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Asthma, Allergy, and Cystic Fibrosis

Introduction

This year’s highlighted publications about asthma and cystic fibrosis (CF) were chosen from scores of articles, and those appearing in this chapter reflect investigations that we believe hold particular significance for the practicing clinician.

Asthma remains the culprit of inordinate use healthcare resources and a significant cause for morbidity, regardless of the age of the patient. A very provocative investigation published in 2014 by Raedler and colleagues highlighted extensive work on allergic and non-allergic asthma phenotypes. The results of this research shed light on immune-regulatory cellular mechanisms at work in childhood asthma. The potential for identification of new pathways to provide the basis for individualized strategies for asthma prevention is promising and appears not too far away—exciting!

A very practical and clinically important manuscript chosen for highlighting in the 2015 Review includes “Management of acute loss of asthma control in the yellow zone: a practice parameter,” which represents an evidence-based practice parameter calling for focus on the yellow zone by practitioners and education of patients on how to manage this zone. The intervention to be recommended for patients who reach the yellow zone will depend upon what type of dosing the subject is taking with regard to inhaled corticosteroid (ICS), eg, scheduled dosing of ICS alone; using ICS with short-acting, quick-onset reliever; using ICS with long-acting beta agonist). Due to the current paucity of research on how best to handle the yellow zone, and the fact that intervention in the yellow zone has the potential to prevent morbidity (emergency department visits, missed school, hospitalization), it seems high time that a practice parameter has been written. Kudos to the three organizations involved: American College of Allergy, Asthma, and Immunology; Joint Council on Allergy, Asthma, and Immunology; American Academy of Allergy, Asthma, and Immunology! It is my strong recommendation that all healthcare providers caring for asthmatics take a careful look at this practice parameter and implement it immediately!

Several studies of asthma therapeutics were published this year, including a randomized, double-blind, placebo-control, parallel group, multi-center study of benralizumab (B), an anti-interleukin 5 receptor alpha monoclonal
antibody. B reduced asthma exacerbation rates over 12 weeks by 49% ($p = 0.01$) and exacerbations resulting in hospitalization by 60% ($p = 0.02$). Additionally, several studies were published studying a long-acting muscarinic antagonist, umeclidinium (UMEC), in asthma, both with and without inhaled corticosteroids (ICS). UMEC led to significant improvements in change from baseline trough FEV1. UMEC was rapidly absorbed and showed evidence of some accumulation. In the absence of ICS, there appeared no therapeutic benefit in the asthmatics studied.  

A study published by Bergert et al, demonstrated successful reduction of hospital readmission rates by using a multidisciplinary asthma task force employing the patient-centered medical home model. This dedicated group of clinicians worked for years to fine-tune their model to intervene and ensure return to the medical home for follow-up visit following hospitalization of children for asthma and documented successful reduction in hospital readmission rates!  

Several CF investigations were chosen for inclusion in this 2015 Year Book, including a review of gene therapy for the treatment of CF. As might be expected, this represents a very complex subject due to the tremendous numbers of known mutations that exist, and not all mutations respond to the same therapeutic interventions. Nevertheless, there has been tremendous advancement in the field of genetics of CF to date. In addition, a registry-based study now allows us to more accurately predict longevity in patients with CF: Median survival of children born with CF in 2010 is projected to be 37 years (CI, 35-39 years) for females and 40 years (CI, 39-42 years) for males, if mortality remains at 2010 levels. The CF Foundation published clinical care guidelines in December 2014 for the prevention of *Pseudomonas aeruginosa* (PA) infection, treatment of initial PA infection, and the use of bronchoscopy for obtaining routine airway cultures in individuals with CF.  

Finally, we hope that you enjoy reviewing this selection of publications as much as we enjoyed selecting them for you.

Best regards professionally,

Sandra K. Willsie, DO, MA

References


**Asthma**

**Trends in the age of diagnosis of childhood asthma**

**Background.**—The cause of rising asthma incidence over time remains unexplained. Examining trends in the age of diagnosis across successive birth cohorts may offer insights into asthma etiology.

**Objective.**—To examine trends in the age at asthma diagnosis and the age and proportion of children hospitalized at first asthma diagnosis in Ontario, Canada.

**Methods.**—Eight consecutive birth cohorts of children (1993-2000) were observed using administrative data from a universal health insurance plan in Ontario, Canada (population 13 million). Trends in the need for hospitalization and age at asthma diagnosis were examined with descriptive and survival analyses.

**Results.**—The records of 1,059,511 children were examined, of whom 201,958 developed asthma in the first 8 years of life, with an average cumulative incidence of 19.1%. Mean age at asthma diagnosis decreased from 4.7 ± 1.5 years in birth year 1993 to 2.6 ± 2.0 years in birth year 2000 (*P* < .0001), with a higher adjusted risk of asthma diagnosis (hazard ratio, 6.7; 95% CI, 6.5-6.9) in the first 3 years of life for children born after 1996 versus children born in the period 1993 to 1995 (hazard ratio, 1.4; 95% CI, 1.3-1.4). The proportion of children hospitalized at asthma diagnosis stayed stable while the age at first asthma hospitalization decreased over time (*P* < .0001).

**Conclusions.**—This study demonstrates a significant increase in asthma incidence and a decrease in the age of asthma diagnosis across multiple birth cohorts. Changes in asthma incidence over time are primarily explained by variations in asthma rates in children younger than 3 years (Fig 2, Table 1).

► This study evaluated all children born between 1993 and 2001 in the single province of Ontario, a single-payor system, evaluating the incidence of childhood...
FIGURE 2.—A, Incidence of asthma in the first 8 years of life per cohort, stratified by age at diagnosis. Total sample size: N = 1,059,511 children in total and 201,958 children with asthma. \( P < .0001 \) for significant increase in overall asthma incidence and asthma incidence in children younger than 3 years by Cochrane Armitage trend test. B, Proportion of children with asthma hospitalized at diagnosis, stratified by age at diagnosis. Total sample size: N = 201,958 children with asthma. \( P < .001 \) for significant increase over time in proportion of children younger than 3 years hospitalized at first asthma diagnosis. \( P < .001 \) for significant reduction over time in proportion of children 3 years or older hospitalized at first asthma diagnosis. (Reprinted from Radhakrishnan DK, Dell SD, Guttmann A, et al. Trends in the age of diagnosis of childhood asthma. J Allergy Clin Immunol. 2014;134:1057-1062, Copyright 2014, with permission from Elsevier.)
asthma and the age at diagnosis, and observing their care, admissions, and treatment over time. Table 1 shows the mean age of asthma diagnosis by birth year cohort (1993–2000; total of 201,962 cases of asthma). The mean age of diagnosis in 1993 was 4.7 years, 1.5 and in 2000, 2.6 years (2.0 (P < .001). Fig 2 depicts the incidence of asthma in the first 8 years of life, stratified by age of diagnosis and the proportion of children with asthma hospitalized at the time of diagnosis. There was a significant increase (P < .0001 in overall asthma incidence and asthma incidence in children younger than 3 years) and a significant reduction, over time, in the proportion of children 3 years or older hospitalized at the time of diagnosis of asthma (P < .001). The investigators cite previous studies indicating that childhood asthma that persists into adulthood is more likely to develop before the age of 3 years and that this trend may equate to a greater burden for the health care system in the long run. Importantly, in this investigational population, the increased burden of asthma among preschool children warrants modification of health care delivery and treatments to target this youngest age group. Future research into primary prevention of asthma in the early years following birth must become a priority.

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Reference