## Title

SURG-25. EFFECT OF VENTRICULAR ENTRY DURING GLIOBLASTOMA RESECTION ON PATIENT OUTCOMES



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analyzed using iPlan® Flow software (Brainlab AG, Munich, Germany) for volumetric measurements. Target and catheter coordinates as well as radial, depth, and absolute error in MRI space were calculated with the Clearpoint imaging software (Clearpoint®, MRI Interventions Inc. Irvine, USA). RESULTS: Seven patients underwent two or more sequential CED infusions. No patients experienced deficits Clinical Terminology Criteria for Adverse Events (CTCAE) grade 3 or greater. One patient had persistent grade 2 cranial nerve deficit after a second infusion. No patients experienced hemorrhage or stroke post-operatively. There was a statistically significant decrease in radial error (p= 0.005) and absolute tip error (p=0.008) for infusion two compared to the initial infusion. Sequential infusions did not result in significantly different distribution capacity between the first and second infusion (Vd:Vi ratio: 2.66 ± 0.35 versus 2.42 ± 0.75; p=0.45). CONCLUSIONS: This series demonstrates the ability to safely perform sequential CED infusions into the pediatric brainstem. Past treatments did not negatively influence the procedural work flow, technical application of the targeting interface, or distribution capacity. This limited experience provides a foundation for using repeat CED for oncologic purposes.

**SURG-25. EFFECT OF VENTRICULAR ENTRY DURING GLIOBLASTOMA RESECTION ON PATIENT OUTCOMES**

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BACKGROUND: Tumor proximity to the ventricle and ventricular entry (VE) during surgery have both been associated with poorer prognoses; however, the interaction between these two factors is poorly understood. METHODS: The UCSF tumor registry was searched for patients with newly diagnosed and recurrent supratentorial glioblastoma who underwent surgical resection with the senior author between 2013 – 2018. Tumor location with respect to the subventricular zone (SVZ), size, VE, and extent of resection were assessed using pre and postoperative imaging. RESULTS: In the 200-patient cohort of newly diagnosed and recurrent glioblastoma, 26.5% had VE. Comparing patients with VE to those without VE, there was no difference in postoperative hydrocephalus (1.9% vs. 4.8%, p = 0.36), ventriculoperitoneal shunting (0% vs. 3.4%, p = 0.17), pseudomeningoceles (7.5% vs. 5.4%, p = 0.58), or subdural hematomas (11.3% vs. 3.4%, p = 0.07). Importantly, rates of leptomeningeal disease (7.5% in VE vs. 10.2% w/o VE, p = 0.57) and distant parenchymal recurrence (17.9% in VE vs. 23.1% w/o VE, p = 0.35) were not different between the groups. There was no effect of VE on EOR when controlling for SVZ type. Newly diagnosed patients with tumors contacting the SVZ (Type 1 or 2) had worse survival than patients with tumors that did not contact the SVZ (Type 3 or 4) (1.27 vs 1.84 years, p = 0.014, HR 1.8, CI 1.08 – 3.03), but VE was not associated with worse survival in these patients with high risk SVZ Type 1 and 2 tumors (1.15 vs 1.68 years, p = 0.151, HR 0.59, CI 0.26 – 1.34). DISCUSSION: VE was well tolerated with complications being rare events. There was no increase in leptomeningeal spread or distant parenchymal recurrence in patients with VE. Finally, VE did not change survival for patients with tumors contacting the ventricle.

**SURG-27. TREATING HYDROCEPHALUS IN DIFFUSE MIDLINE GLIOMAS WITH AN H3 K27M MUTATION**

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BACKGROUND: Diffuse midline gliomas (DMG) are a subset of malignant gliomas that share a characteristic Histone H3K27M mutation. These tumors are centrally located and may cause hydrocephalus on initial presentation. DMG lack characteristic imaging that distinguish from other primary brain tumors in the midline. We conducted this retrospective chart review of 43 consecutive patients presenting with midline tumors to determine: how many had a DMG; whether DMG patients with hydrocephalus were candidates for resection; and what the outcomes of endoscopic third ventriculostomy (ETV) versus ventriculoperitoneal shunt (VPS) placement were, as compared to wild type (WT) tumors. METHODS: We conducted an IRB approved retrospective chart review of patients presenting with midline tumors from 9/2016-3/2020 to determine H3K27M mutation status, hydrocephalus, and neurosurgery intervention. RESULTS: The median age of all midline tumor patients was 19.1 years (range 1.1-80.1). 26% (11/43) of midline tumors presented with H3K27M mutation, with a higher rate of hydrocephalus compared to patients without mutation [7/11 (65%) for DMG vs. 6/32 (19%) for WT, p< 0.05]. Of the seven H3K27M patients presenting with hydrocephalus, none were candidates for resection, 5 underwent ETV, and 2 underwent VPS placement as initial management. 4 out of these 5 ETVs failed within an average of 24 days (6-42 days). 2 patients then underwent VP shunt placement; the other 2 underwent secondary ETV but both failed and required VP shunting as well. All 6 WT tumor patients had one procedure (1 ETV, 5 resection) to relieve hydrocephalus, and no patients had recurrent hydrocephalus. CONCLUSIONS: Both pediatric and adult patients may present with DMG associated with a higher rate of unresectable tumors and hydrocephalus on presentation. Furthermore, these data suggest that neuroendoscopic third ventriculostomy and septum pellucidum fenestration for the management of obstructive hydrocephalus in patients with DMG may be less robust than shunting.

