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Neurosurgical short-term outcomes for pediatric medulloblastoma patients and molecular correlations: a 10-year single-center observation cohort study

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Abstract

This study examined the risk factors for short-term outcomes, focusing particularly on the associations among molecular subgroups. The analysis focused on the data of pediatric patients with medulloblastoma between 2013 and 2023, as well as operative complications, length of stay from surgery to adjuvant treatment, 30-day unplanned reoperation, unplanned readmission, and mortality. 148 patients were included. Patients with the SHH TP53-wildtype exhibited a lower incidence of complications (45.2% vs. 66.0%, odds ratio [OR] 0.358, 95% confidence interval [CI] 0.160 - 0.802). Female sex (0.437, 0.207 - 0.919) was identified as an independent protective factor for complications, and brainstem involvement (1.900, 1.297 - 2.784) was identified as a risk factor. Surgical time was associated with an increased risk of complications (1.004, 1.001 - 1.008), duration of hospitalization (1.006, 1.003 - 1.010), and reoperation (1.003, 1.001 - 1.006). Age was found to be a predictor of improved outcomes, as each additional year was associated with a 14.1% decrease in the likelihood of experiencing a prolonged length of stay (0.859, 0.772 - 0.956). Patients without metastasis exhibited a reduced risk of reoperation (0.322, 0.133 - 0.784) and readmission (0.208, 0.074 - 0.581). There is a significant degree of variability in the occurrence of operative complications in pediatric patients with medulloblastoma. SHH TP53-wildtype medulloblastoma is commonly correlated with a decreased incidence of complications. The short-term outcomes of patients are influenced by various unmodifiable endogenous factors. These findings could enhance the knowledge of onconeurosurgeons and alleviate the challenges associated with patient/parent education through personalized risk communication. However, the importance of a dedicated center with expertise surgical team and experienced neurosurgeon in improving neurosurgical outcomes appears self-evident.

Keywords: Medulloblastoma; Molecular subgroup; Operative complications; Pediatric; Quality indicator; Short-term outcome.