BACKGROUND: The efficacy of salvage resection (SR) of recurrent brain metastases (BrM) post-stereotactic radiosurgery (SRS) is not well described. We sought to characterize the impact of adjuvant post-salvage radiation therapy (PSRT) in this setting and identify tumor-specific variables that influence local control. METHODS: Retrospective analysis of post-SRS recurrent BrM that underwent SR between 2003–2020 at Memorial Sloan Kettering Cancer Center was performed. Cases with histologically-viable malignancy were included and stratified by receipt of adjuvant PSRT within 60 days of SR (PSRT cohort) vs. observation (observation cohort). Recurrence site outcomes were described using cumulative incidence curves and univariate and multivariate competing risks regression accounting for clustering. RESULTS: One-hundred fifty-five recurrent BrM in 135 patients were included. Thirty-nine (25.2%) of the post-operative cavities were treated with adjuvant PSRT, and the remaining 116 (74.8%) cavities were initially observed. Gross- or near-total resection was associated with significantly improved local control compared to subtotal resection (p=0.007). Adjuvant PSRT was associated with a reduced rate of LR at 6 months [18.0% (95% CI: 9.8–33.1%) vs. 35.9% (95% CI: 27.9–46.2%) with initial observation and 12 months [28.8% (95% CI: 17.0–48.8%) vs. 43.9% (95% CI: 36.2–53.4%)]. On multivariable analysis, adjuvant PSRT (p=0.095), low tumor-viability within the resected BrM (p=0.17), and first-time resection (p=0.033) all independently trended towards improved local control. BrM size at SR (≤2cm vs. >2cm, p=0.01), primary malignancy (NSCLC vs. other), and specific PSRT modality (whole or partial brain radiation vs. SRS, p=0.43) were not associated with differences in LR rate. Radiation necrosis (RN) was significantly increased in the PSRT cohort (HR 4.55, 95% CI: 1.26–16.39, p=0.02), though the total percentage with symptomatic RN remained low (PSRT cohort 5.1% vs. observation cohort 0.9%). CONCLUSIONS: Local control after SR of a recurrent BrM may be optimized with gross- or near-total resection and adjuvant post-operative re-irradiation, with low symptomatic RN.

Abstracts

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BACKGROUND: The efficacy of salvage resection (SR) of recurrent brain metastases (BrM) post-stereotactic radiosurgery (SRS) is not well described. We sought to characterize the impact of adjuvant post-salvage radiation therapy (PSRT) in this setting and identify tumor-specific variables that influence local control. METHODS: Retrospective analysis of post-SRS recurrent BrM that underwent SR between 2003–2020 at Memorial Sloan Kettering Cancer Center was performed. Cases with histologically-viable malignancy were included and stratified by receipt of adjuvant PSRT within 60 days of SR (PSRT cohort) vs. observation (observation cohort). Recurrence site outcomes were described using cumulative incidence curves and univariate and multivariate competing risks regression accounting for clustering. RESULTS: One-hundred fifty-five recurrent BrM in 135 patients were included. Thirty-nine (25.2%) of the post-operative cavities were treated with adjuvant PSRT, and the remaining 116 (74.8%) cavities were initially observed. Gross- or near-total resection was associated with significantly improved local control compared to subtotal resection (p=0.007). Adjuvant PSRT was associated with a reduced rate of LR at 6 months [18.0% (95% CI: 9.8–33.1%) vs. 35.9% (95% CI: 27.9–46.2%) with initial observation and 12 months [28.8% (95% CI: 17.0–48.8%) vs. 43.9% (95% CI: 36.2–53.4%)]. On multivariable analysis, adjuvant PSRT (p=0.095), low tumor-viability within the resected BrM (p=0.17), and first-time resection (p=0.033) all independently trended towards improved local control. BrM size at SR (≤2cm vs. >2cm, p=0.01), primary malignancy (NSCLC vs. other), and specific PSRT modality (whole or partial brain radiation vs. SRS, p=0.43) were not associated with differences in LR rate. Radiation necrosis (RN) was significantly increased in the PSRT cohort (HR 4.55, 95% CI: 1.26–16.39, p=0.02), though the total percentage with symptomatic RN remained low (PSRT cohort 5.1% vs. observation cohort 0.9%). CONCLUSIONS: Local control after SR of a recurrent BrM may be optimized with gross- or near-total resection and adjuvant post-operative re-irradiation, with low symptomatic RN.

MLTI-06. SURGICAL RESECTION PLUS STEREOTACTIC RADIOSURGERY VERSUS SRS ALONE FOR LARGE BRAIN METASTASES: A COMPARATIVE STUDY

