Use of the lung flute for sputum induction in children with cystic fibrosis: a pilot study

Michael Doumit
Physiotherapy, Sydney Children’s Hospital, University of NSW, Australia

Introduction

It is important to obtain sputum samples from children with cystic fibrosis (CF) on a regular basis.

The majority of children that attend outpatient CF clinics are non-productive of sputum.

The lung flute is designed to mobilise sputum from the airways by transmitting acoustic waves (16-22Hz) and PEP (1-2.5cmH₂O) through the tracheobronchial tree on exhalation.

The lung flute has been shown to be useful in obtaining sputum samples in non-expectorating adults with suspected pulmonary tuberculosis.

Aim

To assess the effectiveness of the lung flute in obtaining a sputum sample from children with cystic fibrosis (CF) that are unable to produce a sample with coughing alone.

To assess ease of use of the lung flute.

Method

Consecutive children with CF attending an outpatient clinic.

Known ability to expectorate sputum.

Unable to provide a sputum sample with vigorous coughing alone on day of study.

Outcomes

Production of a sputum sample as assessed by presence of a macroscopic sputum plug.

Sputum microbiology.

Ease of use of the device on visual analogue scale.

Results

25 children each used the device on two separate clinic visits.

15 males, mean age 12 (range 6-17), mean FEV₁ 90% (range 61-132%).

A sputum sample was obtained on 26/50 (52%) occasions.

A sample was obtained on 9/33 (27%) occasions when a child’s cough was dry and non-productive.

A sample was obtained on 17/17 (100%) occasions when a child’s cough was moist and non-productive.

24/26 samples yielded a positive culture result for at least one known CF pathogen.

Further Results:

Bacterial pathogen | Number of samples
-------------------|------------------
staphylococcus aureus | 14
pseudomonas aeruginosa | 13
haemophilus influenzae | 3
stenotrophomonas maltophilia | 2
MRSA | 1

Conclusion

The lung flute appears to be a clinically useful and easy device to use for sputum induction in children with CF.

Further research comparing the lung flute to other sputum induction methods in children with CF is warranted.

Acknowledgements

The children and families of the Cystic Fibrosis Clinic at Sydney Children’s Hospital, Randwick, Australia.