

#### RADT-43. TREATMENT OF RETROPERITONEAL LEIOMYOSARCOMA BRAIN METASTASES WITH STEREOTACTIC RADIOSURGERY

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**INTRODUCTION:** Retroperitoneal leiomyosarcoma is a relatively rare disease, with infrequent metastatic spread to the CNS. We present the first report of radiosurgical treatment of this disease. **METHODS:** A 49-year-old woman developed leiomyosarcoma of the inferior vena cava and retroperitoneum with lung metastases on diagnosis. Following multiple courses of systemic and operative treatment, she developed a tender ulcerating mass in the left upper maxillary incisor associated with numbness along the upper gum, lip, and premaxillary area. CT revealed a 3.0 cm left posterior alveolar ridge gum lesion with bone invasion, for which she elected to undergo palliative radiation therapy (30 Gy in 10 fractions). Due to potential maxillary nerve involvement altering the intended radiation therapy treatment fields, an orbit/face MRI was performed to better delineate the lesion. On this MRI, two frontal lobe lesions were visualized; subsequent dedicated brain MRI revealed a total of five metastases (0.9 cm right superior frontal gyrus, 0.9 cm left middle frontal gyrus, 0.9 cm right postcentral gyrus, 0.7 cm right occipital, and 1.6 cm left occipital). Consequently, the decision was made to treat the brain metastases with linear accelerator (LINAC) stereotactic radiosurgery (SRS) to allow simultaneous treatment of the maxillary lesion and brain metastases. **RESULTS:** A single CT simulation was performed for her intracranial and extracranial disease, using the Encompass face mask to allow for simultaneous head immobilization and optimal SRS targeting accuracy. LINAC SRS was delivered simultaneously during maxillary lesion radiation therapy to all five lesions (22 Gy to the 80% isodose line) in a single fraction with a 0.2 cm planning target volume (PTV) margin for each lesion. **CONCLUSIONS:** The first reported case of metastatic retroperitoneal leiomyosarcoma brain metastases treated with SRS demonstrates the flexibility of LINAC (rather than Gamma Knife) SRS in allowing for simultaneous treatment of intracranial and extracranial metastatic disease.

#### RADT-44. STEREOTACTIC RADIOSURGERY FOR RESIDUAL LESIONS OF PINEAL NON-GERMINOMATOUS GERM CELL TUMORS AFTER CONVENTIONAL RADIOTHERAPY: A RETROSPECTIVE STUDY

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**OBJECTIVE:** To evaluate the safety and efficacy of stereotactic radiosurgery (SRS) in treating residual lesions of pineal non-germinomatous germ cell tumors (NGGCTs) after conventional radiotherapy. **METHODS:** The patients admitted to Guangdong Sanjiu Brain Hospital from 1 January 2008 to 31 December 2018 who diagnosed with pineal NGGCTs pathologically or clinically were retrospectively analyzed. Among those, the patients received conventional radiotherapy with or without SRS were included. The residual lesions after radiotherapy were defined with a maximum diameter > 10mm. Prognosis related parameters such as local control rate, progress-free survival, overall survival and treatment-related toxicity were determined. **RESULTS:** The median follow-up time was 34 months (range 8-142 months). The objective response rate and disease control rate were 71.4% and 95.2%, respectively. Three-year progression-free survival rate was 85.2% and 3-year total survival rate was 88.0%. The univariate analysis revealed that both age and concurrent chemotherapy were not correlated with the prognosis ( $P=0.286$ ,  $0.824$ ). Partial tumor resection before radiotherapy and chemotherapy, AFP > 500ng/ml, and no more than 4 cycles of adjuvant chemotherapy were poor prognostic factors ( $P=0.037$ ,  $0.010$ ,  $0.006$ ). Moreover, no acute radiation response was observed after treatment with SRS. Only 1 out of 27 patients (3.7%) had brain neurotoxicity related to a prolonged course of radiochemotherapy. **CONCLUSION:** SRS for residual lesions of NGGCTs following conventional radiotherapy appears to be well tolerated and improved local control. However, the combination of conventional radiotherapy and SRS warrants further investigations in a large-scale randomized controlled clinical trials.

