Effectiveness Assessment of Oscillating Positive Expiratory Pressure (OPEP) Devices: Using a Clinically Relevant Laboratory Measure

AIMS

bronchiectasis, cystic fibrosis and COPD. The mechanism of device action can differ greatly between different OPEP devices and therefore clinical data is important to demonstrate the effectiveness of each device.

A clinically relevant laboratory metric such as the one utilized in this study can provide additional insights into likely differences in effectiveness.

METHODS

Aerobika* (TMI), AirPhysio[†] (AirPhysio), Flutter⁺ (Allergan), Acapella Choice[†] (ICU Medical) and RC Cornet[†] Plus (Cegla) OPEP devices (n=3, 3 repeats for each) were assessed at their highest resistance setting, utilizing simulated OPEP expiratory breathing patterns at various different peak expiratory flows (PEFs), using a pressure wave generator (Pulmonary Waveform Generator System – Model: wPWG).

The total pressure pulse impact (TPPI), calculated as the sum of pressure pulse amplitudes for all discernible pulses (> 1.0 cm H_2O) in a single exhalation, was determined for each pattern and each device.







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DISCUSSION / CONCLUSIONS

The therapeutic effectiveness of the air flow pulses, as assessed here via the laboratory TPPI value, is considered to be dependent on the ability of the device to generate and maintain significant pressure pulses throughout the exhalation. Higher pressure pulse amplitudes indicate greater changes in pressure differentials which can create stronger shear forces that reduce the viscoelastic properties of bronchial secretions, enabling secretions to be cleared from the airways.^{1,2}

The different mechanisms of OPEP device function appear to significantly impact the extent to which the pressure pulses are generated. The Aerobika* OPEP device demonstrated significantly larger TPPI values at all PEFs than other devices (p<0.05). The two devices with metal ball mechanism (AP, FL) had the lowest.

Such differences highlight the risk of assuming that all devices will perform the same clinically and the importance of reviewing clinical efficacy and real life usability when selecting an OPEP device.

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