

## 論 文 要 旨

**An Analysis of a US Case-Control Study on the Association between High Birth Weight and the Risks of Childhood CNS Tumors and Leukemia**

〔 高出生時体重と小児脳腫瘍および白血病リスク  
との関連：米国患者・対照研究の解析 〕

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**【Background】**

The incidence of childhood cancer from 2001-2010 has increased since the 1980s in most parts of the world. The most common cancers among children are leukemia and central nervous system (CNS) tumors. According to a recent study conducted in the US, a significant upward trend in the incidence rate of acute lymphocytic leukemia was noticed in children aged 5 to 9 years between 2000 and 2010; however, the incidence rates of CNS tumors remained stable. High birth weight (BW), 4,000g or larger, is an established risk factor for childhood leukemia. However, its association with CNS tumor risk is yet unclear. The present study examined it, analyzing data obtained from a case-control study conducted among three states from the US. The association with childhood leukemia risk was also further examined.

**【Methods】**

In this study, a data set provided by the Comprehensive Epidemiologic Data Resource was analyzed with an official permission. The original case-control study was conducted to examine the association between paternal preconception exposure to ionizing radiation and childhood cancer risk. Cases with childhood cancer were mainly ascertained from local hospitals, and controls were selected, matched with birth year (1-year category), county of residence, sex, ethnicity and maternal age (+/-2 years). The controls in the original study consisted of children identified from birth certificates. Since the ID numbers were unavailable,

conventional logistic analyses were conducted adjusting for those matching variables except for the county of residence. In addition to those variables, gestational age, age at diagnosis and study sites as covariables were included in the logistic models.

### **【Results】**

Analyzed subjects were 72 CNS tumor cases, 124 leukemia cases and 822 controls born from 1945-1989. Cases and controls showed similar distributions regarding demographic factors and gestational age at birth, except birth year. There was no CNS tumor cases who were born before 1952. The proportion of children with CNS tumors born in later years, especially after 1970, was higher than that of children with leukemia. The odds ratios (ORs) of CNS tumor risk for children with low BWs (<2,500 g) and high BWs (>4,000 g) were 2.0 (95% confidence interval [CI] = 0.7, 5.9) and 2.5 (95% CI=1.2, 5.2)], respectively. When high-BW children were restricted to those who were large for gestational age (LGA), the OR for high-BW children remained similar (OR=2.7; 95% CI=1.1, 6.2). On the other hand, the ORs of leukemia risk for children with low and high BWs were 0.8 (95% CI=0.2, 3.0) and 1.4 (95% CI=0.7, 2.6), respectively. In the normal range of BW (2,500-4,000 g), higher BW was positively associated with CNS tumor risk (beta=0.0011, p for trend=0.012). However, the association with leukemia risk was not significant (beta= -0.0002, p for trend=0.475).

### **【Conclusion】**

High-BW and LGA children had an elevated childhood CNS tumor risk. Low-BW was not associated with the CNS tumor risk. In the normal BW range, the BW itself was positively related to CNS tumor risk. No significant association between BW and childhood leukemia risk was observed in this study. Further investigations are required to explore the biologic mechanisms underlying the association between high BW and CNS tumor risk.