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OTHR-06. PACS LESION TRACKING TOOL PROVIDES REAL TIME AUTOMATIC INFORMATION ON BRAIN TUMOR METASTASIS GROWTH CURVES AND RECIST CRITERIA

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OBJECTIVE: Communicating metastatic brain tumor response treatment 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 brain MRI studies were examined. All lesions were measured on post-contrast T1 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/equiv, disagree, 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.

OTHR-07. SYSTEMATIC REVIEW AND META-ANALYSIS OF LUNG CANCER BRAIN METASTASIS AND PRIMARY TUMOR PD-L1 EXPRESSION DISCORDANCE

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BACKGROUND: Novel immunotherapeutic strategies, such as those targeting the PD-1/PD-L1 axis, are promising in patients with metastatic cancer. However, the impact of the PD-L1 expression on patient outcomes in patients with brain and lung tumors remains unclear. OBJECTIVE: The objective of this study was to analyze PD-L1 receptor discordance in tumor tissue from brain metastases and primary tumors. METHODS: A systematic review of systemic published prior to April 2021 was performed using PRISMA guidelines. Weighted random effects models were used to calculate pooled estimates. RESULTS: Six full-text articles (n=247 patients) with a median of 32 patients in each study range (24–73 patients) reported PD-L1 receptor expression analyses of both primary and metastatic tumors. The majority of patients (81%) were smokers, with 67% non-small cell lung cancer and 33% small cell lung cancer. PD-L1 expression was more prevalent in the primary tumor compared to metastatic tumors (76% vs. 55%). The positivity rate varied when analyzed by various cutoff levels of PD-L1 expression; for <1% ex-
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pressure, it was 41% (95% CI: 22%-62%) for primary vs. 58% (95% CI: 35%-78%) for LCBM; for PD-L1 expression of 1–50%, it was 24% (95% CI: 13%-40%) vs. 19% (95% CI 10%-33%); and for PD-L1 ≥50% it was 12% (95% CI: 5%-23%) vs. 21% (95% CI: 12%-29%); p<0.001 for overall PD-L1 receptor discordance between primary and LCBM was 17% (95% CI: 10%-27%). Meta-regression analysis showed that age, sex, smoking status, and histology were not associated with PD-L1 receptor discordance. CONCLUSIONS: PD-L1 receptor discordance in tumor cells occurs in approximately 20% of LCBM, with the greatest discordance in the <1% expression category. Awareness of this discordance is important for the selection of immune checkpoint inhibitor therapy as well as in the analysis of patterns of failures.

OTHR-08. EFFICACY OF ANTI-EPILEPTIC DRUG PROPHYLAXIS ON SEIZURE PREVENTION IN PATIENTS WITH BRAIN METASTASIS: A SYSTEMATIC REVIEW AND META-ANALYSIS
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INTRODUCTION: Seizures can occur in patients with brain metastasis and are often debilitating, leading to morbidity, mortality, and economic burden. Implementation of anti-epileptic drugs (AEDs) prophylaxis remains controversial, and there is widespread concern about their use. This systematic review gathers the current evidence on the effectiveness of AED prophylaxis on preventing new-onset seizures in patients with BM. Associated adverse effects of AED usage in this population are also reported. METHODS: Search was performed on PubMed and Embase. A meta-analysis was conducted on 11,099 patients across 13 studies. The primary endpoint was occurrence of new-onset seizures. The meta-analysis was predicted to calculate the odds ratio using Der-Simonian and Laird methods to compare AED group with control for new seizures. Heterogeneity was determined by Cochran Q test and I2. RESULTS: Our search returned 175 publications of which 5 retrospective cohort studies met inclusion criteria. A total of 1,292 patients (283 receiving AED prophylaxis, and 1,009 in control group) were included across the studies. AEDs used were phenobarbital, levetiracetam, phenytoin, and valproate. Meta-analysis showed no difference in seizure frequency between the AED and the control group (OR = 0.98, 95% CI: 0.56–1.72). Heterogeneity: F=7.8%. Adverse effects were not reported in the publications. CONCLUSION: Our meta-analysis suggests that there is no improvement in frequency of new seizures with AED prophylaxis in BM patients, supporting current guidelines. However, the evidence is based on a small patient population and retrospective studies. Additional studies are needed to determine efficacy of prophylaxis with newer AEDs and establish guidelines to target therapies for improving morbidity, mortality, and quality of life in patients with BM.

