resents an alternative to surgery in poor surgical candidates. We aimed to investigate the clinical efficacy and safety of 2-SSRS in patients with LBMs. METHODS: LBMs of patients treated with 2-SSRS between 2014 and 2020 were evaluated. Demographic, clinical, and radiologic information was obtained. Volumetric measurements at first SSRS, second SSRS, and follow-up imaging studies were obtained. RESULTS: Twenty-six patients with 28 LBMs were included in the study. Fifteen patients (58%) were male. Median age at 2-SSRS was 61 years (range: 31–84). Median marginal doses for first and second SSRS were 15 Gy (range: 12–18 Gy) and 15 Gy (range: 12–16 Gy), respectively. Median duration between sessions was 32 days. Two patients (8%) failed to receive their second SSRS due to local progression. Median tumor volumes at first SSRS, second SSRS, 3-month follow-up, and 6-month follow-up were 8.7 cm^3 (range: 1.5–34.7 cm^3), 3.3 cm^3 (range: 0.8–26.1 cm^3), 1.7 cm^3 (range: 0.2–10.1 cm^3), and 1.4 cm^3 (range: .04–20.7 cm^3), respectively. The median absolute and relative decrement between S-SRS sessions was 3.7 cm^3 (range: 2.8–16.5 cm3) and 49.5% (range: 17.1- 87.1%), respectively. Overall, 26 of the 28 lesions (93%) demonstrated early local control following the first SSRS with 18 lesions (69%) demonstrating a decrease in volume of >30% and 3 lesions (12%) remaining stable. Six lesions (23%) showed disease progression. There were no grade 3 adverse events. CONCLUSIONS: Our study supports the effectiveness and safety of 2-SSRS as a treatment modality for patients with large, symptomatic brain metastases, especially in non-surgical candidates. The local failure rate and low occurrence of adverse effects are comparable to other staged radiosurgery series.

RADI-06. GAMMA KNIFE SURGERY FOR BRAIN STEM METASTASES

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INTRODUCTION: Gamma Knife Surgery (GKS) is widely used for treatment of brainstem metastases (BSMs) with or without whole bran radiation therapy (WBRT). We hypothesized that BSMs treated with GKS using lower doses and omitting WBRT result in acceptable tumor control rates and low complication rates. METHODS: A retrospective single center study was performed to investigate the outcome following GKS of BSMs. All 33 patients with follow-up information treated with GKS for 39 metastases located in the cerebral peduncle, midbrain, pons or medulla oblongata were included in the study. The median treatment dose, defined as the lowest dose to 95% of the tumor volume, was 18 Gy. The tumor control rate as well as the survival time were related to a number of patients, tumor and treatment parameters. RESULTS: The local tumor control rate was 100% at one year and 89% at five years, and the overall median survival was 17 months. A good performance status and a treatable extracranial disease were favorably related to survival time. Two complications were observed, one lethal hemorrhage at the day of the treatment and one transient complication three months following GKS, resulting in a 6% complication rate at five years. Four of the 10 patient with symptomatic BSM improved clinically after GKS, while six remained unchanged. CONCLUSIONS: High local control and a low complication rates can be achieved using GKS for BSMs using lower doses as compared to brain metastases in other locations.

RADI-07. INDIVIDUALIZED NOMOGRAM FOR PREDICTING SURVIVAL OF PATIENTS WITH BRAIN METASTASES AFTER STEREOTACTIC RADIOSURGERY

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BACKGROUND: Given the increasing use of *stereotactic radiosurgery* (SRS) for brain metastases (BM), there is an emerging need for more precise assessment of survival outcomes after SRS, especially in the modern targeted therapy era. METHODS: Patients with BM and treated by SRS were eligible in this study. Primary endpoint was overall survival (OS). Cox models were used to identify independent prognostic factors. Survival predictive nomogram was developed and evaluated by Concordance-index (C-index), area under the curve (AUC) and calibration curve. RESULTS: From January 2016 to December 2019, a total of 356 BM patients were eligible. Median OS was 17.7 months (95%CI 15.5–19.9) and actual OS at 1- and 2-year measured 63.2% and 37.6%, respectively. Nomogram for OS was developed by incorporating four independent prognostic factors: *Karnofsky Performance Score*, cumulative tumor volume, driver gene mutation status and serum *lactate dehydrogenase*. The nomogram was validated in a separate cohort demonstrated a well calibration and good discriminative ability (C-index=0.780, AUC=0.784). The prognostic accuracy of the nomogram (0.792) was considerably enhanced compared with classical prognostic indices, i.e., GPA (0.708), RPA (0.587) and SIR (0.536). Kaplan-Meier curves showed significant difference of OS among stratified low-, median- and high-risk groups (P < .001). CONCLUSION: In conclusion, we developed and validated an individualized prognostic nomogram by integrating physiological, volumetric, clinical chemistry and molecular biological surrogates. This nomogram, should be validated by independent external study, has a potential to facilitate more precise risk-stratifications to guide personalized treatment for BM.

