Abstract

Introduction

Background: Antibiotic exposure during early life has been associated with an increased risk of obesity in later years. Two main theories have been put forward to explain this association: the microbial hypothesis and the disturbance hypothesis. This study aimed to investigate the relationship between early-life antibiotic exposure and childhood obesity.

Methods

Results

Discussion

Conclusion

The Hidden Culprit: Predisposition to Obesity as a Result of Early-life Antibiotic Exposure

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Background: It has been reported that the use of antibiotics is associated with excessive weight gain or obesity in healthy infants. Current data suggest intestinal microbiota perturbation caused by antibiotic exposure in the perinatal period programs the host to assume an obesity-prone metabolic phenotype. However, there is a lack of evidence regarding the causal pathway given the multifactorial etiology of obesity.

Objective: The objective of this study was to explore the significance of the association between antibiotic exposure during critical periods of infancy before the age of 2 and the development of obesity.

Methodology: A structured literature review was conducted on databases Medline, Scopus, CINAHL, and Google Scholar resulting in 18 pertinent articles. Queries “Infants AND Obesity AND Antibiotic Exposure AND Gut Microbiota” were searched and screened, and infants’ ages were restricted to 2-3 months.

Results: Antibiotic exposure during critical periods of early development significantly influenced weight gain and the progression of obesity. Furthermore, marked differences in the composition of their microbiota were exhibited when compared to lean subjects. Few studies concluded that exposure was not consistently associated with increased body mass, while others restricted the association solely to male infants.

Conclusion: Over-prescription of antibiotics during infancy not only causes resistance to potentially harmful organisms in the GI tract but may also lead to a lifetime risk for obesity by destroying healthy colonization of necessary bacteria. It is paramount that further research be performed in order to establish preventive measures of obesity and counteract unforeseen effects on microbiota.

The critical period of gut colonization appears in postnatal life. Thus, early administration of antibiotics may disrupt patterns of intestinal colonization and increase intestinal permeability (Figure 1). Moreover, the host assumes an obesity-prone metabolic phenotype which alters the host’s response to specific microbial signals. Although an association between antibiotic exposure and obesity in healthy infants and children has been reported, there is a lack of evidence regarding the exact causal pathway given the multifactorial etiology of obesity.28,29

Is there a significant association between antibiotic exposure during critical periods of infancy before the age of 2 and the development of obesity?

 skim the results of previous studies and then discuss the implications of these

Discussion

It is presumed that the overprescription of antibiotics and its exposure during infancy significantly contributes to the modern prevalence of obesity due to its potentially harmful effects on the microbiota. However, further studies are needed to confirm these findings in order to establish preventative measures.

Future Directions

To investigate the association between antibiotics and the hunger hormone, ghrelin30-32

• the association between antibiotics and the safety hormone leptin33

• the implementation of omega 3 fatty acids to combat obesity through the prevention of antibiotic-induced modulation of gut microbiota34

• the anti-obesity effects of probiotics (Lactobacillus genus)35

• the administration of probiotics such as FOS, malt, galacto-oligosaccharides (GOS) and lactulose to prevent and treat childhood obesity.27

• the role of gut microbiota in immunosuppression

• the role of gut microbiota in the development of childhood obesity

References