(92.3% in BM vs. 80.8% in non-BM, p=0.2193). Out of 658 patients tested for BRCA, 33.6% (n=221) were BRCA mutation carriers (BRCA+). Of the patients with BM, 22 tested for BRCA, 13 were carriers. BRCA+ was significantly higher in the BM group compared to the non-BM group (59.1% vs. 32.9%, p=0.0123). Among BRCA+ the rate of BM was higher than among BRCA- (5.8% vs. 2.1%, p=0.0123, HR=3.029; 95%CI: 1.4–6.5). Median time from OC diagnosis to BM and from disease recurrence to BM, was longer for BRCA+ compared to BRCA- (44.3mo vs. 32.3mo and 11.8mo vs. 0.7mo, respectively). Median survival (mOS) was not significantly different among patients with BM compared to those without BM (59.4mo vs. 71.2mo, p=0.36). Following diagnosis of BM, mOS was 20.6mo among BRCA+ and 12.3mo among BRCA- (p=0.4266). No correlation was demonstrated with PARP inhibitors or bevacizumab treatment and subsequent development of BM. CONCLUSION: BM are an infrequent event among OC patients. However, the risk is three-folds higher among BRCA+. Interestingly, BM do not significantly alter survival among OC patients. Our work suggests that the higher rate of BM in BRCA+ may be related to longer survival. Another hypothesis requiring further evaluation, is possible higher brain tropism among this population.

OTHR-04. GYNECOLOGICAL MALIGNANCIES WITH METASTASIS TO THE CENTRAL NERVOUS SYSTEM: A CASE SERIES AND SYSTEMATIC REVIEW OF THE LITERATURE

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INTRODUCTION: Gynecologic malignancies are an increasingly common proportion of central nervous system metastatic disease. As genetic sequencing technology improves and becomes more accessible, mutations associated with CNS metastasis are easier to elucidate. The aims of this case series and systematic literature review are to describe the patient population with CNS metastatic disease from a gynecologic primary, and to investigate why the proportion 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 (e.g., bony spine metastases without evidence of meningeal/parenchymal invasion). RESULTS: Our review showed that patients with gynecological metastasis to the CNS generally have worse outcomes regarding overall survival, progression free survival, and quality of life than patients without CNS metastasis. DISCUSSION: Our results infer that the reported increase in incidence of CNS metastasis from gynecologic malignancies is a reflection of improvement of detection given advances in technology, improved patient follow up, and increased overall survival of patients with gynecologic malignancies. Further characterization of mutations from gynecologic malignancies associated with brain metastasis could result in development of more treatment options for patients in the future and help determine factors that contribute to developing metastasis to the CNS of various degrees, thus, potentially inform treatment strategies.

OTHR-05. DIAGNOSIS AND TREATMENT OF SOLITARY PITUITARY METASTATIC CANCER: A CASE SERIES

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OBJECTIVE: Metastatic pituitary carcinoma accounted for only 1% of pituitary lesions. METHODS: Patients with isolated pituitary metastatic carcinoma admitted to our hospital from 2014 to 2018 were retrospectively collected, clinical features and prognosis were analyzed. RESULTS: 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), hypopituitarism (5/5 cases), visual field defect (5/5 cases), headache (4/5 cases), hypothyroidism (4/5 cases), 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, confirmed that the primary lesions of all the 5 patients were from the lung. 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 that 4 patients had died, with a survival of 2, August, 28, 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 are 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.

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 treatment 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: Nuance ® 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-gadolinium 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/yes, 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.

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 lung cancer and are often administered when tumors show PD-L1 positivity. The objective of this study was to analyze PD-L1 receptor discordance in tumor cell between the primary tumor and lung cancer brain metastasis (LCBM). METHODS: A systematic review of series published prior to April 2021 obtained from the Medline database of biopsied or resected LCBM evaluating PD-L1 discordance 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 lung tumors and brain metastases. The majority of patients (81%) were smokers, with 67% non-small cell lung cancer and 33% small cell lung cancer. The pooled estimate for overall PD-LI receptor concordance between primary and LCBM was 76% (95% CI: 52%-90). The positivity rate varied when analyzed by various cutoff levels of PD-L1 expression; for <1% ex-

pression, 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: 4%-33%) vs. 21% (95% CI: 14%-29%) (p=0.425). The pooled estimate for overall PD-LI 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-LI receptor discordance. CONCLUSIONS: PD-L1 status discordance in tumor cell 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 METASTASES: 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 provider dependent as current Level III guidelines recommend against 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: Using PRISMA guidelines, a pertinent search was conducted on Embase, PubMed, and Web of Science to identify journal articles that reported AED prophylaxis as a variable to modify seizure frequency in adult patients with BM. Data of interest included AED agent, new-onset seizure frequency, and safety profile. A meta-analysis was performed to calculate 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: I^2 = 7%. Adverse events 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 an 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). DISPARITIES 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 are difficult to image and detect, tend to have poorer prognoses with lower overall survival, and are treated with invasive therapies which can have lasting 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 (BRCBM) PRESENTING WITH ISOLATED BRAIN RELAPSE COMPARED TO THOSE WITH CONCURRENT EXTRACRANIAL DISEASE

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BACKGROUND: In patients with isolated HER2+ BrCBM and no extracranial 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+ BrCBM on intracranial progression-free survival (PFS1) and overall survival (OS). METHODS: Retrospective analysis was performed on 77 patients with HER2+ BrCBM who received 1st CNS radiation from 2006–2020. Demographics, dates of metastatic and intracranial diagnosis, ECD status at 1st BrCBM, 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 RECIST1.1 from staging scans within 30 days of 1st BrCBM. RESULTS: In this patient cohort, 25% (19/77) had isolated brain relapse/no ECD. Median age was 50 years. Most patients (58%) developed first BrCBM 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 BrCBM 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 amongst groups. CONCLUSIONS: Patients with isolated HER2+ BrCBM 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 METASTATIC DISEASE

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PURPOSE: Approximately 228,820 people are diagnosed annually with lung cancer diagnosis and 135,720 die from their disease[1]. *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 to retrospectively extract data from tertiary hospital tumor registry from 2011 to 2017. 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, 715 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 than 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.