RADI-08. ELUCIDATING THE ELECTROPHYSIOLOGY OF INTRAOPERATIVE RADIOTHERAPY – EXPERIENCE FROM TWO CASES

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Brain metastases require multimodality treatment, often combining surgical resection, radiation therapy, and individualized systemic pharmacotherapy based on oncogenic drivers. Intraoperative radiation therapy (IORT) is an emerging treatment option where radiation is delivered directly to the resection cavity at the time of surgery. We present two patients who underwent electrocorticography (ECoG) during IORT, providing information regarding electrophysiologic safety and tolerability of the technique. In the first case, a 65-year-old woman underwent resection of a hemorrhagic right occipital metastasis from non-small cell lung cancer. IORT was administered over sixteen minutes for a surface dose of 30 Gy. In the second case, a 73-year-old man with underwent resection of a right posterior frontal metastasis from non-small cell lung cancer. IORT was delivered over eleven minutes for a surface dose of 30 Gy. In both cases, a 1x6 contact array of subdural electrodes was placed adjacent to the planned field of radiation. Electrocortigraphy (HFF 70 Hz, TC 0.3 sec, sensitivity 150uV/mm) was obtained from the array two minutes prior to initiation of therapy, during therapy, and two minutes after completion of therapy in both cases. We found that IORT did not induce electrophysiological change in the tissue surrounding it in both cases with no epileptiform or ictal discharges during 20 minutes of ECoG recording around the time radiation therapy, nor did the patients have episodes suggestive of epileptic seizures in the acute post-operative period. One of the patients (case 1) experienced a single epileptic seizure 4 months after IORT, but this was temporally related to a new intraparenchymal hemorrhage and unlikely due to radiation therapy. These two cases illustrate the relative safety of IORT with respect to induction of immediate epileptiform changes within the brain parenchyma.

RADI-09. CLINICAL FACTORS ASSOCIATED WITH DEATH AFTER RADIOTHERAPY FOR BRAIN METASTASES

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INTRODUCTION: It can be challenging to accurately identify patients with brain metastases who have very poor prognosis and are unlikely to benefit from radiation (RT). We characterized factors of patients who died within 30 days of receiving RT for brain metastases. METHODS: Patients who received whole brain RT (WBRT) or stereotactic radiosurgery (SRS) for brain metastases between 1/1/2017–9/30/2020 at a single institution were identified. Patient, tumor, treatment, and death variables were collected. Characteristics between those who did and did not die within 30 days were compared using the Wilcoxon Rank-Sum or Chi-Square test. Survival was estimated with Kaplan-Meier method. RESULTS: 636 patients received WBRT (n=117) or SRS (n=519). Median age was 61. Median survival was 6 months (95% CI 5–7 months). 75 (12%) died within 30 days of RT. Patients who died within 30 days had worse median KPS (50 vs 80, p<0.001). A higher proportion who died within 30 days had innumerable intracranial metastases (45% vs 11%, p<0.001), leptomeningeal disease (16% vs 5%, p<0.001), and higher burden of neurologic symptoms at presentation (seizures (12% vs 4%, p=0.003); cranial neuropathies (32% vs 9%, p<0.001); motor/sensory deficits (51% vs 29%, p<0.001); altered mentation (60% vs 26%, p<0.001); headaches (48% vs 30%, p<0.001); steroid use (68% vs 48%, p<0.001)). Patients who died within 30 days had progressive extracranial disease (intrathoracic: 87% vs 50%; spinal: 57% vs 18%; liver/adrenal: 60% vs 24%), p<0.001. More patients who died within 30 days received inpatient RT (39% vs 4%, <0.001) and did not complete RT (24% vs 1%, p<0.001). DISCUSSION: Patients who died within 30 days of RT had worse KPS, intracranial/extracranial disease burden, and neurologic symptoms. Future analyses will assess whether these factors can inform a prognostic model to identify patients with poor prognosis who may be appropriate for supportive care alone.

RADI-10. IS THERE ANY BENEFIT FOR POST-OPERATIVE RADIATION IN BRAIN METASTASES? A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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PURPOSE: The benefits of adding upfront post-operative radiation (either whole-brain or cavity radiation) have been debated, particularly due to the pos-