PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Published online December 27, 2010
PEDIATRICS (doi:10.1542/peds.2010-0442)

ARTICLES

Cord-Blood 25-Hydroxyvitamin D Levels and Risk of Respiratory Infection, Wheezing, and Asthma

Carlos A. Camargo, Jr, MD, DrPH[a,b], Tristram Ingham, MBChB[c], Kristin Wickens, PhD[c], Ravi Thadhani, MD, MPH[a], Karen M. Silvers, PhD[d], Michael J. Epton, PhD, FRACP[d], G. Ian Town, DM[e], Philip K. Pattemore, MD, FRACP[d], Janice A. Espinola, MPH[b], Julian Crane, FRACP[c], the New Zealand Asthma and Allergy Cohort Study Group

[a]Center for D-receptor Activation Research and
[b]Department of Emergency Medicine, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts;
[c]Wellington Asthma Research Group, Department of Medicine, Wellington School of Medicine and Health Sciences, University of Otago, Wellington, New Zealand;
[d]Canterbury Respiratory Research Group, Department of Paediatrics, Christchurch School of Medicine and Health Sciences, University of Otago, Christchurch, New Zealand; and
[e]University of Canterbury, Christchurch, New Zealand

OBJECTIVE Higher maternal intake of vitamin D during pregnancy is associated with a lower risk of wheezing in offspring. The relationship between cord-blood levels of 25-hydroxyvitamin D (25[OH]D) and childhood wheezing is unknown. We hypothesized that cord-blood levels would be inversely associated with risk of respiratory infection, wheezing, and asthma.

PATIENTS AND METHODS Cord blood from 922 newborns was tested for 25(OH)D. Parents were asked if their child had a history of respiratory infection at 3 months of age or a history of wheezing at 15 months of age and then annually thereafter. Incident asthma was defined as doctor-diagnosed asthma by the time the child was 5 years old and reported inhaler use or wheezing since the age of 4 years.

RESULTS The median cord-blood level of 25(OH)D was 44 nmol/L (interquartile range: 29–78). Follow-up was 89% at the age of 5 years. Adjusting for the season of birth, 25(OH)D had an inverse association with risk of respiratory infection by 3

months of age (odds ratio: 1.00 [reference] for ≥75 nmol/L, 1.39 for 25–74 nmol/L, and 2.16 [95% confidence interval: 1.35–3.46] for <25 nmol/L). Likewise, cord-blood 25(OH)D levels were inversely associated with risk of wheezing by 15 months, 3 years, and 5 years of age (all $P < .05$). Additional adjustment for more than 12 potential confounders did not materially change these results. In contrast, we found no association between 25(OH)D levels and incident asthma by the age of 5 years.

CONCLUSIONS Cord-blood levels of 25(OH)D had inverse associations with risk of respiratory infection and childhood wheezing but no association with incident asthma.

Key Words: vitamin D • 25-hydroxyvitamin D • cord blood • respiratory infection • wheezing • asthma • New Zealand

Abbreviations: 25(OH)D-25 = hydroxyvitamin D • IQR = interquartile range • OR = odds ratio • CI = confidence interval

Accepted Sep 15, 2010.