Asthma reviews in children: what have we learned?

Mark L Levy ,[1] Louise Fleming[2,3]

Asthma is a complex chronic disease, characterised by intermittent respiratory symptoms, airway inflammation and reversible airflow obstruction, without the availability of a single confirmatory diagnostic test. Management of this disease involves many challenges for primary care physicians. These include diagnosis, monitoring, identifying risk and chronic as well as acute management; furthermore, it is challenging to maintain up to date knowledge of asthma to facilitate good quality patient education. Primary care clinicians with their limited availability of routine appointments, plus the vast spectrum of medical conditions they manage, are generalists and cannot be experts in every clinical condition. Although these health professionals develop skills in quickly assessing patients and making decisions for urgent or delayed management, the initial challenge is to accurately diagnose chronic diseases and second having the confidence and knowledge to manage these complex diseases in the community. In the case of asthma, diagnosis and monitoring are frequently based on reporting of symptoms, which are limited by their lack of specificity and patient recall.

Considerable controversy[1 2] surrounds the recent UK recommendations[3] that primary care physicians should include spirometry and fractional exhaled nitric oxide (FeNO) in diagnosing asthma in the UK. Neither quality assured spirometry nor FeNO is widely available in primary care. This is further complicated because asthma patients may have normal spirometry when tested and this would potentially need to be repeated on a number of occasions to demonstrate reversible airflow obstruction, which is totally impractical in primary (or secondary) care settings. Peak flow diaries are a practical alternative in these cases.[4 5] In their prospective observational cohort study in children managed in primary care, Lo *et al*[6] demonstrated that asthma assessments based on either reported symptoms or objective tests in isolation do not provide a full clinical picture of a child with asthma. They found that <10% of those treated with asthma medication had evidence of previous spirometry, suggesting that there was little objective evidence supporting the diagnosis of asthma. In the National Institute for Health and Care Excellence feasibility study[7] assessing the utility in well-resourced primary care practices of implementing their guidelines, less than a third of those with confirmed asthma had evidence of obstructive spirometry. Furthermore, after practices performed spirometry during the Lo *et al*' study the use of the controversially recommended fixed cutoff of 70% for forced expiratory volume for 1 s/forced vital capacity for diagnosing airflow obstruction would have missed the diagnosis in 108 (18%) of the children studied whose ratio was below the global lung initiative lower limit of normal (LLN).[6] Therefore, the LLN should be recommended for clinicians use when interpreting spirometry results.

Asthma is a chronic ongoing disease prone to flare ups ranging from mild symptoms to acute life-threatening attacks. In contrast with the situation in secondary care, patients do not present in primary care with a presumptive diagnosis, they present with symptoms. As a result, it is not uncommon for patients to be prescribed a 'trial of medication' before making a formal diagnosis. However, as in the case of 25% (156/612) of the children in the Lo *et al*' study, continued prescription of medication without a diagnostic label may persist.[6] That such a high proportion of children in the practices studied were treated with asthma medication without being coded with the disease is extremely worrying. These children suffered from more asthma attacks than those with a recorded confirmed diagnosis, and 59 of the 156 (37.8%) undiagnosed (ie, uncoded) children had poor symptom control (asthma control test (ACT)/childhood asthma control test (cACT)<19). Parents of these treated, but undiagnosed children were presumably not provided with a self-management plan with information on identifying risk and what action to take, and they may not have been taken seriously by emergency services or practice staff had they sought urgent medical assistance. This finding is probably not an isolated one and health professionals in primary or secondary care as well as emergency departments should be vigilant in ensuring patients have been given appropriate information and education. Clear records detailing the rationale and diagnosis for the ongoing prescription of asthma medication in patients initially prescribed a 'trial of medication' would help improve the quality of ongoing management. Furthermore, if the trial did not result in improvement, the medication should be discontinued, and further diagnosis and treatment options considered at subsequent review.

Lo *et al* focused in their study on the relevance of spirometry and FeNO measurements as monitoring tools in primary care and identifying those at risk of poor asthma outcomes, particularly excess healthcare utilisation. In their conclusions, they implied that abnormal lung function and FeNO may identify children at high risk of future severe asthma attacks; however, in our view, their data do not support this assertion. Severe asthma attacks were not defined in this study, nor was a relationship between these and objective measurements assessed. They clearly demonstrated the known relationship between poor current symptom control (asthma control test <19) and future unplanned healthcare attendances (UHAs) in primary or secondary care. This finding was irrespective of FeNO levels above and below 35 ppb. However, in just under half of the subjects with good control (ACT or cACT >19), FeNO or spirometry was abnormal, and both were abnormal in 12% of the children.[6] Without an analysis relating these findings and subsequent UHAs, one cannot imply these measurements are helpful in predicting attacks. Conversely, 49% of the children had normal tests; however, the authors did not report a relationship between this finding and UHAs.

