tumors. A total of 51/71 of the tumors were found in the skull base (72.82%). 22/71 (31.42%) of the tumors were meningotheial, 6/71 (8.57%) were atypical, 6/71 (8.57%) were transitional, 3/71 (4.28%) were secretory, and 2/71 (2.86%) were chordoid. We detected an average of 1.56 ± 1.07 genomic alterations (GAs) per patient. The most common mutations were in NF2 (52/71), PIK3CA (22/71), FGFR3 (13/71), SMO (11/71) and AKT1 (10/71), with Tertp (1/71) mutations being the least frequent. The NF2-positive tumors were predominantly of grade I (43/52 (82.69%) with lower rates of recurrence (7/52, 13.41%) in tumors harboring NF2 mutations compared to tumor harboring non-NF2 mutations (8/18, 44.44%). Single FGFR3 mutations reported in three patients, all had WHO grade I tumors, with no recurrence in our cohort.

CONCLUSIONS: This cohort focusing skull base meningiomas, highlights a range of mutations outside the known cancer driver NF2 that may be linked to meningioma prognosis. Among our findings were the identification of a rare TERTp mutation and the first report of FGFR3 mutations that may represent biomarkers for the identification of skull base meningioma patients with a favorable prognosis. Taken together, these findings highlight how genetic profiling can guide optimal treatment strategies, prognostic prediction, and patient management for skull meningioma.

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Association Between Tumor Mutations and Meningioma Recurrence in Grade I/II Disease
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INTRODUCTION: A subset of grade I and II meningiomas, in contrast to their predicted favorable oncologic course, recur. Recent interest has been paid to the development of predictive measures to identify which tumors may necessitate more aggressive initial management or more frequent post-resection surveillance.

METHODS: Using our tissue bank of 255 meningiomas with linked findings were the identification of a rare TERTp mutation and the first report of FGFR3 mutations that may represent biomarkers for the identification of skull base meningioma patients with a favorable prognosis. Taken together, these findings highlight how genetic profiling can guide optimal treatment strategies, prognostic prediction, and patient management for skull meningioma.

INTRODUCTION: Awake mapping has been associated with decreased neurological deficits and increased extent of resection in eloquent glioma resections. However, its impact within clinically relevant glioblastoma subgroups remains poorly understood.

METHODS: 918 patients with tumor resection for primary eloquent glioblastoma between 2010 and 2020 at four tertiary centers from Europe and the United States were included from an initial cohort of 4075 patients. Awake patients were matched with asleep patients for the overall cohort and subgroups.

RESULTS: Overall, awake mapping led to less neurological deficits at 6 weeks (18.4% vs. 27.8%, p = 0.036) and 6 months postoperatively (26.5% vs. 41.9%, p = 0.0039), lower residual volume (mean: 1.9 vs. 6.3 ml, p = 0.0076), a higher extent of resection (mean: 95.5% vs. 85.3%; median: 99.8% vs. 94.0%, p < 0.001), and longer overall survival (median: 20.0 vs. 18.5 months, p = 0.042). Awake mapping led in the subgroups of age <70, age = 70, preoperative NIHSS score 0-1 and preoperative KPS 90-100 to less postoperative neurological deficits at 6 weeks and 6 months. For patients in the KPS = 80 subgroup, awake mapping led to less postoperative neurological deficits at 6 months (22.0% vs. 45.9%, p = 0.026). Patients aged < 70 years undergoing awake craniotomy had on average a longer overall survival than the asleep resection group (median: 24 months vs. 20.5 months, p= 0.031). Awake mapping was an independent predictor for receiving adjuvant chemotherapy and radiotherapy (OR for no receipt: 0.40, p = 0.025), gross-total resection based on residual volume (OR 2.79, p = 0.041), and gross-total resection based on extent of resection (OR 2.24, p = 0.002). Moreover, it had a positive impact on overall survival in the = 70 subgroup (HR 0.88, p = 0.033), but a negative impact on overall survival in the NIHSS = 2 subgroup (HR 3.07, p = 0.014).

CONCLUSIONS: Awake mapping prevents postoperative neurological deterioration in eloquent glioblastoma resections for patients aged <70, aged = 70, with a preoperative NIHSS score of 0-1 or preoperative KPS of 90-100 and increases the rate of gross-total resections in all patients.

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IPAX-1: Phase ½ Study of 4-L-[131I] IODO-Phenylalanine (131I-IPA) Combined with External Radiation Therapy (XRT) as Treatment for Patients with Glioblastoma Multiforme
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INTRODUCTION: Many tumor types, including glioblastoma multiforme (GBM), overexpress the L-type amino transporter 1 (LAT-1). I-iodo-phenylalanine (I-IPA) is a small-molecule amino acid derivative taken up by LAT-1 and designated orphan status in the United States and European Union for the treatment of GBM. Tumor accumulation of I-IPA was shown in a proof-of-principle study and confirmed with single dosing of 2–7 GBq I-IPA in combination with XRT in recurrent GBM. The I-IPA + XRT as Treatment for Patients with GBM (IPAX-1) study evaluates the safety, tolerability, dosing schedule, and preliminary efficacy of I-IPA in combination with second-line XRT in patients with recurrent GBM.

