A weighted genetic risk score of adult glioma susceptibility loci associated with pediatric brain tumor risk

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Genetic risk score (GRS) is used to demonstrate the genetic variants contributing to the polygenic architecture of complex diseases. By using a GRS, we have investigated the additive impact of the known adult glioma susceptibility loci on the pediatric brain tumor (PBT) risk and assessed the proportion of PBT heritability attributable to these susceptibility loci. A GRS was generated for PBTs based on the alleles and associated effect sizes derived from a previously published genome-wide association study on adult glioma. The GRS was calculated in CEFALO, a population-based case-control study of brain tumors in children and adolescents including saliva DNA of 245 cases and 489 controls. The unconditional logistic regression model was used to investigate the association between standardized GRS and risk of PBTs. To measure the variance explained by the effect of GRS, Nagelkerke pseudo-R; 2; was calculated. The GRS for adult brain tumors was associated with an increased risk of PBTs (OR 1.25 [95% CI 1.06-1.49], p = 0.009) and 0.3% of the variance in PBTs could be explained by the effect of GRS on the liability scale. This study provides evidence that heritable risks of PBTs are in-part attributable to some common genetic variants associated with adult glioma.
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