MLTI-13. RESPONSE ASSESSMENT OF MELANOMA BRAIN METASTASES TREATED BY STEREOTACTIC RADIOTHERAPY OR IMMUNOTHERAPY OR BOTH: A COMPARISON OF RECIST 1.1, RANO AND IRANO CRITERIA
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BACKGROUND: The evaluation of response for brain metastases (BM) may be challenging in the context of treatment by stereotactic radiotherapy (SRT) or immunotherapy or both. METHODS: We reviewed clinical and neuroradiographic data of 62 melanoma patients with newly diagnosed BM treated by the combination of immunotherapy and SRT (n=33, group A) or immunotherapy alone (n=10, group B) or SRT alone or in combination with other systemic therapies (n=19, group C). Response was assessed using RECIST 1.1, RANO or IRANO criteria. RESULTS: BRAF mutations were noted in 26 patients. 34 patients (87%) had 1–3 metastases. The median DS-GPA was 3. After a median follow-up of 30.5 months, 39 patients experienced CNS progression, 16 (48.6%) in group A, 9 (90%) in group B, 14 (73.5%) in group C. Median PFS was 129.5 days (range 82–532) in group A, 73 days (range 35–203) in group B, 136 days (range 59–514) in group C. Forty-seven patients (76%) had died at the time of the analysis, 22 (66.5%) in group A, 7 (70%) in group B, 18 (94.5%) in group C. Median OS was 345 days (range 65–1824) in group A, 174.5 days (range 17–1244) in group B, 409 days (range 102–744) in group C. In group A, 33 patients (79%) experienced CNS-only progression, 9 (21%) had progression that included a new BM site. In group B, 34 patients (68%) experienced CNS-only progression, 15 (29.4%) had progression that included a new BM site. In group C, 23 patients (121%) experienced CNS-only progression, 1 (5.3%) had progression that included a new BM site. CONCLUSIONS: Despite the retrospective nature and the small sample size, these data may indicate that the omission of SRT from first-line treatment may compromise outcome. Suggesting the need for randomized prospective trials with these patient populations.

MLTI-14. A SYSTEMATIC REVIEW OF TREATMENT PARADIGMS FOR PATIENTS WITH BREAST CANCER AND ONE OR MORE BRAIN METASTASES
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BACKGROUND: Upwards of 50% of patients with advanced breast cancer are diagnosed with brain metastases (BM). Treatment options for these patients have been rapidly evolving due to increased understanding of the tumor pathophysiology and its genetic underpinnings. This systematic review of randomized controlled trials (RCTs) aims to clarify the evidence guiding the treatment of brain metastases from breast cancer. METHODS: We conducted a systematic search of Embase, Cochrane, ClinicalTrials.gov, and Web of Science from inception to October 2018 for RCTs comparing treatments for breast cancer BM. We screened studies, extracted data, and assessed risk of bias independently and in duplicate. Outcomes assessed were overall survival (OS), progression-free survival (PFS), and adverse events (Grade 3+). RESULTS: Among 3188 abstracts, only 3 RCTs (N=412; mean sample size per group 54.7) meeting inclusion criteria were identified. The studies were phase II or III, open-label, parallel superiority trials. Inclusion criteria among these trials consisted of age >18 with radiologic evidence of >1 BM. Exclusion criteria consisted of poor-performance functional status (ECOG ≥2 or KPS <70). The treatment groups included whole-brain radiation therapy (WBRT) vs WBRT + Tamoxifen, WBRT vs WBRT + Erlotinib, and Atazanib vs Usosdenib. Response rates were similar with all three sets of response criteria. Paired t-tests were less often called when applying irANO to assess SRT target lesions. CONCLUSIONS: Despite the retrospective nature and the small sample size, these data may indicate that the omission of SRT from first-line treatment may compromise outcome. Suggesting the need for randomized prospective trials with these patient populations.

