

EDITORIAL

Clinical & Experimental Allergy

Weight loss in children with asthma improves asthma control and quality of life

This editorial discusses the findings of the paper in this issue by M. E. Jensen et al. [12] pp. 775–784.

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Obesity has been associated with poor asthma control, increased exacerbation risk and reduced response to inhaled corticosteroids in children and adults [1, 2]. Although our understanding of how weight gain or obesity affects asthma remains limited, it is becoming evident that this complex association is not determined by increased allergic airway inflammation [3]. Furthermore, this multifactorial relationship probably does not affect all obese asthmatics alike [4, 5]. There are cases in which obesity may be the result, rather than the cause of severe asthma [6]; in others, obesity might be predominantly a symptom burden that contributes to a diagnostic bias [7]. Yet in others, obesity may adversely influence asthma pathophysiology and or response to steroids [8]. What determines which of these obese–asthma relationship exists in a given patient may depend on other phenotypical characteristics such as age of asthma onset, the duration of obesity, gender and underlying genotypes. However, regardless of the specific mechanisms or the type of obese–asthma phenotype, weight loss improves asthma control as shown in the study by Jensen et al. in this issue of the journal [9].

Briefly, the authors recruited obese children diagnosed with asthma from outpatient clinics. Study subjects ages 8–17 years were non-blindly randomized to either a 10-week diet consisting on a 500 kcal reduction based on age- and gender-appropriate energy

requirements, vs. wait-list control group that subsequently received the same treatment. The dietary intervention was intensive, consisting in seven visits with a dietician and alternate week phone calls. Participants were given a calorie counter and individualized meal plans. Study outcomes included the before and after intervention and between group comparison of: anthropometrics, asthma control questionnaire (ACQ) scores, paediatric asthma quality-of-life scores, lung function and airway and systemic biomarkers of inflammation.

Given the short study duration and limited number of subjects, the results are impressive. Participants in the weight loss intervention group had significantly larger reductions in z-BMI and % adiposity from baseline when compared with the control group. Similarly, the intervention arm showed improvements in asthma control, asthma-related quality of life and expiratory reserve volume. At the end of the study, those in the dietary intervention had lower levels of C Reactive Protein (CRP) when compared with the control group. Although the majority of studies have shown that weight loss improves asthma control [10], a successful short-term dietary intervention in this age group had not been carried out previously; in addition, these findings provide clues to potential mechanistic links between obesity and asthma control and have practical implications for the treatment of overweight asthmatic children. While improvements in asthma control could be secondary to betterments in lung function as weight is reduced, it is also possible that obesity or diet-induced airway neutrophilia improves with decreasing BMI [11, 12]. Although this result did not achieve statistical significance between the intervention and the control group, a type II error cannot be excluded. As with other studies, the results from Jensen et al. further support the notion that the effects of obesity or benefits from weight loss are not associated with changes in biomarkers of

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allergic airway inflammation. Given the significant correlation found between CRP and ACQ, the authors speculate that obesity affects asthma through changes in systemic inflammation; yet it is equally possible that CRP levels merely reflect a greater degree of obesity and thus primarily confound this association.

The improvements in asthma control and quality of life make clear the practical implications of this study; the bottom line is that weight loss works and should be incorporated into the clinical management of any overweight or obese child with asthma. Both the Expert Report of the National Heart & Lung Blood Institute of the US NIH and the Global Initiative for Asthma recommend that weight loss should be encouraged for overweight asthmatics to improve asthma control; however, it remains unclear whether children or adults with asthma are usually counselled about weight loss during clinic visits as part of a comprehensive management plan to achieve control.

While the study findings are encouraging there are several questions remaining; for example, could such an intensive weight loss intervention be implemented in a real-life clinical practice?; would an intervention requiring less frequent visits to the dietician be equally effective?; What happens after 10 weeks? Do the majority of subjects gain the weight/increased

adiposity back? If so, does that correlate with loss of asthma control? A larger, multi-centre, randomized clinical trial is now needed to answer many of these important questions. Such a study would also be useful to evaluate whether steroid responsiveness changes in relation to weight loss and to potentially establish what degree of weight loss is needed to enhance response to these medications. Having said this, let's not wait for larger studies to be conducted or for the mechanisms of action to be fully elucidated before implementing more ambitious weight loss interventions for all of our overweight and obese asthmatics. Because the benefits obtained from weight loss in asthma control and quality of life are substantial (and achievable, as shown in this study), the time to act is now. The results from Jensen et al. reassure us that obesity should be considered an important comorbidity to asthma, whose effects are modifiable through caloric restriction and lifestyle modifications. However, the success of this approach will likely only be successful through continuous interventions that require a long-term commitment from a multidisciplinary team of health care providers.

Conflicts of interest: The author declares that no conflict of interest exists.

References

- 1 Forno E, Lescher R, Strunk R, Weiss S, Fuhlbrigge A, Celedon JC. Decreased response to inhaled steroids in overweight and obese asthmatic children. *J Allergy Clin Immunol* 2012; **127**:741–9.
- 2 Taylor B, Mannino D, Brown C, Crocker D, Twum-Baah N, Holguin F. Body mass index and asthma severity in the National Asthma Survey. *Thorax* 2008; **63**:14–20.
- 3 van Veen IH, Ten Brinke A, Sterk PJ, Rabe KF, Bel EH. Airway inflammation in obese and nonobese patients with difficult-to-treat asthma. *Allergy* 2008; **63**:570–4.
- 4 Moore WC, Bleecker ER, Curran-Everett D et al. Characterization of the severe asthma phenotype by the National Heart, Lung, and Blood Institute's Severe Asthma Research Program. *J Allergy Clin Immunol* 2007; **119**:405–13.
- 5 Halder P, Pavord ID, Shaw DE et al. Cluster analysis and clinical asthma phenotypes. *Am J Respir Crit Care Med* 2008; **178**:218–24.
- 6 Holguin F, Bleecker ER, Busse WW et al. Obesity and asthma: an association modified by age of asthma onset. *J Allergy Clin Immunol* 2012; **127**:1486–93, e2.
- 7 Pakhale S, Doucette S, Vandemheen K et al. A comparison of obese and non-obese people with asthma: exploring an asthma-obesity interaction. *Chest* 2009; **137**:1316–23.
- 8 Sutherland ER, Lehman EB, Teodorescu M, Wechsler ME. Body mass index and phenotype in subjects with mild-to-moderate persistent asthma. *J Allergy Clin Immunol* 2009; **123**:1328–34, e1.
- 9 Jensen ME, Gibson PG, Collins CE, Hilton JM, Wood LG. Diet-induced weight loss in obese children with asthma: a randomized controlled trial. *Clin Exp Allergy* 2013; **43**:775–84.
- 10 Juel CT, Ali Z, Nilas L, Ulrik CS. Asthma and obesity: does weight loss improve asthma control? a systematic review. *Journal of Asthma and Allergy* 2012; **5**:21–6.
- 11 Telenga ED, Tideman SW, Kerstjens HA et al. Obesity in asthma: more neutrophilic inflammation as a possible explanation for a reduced treatment response. *Allergy* 2012; **67**:1060–8.
- 12 Wood LG, Garg ML, Gibson PG. A high-fat challenge increases airway inflammation and impairs bronchodilator recovery in asthma. *J Allergy Clin Immunol* 2011; **127**:1133–40.