INTRODUCTION: We analyzed a collaborative institutional experience support efficacy and SLA achieved 1-4, 12-month local control of 80.8% and for Cs131 brachytherapy was 80.8%.

CONCLUSIONS: Aggressive re-irradiation after resection for pathologic consolidation appear to be appropriately safe and effective for the majority of patients after local failure of initial radiosurgery.

RADI-23. EXPLORING THE OPTIMAL TIMING OF ROUTINE INITIAL SURVEILLANCE MRI FOLLOWING TREATMENT OF BRAIN METASTASES WITH STEREOTACTIC RADIOSURGERY: A COMPARISON OF TWO APPROACHES

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PURPOSE: To measure the value of early initial surveillance MRI scans in patients with brain metastases undergoing stereotactic radiosurgery (SRS), as MRI scans add significant cost and patient stress. METHODS: We identified a retrospective cohort of patients with brain metastases treated with SRS and followed at a single institution with scheduled 6-week or 12-week initial surveillance MRI. Imaging interval was based on policy of different providers. Outcome measures included new/progressive lesions, salvage treatment, detection of new lesions before symptoms, and use of surgical resection. RESULTS: Two hundred patients were included: 100 consecutive patients scanned with 6-week and 12-week imaging. Eighty-seven and 74 patients in each group had available follow-up imaging every 3 months. Time from resection to MRI was 6.7 weeks and 13.3 (p<0.001). No difference in primary site, prior SRS, number of treated brain metastases, or use of targeted therapy/immune checkpoint inhibitors was detected. A lower percentage of patients with 6-week MRI had controlled extracranial disease at initial treatment (30% vs 47%, p=0.033). Twenty-eight percent with 6-week MRI had findings concerning for new/progressive disease, compared to 47% with 3-month MRI (p=0.01). Fifteen percent (10/87) with 6-week MRI underwent intervention (i.e. SRS, whole brain radiotherapy, or surgery) compared to 34% (20/74) with 12-week MRI (p=0.004). Of patients receiving SRS, a higher percentage had new/worsening neurologic symptoms (45% vs 30%) at follow-up although a lower percentage had new lesions >1cm (20% vs 50%) when discovered. One patient in each group underwent surgical salvage. CONCLUSION: While shorter 6-week interval MRI surveillance post-SRS may detect new/progressive disease less frequently than 12-week MRI surveillance intervals, short interval MRI may be more likely to detect new/progressive lesions before symptoms develop. Surgical salvage was uncommon with either schedule. Further study may identify a high-risk sub-group who would benefit from early surveillance.

SURGERY

SURG-01. MANAGEMENT OF SOLITARY BRAIN METASTASIS LESS THAN 4 CM IN DIAMETER: SURGICAL RESECTION VERSUS STEREOTACTIC RADIOTherAPY: A META-ANALYSIS

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INTRODUCTION: To treat a solitary metastasis in the brain, surgical resection and/or radiotherapy are the standard treatments of care. However, the clinical scenarios in which to use these techniques alone or in combination are controversial. While a course of stereotactic radiotherapy is often administered to a patient who presents with multiple metastases, surgical resection is often indicated against a larger solitary brain metastasis before irradiating the resection bed. The management of a smaller solitary tumor (diameter less than 4 cm) is less clear. Accordingly, our meta-analysis assembles research that focused on patients with a solitary tumor less than 4 cm in diameter. METHODS: Following PRISMA guidelines (PROSPERO ID: CRD42021242434), we searched PubMed, Web of Knowledge, and Cochrane Library databases for randomized controlled trials (RCT) and observational studies comparing surgery to radiotherapy for solitary metastatic brain tumors less than 4 cm in diameter. From 498 total records, we included 9 studies for meta-analysis. Analysis was performed on R. RESULTS: 2 RCTs and 7 observational studies were identified. 431 patients underwent surgical intervention, and 349 patients exclusively underwent radiotherapy. The surgical treatment cohort did not exhibit a difference in overall survival (1.8 [0.598–2.327]), but the surgical treatment group demonstrated greater local tumor recurrence after 1-year (3.975 [1.979–7.987]) and overall local recurrence (3.045 [1.276 – 7.268]). There was no difference between the overall rates of distant recurrence (0.365 [0.218 – 1.466]). CONCLUSIONS: Our analysis opens more questions about the management of solitary brain metastasis. Patient selection is paramount in achieving better local control. Stereotactic radiotherapy should be considered for treatment of solitary brain metastasis less than 4 cm in diameter in selected patients. Future randomized control trials for small solitary masses are recommended.

SURG-02. STEREOTACTIC LASER ABLATION (SLA) FOLLOWED BY CONSOLIDATION STEREOTACTIC RADIosurgery (SRS) AS A TREATMENT STRATEGY FOR BRAIN METASTASIS THAT RECURRENT LOCALLY AFTER INITIAL RADIosurgery (BMRs): A COLLABORATIVE INSTITUTIONAL EXPERIENCE