METHODS: IPAX-1 is a multi-center, open-label, phase 1/2, dose-finding study recruiting patients with previously confirmed histological diagnosis of GBM and evidence of first recurrence, history of GBM standard therapy, at least 6 months since end of first-line XRT, pathologically increased amino acid tumor uptake shown by molecular imaging, and current indication for repeat radiation. Participants receive intravenous I-IPA either as a single fraction (1f) followed by XRT, or as three equal fractions (3f) at weekly intervals followed by XRT commencing between the first and second I-IPA administration.

RESULTS: Good tolerability and safety profile Promising progression free survival median 4.33 months and overall survival median 15.97 months Patients with unmethylated MGMT have a worse response to therapy than methylated MGMT.

CONCLUSIONS: Early evidence indicates that the combination of 131I-IPA and XRT may have an anti-neoplastic effect.

824 Development of a Preclinical Glioblastoma Platform in a Murine Model in order to optimize Diffusion Kurtosis Imaging Protocol to be able to accurately differentiate Acute and Chronic Radiation Necrosis from Tumor Recurrence

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INTRODUCTION: Radiation induced damage in glioblastoma (GB) patients can present in a late-delayed fashion as radiation necrosis (RN) or tumor recurrence (TR). The radiographic differentiation of these entities is particularly challenging as they appear similar on magnetic resonance imaging (MRI). Failure to differentiate these can ultimately lead to unnecessary surgery and early cessation radiation therapy. There is a need for developing novel non-invasive techniques that can reliably distinguish between radiation necrosis and tumor recurrence.

METHODS: We orthotopically transplanted GL261 mouse glioblastoma cells into C57BL/6 mice, with successful tumor induction verified by MRI after two weeks. To consistently induce RN/TR, an aggressive radiation dose fractionation (12 Gy/60 Gy) on alternating days was used. This was completed such that one portion of the tumor received 100% dose of radiation fraction, sufficient to cause RN, whereas the tumor edge received only 50% of the dose, allowing for tumor recurrence. At four time points, MRI and diffusion kurtosis imaging (DKI) were obtained, and objective metrics such as mean, axial, and radial kurtosis and diffusivity were calculated.

RESULTS: Our data demonstrated mice tumor recurrence and radiation necrosis on MR imaging. MRI and DKI at 2 weeks following orthotopic glioblastoma implantation demonstrated edema and gyril edema compatible with tumor recurrence. One week later, imaging sequences demonstrated continued tumor progression. This demonstrated that our proposed model for radiation induction was effective at achieving its goal of creating some areas of RN and some of TR.

CONCLUSIONS: Our results provides an invaluable platform for the mechanistic study of acute radiation necrosis, chronic radiation necrosis, and tumor recurrence, and management of these conditions.

825 Can Applying Machine Learning on Perioperative Team Communication Data Change the Way We Predict Case Time Duration?

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INTRODUCTION: Accurate case-time prediction is a critical component in improving operating room efficiency. Applying machine learning on patient and booking parameters has been shown to improve accuracy. However, the details of the actual surgical plan as determined by the surgeon pre-operatively have not been included in these predictions. In this study, we applied machine learning methods on data from perioperative team communication platform to predict case time duration.

METHODS: The objective data collected from 535 neurosurgical cases by a perioperative team communication platform were divided to training and testing datasets (431 and 104 cases respectively). We developed a machine learning algorithm based on historical case-duration data (last 10 similar cases by the same surgeon) and compared to planning data collected from a perioperative team communication platform. We used the real case-time duration of the cases in the training dataset to train the algorithm. We then tested our model on the testing dataset and compared the accuracy of case-time prediction to the historical data alone prediction model, which is the common method used in our institution.

RESULTS: The data collected from 535 neurosurgical cases by a perioperative team communication platform were divided to training and testing datasets (431 and 104 cases respectively). We developed a machine learning algorithm based on historical case-duration data (last 10 similar cases by the same surgeon) and compared to planning data collected from a perioperative team communication platform. The real case-time duration of the cases in the training dataset to train the algorithm. The historical data method averaged 90.6 minutes difference in case-time from real time, and the machine learning model averaged 80.04 minutes (p=0.029). For cases longer than the case-time 50th percentile (183 minutes), the historical data method averaged 126.02 minutes difference from real time, and the machine learning model averaged 104.52 minutes (p=0.014).

CONCLUSIONS: The actual case plan as discussed amongst the surgical team in the perioperative period provides information that is not often available otherwise. Applying a machine learning algorithm on the data captured through a team communication platform improved case time prediction compared to common methods.