MLTI-15. A CASE SERIES OF PRE-OPERATIVE GAMMA-KNIFE RADIOSURGERY FOR RESECTABLE BRAIN METASTASES
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Recent advances in the systemic treatment of various cancers have resulted in longer survival and higher incidence of brain metastases. Phase 3 trials in north America and in Japan have demonstrated that stereotactic radiosurgery will be a standard adjuvant modality following surgery for resectable brain metastases. However, we don’t know the optimal sequence of this combination therapy. We hypothesized that pre-operative stereotactic radiosurgery for resectable brain metastases provides favorable rates of local control, overall survival, leptomeningeal dissemination and stereotactic radiation necrosis. We have experienced 4 cases of resected brain metastases within 1–7 days after Gamma-knife surgery (median margin dose:22Gy) and have been following their clinical course. We will show the repressive cases.

MLTI-16. SYSTEMIC THERAPY FOLLOWING CRANIOTOMY IN PATIENTS WITH A SOLITARY BREAST CANCER BRAIN METASTASIS
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INTRODUCTION: Between 15–50% of patients with metastatic breast cancer will develop brain metastases, with the frequency more common in patients with HER2-positive or triple-negative subtypes. Surgical resection is often indicated for diagnostic and/or therapeutic intent for patients presenting with a solitary lesion and symptomatic lesion(s) with mass effect. Practice patterns and patient outcomes with respect to the use of postoperative systemic therapy (ST) after resection of a solitary breast cancer brain metastasis (BCBM) have not been previously well-described, particularly in the modern era. METHODS: A multi-institutional retrospective review of 44 patients was performed to assess the impact of type of ST on site of recurrence, progression-free survival (PFS) and overall survival (OS) at resection of solitary BCBM. RESULTS: Stratified estimates of median OS were 15, 24 and 36 months for patients with triple-negative estrogen receptor positive (ER+) and human epidermal growth factor receptor 2 positive (HER2+) BCBMs. Patients receiving postoperative ST had a longer median PFS (8 versus 4 months) and OS (32 versus 15 months). Nineteen patients (43%) had extracranial progression, 16 (36%) had CNS-only progression, 12 (27%) had re-cranial progression, three (8%) had both, and nine (20%) did not experience progression at last follow-up. Multivariate analysis showed that postoperative hormonal therapy was associated with longer OS in estrogen receptor (ER) positive patients (HR = 0.26; CI = 0.08 – 0.89; p = 0.048) but not with longer PFS. Postoperative human epidermal growth factor receptor 2 (HER2) targeted therapy was not associated with longer PFS or OS in HER2+ patients. CONCLUSIONS: Disease progression occurred intracranially more often than extracranially following resection of a solitary BCBM. In ER+ patients, postoperative hormonal therapy was associated with longer OS. Postoperative HER2-targeted therapy did not show survival benefits in HER2+ patients. These results should be validated in larger cohorts.

MLTI-17. DIFFERENTIATION OF RADIATION INJURY FROM RECURRENT BRAIN METASTASIS USING COMBINED FET PET/ MRI RADIOMICS
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BACKGROUND: The aim of this study was to investigate the potential of combined radiomics textural feature analysis of contrast-enhanced MRI (CE MRI) and fluorine-18-fluoroethyl-L-tyrosine (FET) PET for the differentiation of recurrent brain metastasis from radiation injury. PATIENTS AND METHODS: Fifty-two patients with newly diagnosed or progressive contrast-enhancing brain lesions on MRI after radiotherapy (predominantly radiosurgery, 84% of patients) of brain metastases were additionally investigated using FET PET. Based on histology (n=19) or clinicoradiological follow-up (n=33), local recurrent brain metastases were diagnosed in 21 patients (40%) and radiation injury in 31 patients (60%). Forty-two features (shape-based, first and second order features) were calculated on both unfiltered and filtered CE MRI and summed FET PET images (2040 min pi). After feature selection, logistic regression models using a maximum of five features to avoid overfitting were calculated for each imaging modality separately, as well as for the combined model. RESULTS: For differentiation between radiation injury and brain metastasis, a diagnostic accuracy of 81% from CE MRI had a diagnostic accuracy of 81%. FET PET textural features revealed a slightly higher diagnostic accuracy of 83%. However, the highest diagnostic accuracy was obtained when combining CE MRI and FET PET textural features (accuracy, 89%). CONCLUSION: Our findings suggest that the combined FET PET/MRI radiomics using textural feature analysis offers a great potential to contribute significantly to the management of patients with brain metastases. SUPPORT: This work was supported by the Wilhelm-Satter Stiftung, Germany.