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Association between early-life antibiotics and incidence of rheumatic diseases: a systematic literature review

Although antibiotics have significantly improved global health outcomes, their use has also been associated with potential risks, namely disruptions of the gut microbiota and development of autoimmune diseases. This systematic literature review aimed to explore the association between the use of early-life antibiotics and the subsequent development of rheumatic diseases later in adult life.

We conducted a systematic search in PubMed and Embase with the assistance of a professional librarian. Studies examining antibiotic exposure during prenatal life, infancy, or childhood, reporting on the incidence of rheumatic diseases, including a comparator group, and published in English or French were eligible. Rheumatic diseases of interest included juvenile idiopathic arthritis (JIA), rheumatoid arthritis, lupus, scleroderma, Sjögren's syndrome, and myositis. Two reviewers independently selected studies and extracted data using a standardized form, with disagreements resolved by a third reviewer. Study quality was assessed using the Newcastle–Ottawa Scale.

Out of 1753 citations, nine studies met inclusion criteria, 8 of which were case–control or cohort studies. All 9 studies reported a positive association between antibiotic exposure in early life and increased risk of JIA, with odds ratios ranging from 1.2 to 3.17. A dose-response relationship was reported in 5 studies, with higher numbers of antibiotic courses being associated with greater risk of developing JIA. Antibiotic exposure during the first years of life appeared particularly relevant, although 2 studies found no significant association for exposures during the first six months of life. One meta-analysis reported a pooled odds ratio of 1.74 (95% CI 1.21–2.52) for the association between antibiotic exposure and JIA. However, some studies highlighted the potential role of confounding factors, such as infections, prematurity, and perinatal conditions. No paper studied the association between early-life antibiotic exposure and risk of other rheumatic diseases.

Early-life antibiotic exposure appears to be linked to a higher risk of JIA, possibly in a dose-dependent manner. The association between early-life antibiotic exposure and development of adult-onset rheumatic diseases remains to be studied.