

“Fish Oil and Vitamin D Supplementations in Pregnancy Protect Against Childhood Croup”

Background

Croup is a prevalent respiratory disorder in early childhood most often caused by parainfluenza virus infections. Today, there are no preventive strategies and we therefore investigated potential effects of prenatal micronutrient supplementations.

Objective

To investigate the supplementation effects of 1) 2.4-gram n-3 LCPUFA (fish oil) vs. olive oil and 2) high-dose (2800 IU/day) vs. standard-dose (400 IU/day) of vitamin D from pregnancy week 24 until 1 week after birth on the risk of offspring croup during the double-blinded first 3 years of life in a secondary analysis of a 2x2 factorial designed randomized controlled trial (RCT).

Methods

The study was completed in the Danish population-based single-center COPSAC₂₀₁₀ mother-child cohort including 736 pregnant women. Croup was diagnosed by physicians' clinical examinations and medical record checks. Potential mediating mechanisms were investigated using blood metabolomics, airway cytokines and airway microbiome.

Results

A total of 97 of 695 children (14%) had croup before age 3 years. The risk of croup was reduced in the n-3 LCPUFA ($n_{\text{cases}}/n_{\text{total}}=38/346$ (11%)) vs. olive oil group ($59/349$ (17%)), hazard ratio (HR) (95% CI): 0.62 (0.41;0.93), $p=0.02$, and in the high-dose vitamin D ($32/295$ (11%)) vs. standard-dose ($51/286$ (18%)) group, HR: 0.60 (0.38;0.93), $p=0.02$. There was no evidence of interaction or additive effects between the two supplements ($p_{\text{interaction}}=0.56$). Further, the results did not change when adjusting for each other, persistent wheeze and lower respiratory tract infection.

Conclusion

This analysis of the double-blinded period of the COPSAC₂₀₁₀ RCT of n-3 LCPUFA and high-dose vitamin D supplementation during pregnancy demonstrated reduced risk of croup in early childhood.