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INTRODUCTION: In independent clinical trials, ~30% of brain metastases recur locally after radiosurgery (BMRs). For these lesions, treatment strategies include stereotactic laser ablation (SLA) also known as laser interstitial thermal therapy (LITT) alone achieves a 12-month local control (LC12) of 54-85% while repeat SRS achieved LC12 of 54-79%. Here, we report favorable outcomes for BMRs treated with SLA followed by consolidation radiosurgery (SLA+SRS). METHODS: Clinical outcome of 18 patients with 19 histologically confirmed BMRs treated with SLA followed by consolidation SRS and >3 months follow-up were collected retrospectively across three institutions. Local control was defined as stability or decrease in contrast-enhancing (CE) and FLAIR volume. RESULTS: SLA achieved ablation of 73-100% of the BMRs CE volumes. Consolidation hypofractionated radiosurgery (5 Gy x 5 or 6 Gy x 5) was carried out 16-40 days post-SLA (median of 26 days). With a median follow-up of 185 days (range: 93-1367 days) and median overall survival (OS) of 185 days (range: 99-1367 days), 100% LC12 was achieved. 13/18 (72%) patients that required steroid therapy prior to SLA+SRS were successfully weaned off steroid by three months post-SLA+SRS. Post-SLA, KPS declined for 3/19 (16%) patients and improved for 1/19 (5%) patients. No KPS changes occurred subsequent to consolidation SRS. There were no peri- or postoperative mortalities or wound complications. Two patients required re-admission within 30 days of SRS (severe headache that resolved with steroid therapy (n=1) and new-onset seizure (n=1)). Except for two patients who suffered histologically confirmed local failure at <3 months, all other patients either were alive (n=5) or died from systemic disease progression (n=11). None of the treated patients developed symptomatic radiation necrosis. CONCLUSIONS: This collaborative institutional experience support efficacy and safety of SLA followed by consolidation SRS as a treatment for BMRs. The treatment strategy warrants further investigations.

SURG-03. THE EFFECT OF SURGERY ON RADIATION NECROSIS IN IRRADIATED BRAIN METASTASES: EXTENT OF RESECTION AND LONG-TERM CLINICAL AND RADIOGRAPHIC OUTCOMES

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OBJECTIVE: Radiation therapy is a cornerstone of brain metastasis (BrM) management but carries the risk of radiation necrosis (RN), which can require resection for palliation or diagnosis. We sought to determine the impact of extent of resection (EOR) on pathologically-confirmed RN and postoperative radiographic and symptomatic outcomes.
METHODS: A single-center retrospective review was performed at an NCI-designated Comprehensive Cancer Center to identify all surgically-resected, previously-irradiated necrotic BrM without adjuvant recurrent malignancy from 2003-2018. Clinical, pathologic and radiographic parameters were collected. Volumetric analysis determined EOR and long-term evaluation of critical structures post SRT. RESULTS: Forty-six patients were included. Most untreated patients were treated by stereotactic radiosurgery with or without whole brain radiation therapy (n=42, 91%). Twenty-seven patients were operated upon. All but one tumor was radiation resistant. Median overall survival for BM of NSCLC was 36 months and 5-year survival percentages of 30.3% and 9.8%, respectively. Furthermore, the survival of BM patients without extracranial metastasis is significantly longer than those with extracranial metastases (median OS: 10 versus 5 months, P<0.001). 225 BM (cohort A) and 449 BM with treatment history on primary NSCLC (cohort B) were collected from SYSUCC. In cohort A, BM with extracranial metastases were found (38.2%) and the median OS was significantly shorter than those without extracranial metastases (15.2 versus 23.7 months, P<0.001). In cohort B, 255 cases with extracranial metastases were found (56.8%) and their prognosis was also worse than cases without extracranial metastases (median OS: 18.3 versus 22.1 months, P=0.002). Multivariate analyses revealed that younger age (HR=0.71, P=0.003), without extracranial metastases (HR=0.65, P=0.001) and radiation for BM (HR=0.78, P=0.003) were independent factors for better OS. CONCLUSION: Improved survival of patients received BM resection was observed in SYSUCC cohort as comparison with SEER patients with NSCLC and BM. Aggressive local treatment including surgery and radiation is still important in Modern management of BM from NSCLC.

SURG-06. METASTASES IN THE PINEAL REGION: A SYSTEMATIC REVIEW OF CLINICAL FEATURES, TREATMENT STRATEGIES AND SURVIVAL OUTCOMES

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BACKGROUND: Pinal region metastases are rare but often lead to severe neurological deficits. Surgical resection may play a therapeutic role. METHODS: We searched PubMed, EMBASE, Scopus, and Cochrane according to PRISMA guidelines. Studies reporting clinical outcomes data of patients with pinal region metastases were included. Clinical characteristics, management strategies, and survival data were reviewed. RESULTS: We included 30 studies comprising 46 patients. The median age at diagnosis was 58 years (range 27–82). Lung cancer (30.4%) and carcinomas of unknown origin (15.2%) were the most frequent primary tumors. In 50% of patients, symptomatic pinal metastases preceded primary tumor diagnosis. Headache (66.7%) and confusion (45.2%) were the most common presenting symptoms. Parnaud’s syndrome (47.6%) and hydrocephalus (87%) were commonly noted. Postoperative complications (variable) included cerebrospinal fluid leak (0.7%). Mean postoperative stay was 7.4 days. Adjuvant chemotherapy and CSF diversion (37.5%) was performed in some patients. Postoperative mortality was 0.6%. Conclusion: Pinal region metastases from NSCLC, paraneoplastic syndrome, and other primary tumors are associated with poor prognosis. Surgical resection improves survival in selected cases.

SURG-07. PLASMONIC GOLD NANOSTARS TO INCREASE THE EFFICIENCY AND SPECIFICITY OF LASER INTERSTITIAL THERMAL THERAPY (LITT) IN THE TREATMENT OF BRAIN TUMORS

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INTRODUCTION: Laser interstitial thermal therapy (LITT) is an effective minimally-invasive treatment option for intracranial tumors. Our