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abstract

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abstract

Pediatric Spinal Clear Cell Meningioma (PSCLM) – A Systematic Synthesis of Existing Evidence

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Introduction: Clear cell meningiomas are rare neoplastic lesions of the central nervous system with limited involvement of the spinal cord, yet a surge in pediatric spinal clear cell meningioma (PSCLM) cases has been reported in the literature recently. The objective was to develop consolidated evidence on clinic-pathological patterns, treatment strategies, follow-up outcomes, and recurrence rates associated with PSCLM.

Methodology: A systematic literature search was conducted over PubMed and Google Scholar according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to retrieve all articles from inception until July 31, 2025, reporting the occurrence of PSCLM by using keywords. Data extraction and descriptive analysis were conducted using MS Excel.

Results: A total of 22 patients (21 studies), suffering from PSCLM, were identified with a mean age of 5.85±3.54 years and female preponderance (63.6%). The most common presenting complaints were backache (50%) and limb weakness or numbness (45.4%). absent tendon reflexes and paraparesis were frequent clinical features i.e., 22.7% each. Majority of the tumors (95.4%) were Intradural extramedullary lesions, were lumbar (54.5%), showed isointensity to spinal cord on T1 and T2-weighted MRI sequences (53.1% and 62.5% respectively and, homogenous contrast enhancement. Gross total resection was achieved in 90.9% of patients with nerve rootlet sectioning in 13.6% patients. Epithelial membrane antigen (EMA) was frequently found positive immunohistochemical markers (93.3%), where genetic testing revealed a SMARCE-1 mutation. The mean duration of follow-up was 23.3 ±27.14 months, with 59% of patients alive without a deficit, and 40.9% patients alive with preexisting deficit. Adjuvant radiotherapy was given in 27.2% patients with recurrence rates of 45.4%, distant metastasis in 4.5% patients, and no mortality.

Conclusion: PSCLMs are rare tumors, predominantly found in females, mostly in the lumbar spinal cord. They are typically intradural extramedullary, yet lacking the dural tail sign. Safe GTR and effective role of adjuvant radiotherapy render them favorable tumors with no mortality. EMA positivity and genetic workup for monosomies indicate to opt for a type-specific treatment option.

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