PARP Inhibitor Tolerability and Impact on Progression-Free Survival in Patients with High-Grade, Ovarian Carcinoma with Brain Metastasis: A Case-Series

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of LMD is largely devoid of CD3+ T cells, but is enriched for immune suppression and innate immunity.

MEDICAL THERAPY (CHEMOTHERAPY AND IMMUNOTHERAPY)

THER-01. TARGETED THERAPY AND INTRACRANIAL METASTATIC DISEASE: A POPULATION-BASED RETROSPECTIVE COHORT STUDY
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BACKGROUND: Targeted therapies have been hypothesized to prolong survival in the management of patients with intracranial metastatic disease (IMD), but, paradoxically, to increase IMD incidence by improving systemic disease control and prolonging survival from the primary tumor. The real-world benefits of targeted therapy in management of patients with IMD are unclear, as clinical trials have excluded patients with IMD and lacked endpoints reporting intracranial outcomes. METHODS: This retrospective cohort study included all patients in Ontario, Canada, diagnosed with IMD from 2005 to 2018 with primary diagnoses of breast cancer, lung or gastrointestinal malignancy, or melanoma. Control patients matched by primary disease without IMD. Kaplan-Meier and multivariable regression analyses were performed to compare overall survival (OS) between patient subcohorts divided by primary disease and stratified by targeted therapy receipt or IMD status. RESULTS: Post-IMD targeted therapy was associated with prolonged OS in patients with HER2-positive breast cancer (HR 0.41; 95% CI, 0.33–0.5), EGFR-positive lung cancer (HR 0.28; 95% CI, 0.23–0.34), and BRAF-positive melanoma (HR 0.28; 95% CI, 0.14–0.29), compared to those who did not receive post-IMD targeted therapy. Presence of IMD was associated with shorter OS in patients with metastatic breast cancer (HR 1.8; 95% CI, 1.56–2.08) and metastatic EGFR-positive lung cancer (HR 1.22; 95% CI, 1.08–1.39) but not metastatic BRAF-positive melanoma (HR 1.11; 95% CI, 0.77–1.61), compared to those without IMD. CONCLUSIONS: Our findings show that real-world use of targeted therapies was associated with prolonged OS in patients with IMD in the setting of HER2-positive breast cancer, EGFR-positive lung cancer, and BRAF-positive melanoma. Inclusion of patients with IMD in clinical trials and use of endpoints that interrogate IMD will be critical to determine the role of targeted therapies in the management of patients with IMD.

THER-02. PARP INHIBITOR TOLERABILITY AND IMPACT ON PROGRESSION-FREE SURVIVAL IN PATIENTS WITH HIGH-GRADE OVARIAN CARCINOMA WITH BRAIN METASTASIS: A CASE-SERIES
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Brain metastases secondary to ovarian carcinoma is an uncommon but increasing phenomenon. PARP inhibitors (PARPi) are increasingly used as an adjunctive treatment in patients with central nervous system metastases (CNS). Historically brain metastases has a historically poor prognosis. Five women with a mean age of 60.4 ± 7.6 years were included. All had stage IIIC/IV ovarian cancer and diagnosed with brain metastases at recurrence. Three underwent resection for oligometastatic disease followed by post-operative stereotactic radiosurgery without surgery, and two patients underwent whole brain radiotherapy for multiple metastases. Pathology was confirmed in those who were resected. Two patients had evidence of systemic disease in addition to CNS spread. Three women were BRCA1/2 Positive. Following initial radiotherapy, one patient received adjuvant chemotherapy followed by olaparib maintenance, one received 13 cycles of bevacizumab/olaparib, followed by olaparib maintenance. A third patient was treated with olaparib/bevacizumab and two patients received olaparib monotherapy, both of whom continued on therapy. All received olaparib therapy during their treatment and all had minor dose modifications due to side effects. Mean survival from initial cancer diagnosis was 62.4 ± 20.4 months. Mean duration of PARPi therapy was 27.6 ± 16.8 months. Mean survival following CNS recurrence was 22.8 ± 12.0 months. One patient is disease-free, while two patients are alive with stable disease, one patient is alive but off treatment secondary to progression, and one patient is deceased secondary to progression of her brain metastases after being on PARPi therapy for 18 months. The cohort remained highly functional across the trajectory of their disease with ECOG scores of 1 (n=4) or 0 (n=1). The results of this single institution retro-
Abstracts

