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Cesarean Section Delivery and Development of Food Allergy and Atopic Dermatitis in Early Childhood

Papathoma E, Triga M, Fouzas S, Dimitriou G. *Pediatr Allergy Immunol.* 2016;27(4):419-424

PURPOSE OF THE STUDY. To investigate the association between cesarean delivery and physician-diagnosed food allergy and atopic dermatitis during the first 3 years of life.

STUDY POPULATION. A prospective birth cohort study of children born at ≥ 34 weeks' gestation at the University Hospital of Patras, Greece, between August 2009 and March 2011.

METHODS. Four hundred fifty-nine children born in the same tertiary maternity unit were examined at birth and followed up at 1, 6, 12, 18, 24, 30, and 36 months of age. Those with symptoms suggestive of food allergy or atopic dermatitis were evaluated by a pediatric allergy specialist to confirm the diagnosis.

RESULTS. Food allergy was diagnosed in 5.2% and atopic dermatitis in 13.5% of study participants. Cesarean delivery (odds ratio [OR] 3.15; 95% confidence interval [CI] 1.14-8.70), atopic dermatitis (OR 3.01; 95% CI 1.18-7.80), parental atopy (OR 4.33; 95% CI 1.72-12.1), and gestational age (OR 1.57; 95% CI 1.07-2.37) were significant and independent predictors of food allergies. Children with at least 1 allergic parent delivered by cesarean delivery had higher odds of developing food allergy compared with vaginally delivered children of nonallergic parents (OR 10.0; 95% CI 3.06-32.7). The effect of cesarean delivery on atopic dermatitis was not significant (OR 1.35; 95% CI 0.74-2.47). Antibiotic use and prolonged rupture of membranes did not have a significant effect on food allergy or atopic dermatitis.

CONCLUSIONS. Children born by cesarean delivery had threefold higher odds of food allergy, independent of a range of confounding factors, including gestational age, birth weight, smoking, family history of atopy, breastfeeding, and others. Those delivered by cesarean delivery with at least 1 allergic parent had 10-fold higher odds of developing food allergy compared with children who were born vaginally to nonallergic parents. Parental atopy, atopic dermatitis, and gestational age were independent predictors of food allergies as well. Cesarean delivery was not related to the development of atopic dermatitis.

REVIEWER COMMENTS. In this study, the authors provide data for a homogeneous birth cohort in Greece. The strengths of this study include the 3-year follow-up period, the similarities between those who remained in the study

and those who were lost to follow-up, physician diagnosis of food allergy rather than self-report, and the ability to control for multiple factors, such as atopy, breastfeeding, and family history.

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Early-Life Antibiotic Use and Subsequent Diagnosis of Food Allergy and Allergic Diseases

Hirsch AG, Pollak J, Glass TA, et al. *Clin Exp Allergy.* 2017;47(2):236-244

PURPOSE OF THE STUDY. To evaluate associations of early-life antibiotic use with subsequent occurrences of a food allergy and other allergies in childhood.

STUDY POPULATION. Children born in Pennsylvania between 2001 and 2011.

METHODS. The Geisinger Clinic electronic health record data on children born between 2001 and 2011, who had at least 2 outpatient encounters in the first 3 months of life, were assessed. Subjects' data were collected up to 7 years of age. Diagnoses were classified as milk allergies, nonmilk food allergies, or other allergic conditions. Disease processes were determined by *International Classification of Diseases, Ninth Revision* codes. Incidence density sampling was used to identify 5 controls for every case individually, matched on sex and age. The Medi-Span Generic Product Identifier Therapeutic Classification System was used to identify the number and type of antibiotic orders before diagnosis of the allergy. Penicillins, cephalosporins, and macrolides were the antibiotic classes analyzed. Other variables studied included sex, race, use of public medical assistance, mode of delivery, outpatient encounters, and inpatient admissions.

RESULTS. Of the total population studied, 30 060 patients met eligibility criteria. Children with 3 or more antibiotic orders had greater odds of having a milk allergy (odds ratio: 1.78; 95% confidence interval: 1.28-2.48), a nonmilk food allergy (1.65; 1.27-2.14), and/or other allergies (3.07; 2.72-3.46) than children with no antibiotic orders. Children with any allergy were significantly more likely than controls to have public medical assistance, outpatient encounters, and antibiotic orders before an allergy diagnosis. Children with milk or nonmilk food allergies were also more likely to have inpatient encounters. Penicillin and cephalosporin orders had a stronger association with overall food allergy diagnoses than macrolides, when prescribed in the first 2 years of life.

CONCLUSIONS. The authors of this study found strong associations between antibiotic orders and diagnoses of milk allergies, nonmilk food allergies, and other allergic conditions in patients up to 7 years of age. Limitations of the

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