Clinical Implications of the Obese-Asthma Phenotypes

Jennifer Diaz, MD, Sherry Farzan, MD*

KEYWORDS

• Obesity • Asthma • Phenotypes • Body mass index

KEY POINTS

- The prevalence of obesity and asthma around the world is increasing, and together they have led to the classification of two obese-asthma phenotypes.
- The two obese-asthma phenotypes are early-onset asthma, which has an atopic quality, and late-onset asthma, with less atopic features.
- Both obese-asthma phenotypes are characterized by a severe form of asthma, with more exacerbations and poorer symptom control compared with lean asthmatics.
- The obese-asthma phenotypes are less responsive to inhaled corticosteroid and therefore new avenues for treatment should be considered, including dietary changes, weight loss, and use of nonstandard medications.
- Comorbid conditions, such as depression and obstructive sleep apnea, must be addressed as complicating factors in asthma management.

INTRODUCTION

Across the United States and the world there is an large increase in the prevalence of both obesity and asthma. The burgeoning rates of these two epidemics are occurring in the both the adult and pediatric populations. With the increased incidence of obesity and asthma, new asthma phenotypes have emerged with different characteristics, presentation, and treatment responses compared with traditionally described asthma. This article discusses these evolving obese-asthma phenotypes.

EPIDEMIOLOGY

The Obesity Epidemic

An epidemic is defined as an outbreak or product of sudden rapid spread, growth, or development, usually used in health care to describe the spread of diseases.

Disclosure: S. Farzan has received research support from the Thrasher Foundation Award # 9174, New York State Empire Clinical Investigators Program, and Merck Study #39377. J. Diaz has nothing to disclose.

North Shore-Long Island Jewish Health System, Division of Allergy and Immunology, Hofstra School of Medicine, 865 Northern Boulevard, Suite 101, Great Neck, NY 11021, USA
* Corresponding author.
E-mail address: sfarzan@nshs.edu

Immunol Allergy Clin N Am 34 (2014) 739–751
http://dx.doi.org/10.1016/j.iac.2014.07.008 **immunology.theclinics.com**
0889-8561/14/$ – see front matter

However, because of its large increase in prevalence, obesity has reached epidemic status.

Obesity is classified using the body mass index (BMI) (**Table 1**). Some studies use waist circumference or percentage of body fat to determine weight classification, and this may be a better predictor of obesity-associated morbidity.[1–3]

According to a 2008 World Health Organization survey, more than half a billion adults around the world were categorized as being obese, and more than 1.4 billion were overweight, constituting 10% of the adult population.[4] More alarming findings exist in the United States, with the 2010 US Centers for Disease Control and Prevention (CDC) National Health and Nutrition Examination Survey (NHANES) showing more than 70 million adults and 12 million children (36% and 15%, respectively) considered obese.[5] With the increase of obesity in the United States has come an increase in heart disease and diabetes, as well as many other diseases, including asthma.

Asthma, Asthma Everywhere

The prevalence of asthma is also increasing. In the 2000 Behavior Risk Factor Surveillance Survey (BRFSS), most states reported an asthma prevalence of less than 8.3%. By the 2010 BRFSS, 46 states reported an asthma prevalence of greater than 11.5%.[6] According to a 2011 CDC health survey, 18.9 million adults (8.2%) and 7.1 million children (9.5%) in the United States were diagnosed with asthma. These numbers have increased by 4.3 million since 2001. Along with increasing prevalence have come increases in asthma-related medical costs, office/emergency room visits, and morbidity.[7] Therefore, it is important for clinicians to be able to recognize modifiable risk factors for development of severe asthma, such as obesity.

RISK FACTORS

Obesity and Asthma: Are These Related?

With the increase in prevalence of both asthma and obesity, it is crucial to examine the underlying relationship. Over the last decade there have been numerous studies showing that both obese adults and children are at a significantly higher risk of developing asthma.[3,8–10]

Pediatric population

Rodriguez and colleagues[9] examined NHANES data from more than 12,000 children and adolescents in an attempt to identify risk factors for pediatric asthma. Children and adolescents with a sex-specific BMI of greater than the 85th percentile had an almost 2-fold increased risk for developing asthma, which was more severe and difficult to control. Compared with other groups with similar risk factors (including parental

Table 1
Weight classification based on BMI

Classification	BMI (kg/m^2)
Underweight	<18.5
Normal	18.5–24.9
Overweight	25–29.9
Obese (class 1)	30–34.9
Obese (class 2)	35–39.9
Extremely obese (class 3)	≥40