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Anthropometrics at birth and risk of a primary central nervous system tumour: A systematic review and meta-analysis.

Georgakis MK[1], Kalogirou EI[1], Liaskas A[1], Karalexi MA[1], Papathoma P[1], Ladopoulou K[1], Kantzanou M[1], Tsivgoulis G[2]; NARECHEM-BT Working Group, Petridou ET[3].

Collaborators (22)

Author information

Abstract

BACKGROUND: The aetiology of primary central nervous system (CNS) tumours remains largely unknown, but their childhood peak points to perinatal parameters as tentative risk factors. In this meta-analysis, we opted to quantitatively synthesise published evidence on the association between birth anthropometrics and risk of primary CNS tumour.

METHODS: Eligible studies were identified via systematic literature review; random-effects meta-analyses were conducted for the effect of birth weight and size-for-gestational-age on childhood and adult primary CNS tumours; subgroup, sensitivity, meta-regression and dose-response by birth weight category analyses were also performed.

RESULTS: Forty-one articles, encompassing 53,167 CNS tumour cases, were eligible. Birth weight >4000 g was associated with increased risk of childhood CNS tumour (OR: 1.14, [1.08-1.20]; 22,330 cases). The risk was higher for astrocytoma (OR: 1.22, [1.13-1.31]; 7456 cases) and embryonal tumour (OR: 1.16, [1.04-1.29]; 3574 cases) and non-significant for ependymoma (OR: 1.12, [0.94-1.34]; 1374 cases). Increased odds for a CNS tumour were also noted among large-for-gestational-age children (OR: 1.12, [1.03-1.22]; 10,339 cases), whereas insufficient data for synthesis were identified for other birth anthropometrics. The findings remained robust across subgroup and sensitivity analyses controlling for several sources of bias, whereas no significant heterogeneity or publication bias were documented. The limited available evidence on adults (4 studies) did not reveal significant associations between increasing birth weight (500-g increment) and overall risk CNS tumour (OR: 0.99, [0.98-1.00]; 1091 cases) or glioma (OR: 1.03, [0.98-1.07]; 2052 cases).

CONCLUSIONS: This meta-analysis confirms a sizeable association of high birth weight, with childhood CNS tumour risk, particularly astrocytoma and embryonal tumour, which seems to be independent of gestational age. Further research is needed to explore underlying mechanisms, especially modifiable determinants of infant macrosomia, such as gestational diabetes.

KEYWORDS: Astrocytomas; Birth weight; Brain tumours; Central nervous system tumours; Childhood;

Embryonal CNS tumours; Foetal growth; Infant macrosomia; Meta-analysis; Size for gestational age

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