

Influence of Energy Uptake on Systemic and Local Inflammation in Obese Asthmatics

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Background

Asthma and obesity are prevalent conditions with a significant public health impact. The obese-asthma phenotype shows poor control, reduced lung function, and decreased treatment efficacy. It involves multiple mechanisms such as systemic inflammation and adipokine imbalance. This study evaluates how energy intake affects systemic and local inflammation in obese asthmatics.

Methods

The study included 10 healthy subjects, 10 obese subjects without lung pathologies, 10 non-obese asthmatics (NOA) (BMI – 18.5–24.9 kg/m²), and 40 obese asthmatics (OA) (BMI – 25.0–49.9 kg/m²). Spirometry with the bronchodilator reversibility test (BRT) was conducted, the exhaled breath condensate (EBC) was obtained, and the level of interleukin-1b (IL-1b), interleukin-4 (IL-4), interleukin-6 (IL-6),

Methods

TNF- α , interleukin-10(IL-10), total and specific immunoglobulin E (IgE), and high sensitive C reactive protein (hs-CRP) were assessed by ELISA. The basal metabolic rate (BMR) and daily calorie needs (DCN) were calculated by the Harris-Benedict equation and Mifflin Jeor formula, respectively. The energy value of food consumed on a working day (EWD) and weekend (EWE), excess energy from food in a working day (EEWD) and in a weekend (EEWE) were calculated by special food album.

Results: Energy Intake

- NOA had lower BMR but higher DCN, EWD, EWE, EEWD, and EEWE vs. healthy subjects.
- Obese participants had higher BMR and energy intake compared to healthy and NOA.
- OA showed greater energy uptake than NOA but lower than non-asthmatic obese subjects.

Results: Correlations

- In NOA:
 - Negative correlations between EEWD and BRT, EEWD and hs-CRP, EWD and IL-26, DCN and IL-10 in EBC.
- In OA:
 - Positive correlations between BMR, EWD, EWE, and hs-CRP, as well as BMI.

Conclusion

- Obese asthmatics consume excess calories, especially on weekends.
- Excess energy increases systemic but not local inflammation.
- Dietary energy intake is an important factor in systemic inflammation among obese asthmatics.