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PURPOSE: Large brain metastases (BRM) are challenging to manage. Therapeutic options include Stereotactic Radiosurgery (SRS) or surgery (S) with adjuvant SRS. We sought to compare overall survival (OS), radioresponse (RN), local failure (LF), pachymeningeval (PMD) and leptomeningeval (LMD) disease in patients treated with SRS vs. S+SRS. METHODS: We reviewed a prospective registry database from 2009 to 2020 and identified all patients with BRM (>4cm in volume) treated with SRS or S+SRS. WRT or SRs re-targeting the same lesion were censoring events. Survival percentages were calculated using the Kaplan-Meier method. Differences between groups were tested using the Cox proportional hazards model. RESULTS: 383 patients were identified, 128 and 255 were treated with S+SRS and SRS, respectively. Median ages in the S+SRS and SRS groups were 62.2 (23.6–98.8) and 60.2 (20.2–97.4) (P = 0.33). OS at 12 and 24 months was 69% and 41% vs 55% and 20% for the S+SRS and SRS groups, respectively. Hazard ratio (HR) 1.64 (1.23–2.18) (P = 0.001). LF requiring salvage surgery at 12 and 24 months were 3% and 5% vs 8% and 10% for S+SRS and SRS groups, respectively (P = 0.067). RN at 12 and 24 months were 9% and 17% vs 15% and 21% for S+SRS and SRS groups, respectively. 1.32 HR (0.77–2.2) (P = 0.32). PMD disease at 12 and 24 months were 16% and 21% vs 3% and 7% for S+SRS and SRS groups, respectively HR 0.26 (0.12–0.56) (P = 0.001). LMD at 12 and 24 months were 4% and 6% vs 2% and 4% for S+SRS and SRS groups, respectively HR 0.73 (0.25–2.17) (P = 0.57). CONCLUSION: Surgical resection plus SRS correlated with improved OS and a trend towards a decreased incidence of LF compared to SRS alone. However, patients treated with S experienced an increased incidence of PMD.
Our results infer that the reported increase in incidence of CNS metastasis from gynecologic malignancies is increasing. Ultimately, we hope to improve understanding of this subset of metastatic CNS malignancies and improve management strategies. METHODS: A literature review of articles describing patients from 1990–2020 who were diagnosed with CNS metastasis from a known gynecologic primary malignancy was performed. Demographics, cancer type, mutation characteristics, management for metastatic disease, progression free survival, number of CNS metastases, and location of metastatic disease were assessed. Inclusion criteria were age≥18 years, diagnosis of primary ovarian, uterine, or cervical cancer with confirmed metastatic disease to the CNS, including brain parenchyma, leptomeninges, or intradural spinal cord or dural metastases. Exclusion criteria included pediatric population and bony metastases. PATIENTS: A total of 5 patients (4 males and 1 female) with a median age of 48 years (21 to 66 years) were included, all with single intracranial pituitary nodules as the initial clinical presentation. The related symptoms were visual impairment (5/5 cases), visual field defect (5/5 cases), headache (4/5 cases), hypopituitarism (5/5 cases), and diabetes insipidus (2/5 cases). All the 5 patients received surgical resection (total or partial resection) of tumors in the sellar region via nasal sphenoidal approach. Postoperative pathology confirmed that 4 cases were metastatic adenocarcinoma and 1 case was metastatic squamous carcinoma. Further imaging examinations, such as CT or whole-body PET/CT imaging, were used for precise lesions localization. Gene testing indicated that 3 of the 4 adenocarcinoma patients were EGFR mutation positive and 1 of the 4 adenocarcinoma patients was ROS1 mutation positive. Patients received radiotherapy (5/5 cases), targeted therapy (4/5 cases), or chemotherapy (1/5 cases) after surgery. Survival follow-up to May 2019 showed 4 patients had died, with a survival of 2, 11, 21, and 30 months, respectively, and 1 patient was still alive with a survival of 4 months. CONCLUSION: The first clinical manifestation of isolated pituitary metastatic carcinoma is nervous system related symptoms, which is easily misdiagnosed. The most of the primary lesions were from lung, especially lung adenocarcinoma with positive driver gene. Surgery, radiotherapy combined with targeted therapy or chemotherapy can provide survival benefits for patients with pituitary metastatic carcinoma.

PACS LESION TRACKING TOOL PROVIDES REAL TIME AUTOMATIC INFORMATION ON BRAIN TUMOR METASTASIS GROWTH CURVES AND RECISt CRITERIA

OBJECTIVE: Communicating metastatic brain tumor response can be complicated. A widely used method to assess clinical response is called response evaluation criteria in solid tumors or RECIST. In our study, we use a PACS Lesion Tracking Tool (TT) to assess intracranial metastasis using RECIST criteria. We predict that the TT will be superior to the standard radiology reports. METHODS: Nineteen mPowerTM was used to identify 30 patients with brain metastasis who received brain MRI from 4/2020–4/2021. Patient’s first brain MRI with metastasis was set as baseline and subsequent 3 brain MRI studies were examined. All lesions were measured on post-contrast T1 weighted sequence and defined as target lesions or new lesions. The TT was used to measure lesion size over time with creation of growth curves and RECIST outcomes, which include stable disease, progressive disease, partial response, or complete response. Subsequently, RECIST evaluations were compared with radiologic impressions for discrepancy, and further evaluations were made to see if it made a clinical difference in patient management and/or provide additional useful information. These evaluations were given a rating of agree, equivocal, or disagree/no. They were assessed by 3 neuroradiologists. RESULTS: Number of lesions ranged from 1–27. The assessments from 3 neuroradiologists were averaged. Comparing impression versus RECIST evaluation, the results demonstrated the following: 8/30 disagreement, 4/30 equivocal, and 18/30 agreement. Using more stringent criteria, assessing whether the TT would result in either change in patient management or provide additional useful information, the results were the following: 6/30 yes, 4/30 equivocal, and 20/30 no. DISCUSSION: In addition to providing real time RECIST criteria evaluations and visually descriptive lesion growth tables, the TT was easy to use. Interpretation of these additional data provided more clarity and was found to be superior to standard radiology report.