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Improvement in health status following bronchopulmonary hygiene physical therapy in patients with bronchiectasis

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Summary
Chronic productive cough is a common symptom in patients with bronchiectasis that is associated with a reduction in health-related quality of life (QOL). Bronchopulmonary hygiene physical therapy (BHPT) is widely prescribed for patients with bronchiectasis, although the evidence for its efficacy is limited. We set out to prospectively evaluate the impact of BHPT on health-related QOL in patients with non-cystic fibrosis bronchiectasis.

We assessed cough symptoms (0–100 mm visual analogue scale; VAS) and cough-related QOL in 53 patients with stable non-cystic fibrosis bronchiectasis at baseline and >4 weeks after outpatient-based BHPT. Cough specific health status was assessed with the Leicester Cough Questionnaire (LCQ; total score range 3–21, higher scores representing better QOL).

All patients with bronchiectasis complained of cough as the major symptom and had mean (SEM) FEV_1 of 2.1 (0.1) L. Cough-related health status was reduced at baseline; mean (SEM) LCQ score 14.3 (0.6). There were significant improvements in cough symptoms (mean cough VAS before 43.3 (3.6) vs after 27.5 (3.1); mean difference 15.8; 95% CI of difference 9.6–22; $p < 0.0001$) and cough-related health status after BHPT (mean LCQ total score before 14.2 vs after 17.3; mean difference 3.1; 95% confidence interval of difference 2.4–3.9; $p < 0.001$). A significant improvement was seen in all LCQ health-related domains (physical, psychological and social; all $p < 0.001$).

Our findings suggest that bronchopulmonary hygiene physical therapy can lead to a significant improvement in cough-related quality of life.

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Introduction

Bronchiectasis is characterised by permanent dilatation of the bronchi and impaired clearance of airway secretions. A wide range of immunological, infective and genetic conditions can lead to the development of bronchiectasis but a substantial proportion of cases is unexplained. Patients with bronchiectasis commonly present with a chronic productive cough and recurrent chest infections.[1,2] Progressive decline in lung function and deteriorating functional capacity is frequently seen and patients can suffer significant physical and psychological morbidity that leads to impaired health-related QOL.[3,4]

There is a paucity of effective therapeutic agents for patients with bronchiectasis. Bronchopulmonary hygiene physical therapy (BHPT) is the mainstay therapy for most patients and is widely prescribed as a prophylactic and therapeutic intervention. BHPT comprises patient education and a range of physical techniques that aid clearance of airway secretions.[5] Despite its routine use in both acute exacerbations and chronic non-cystic fibrosis (CF) bronchiectasis, the evidence for its efficacy is limited. BHPT may reduce sputum volume and increase clearance but there are no studies investigating the impact of BHPT on health-related QOL.[6–8] A recent Cochrane database systematic review identified few clinical trials investigating BHPT in non-CF bronchiectasis and most of these contained small numbers of patients.[9] This review concluded that there was insufficient evidence to support the use of BHPT in non-CF bronchiectasis. The aim of our study was to investigate the effect of BHPT on health-related QOL in patients with stable non-CF bronchiectasis.

Methods

Patients

Consecutive patients diagnosed with bronchiectasis were identified from those attending adult respiratory outpatient clinics. Bronchiectasis was diagnosed if patients had characteristic clinical features and typical radiological appearance of bronchiectasis (chest radiograph and/or high resolution computerised tomography scan; HRCT scan).[10] All but four patients had bronchiectasis confirmed on HRCT. Only clinically stable patients with no significant change in symptoms in the preceding 4 weeks were recruited. No patient had BHPT previously. Patients with radiological appearance of traction bronchiectasis and recent respiratory tract infection (<8 weeks) were excluded. Localised bronchiectasis was defined as disease confined to a single pulmonary lobe.

Leicester Cough Questionnaire (LCQ)

Heath status was assessed with the LCQ which is a 19 item, self-completed, cough specific health-related QOL questionnaire. [11] The LCQ has been extensively validated and has been shown to be valid, reproducible and responsive. The LCQ has three domains: physical, psychological and social (domain score range 1–7; higher score = better QOL). The overall QOL scores range from 3 to 21, 21 being normal. The minimal important difference for total LCQ total score is 1.3.[12]

Protocol

All patients with bronchiectasis were referred for outpatient BHPT. The LCQ and cough symptom severity visual analogue score (0–100 mm; 100 mm worst cough) were administered at initial assessment and >4 weeks later at a follow-up visit. BHPT comprised two sessions at least 2 weeks apart.

Session 1 (1 h)

- General assessment of condition, symptoms, social circumstances and medications.
- Introduction to physiotherapy and aims of treatment.
- Education about disease and self-management rationale.
- Selection of appropriate chest clearance techniques to establish a home programme from the following:
  - Active cycle of breathing techniques (ACBT)
  - Autogenic drainage (AD)
  - Flutter
  - Modified postural drainage (MPD)
  - Breathing retraining advice (BR)
  - Cough control techniques (CC)
- Written information given to reinforce education, management and physiotherapy techniques.

Session 2 (30 min–1 h)

- Progress review assessing compliance with physiotherapy manoeuvres.
- Refine self-management as necessary and discuss any concerns.
- Reinforce aims of physiotherapy including short and long-term goals.
- Holistic advice as indicated: coping strategies for breathlessness, breathing pattern correction, monitoring exercise levels.

Analysis

Data is presented as mean (SEM: standard error of mean). Paired *t*-tests were used to compare VAS and QOL scores before and after BHPT. The relationship between FEV_1 and change in health status was assessed with Pearson's correlation coefficient. Graphpad Prism (Graphpad software Inc) and Minitab software were used for analysis. The study protocol was approved by the local research ethics committee and all subjects gave informed consent.

Results

Fifty-three patients met the inclusion criteria during the study period (Table 1). No patient declined participation or withdrew from the study. The cause of the bronchiectasis was idiopathic ($n = 39$), previous non-tuberculous infection ($n = 10$), previous tuberculosis ($n = 2$), allergic bronchopulmonary aspergillosis ($n = 1$) and immunoglobulin