

## INBRIEF

Summarizing the Evidence

# Acetylcysteine for Patients Requiring Mucus Secretion Clearance: A Review

## Key Messages

- The clinical effectiveness and safety of acetylcysteine for mucus secretion clearance was unclear because of sparse evidence. High-quality studies are needed.
- No clinical effectiveness studies were identified for acetylcysteine use in patients with neuromuscular disorder requiring mucus secretion clearance.
- No relevant studies comparing the effectiveness of oral acetylcysteine compared with inhaled acetylcysteine were identified.
- High-quality studies comparing acetylcysteine with other pharmacologic treatments for mucus secretion clearance are needed.
- Three guidelines recommend using oral acetylcysteine for patients with chronic obstructive pulmonary disease (these recommendations were weak or conditional, and based on low- or moderate-quality evidence).
- One guideline does not provide any recommendation for the use of acetylcysteine because of insufficient evidence, and two guidelines recommend against its use for specific clinical scenarios (the strength of the recommendations was not reported).

## Context

Mucus secretions are a defence mechanism of the lung. The mucus traps particles and pathogens inhaled in the air and is then cleared by airflow and ciliary hairs. Mucus secretions in people with lung disease can be thick and sticky, and therefore not easily cleared. Drug treatments for impaired mucus secretion clearance include isotonic saline, hypertonic saline, dornase alpha, and acetylcysteine.

## Technology

Acetylcysteine is used as a treatment option in various conditions where there are problems with clearance of lung mucus secretions,

such as chronic obstructive pulmonary disease and chronic bronchitis, and in patients who are intubated or post-operative.

## Issue

Acetylcysteine is used in practice to aid in the clearance of mucus from the lungs. A review of the comparative clinical effectiveness and safety, and a review of evidence-based guidelines, will help to inform decisions regarding the use of acetylcysteine for mucus secretion clearance in practice for various patient populations. Additionally, a review of the clinical effectiveness of treatment with nebulized acetylcysteine versus oral acetylcysteine may provide direction on formulation selection in practice.

## 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). For the report regarding acetylcysteine for patients with neuromuscular disorders who require mucus secretion clearance, a limited literature search was performed; a reference list was compiled of articles potentially meeting the pre-specified inclusion criteria.

## Results

Clinical evidence based on 12 publications — five systematic reviews, one randomized controlled trial, and six evidence-based guidelines — was summarized from three Rapid Response reports.

Clinical effectiveness data were sparse. One randomized controlled trial, included in a systematic review on hospitalized patients with acute lung disease, compared acetylcysteine with isotonic saline. This trial reported improvement in coughing out mucus, mucus thickness, and oxygenation with acetylcysteine; however, these results were either not statistically significant or statistical significance was not reported. The Rapid Response reference list on acetylcysteine for patients with neuromuscular disorder who require mucus secretion clearance did not identify any relevant clinical effectiveness studies.

Safety-related outcomes for the comparison of acetylcysteine with placebo — such as hospitalization, atelectasis (complete or partial collapse of the lung), and mortality — were sparsely reported and the results were variable.

Three guidelines recommend the use of acetylcysteine for chronic obstructive pulmonary disease. One guideline does not provide any recommendation because of insufficient evidence; one guideline recommends against the use of acetylcysteine for acute cough; and the last guideline recommends against the use of aerosolized acetylcysteine for patients who are hospitalized, or those with neuromuscular disease, respiratory muscle weakness, or impaired cough.

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