Although objective tests are important in monitoring asthma control, clinicians caring for patients with asthma should be aware of and actively seek, identify and record the well-known risk factors for poor outcome; these include previous attacks, poor adherence to medical advice, excess use of short-acting beta-agonist antagonists, insufficient use of controller medication, poor inhaler technique, comorbid food allergy and others.[4 5] Lack of recognition of these risk factors coupled with a failure to take appropriate action including referral to specialists has been implicated in a number

[1]Locum General Practitioner, London, UK
[2]Imperial College London, London, UK
[3]Department of Paediatrics, Royal Brompton Hospital, London, UK

Correspondence to Dr Mark L Levy, Locum General Practitioner, London, UK; mark-levy@btconnect.com

of preventable child asthma deaths in the UK.[8 9]

Routine asthma reviews often rely only on current symptom control without active identification of risk factors, therefore, intermittent single clinical assessments often fail to identify those at risk or to predict future poor outcomes; a good medical history is also needed in addition to the questions on current symptom control.

Although the Lo *et al*' study did not focus on acute asthma, objective testing in the management of attacks is sadly neglected. Although lung function and oxygen saturation are usually measured before treating asthma attacks respectively in primary and secondary care, measurements following treatment are infrequent in both settings.[8 9]

The take home message from this study, is that we should be far more vigilant in the use of objective measurements in the management of asthma. Further research may illuminate some of the questions raised in our editorial.

Twitter Mark L Levy @bigcatdoc

Contributors MLL and LF: prepared the editorial and represented their personal opinions.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests MLL reports personal fees and honoraria for lectures from: TEVA, Astra Zeneca, Soar Beyond, Orion and Menarini, Napp, Novartis Pharmaceuticals; Expert Consultancy fees: from National Services for Health Improvement, Chiesi, Orion, Menarini, Novartis, Boehringer Ingelheim, Glaxo Smith Klein, Trudel, and Clement Clarke International; Travel support from GINA; and grants from Conzorcio Futuro In Ricerca. LF is an Asthma UK Senior Clinical Fellow. In the past 3 years, LF has received honoraria to speak at sponsored meetings from Novartis and Teva and for expert consultation from Novartis, GSK, Vectura, Astra Zeneca and Boehringer-Ingelheim. All fees have been paid direct to her institution.

Patient consent for publication Not required.

Provenance and peer review Commissioned; externally peer reviewed.

To cite Levy ML, Fleming L. *Thorax* 2020;**75**:98–99.

Accepted 4 December 2019
Published Online First 2 January 2020

Linked

► http://dx.doi.org/10.1136/thoraxjnl-2019-213068

Thorax 2020;**75**:98–99.
doi:10.1136/thoraxjnl-2019-214143

ORCID iD
Mark L Levy http://orcid.org/0000-0002-1807-3246

REFERENCES

1 White J, Paton JY, Niven R, *et al*. Guidelines for the diagnosis and management of asthma: a look at the key differences between BTS/SIGN and NICE. *Thorax* 2018;73:293–7.
2 Keeley D, Baxter N. Conflicting asthma guidelines cause confusion in primary care, 2018 [Accessed 09 Jan 2018].
3 Commissioned by the National Institute for Health and Care Excellence (NICE). Asthma: diagnosis, monitoring and chronic asthma management. NICE guideline [NG80], 2017. Available: https://www.nice.org.uk/guidance/ng80
4 The global strategy for asthma management and prevention, global initiative for asthma (GINA), 2019. Available: http://www.ginasthma.org
5 Scottish Intercollegiate Guideline Network (SIGN), the British Thoracic society (BTS). British guideline on the management of asthma, 2019. Available: https://www.sign.ac.uk/sign-158-british-guideline-on-the-management-of-asthma.html
6 Lo DKH, Beardsmore CS, Roland D, *et al*. Lung function and asthma control in school-age children managed in UK primary care: a cohort study. *Thorax* 2020;75:102–8.
7 National Institute for Health and Care Excellence (NICE). Asthma: diagnosis and monitoring of asthma in adults, children and young people. NICE guideline NG80 Appendices A - R, 2017. Available: https://www.nice.org.uk/guidance/ng80/evidence/appendices-a-r-pdf-4656178048
8 Royal College of Physicians. *Why asthma still kills: the National review of asthma deaths (NRAD) confidential enquiry report*. London: Royal College of Physicians, 2014. http://www.rcplondon.ac.uk/sites/default/files/why-asthma-still-kills-full-report.pdf
9 Radcliffe DS. Regulation 28 statement in the matter of Sophie Holman (deceased), 2019. Available: https://www.judiciary.uk/wp-content/uploads/2019/05/Sophie-Holman-2019-0035_Redacted.pdf