

Challenges for the Clinician: Physical Activity Among Severe Asthmatic Patients with Comorbid Obesity



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Asthma and obesity are difficult comorbidities for the clinician to manage. Oral glucocorticosteroid bursts for uncontrolled asthma contribute to obesity, and both diseases limit exercise. To date, findings are limited in the literature regarding the relationship between physical activity status and sedentary behavior among patients with severe asthma. A novel case-control study of 122 participants performed by Cordova-Rivera et al¹ investigated physical activity and sedentary time recorded via usage of a triaxial accelerometer (Actigraph, Pensacola, Fla) and pedometer among adults with severe asthma. The results demonstrated that those with severe asthma had higher body mass index (BMI) (30 vs 25; $P < .0001$), and exercised with less high-intensity activity (19.8 minutes less higher intensity exercise per day; $P < .0001$) and less steps per day (2,455; $P < .0002$) compared with control patients.¹ Surprisingly, adult patients with asthma increased their time spent in light intensity exercise such as walking (21 minutes more per day; $P = .029$) with no difference noted in sedentary time compared with controls.¹ This finding is unexpected because those with severe asthma are perceived as being more sedentary. Participants with higher activity and reduced sedentary time had associated improved exercise capacity (6-minute walk test), asthma control, and lower inflammation (C-reactive protein). This study suggests that improving the ability to exercise of those with severe asthma either by time or intensity could result in improved asthma parameters while possibly addressing obesity.¹

A novel aspect of this article was the use of a wearable accelerometer to measure exercise intensity among participants with severe asthma. By determining exercise intensity, Cordova-Rivera et al¹ addressed a limitation inherent in other studies, such as that performed by Bian et al,² which tracked both sleep and physical activity via a pedometer (FitBit, Boston, Mass) in adolescents with asthma. The combination of these measurements demonstrates that those with severe asthma are not performing high-intensity activity but are willing to walk. They attempt to increase their time in light exercise to achieve exercise goals. This suggests that clinicians could help each comorbid

condition by more aggressively treating exercise symptoms to achieve higher intensity exercise activities, setting specific goals for walking (eg, longer periods of walking time), or to achieve specific higher step counts (10,000 steps/d are recommended for a healthy lifestyle).³ Assessing exercise strategies among these comorbid patients would be an important area of future investigation for improving both BMI/metabolic status and exercise capacity simultaneously.

This issue does have implications for our commitment to asthma management. In 2014, Seggev et al⁴ documented that patients with asthma aged 0 to 17 years in Southern Nevada required significantly more emergency department use than did adults; and pediatric patients also required more hospitalizations and primary care visits than did adults with asthma.⁴ Regardless of age, asthma costs in the United States were approximately \$56 billion, with costs per patient with asthma at \$3,259 in 2007.^{5,6} The comorbidity of asthma and obesity is a critical focus because children and adults with asthma tend to reduce activity because of concerns of experiencing exercise-induced bronchospasm, and, as such, may drive higher costs for medical care and experience decreased symptom control.⁷ Ultimately, tolerating exercise is a sign of asthma control, and exercise itself in this study was linked to improved asthma control.

Lack of exercise coupled with rescue oral corticosteroid use may make weight management a challenge.⁸ Multiple studies indicate that the risk of developing obesity during childhood and adolescence is increased for children with asthma, who are 51% more likely to become obese over the next decade compared with children without asthma.⁹ This suggests a need to start these studies earlier in life with children, as well as with adult populations such as in the study by Cordova-Rivera et al. A previous study showed that as asthma severity worsens, physician adherence to prescribing based on National Heart, Lung, and Blood Institute guidelines also worsened.¹⁰ This clinical disconnect may also result in unaddressed exercise-induced bronchospasm symptom control with long-term consequences of obesity development and uncontrolled asthma. Cordova-Rivera et al's novel article suggests that it may be desirable to research the factors influencing the individual patient's decision of how they want to exercise, with a goal of both improving lung function and reducing obesity. Specific strategies to overcome these patients' lack of desire to exercise, as well as examining issues such as perception of activity during employment time affecting home exercise goals, require further investigation. Tackling the comorbidities simultaneously through exercise may result in improvement in both asthma and obesity.

Optimistically, the study noted that extra time spent in active pursuits could pay health dividends for their patients. In keeping track of step counts, those with asthma with the highest number

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Conflicts of interest: The authors declare that they have no relevant conflicts of interest.

Received for publication November 29, 2017; accepted for publication November 30, 2017.

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J Allergy Clin Immunol Pract 2018;6:823-4. 2213-2198

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<https://doi.org/10.1016/j.jaip.2017.11.036>

of steps per day had better exercise capacity as measured by a 6-minute walk distance (6MWD; 499 m vs 616 m; $P < .001$).¹ Each additional 1,000 steps per day in Cordova-Rivera et al's study resulted in a 16.9-m increase in the 6MWD.¹ Conversely, the authors were able to note that a value of 500 m gained on the 6MWD could identify individuals engaging in desired amounts of physical activity and were 6 times more likely to engage in the recommended levels of moderate activity of at least 30 min/d. This could suggest a way forward for these patients, as for every 10-minute increase in moderate activity there was an associated improvement in asthma control, with increasing gains for longer periods of moderate physical activity. This has also been noted recently by other investigators of obesity and severe asthma.¹¹ Of note, there are no current 6MWD recommendations specifically for those with asthma, but a distance of less than 350 m is considered poor for patients with chronic obstructive pulmonary disease.

More studies are needed for specific recommendations for the population with severe asthma for achievable targets to be made. This is a point where future investigation may translate to improved therapeutic goals for clinicians treating those with severe asthma. For instance, there may be a benefit to obtaining a 6MWD for those with severe asthma as a goal-driven way to determine a patient's current exercise capability and target areas of improvement in exercise. Disappointingly, those with severe asthma using a pedometer achieved 5362 daily steps, only half the recommended level.¹ The authors surmised that this population needed coaching to increase steps by more than 4000 steps per day or 25 minutes of moderate exercise per day.

Further studies for exercise and the comorbidities of obesity and asthma need to address the following: (1) does exercise have the capability to improve asthma inflammation/control while improving chances of a lower BMI? (2) is obesity a limiting factor for exercise intensity itself? and (3) what is the best way to improve exercise among those with severe asthma (exercise type/length/pharmacologically) to achieve improved lung function and asthma control. In addition, the authors found that the study population had more depression and anxiety than controls. This may have been a confounding factor for why those with severe asthma exercised less than controls, possibly experiencing anxiety regarding disease exacerbation or depression that may have impaired completion of exercise. As such, the potential interplay between asthma, exercise, anxiety, and depression requires further study.¹²

Overall, a novel use of exercise technology provided multiple possible avenues for future study and improvement of comorbid

asthma and obesity. Take home points for the clinician: our patients with severe asthma with obesity as a comorbidity are not exercising intensively enough to improve both conditions; they are however willing to do light exercise for longer periods of time, but this does not sufficiently replace the potential gains from moderately to highly intensive activity. This suggests a 2-pronged approach for our patients: to clinically address exercise symptoms better, and coach our patients more (step goals, distance goals, length and intensity of exercise) to improve asthma control. The goals may need to be adjusted such that as asthma improves, exercise goals are reset accordingly. It is important to continue investigation of how to encourage exercise to improve asthma and obesity outcomes among patients with severe asthma.

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