#### RADT-45. EFFECT OF DIFFERENT RADIOTHERAPY TECHNIQUES ON HEMATOLOGICAL TOXICITY OF CRANIOSPINAL IRRADIATION

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**OBJECTIVE:** To investigate the effect of different radiotherapy techniques on hematological toxicity of craniospinal irradiation. **METHODS:** A retrospective study involving changes in hematology during craniospinal

irradiation were conducted. 79 patients were divided into observation group and control group. 36 patients in observation group received intensity modulated radiation therapy and 43 patients in control group received three-dimensional conformal radiotherapy. The prescribed dose of PTV in the two groups are 28.8-36 Gy, and the single dose are 1.6-2.0 Gy. The hematological toxicity changes and bone marrow suppression stage of the two groups of patients before, during and after radiotherapy were recorded and analyzed. **RESULTS:** 90% of patients showed different bone marrow suppression stage during and after radiotherapy. During radiotherapy, the toxicity of hemoglobin in the observation group was more serious than that in the control group ( $z=-2.272$ ,  $p=0.023$ ). After radiotherapy, the toxicity of hemoglobin and white blood cells in the observation group was more serious than that in the control group ( $z=-3.053$ ,  $p=0.002$ ;  $z=-3.163$ ,  $p=0.002$ ). **CONCLUSION:** We should closely observe the changes of hematological toxicity for craniospinal irradiation patient treated with IMRT and take corresponding preventive measures to avoid serious bone marrow suppression stage.

#### RADT-46. SYSTEMATIC REVIEW OF RADIOSENSITIZERS FOR MALIGNANT BRAIN TUMORS: POTENTIAL FOR LEARNING FROM PAST FAILURES

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**INTRODUCTION:** Radiation therapy (RT) is the cornerstone of management of malignant CNS tumors but its efficacy is limited in hypoxic tumors. Although numerous radiosensitizer compounds have been developed to enhance the effect of RT, progress has been stagnant. Through this systematic review of the literature on radiosensitizers for malignant CNS tumors, we have sought to provide an overview of radiosensitizers developed to date, summarize their safety and efficacy, and evaluate areas for possible improvement. **METHODS:** PUBMED, EMBASE, Cochrane, and Web of Science were searched using terminology pertaining to radiosensitizers for brain tumor RT according to PRISMA guidelines. Publications reporting clinical evidence of non-antineoplastic radiosensitizers with RT for malignant CNS tumors were included. Pre-specified variables were extracted. Outcomes of interest were overall survival, progression-free survival, adverse events, and quality-of-life outcomes. **RESULTS:** Forty-eight publications were identified which included 20 unique non-antineoplastic radiosensitizing agents. Only 2/20 agents, flusol with oxygen, and efaproxiral, showed improvement in outcomes in patients with glioblastoma and brain metastasis, respectively. A larger study was not able to confirm the latter. While molecular similarities between these two agents were not identifiable, the effective mechanism of action allowed them to modulate hypoxia from within blood vessels, without crossing blood-brain barrier. Nine agents required dose modification, change of schedule, or complete discontinuation due to toxicities. **CONCLUSION:** Despite decades of research, progress in the field of radiosensitizers for malignant CNS tumors has been limited. Available data demonstrates the lack of progress in identifying effective radiosensitizers for brain tumors. Of the many non-antineoplastic radiosensitizers that have been tested, only two have showed (limited) efficacy by targeting tumor oxygenation. Alternative strategies such as synthetic drug design, based on a mechanism of action that is independent of crossing the blood-brain barrier, may be necessary. Such studies are currently underway.

#### RADT-47. A MULTICENTER OBSERVATIONAL STUDY OF SURGICALLY TARGETED RADIATION THERAPY (START) USING IMPLANTED CS-131 SEEDS IN A COLLAGEN-BASED CARRIER TILE IN INTRACRANIAL BRAIN NEOPLASMS - PROTOCOL IN PROGRESS

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**INTRODUCTION:** Post-resection radiotherapy (RT) is the most effective adjuvant treatment for brain tumors. However, there is no current consensus as to the "best" type of post-resection RT, either at diagnosis or recurrence. The use of internally placed radiation (brachytherapy) allows immediate initiation of RT when residual tumor burden is minimal, which theoretically should lessen the risk of recurrence. Brachytherapy placement intraoperatively allows more precise identification of the tumor margins than by postoperative imaging. Traditional brachytherapy methods have several drawbacks, including uneven dose distribution, long operating room times, a need for expensive equipment, and/or frequent adverse events (AE). To address these issues, a device with Cs-131 radiation seeds in a resorbable collagen-based carrier tile (GammaTile, GT Medical Technologies, Tempe AZ) was developed and is described as Surgically Targeted Radiation Therapy or START. The device has demonstrated excellent safety and local control in early commercial use. **OBJECTIVE:** The objectives of this registry