

Caesarean section is associated with an increased risk of childhood-onset type 1 diabetes mellitus: a meta-analysis of observational studies.

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AIMS/HYPOTHESIS: The aim of this study was to investigate the evidence of an increased risk of childhood-onset type 1 diabetes in children born by Caesarean section by systematically reviewing the published literature and performing a meta-analysis with adjustment for recognised confounders. **METHODS:** After MEDLINE, Web of Science and EMBASE searches, crude ORs and 95% CIs for type 1 diabetes in children born by Caesarean section were calculated from the data reported in each study. Authors were contacted to facilitate adjustments for potential confounders, either by supplying raw data or calculating adjusted estimates. Meta-analysis techniques were then used to derive combined ORs and to investigate heterogeneity between studies. **RESULTS:** Twenty studies were identified. Overall, there was a significant increase in the risk of type 1 diabetes in children born by Caesarean section (OR 1.23, 95% CI 1.15-1.32, $p < 0.001$). There was little evidence of heterogeneity between studies ($p = 0.54$). Seventeen authors provided raw data or adjusted estimates to facilitate adjustments for potential confounders. In these studies, there was evidence of an increase in diabetes risk with greater birthweight, shorter gestation and greater maternal age. The increased risk of type 1 diabetes after Caesarean section was little altered after adjustment for gestational age, birth weight, maternal age, birth order, breast-feeding and maternal diabetes (adjusted OR 1.19, 95% CI 1.04-1.36, $p = 0.01$). **CONCLUSIONS/INTERPRETATION:** This analysis demonstrates a 20% increase in the risk of childhood-onset type 1 diabetes after Caesarean section delivery that cannot be explained by known confounders.

Related Links

- Parental age at delivery, birth order, birth weight and gestational age are associated with the risk of childhood Type 1 diabetes: a UK regional retrospective cohort study. [Diabet Med. 2005]
- Male circumcision for prevention of heterosexual acquisition of HIV in men. [Cochrane Database Syst Rev. 2003]
- A meta-analysis of the association between childhood type 1 diabetes and atopic disease. [Diabetes Care. 2003]
- Caesarean section delivery and the risk of allergic disorders in childhood. [Clin Exp Allergy. 2005]
- A case-control investigation of perinatal risk factors for childhood IDDM in Northern Ireland and Scotland. [Diabetes Care. 1994]

