee[6] were used to select the Expert Cough Panel Chair and the international panel of pediatric and adult experts in non CF-bronchiectasis and CF to synthesize the evidence and to develop the suggestions that are contained within this article. In addition to the quality of the evidence, the recommendation/suggestion grading also includes a strength of recommendation dimension, used for all CHEST Guidelines.[6] The strength of recommendation here is based on consideration of three factors: balance of benefits to harms, patient values and preferences, and resource considerations. Harms incorporate risks and burdens to the patients that can include convenience or lack of convenience, difficulty of administration, and invasiveness. These harms, in turn, affect patient preferences. The resource considerations go beyond economics and should also factor in time and other indirect costs. The authors of these suggestions have considered these parameters in determining the strength of the suggestions.

The findings of a systematic search for and evaluation of evidence were used to support the evidence-graded recommendations or suggestions. A highly structured consensus-based Delphi approach was used to provide expert advice on all guidance statements.[6] The total number of eligible voters for each guidance statement did not vary because none was recused from voting on any statements because of their potential conflicts of interest. Transparency of process was documented. Further details of the methods related to conflicts of interests and transparency for all CHEST guidelines have been published previously.[6]

Based on the evidence review and the Delphi methods described, the writing group developed guideline recommendations or suggestions. These then underwent review and voting by the full cough panel. For a recommendation or suggestion to be accepted, it had to be voted on by 75% of the eligible Cough Panelists and achieve ratings of strongly agree or agree by 80% of the voting panelists. Agreement was achieved by 85% to 90% of those voting in the current recommendations. No panelist was excluded from voting.

Key Question Development

A key clinical question was developed by using the PICO (Population, Intervention, Comparator, Outcome) format. The following question was addressed: *"Is there evidence of clinically important treatment effects for non-pharmacological therapies in cough treatment for patients with bronchiectasis?"*

Systematic Literature Search

A systematic literature search for individual studies was initially conducted by using the following databases: MEDLINE via