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Surgical approaches to adult thalamic gliomas: a systematic review

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Background: Adult thalamic gliomas (ATGs) present a surgical challenge given their depth and proximity to eloquent brain regions.Though a relative abundance of literature has been published regarding the surgical management of thalamic lesions in pediatric patients, a scarce amount exists dedicated to adult populations. Methods: Literature regarding surgical management of thalamic gliomas in adult patients was reviewed according to the PRISMA guidelines. Fours databases were searched with keywords "'thalamic glioma' AND 'surgical intervention' OR 'thalamic glioma' AND 'surgical treatment'" in July 2021 for articles assessing surgical techniques of ATG resection. Results: The mean age of adult undergoing surgical management was 33.57 years with a median preoperative KPS of 72.15. Among the 507 cases, several surgical approaches were utilized. Transcortical approaches were most frequently used accounting for 37.8% of all cases followed by transventricular (23.8%), transcallosal (22.8%), and trans-sylvian transinsular (2.92%). Conclusions: Studies in this review agree that decreased age, low grade glioma, increased KPS, and increased duration of symptoms are positive prognostic factors. Greater degree of resection provides a positive survival benefit, and transcortical approaches appear to carry a greater overall survival. Stratified guidelines could pose an overall advantage to surgical success when making decisions on treatment approach.

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A small RNA signature from extracellular vesicles in patient plasma correlates with recurrence or progression of high-grade gliomas

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Background: While managing patients with high-grade gliomas (HGG), predicting recurrence, or differentiating between pseudoprogression (radiation necrosis) and true tumour progression would be invaluable in improving overall prognosis. Characterizing small RNA (sRNA) expression profiles from plasma-derived extracellular vesicles (EVs) over the course of a patient's treatments, may allow for patient-specific treatment modifications and improve outcomes. Methods: EVs were isolated using Vn96 capture from plasma obtained longitudinally from HGG patients perioperatively and with routine, follow-up surveillance imaging. sRNA was enriched from the EVs, upon which sequencing and unsupervised hierarchal clustering of sRNA signatures were completed. Expression profiles were grouped longitudinally with the clinical status of patients. Results: Cluster analysis of sequences from nine HGG patients, has revealed a sRNA signature that is able to distinguish between tumours showing evidence of progression and those remaining stable over time. Those samples obtained from patients where a clinical diagnosis of tumour progression or pseudoprogression were uncertain, were found to cluster into progression vs. stable signatures. Clinical follow up of these patients will reveal the predictive value of these identified clusters. Conclusions: These preliminary findings demonstrate the potential utility of small RNA profiling of EVs obtained from patients with high-grade gliomas as non-invasive biomarkers for recurrent/progressive disease or stability/pseudoprogression.

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Pediatric posterior fossa ependymoma recurrence in a molecularly defined cohort – Clinical, demographic, and surgical factors associated with outcome

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Background: Pediatric posterior fossa ependymoma contributes to morbidity and mortality in children. Following gross total resection and adjuvant radiotherapy, there is a known risk of local recurrence that portends a dismal prognosis. We sought to characterize survival in a molecularly defined cohort with an emphasis on recurrence patterns that influence outcome. Methods: This study was approved by the Ethics Board of the Hospital for Sick Children. We performed a twenty-year single-center retrospective study to identify clinical, demographic and treatment characteristics of patients with pathologically diagnosed posterior fossa ependymoma. Results: There were 60 patients identified that underwent primary resection. Recurrence rate in the cohort was 48% with 29 cases of recurrent ependymoma occurring at a mean time of 24 months after index surgery. No mortalities were observed among patients undergoing primary resection without recurrent disease. Median cohort survival was 12.3 years in the primary cohort and and 6.32 years among patients recurrent ependymoma. Recurrent disease was significantly associated with worse overall survival after multivariate analysis (HR = 0.024). Conclusions: We highlight overall survival and factors influencing mortality in pediatric posterior fossa ependymoma. Recurrent disease confers a worse prognosis. We describe for the first time survival trends following local and distant recurrences managed through multiple resections.