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Pediatric intramedullary spinal tumors: Pathological and clinical outcomes in a 96-case single-institution cohort study

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Abstract

Objective: Pediatric intramedullary spinal cord tumors (PIMSCTs) seriously threaten children's growth and development. This study aims to evaluate the pathological features of PIMSCTs and analyze related factors influencing clinical outcomes.

Methods: A retrospective analysis was conducted on 96 children with PIMSCT who underwent surgical treatment at our hospital from January 2015 to June 2024. Relevant clinical data were collated to comprehensively analyze clinical and pathological characteristics, and to explore factors potentially affecting prognosis and neurological function.

Results: Among the 96 included patients, the thoracic spine was the most common tumor location (n = 43, 44.8%). Most patients presented with mild neurological deficits (MMS II) at admission. Overall survival was unrelated to tumor length but correlated with the WHO grade of the tumor. No significant difference in survival was observed between H3K27M mutant and wild-type tumors (p = 0.087), while both Ki-67 and p53 expression were significantly associated with postoperative survival. Short-term postoperative neurological function correlated with tumor length, initial symptoms, and preoperative neurological status. For long-term neurological function, influencing factors included age, WHO grade, syringomyelia, postoperative MMS, and changes in the platelet-to-lymphocyte ratio (PLR).

Conclusion: Astrocytoma was the most prevalent pathology in this study. H3K27M mutation did not significantly affect survival in high-grade spinal astrocytoma, while high Ki-67 and p53 expression correlated with poorer prognosis. Tumor length was associated with short-term but not long-term neurological function. Long-term neurological outcomes were mainly linked to inherent tumor properties and postoperative neurological status; postoperative PLR changes may partly indicate long-term neurological function.

Keywords: Astrocytoma; Intramedullary spinal tumors; Neurological function; Pediatric; Surgical outcomes.

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