Antibiotic exposure in early infancy and risk for childhood atopy

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FROM ABSTRACT

Background
The increase in pediatric allergy and asthma parallels the increase in use of antibiotics.

Antibiotics disturb the flora of the gastrointestinal tract, possibly perturbing the developing immune system.

Objective
We evaluated whether antibiotic use during early infancy increased the risk for atopy.

Methods
Antibiotic prescriptions documented in medical records were collected from a birth cohort born from 1987 through 1989 (n = 725).

At 6 to 7 years of age, 448 were followed by means of examination, including skin prick tests and serum IgE measurements to common allergens.

Results
Atopy increased with antibiotic use.

Conclusion
Antibiotic use in early life appears to contribute to increased risk for atopy in certain subgroups of children.

THESE AUTHORS ALSO NOTE:

The prevalence of pediatric allergy and asthma is increasing worldwide.

The hygiene hypothesis suggests that early exposure to infections decreases the risk for allergy and asthma. [Important]

The immunologic model for the hygiene hypothesis, theorizes that early-life exposure to bacterial infections and bacterial products naturally present in the gut protects against atopy and asthma by favoring the development of a TH1-
predominant [IgG] versus TH2-predominant (allergic) [IgE] cytokine profile in the maturing immune system.”

Antibiotics have changed the patterns of infectious disease and bacterial exposure in infancy in the past 3 decades. [Important]

Antibiotic use “is well known to alter gut flora.”

The “increase in antibiotic use among young children is coincident with the increasing prevalence of pediatric allergy and asthma.” [Important]

Most studies suggest that “antibiotic exposure increased the risk of pediatric atopy or asthma.”

These authors evaluated the influence of antibiotics and other factors during the first 6 months of life in relationship to atopic disorders.

RESULTS

For susceptible children (children with fewer than 2 at home pets and with certain patterns of breast feeding), the risk for atopy “increased with increasing number of antibiotic courses”:
For 1 course of antibiotics, the increased risk was 159%.
For 2 courses of antibiotics, the increased risk was 387%.
For 3 or courses of antibiotics, the increased risk was 415%, with some children being at an increased risk of 1920%.

DISCUSSION

The results from this “prospective birth cohort suggest that antibiotic use is a risk factor for atopic indicators, specifically for children with other risk factors for atopy.”

Children without exposure to the protection afforded by multiple pets are more vulnerable to the effects of antibiotics.

The first 6 months of life is the critical period when antibiotic exposure is most likely to cause atopy, yet any exposure in the first three years of life is important.

“Complementary to the hygiene hypothesis, our data support the premise that antibiotic use in early life exerts an important effect on the immune system and thereby increases the risk of atopic conditions in childhood.”

This “data bolsters the current campaign within the public health and medical communities to avoid the inappropriate use of [antibiotics].”
KEY POINTS FROM DAN MURPHY

1) The increase in pediatric allergy and asthma parallels the increase in use of antibiotics.

2) Antibiotics disturb the flora of the gastrointestinal tract, altering the developing immune system.

3) The prevalence of pediatric allergy and asthma is increasing worldwide.

4) The hygiene hypothesis suggests that early exposure to infections decreases the risk for allergy and asthma. [Important]

5) The immunologic model for the hygiene hypothesis, theorizes that early-life exposure to bacterial infections and bacterial products naturally present in the gut protects against atopy and asthma by favoring the development of a TH1-predominant [IgG] versus TH2-predominant (allergic) [IgE] cytokine profile in the maturing immune system.

6) Antibiotics have changed the patterns of infectious disease and bacterial exposure in infancy in the past 3 decades. [Important]

7) Antibiotic use “is well known to alter gut flora.”

8) The “increase in antibiotic use among young children is coincident with the increasing prevalence of pediatric allergy and asthma.” [Important]

9) Most studies suggest that “antibiotic exposure increased the risk of pediatric atopy or asthma.”

10) Each course of antibiotics in children increases the risk of the child developing atopic disorders.
One course of antibiotics increased the risk by 159%.
Two courses of antibiotics increased the risk 387%.
Three courses of antibiotics increased the risk 415%, with some children being at an increased risk of 1920%.

11) This prospective study indicates that antibiotic use is a risk factor for atopic disorders.

12) The first 6 months of life is the critical period when antibiotic exposure is most likely to cause atopy, yet any exposure in the first three years of life is important.

13) “Antibiotic use in early life exerts an important effect on the immune system and thereby increases the risk of atopic conditions in childhood.”

14) This “data bolsters the current campaign within the public health and medical communities to avoid the inappropriate use of [antibiotics].