**SURG-28. PRESENTATION OF A POSTERIOR FOSSA TUMOR AT A HOSPITAL IN WESTERN JAMAICA**

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The posterior cranial fossa is part of the cranial cavity, located between the foramen magnum and tentorium cerebelli that houses the cerebellum, pons and medulla oblongata. Commonly, tumors arising from this region in adults are cerebellar metastases or schwannomas of the vestibular nerve – the incidence of primary neoplasms is uncommon and more reserved for the pediatric population. A 28 year old female was in her usual state of health until last year when she started experiencing recurrent headaches with associated vomiting and intermittent loss of consciousness. A CT brain was done upon presentation to the hospital that revealed a 4th ventricle mass with obstructive hydrocephalus. A ventriculoperitoneal (VP) shunt was done thereafter to decompress the ventricular system, in anticipation for further surgical intervention for mass. Occipital craniotomy and resection of tumor was done and patient managed in a multidisciplinary manner in the intensive care unit. Post-operative course was marked by occipital pseudomeningocele with an associated CSF leak; a lumbar drain was placed in situ until complete resolution of leak. Histological analysis showed WHO Grade II Astrocytoma. Adult primary posterior fossa tumors are rare and can present with a constellation of symptoms. Although patient presented with findings in keeping with the diagnosis of an ependymoma, close clinical follow up will be required henceforth due to the refractory nature of such a low grade astrocytoma post-resection. Radiotherapy can also be considered in further management of case.

**SURG-29. CLINICAL FACTORS ASSOCIATED WITH RECURRENCE IN ATYPICAL MENINGIOMA: RETROSPECTIVE ANALYSIS OF 99 PATIENTS IN TWO INSTITUTES**

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OBJECTIVE: The objectives of this study were to examine the local control (LC) rate of atypical meningioma after surgical resection with or without adjuvant treatment, to identify risk factors for the recurrence of atypical meningioma, and to compare our results to known factors from the literature. METHODS: Clinical and radiological records of patients with atypical meningiomas diagnosed at two institutes from January 2000 to December 2018 were reviewed retrospectively. Histopathological features were also reviewed using formalin-fixed paraffin embedded samples from pathological archives. RESULTS: Of the 99 atypical meningiomas eligible for analysis, 36 (36.4%) recurred during the follow-up period (mean 83.3 months, range 12–232 months). The rate of 3-year LC and 5-year LC was 80.8% and 74.7% respectively. The mean time-to-recurrence was 49.4 months (range 12–150 months). Multivariate analysis using Cox proportional-hazard regression model showed that the extent of resection (Hazard ratio [HR] 4.761, p=0.013), Ki67 index (HR 8.541, p=0.004), mitotic index (HR 3.275, p=0.044), tumor size (HR 3.228, p=0.041), and radiotherapy (HR 3.816, p=0.029) were independently associated with 3-year LC. These factors was also statistically associated with recurrence-free survival. In terms of radiotherapy after surgical resection, the recurrence was not prevented by immediate radiotherapy because of the strong effect of proliferative index on recurrence. Three cases of malignant transformation to WHO grade III meningioma were histopathologically confirmed after repeated surgery. Two out of these three patients succumbed to malignant transformation. The mean Ki67 proliferative index increased for recurrent cases in 18 patients (58.1%) from 7.55% (range 4-16) to 11.81% (range 5-24). CONCLUSION: The present study suggests that the extent of resection, proliferative index (according to Ki67 expression) and mitotic index, tumor size, and radiotherapy are associated with recurrence of atypical meningiomas. However, our results should be further validated through prospective and randomized clinical trials.

**SURG-30. SURGICAL RESECTION OF PRIMARY CENTRAL NERVOUS SYSTEM LYMPHOMA: IMPACT OF PATIENT SELECTION ON OVERALL SURVIVAL**

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