OTHR-09. ACCELERATING RESEARCH FOR BREAST CANCER BRAIN METASTASIS AND LEPTOMENINGEAL DISEASE THROUGH PATIENT-LED COLLABORATIONS
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PATIENT-DRIVEN INITIATIVE OF THE METASTATIC BREAST CANCER (MBC) ALLIANCE: The Breast Cancer Brain Metastasis (BCBM) Initiative: Marina Kaplan Project launched in June 2020 as a official project of the MBC Alliance which includes 32 nonprofits, 12 industry partners, and 30 individual patient advocates. The Marina Project has grown to include 35 members with representation from industry, research institutions, and individual patients. Nearly one-third of the group is comprised of patients living with brain metastases or leptomeningeal disease (LMD). GOALS FOR PATIENTS LIVING WITH BCBM & LMD: In the US, approximately 200,000 new cases of brain metastases are diagnosed each year [1]. Approximately 10–15% of patients with MBC will develop brain metastases, and may be as high as 30–50% for certain subtypes [2]. A diagnosis of central nervous system (CNS) metastasis often accelerates an already incurable diagnosis. CNS metastasis is difficult to image and detect, tend to have poorer prognoses with lower overall survival, and are treated with invasive therapies with many serious side effects. Furthermore, most clinical trials exclude patients with CNS metastasis which further hinders research. VALUES AND OBJECTIVES: The overarching goal of this initiative is to accelerate the scope and breadth of evidence-based CNS metastasis research by targeting entities conducting clinical trials and collaborating with them to do the following: (i) Increase the quality and quantity of basic research; (ii) Increase the number of clinical trials in areas where research is lacking; (iii) Diversify the type of clinical trial interventions; (iv) Eliminate restrictive eligibility criteria in clinical trials; (v) Incorporate clinically meaningful trial endpoints.

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OTHR-10. DIVERSE SURVIVAL OUTCOMES OF HER2+ BREAST CANCER BRAIN METASTASES (BCBM) PRESENTING WITH ISOLATED BRAIN RELAPSE COMPARED TO THOSE WITH CONCURRENT EXTRACRANIAL DISEASE
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BACKGROUND: In patients with isolated HER2+ BCBM and no extra- cranial disease (ECD), there are no consensus guidelines on optimal treatment approaches following CNS-directed therapy. Our goal was to determine the implications of ECD at time of first HER2+ BCBM on intracranial progression-free survival (PFS1) and overall survival (OS). METHODS: Retrospective analyses with HER2+ BCBM were identified from 1st CNS radiation from 2006–2020. Demographics, dates of metastatic and intracranial diagnosis, ECD status at 1st BCBM, and outcomes were collected. The primary endpoint was PFS1 defined as time from first CNS radiation to the subsequent documentation of intracranial progression (RANO-BM). OS was defined as time from 1st CNS radiation and 1st metastatic disease to date of death/last known alive. ECD status was defined by R.ESTIST.1 from staging scans within 30 days of 1st BCBM RESULTS: In this patient cohort, 25% (17/68) had isolated brain relapse/no ECD. Median age was 50 years. Most patients (58%) developed first BCBM during adjuvant or early-line metastatic therapy. All patients with no ECD presented with isolated brain relapse as first metastatic presentation. Patients with concurrent ECD presented with first BCBM at a median of 16.6m (95% CI: 10.5 to 25.3) after initial metastatic presentation. Median OS from initial metastatic presentation to death was worse for patients with isolated brain relapse (25.3m, 95% CI: 16.8 to 35.3) compared to those with concurrent ECD (49.7m, 95% CI: 43.2 to 62; p<0.01). Median OS from first CNS involvement to death was not statistically different across groups. CONCLUSIONS: Patients with isolated HER2+ BCBM as their initial metastatic event have substantially worse OS compared to patients with concurrent ECD developing CNS metastases later in their disease course. This population with isolated brain relapse deserves investigation of novel treatment algorithms, including earlier introduction of brain-penetrable HER2-targeted agents.

OTHR-11. COMPREHENSIVE ANALYSIS OF DRIVER MUTATION PROFILE IN A COHORT OF LUNG CANCER PATIENTS USING TARGETED GENE PANEL ANALYSIS WITH FOCUS ON BRAIN METASTASIS DISEASE
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PURPOSE: Approximately 228,820 people are diagnosed annually with lung cancer diagnosis and 135,720 die from their disease1. EGFR and KRAS targeted therapies have been shown to significantly improve treatment of non-small cell lung cancer (NSCLC), but they don't apply to the majority of patients. There's a critical need to characterize the molecular signature of patients with lung cancer and to define the proportion of patients eligible for novel targeted therapies. METHODS: IRB approval was obtained for retrospective review of lung cancer patient hospital tumor registry from 2017 to 2019. Data collected included patient demographics, targeted next-generation sequencing results (50 and 150 gene panel), histology, and biopsy location in the final 2,203 patients, 713 of which were manually checked. FINDINGS: 83.8% of patients in the lung cancer cohort that had targeted next-generation gene panel analysis demonstrated presence of at least one mutation. 50.9% of the patients in our cohort had a targetable mutation. There were 9.5% with hypermutated phenotype characterized as at least 5 mutations per sample. 1.3% of patients had at least 10 mutations per sample. We also characterize the distribution of mutations within brain metastatic lesions and demonstrate that brain metastases with hypermutated phenotype demonstrate larger volumes of edema and greater involvement of deep white matter compared to non-hypermutated brain metastases. CONCLUSION: We present a comprehensive analysis of the molecular signature of lung cancer from a tertiary referral institution with focused analysis of brain metastases. Lung cancer brain metastases with greater than 5 mutations correspond to greater volume of edema and involvement of deep white matter.