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EDITORIAL

Diagnosis, Evaluation and Monitoring of Asthma

Asthma is a common condition, and diagnosis, severity, and control of the disease can be determined both subjectively and objectively. It is important to assume that recurrent breathlessness is due to asthma in primary care. Treatment without a definite diagnosis and a careful monitoring of the disease risks unnecessary side effects and costs, and may fail to identify and address the real issue. Physical examination of the patient is one of the initial steps to diagnose asthma, where abnormal lung sounds including wheezing and rhonchi are characteristic.

In this issue of Allergology International, Nagasaka[1] describes that an increase of the frequency and/or intensity of lung sounds is associated with airway wall oscillation and vortex shedding in central airways, and that this change may be more sensitive to airway narrowing than the appearance of wheezing and rhonchi.[2] He also emphasizes the importance of a forced expiratory wheeze, which is an early sign of airway obstruction in patients with mild asthma, and points out possible usefulness of a recently developed computerized and automated analysis of lung sound in the management of the disease.[3]

There is ample evidence that endogenous nitric oxide (NO) plays a role in regulating airway function and that upregulation of NO by inflammatory cytokines and mediators in the airways can be monitored easily in exhaled air. Munakata[4] implicates in this issue that exhaled NO (FeNO) is a non-invasive marker of airway inflammation. In asthma, increased FeNO reflects eosinophil-mediated inflammatory pathways moderately well and predicts good responses to treatment with inhaled corticosteroid.[5] Therefore, FeNO may be a useful way to monitor asthma and prevent asthma exacerbations. However, recent randomized controlled trials have reported only equivocal benefits of adding measurements of FeNO to usual examinations such as spirometry. More longitudinal studies are needed to further determine the potential use of FeNO in various phenotypes of asthma in relation to other biomarkers relating airway inflammation, bronchial hyperresponsiveness and airflow limitation.

The impulse oscillation system (IOS) has recently been introduced into clinical practice. The IOS is a type of forced oscillation technique (FOT), which can evaluate respiratory resistance and reactance at various oscillatory frequencies to determine properties not measurable by spirometry or body plethysmography.[6] This method is non-invasive and can be applied for children and elderly subjects with a low dependency on cooperation during tidal breathing. Various IOS measures correlate with predicted FEV_1, RV/TLC, ΔN_2 of a single nitrogen washout test, thereby separately detecting large and small airways abnormalities. In this issue of Allergology International, Mochizuki *et al.*[7] and Tanaka *et al.*[8] describe the role of IOS as a biomarker of childhood asthma and adult asthma, respectively, and the latter authors also demonstrate the effect of transdermal long-acting β_2 agonist patch on IOS measures. Favorable sensitivity and specificity of IOS #3) in addition to its broad application to patients merits the consideration to incorporate IOS into future asthma guidelines, but further studies are required to clarify clinical implication of each IOS indices.

Other than the above 4 review series articles, we have one more review article which is written by Higashi *et al.*[9] who received the JSA Best Presentation Award 2010. They discuss about the usefulness of urinary biomarkers for aspirin-intolerant asthma, i.e., leukotriene E_4 and prostaglandin D_2 metabolites.

As has recently been reported by many researchers using genome-wide analysis, IL-33 and its receptor polymorphisms are most significantly related to the onset of asthma. However, the mechanisms involved in the expression of these molecules have remained unrevealed yet. Among 10 original articles and 5 letters to the editor, we would like to introduce the article written by Baba *et al.*.[10] They found that a transcription factor, PU.1 positively regulates the expression of IL-33 receptor, ST2 on mast cells and basophils. Development of a new drug down-regulating IL-33 receptor is expected.

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REFERENCES

1. Nagasaka Y. Lung souds in bronchial asthma. *Allergol Int* 2012;**61**:353-63.
2. Malmberg LP, Sorva R, Sovijarve ARA. Frequency distribution of breath sounds as an indicator of bronchocontriction during histamine challenge test in asthmatic children. *Pediatr Pulmonol* 1994;**18**:170-7.

3. Habukawa C, Murakami K, Horii N, Yamada M, Nagasaka Y. [The influence of airflow and body size on breath sound in healthy children]. *[Jpn J Clin Physiol]* 2011;**41**:69-74 (in Japanese).
4. Munakata M. Exhaled nitric oxide (FeNO) as a noninvasive marker of airway inflammation. *Allergol Int* 2012;**61**:365-72.
5. Barnes PJ, Dweik RA, Gelb AF *et al*. Exhaled nitric oxide in pulmonary diseases: a comprehensive review. *Chest* 2010;**138**:682-92.
6. Pride NB. Forced oscillation techniques for measuring mechanical properties of the respiratory system. *Thorax* 1992;**47**:317-20.
7. Mochizuki H, Hirai K, Tabata H. Forced oscillation technique and childhood asthma. *Allergol Int* 2012;**61**:373-83.
8. Tanaka H, Hozawa S, Kitada J, Fujii M. Impulse oscillometry:therapeutic impacts of transdermal long-actinb β_2 agonist patch in elderly asthma with inhaled corticosteroid alone. *Allergol Int* 2012;**61**:385-92.
9. Higashi N, Taniguchi M, Mita H, Yamaguchi H, Ono E, Akiyama K. Aspirin-intolerant asthma (AIA) assessment using the urinary biomarkers, leukotriene E_4 (LTE_4) and prostaglandin D_2 (PGD_2) metabolites. *Allergol Int* 2012;**61**:393-403.
10. Baba Y, Maeda K, Yashiro T *et al*. Involvement of PU.1 in mast cell/basophil-specific function of the human IL1RLI/ST2 promoter. *Allergol Int* 2012;**61**:461-7.