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Editorial

The Utility of Peak Flow Measurements in Guiding Asthma Management – What is the Evidence?

C B E Chee

Accurate patient and physician assessment of asthma severity is often a difficult task as the correlation between symptoms and airflow obstruction is extremely variable. This has led national and international asthma consensus guidelines to emphasise the incorporation of objective measures of lung function in the management of moderate to severe asthma⁽¹⁻³⁾.

The peak expiratory flow rate (PEFR) provides an objective index of airflow limitation. This is easily measured using a peak flow meter, an inexpensive and easy-to-use device. PEFR monitoring may be applied in clinical practice in aid of asthma diagnosis (eg. in demonstrating the increased diurnal variation or bronchodilator response present in asthma), in documenting the relationship of asthma to occupational exposures and other triggers, and in demonstrating response to therapy.

The recent rise in asthma morbidity and mortality has prompted an emphasis towards patient education and self-management. All current consensus guidelines actively promote the use of symptom and PEFR-based action plans for patient self-management of chronic stable asthma as well as acute exacerbations. The integration of PEFR monitoring into these self-management plans is based on the premise that monitoring PEFR will enable patients to detect any deterioration in lung function which may precede the onset of symptoms, or which may not be accurately perceived in certain asthmatics, particularly those at high risk of a fatal attack. Measures to “step up” their asthma anti-inflammatory therapy according to a physician-provided individualised asthma action plan may then be taken by the patients to prevent further deterioration in their asthma control. PEFR readings should also theoretically be helpful to guide patients in their home management of acute exacerbations, and in indicating when they should seek emergency medical treatment. Whether asthma self-management plans result in improved symptom control and lung function, decreased medication use, decreased hospital admissions and mortality remains the subject of debate. An early uncontrolled study by Beasley⁽⁴⁾ showed that PEFR-based self-management plans resulted in improved outcomes. Following this, data from 2 community-based studies^(5,6) in the UK showed that patient PEFR self-monitoring and management was not useful in improving outcomes, especially in mild asthmatics. Others⁽⁷⁻¹⁰⁾ reported improved outcomes in patients who were given either symptom or PEFR-guided asthma self-management plans; most of these studies revealed that symptom-guided management plans were as effective as PEFR-guided plans⁽⁷⁻⁹⁾.

The usefulness of PEFR to guide therapy in the A & E has not been as widely evaluated as its role in long-term patient self-management. Here again, most guidelines for A & E asthma management utilise PEFR readings to guide the intensity of therapy and to base decisions for patient admission or discharge. In this issue of the SMJ, Abisheganaden et al⁽¹¹⁾ compared the outcome of acute exacerbations of bronchial asthma managed in the A & E of a community hospital among 2 groups of patients treated with 2 different protocols one year apart. One group was treated with the “routine” protocol (RP), in which patients were assessed and dispensed according to overall subjective and clinical response (although PEFR readings were also recorded); and the other with the “peak” protocol (PP), in which PEFR readings in addition to subjective and clinical response were used to guide treatment and dispensation. The authors had expected improved immediate outcomes in the PP

group, but this was not demonstrated by their study findings which showed that both protocols resulted in similar improvement in PEFr (41% in the RP group vs 35% in the PP group), with the PP protocol resulting in a higher (but statistically insignificant) hospital admission rate. It must, however, be noted that the bronchodilator agents used in the 2 groups differed. It was also not clear whether the 2 groups received parenteral steroids to the same degree. The authors implied that the higher admission rate as a result of the PP protocol was unnecessary. However, it may be argued that this may in fact be regarded as a good outcome, ie. that the PP protocol directed doctors to err on the side of safety by admitting patients they would otherwise have discharged according to subjective criteria. Comparison of post A & E discharge outcomes such as the relapse rate (as indicated by unscheduled GP visits, A & E re-attendance or hospital admission), and short-term morbidity (eg. symptom frequency and severity, need for rescue medications, quality of life, days off work) between the 2 groups would have been useful in clarifying this issue. Of particular interest would have been the post A & E discharge outcome of the 35% of patients treated under the RP protocol who were discharged with PEFr readings < 60% predicted, and the 5 patients under the PP protocol with PEFr < 60% predicted who were discharged against medical advice. Whether admission to hospital as required under the PP protocol would have been more appropriate, or even life-saving for these patients poses an interesting unanswered question. If the answer to this is "no", it might be suggested that the cut-off point of 60% predicted PEFr for admission would have been too high. Could it then be postulated that using predicted normal values for PEFr may be an over-estimation of the asthmatic's actual lung function? It is known that there is a wide range in normal values for lung function, which may also vary between ethnic groups (the predicted values used in this study pertained to the local Chinese population). Ideally, the patient's personal best PEFr should be the standard against which his or her PEFr readings is measured. This, however, may not be realistic locally, as most of our asthmatic patients would probably not be aware of their personal best PEFr reading.

Without a doubt, PEFr monitoring, whether in the A & E setting, at the physician's clinic or patient's home, remains a useful objective measure of severity of airflow obstruction and response to treatment. In terms of using it as an index to guide therapy, it must be emphasised that the incorporation of PEFr into asthma exacerbation management protocols is in addition to, and not a substitute for, the patient's symptom response and the physician's clinical assessment. Hence, in the A & E setting, the use of PEFr readings to guide management should be regarded as an additional "safety net" to compensate for patients who are poor perceivers of their degree of airway obstruction, or for any lapse in clinical judgement. When all is said and done, it is "better to be safe than sorry", and this adage is never more true than in the management of the patient presenting to the A & E with acute asthma.

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Department of Respiratory Medicine

Tan Tock Seng Hospital, Moulmein Road, Singapore 308433

C B E Chee, MBBS, M Med (Int Med), MRCP (Edin), Consultant