LETTER TO THE EDITORS

Training tools for inhalation devices: the need for more sophistication

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Dear Sirs,

Frequent inhaler technique training is recommended, but methods of assessing a patient's existing technique are subjective. Recent publications in this journal^{1,2} have highlighted how the aerosol inhalation monitor (AIM) and IN-Check device provide useful information about metered-dose inhaler (MDI) and dry powder inhaler (DPI) use. However, more sophisticated generic evaluations are possible; for example, useful data can be obtained by recording and interpreting inhalation profiles in the same fashion as a flow-volume loop.

We are developing methods to measure inhalation profiles in studies involving children with asthma, and adults with asthma and COPD. Some of our methodologies involve modifying the mouthpiece of a spirometer to incorporate a placebo inhaler and the inspiration portion of the flow-volume loop.

Our methods measure the exact time of co-ordination (MDI only), peak inhalation flow (PIF), inhalation volume, and inhalation time. We have found that simply suggesting to the patient that they should extend their inhalation towards 5 seconds³ not only prolongs the inhalation but also results in a lower PIF because the inhalation volume remains the same. Using this method with 50 adult asthmatics resulted in the mean PIF falling from 159 to 77 L/min and an extension in the mean inhalation time from 1.6 to 3.1 seconds. Eight patients inhaled correctly (between 30-90L/min) before, and 32 patients inhaled correctly after, the instruction to prolong their inhalation.

When using DPIs, the emphasis (almost obsession) has been on a patient's PIF, but it is their initial acceleration rate that is critical for effective de-aggregation of the metered dose.⁴ Inhalation profiles can be used to educate patients on appropriate inhalation technique. Our studies have shown that flows over the period to 90% PIF (mean 0.4 secs) are representative of the previously defined acceleration rate.⁵ Inhalation flows at this time corresponding to the optimal desired values of each DPI (based on current knowledge) provide a good indication of efficient deaggregation. We have found a greater than 20-fold difference in acceleration rates compared to a 3-fold difference in PIF. Counselling patients to use a forceful inhalation from the start³ increased acceleration rates from 3.0 to 5.2 L/sec.²

Our work is ongoing, and the parameters we are using are being linked to ex-vivo studies. The aim is to use our methodologies in conjunction with standard subjective inhaler technique assessments to improve inhalation technique and help tailor each patient's inhaler to their natural ability.

Conflict of interest

None.

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