

CORRESPONDENCE

It is time to consider standardizing the interrupter technique

To the Editor:

Two studies by BRIDGE and co-workers [1], and PHAGOO and co-workers [2], recently published together in the Journal [1, 2], evaluated the ability of the interrupter technique to assess bronchial responsiveness in children. These studies provide further support for the clinical utility of this resistance measurement. There are now many studies, including one by CARTER and co-workers [3], that support the use of the interrupter technique to measure intrasubject changes in airways calibre caused by bronchodilation. I believe it is now time to standardize the technique so that we can determine its true clinical utility.

In the late 1980s, BATES and co-workers renewed interest in the interrupter technique with a series of studies that elucidated what the interrupter technique actually measured [4–8]. However, since then it has become evident that the resistance measurements obtained in awake, spontaneously breathing children are only a gross approximation of airway resistance. The numerous variables that can affect the final resistance measurement (R_{int}) obtained with the interrupter technique include: compliance of the cheeks; degree of air leak around the mouth piece or face mask; airflow rate; lung volume at the time of interruption; the type of interrupter device used; and the criteria for selecting the post-occlusion mouth pressure tracings to be included in the final analysis. Perhaps the most important factor is the method of extrapolating the post-occlusion pressure tracing back to the time of valve closure to obtain a value for mouth pressure that is then divided by the pre-occlusion flow rate to calculate R_{int} . Therefore, while R_{int} is not a "physiological" resistance, it is a representation of the resistance to airflow within the airways. If one can demonstrate that R_{int} , or its reciprocal (interrupter conductance, G_{int}), changes in a consistent manner when airway calibre or actual airway resistance changes, then one can interpret values for R_{int} within specific clinical contexts similar to the way that we use standard spirometry. For example, FEV₁ is a useful measure of airways obstruction not because it represents a specific physiological entity, but rather because we can correlate it with changes in airways calibre. In addition, we also have standard reference values for FEV₁ that we can use to help determine whether a patient's airway caliber is within the normal range. If the same can be done for R_{int} , or G_{int} , then the interrupter technique can also become a useful clinical tool. The studies by BRIDGE and co-workers [1] and PHAGOO and co-workers [2] add to the growing body of evidence that this is possible.

It is now time to standardize the interrupter technique. Presently, investigators are using a number of different interrupter devices, back extrapolations of the

post-occlusion tracing to determine "interrupter" pressure, and algorithms for selecting numbers and types of interrupted breaths. Until these and other variables are standardized it will be difficult to compare data obtained from different laboratories and establish standard reference values. The studies by BRIDGE and co-workers [1] and PHAGOO and co-workers [2] can be used to begin this process. They have assessed and validated a commercial interrupter device, and all laboratories could use the same or similarly constructed devices that meet established specifications. In two previous studies, these investigators compared several different methods of back extrapolating the post-occlusion mouth pressure curve, and they demonstrated that a linear back extrapolation was the most sensitive [9, 10]. Fortunately, this is also the easiest extrapolation method to implement. Despite recognizing that no method of extrapolation will provide a R_{int} that has a specific physiological meaning, we must adopt one, and a linear extrapolation similar to that used by BRIDGE and co-workers [1] and PHAGOO and co-workers [2] appears to be the most reasonable option. Guidelines must be established for the number of interruptions averaged to give the final value, the acceptable range of flow rates at the time of flow interruption, and the point in the respiratory cycle when flow should be interrupted. There must also be agreement on the criteria used to accept or reject individual post-occlusion pressure curves and the computer algorithm used to analyse the data.

In 1994, my colleagues and I stated that before the interrupter technique could be widely accepted or assessed as a clinical tool there must be standardization of the technique [3]. Since then, although there have been a number of studies indicating that the interrupter technique can be a valid clinical tool, especially for detecting intrasubject changes in airways calibre, there has been little progress made towards establishing standard criteria for its use. These investigations have also made it clear that until the interrupter technique is standardized we will never know its ultimate clinical potential. The extensive work by BRIDGE and co-workers [1] and PHAGOO and co-workers [2] should facilitate the standardization process, and they should be commended for their efforts.

References

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CORRESPONDENCE

Mini-Wright peak-flow meters are reliable after 5 yrs use

To the Editor:

Concerning the article of DOUMA [1] about the reliability of mini-Wright peak flow meters, we performed a study some years ago [2] comparing the reliability of five new mini-Wright flow meters before and after 10,000 compressed air impulses of about 450 L·min⁻¹ flow controlled by an electrically driven magnetic valve. There were no significant deviations of peak flow values read from the mini-Wright peak flow meter before and after the 10,000 impulses compared to those controlled by a pneumotachograph. These tests confirm and supplement the results of the Dutch group: using a peak-flow meter twice a day for three measurements adds up to about 10,000 impulses after 5 yrs use. I totally agree

that the replacement of mini-Wright peak-flow meters should be restricted to cases of obvious malfunction.

References

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