A Systematised Literature Review investigating the effects of Oscillating Positive Expiratory Pressure (OPEP) therapy on clinical outcomes in patients with Chronic Obstructive Pulmonary Disease (COPD)

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Background

The progressive airflow obstruction and frequent exacerbations characteristic of COPD accounts for 1.4 million GP consultations annually and costs the NHS over £800 million annually for emergency hospital admissions (Greener, 2011; NHS Medical Directorate, 2012). OPEP is an airway clearance technique which produces high frequency short bursts of increased expiratory airflow to create shearing forces which reduce secretion viscosity and cause the airways to vibrate, aiding secretion mobilisation from the peripheral to the central airways (Lee et al., 2015; Barker, Laverty and Hopkinson, 2017). The use of OPEP to optimise mucociliary clearance and remove excess secretions from the airways may reduce the economic burden of COPD on NHS resources. Therefore, this study aimed to evaluate the effect of intrathoracic OPEP on clinical outcomes in stable and acute exacerbations of COPD.

Methods

A comprehensive search was undertaken (Figure 2). Inclusion criteria included an experimental study design of randomised controlled trials or randomised crossover studies, which investigated the effects of intrathoracic OPEP compared to control or other ACTs in adults with COPD, Chronic Bronchitis or Emphysema which were written in the English language. Studies which evaluated OPEP as a single treatment and studies which investigated extra thoracic oscillation devices were excluded.

Results

A total of 322 participants from 10 studies were included. Mean PEDro score was 6.4 (+/−1.3) and the range was 5-8. Only two of the included studies investigated AECOPD. Treatment duration ranged from 10-30 minutes per session, repeated one to four times daily, for two days to 26 weeks. OPEP was compared to other ACTs in five studies, usual care in three studies and to a sham device in two studies.

Stable COPD

<table>
<thead>
<tr>
<th>HRQL</th>
<th>OPEP did not improve disease specific HRQOL total scores</th>
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<tbody>
<tr>
<td>Exacerbation Rate</td>
<td>OPEP did not improve exacerbation rate</td>
</tr>
<tr>
<td>Sputum Volume</td>
<td>OPEP was equally effective as other ACTs in improving volume of sputum expectorated</td>
</tr>
<tr>
<td>Gas Exchange</td>
<td>OPEP was equally effective in improving SpO2 as other ACTs</td>
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</tbody>
</table>

Lung Function

OPEP resulted in significant improvement in FVC compared to shamb and significantly (p<0.000) slowed deterioration in FEV1 when compared to usual care. OPEP was equally effective in improving PEFR as other ACTs

Exacerbation of COPD

<table>
<thead>
<tr>
<th>Gas Exchange</th>
<th>OPEP significantly improved ABGs (p&lt;0.01) compared to usual care and usual care plus physiotherapy</th>
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<tbody>
<tr>
<td>Use of NIV</td>
<td>OPEP significantly (p&lt;0.05) reduced the requirement and duration of NIV treatment compared to usual care</td>
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<tr>
<td>Hospital Length of Stay</td>
<td>OPEP significantly (p&lt;0.05) reduced hospital length of stay compared to usual care</td>
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Conclusions

In stable COPD, OPEP is associated with an improvement in exercise capacity and lung function. In acute exacerbation of COPD, use of OPEP reduced the requirement and duration of NIV treatment and reduced hospital length of stay.

Implications

Practice

• Physiotherapists should continue to prescribe ACTs based on the assessment findings of each individual and their individual problems. Use of OPEP should be considered in AECOPD.

Research

A systematic review with meta-analysis is recommended conducted by experts such as the Cochrane Collaboration, in order to inform evidence-based practice and future policy.

High-quality RCTs are required to investigate the effect of OPEP on exercise capacity as part of a pulmonary rehabilitation programme and to investigate the effect of OPEP in AECOPD managed in primary care.

Policy

• It is not recommended policy should change following this study, as the research question has not been conclusively answered as methodological quality of studies was limited, introducing the risk of bias and inflated treatment effects.