**MULTIMODALITY**

**MLTI-01. STUDY ON THE ASSOCIATION BETWEEN PRONE LOCATIONS AND PROGNOSIS OF BREAST CANCER BRAIN METASTASES VIA Voxel ANALYSIS**

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**PURPOSE:** This study aimed to analyze the preferred locations of secondary brain tumors of breast carcinoma according to different biological characteristics. **METHODOLOGY:** 161 Breast cancer brain metastasis (BCBM) patients diagnosed between January 2007 and February 2018 were retrospectively analyzed. MR images when brain metastases occurred were collected, registered, and segmented. The frequency map and p-value heatmaps were constructed to compare two biological phenotypes using two-tailed Fisher’s exact test. Age, treatments, the status of ER, PR, and HER2, luminal sub-type, tumor marker levels in peripheral blood including CEA, CA19-9, and CA15-3 were statistically analyzed. Survival data were analyzed by Kaplan-Meier method, log-rank test, and multivariate logistic regression. **RESULT:** The frequency heat map shows lesions of patients with BCBM are more inclined to the cerebellar hemisphere. Older patients (>49 years old, median age) mainly occur in the left frontal lobe, the right parietal lobe, and adjacent meninges comparing with white matter of the left parietal lobe, cerebellum vermis, and area around the fourth ventricle among younger patients and the difference is significant. Patients with tumors located on the surface of the brain are more likely to undergo surgical treatment, however, conservative treatment was considered if metastases are located at the midbrain tectum. ER and PR-positive and HER-2 enriched patients have more significance in metastases, at the left parieto-occipital junction area, frontal lobe, parietal lobe, cerebellar hemisphere, and adjacent meninges. Metastases with high levels of CEA are found significantly at areas around the central anterior gyrus. Lesions with an elevated level of CA19-9 and CA15-3 tend to be frontal, parietal, and occipital. Besides, HER-2 enriched in primary sites and a normal level of CA15-3 were two independent protective factors in determining prognostic outcomes. **CONCLUSION:** The preferred locations of BCBM could be clues of future study and helpful for clinical strategies.

**MLTI-02. IMPACT OF DRIVER MUTATIONS ON TIMING, PATTERN, TREATMENT, AND OUTCOME IN PATIENTS WITH BRAIN METASTASES FROM NON- SMALL CELL LUNG CANCER**

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**OBJECTIVE:** To assess the impact of driver mutations in non-small cell lung cancer (NSCLC) on the treatment and outcome of brain metastases (BM). **PATIENTS AND METHODS:** We retrospectively analyzed patients with BM from NSCLC with respect to driver mutations and assessed timing and pattern of BM development as well as local cerebral control in a multimodal treatment setting. **RESULTS:** The number of BM did not influence local control and overall survival rates (p=0.24 and p=0.21, respectively). Controlled systemic therapy (HR 0.42; 95% CI 0.228-0.633; p=0.0001), clinical status (Karnofsky Performance Score > 70; HR 0.41; 95% CI 0.265-0.661; p=0.0001) and adjuvant systemic therapy (HR 0.38; 95% CI 0.279–0.530; p<0.0001) were independent prognostic factors for survival. **CONCLUSIONS:** The median number of BM metastases is not a prognostic factor for survival and local cerebral control in a multimodal treatment setting.

**MLTI-03. THE RELEVANCE OF THE COUNT OF BRAIN METASTASES FOR TREATMENT AND OUTCOME IN NSCLC**

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**BACKGROUND AND PURPOSE:** While data reporting the number of brain metastases as a prognostic factor for patients with NSCLC, we analyzed whether the prognostic importance of the mere count of brain metastasis in a modern, multimodal treatment setting. **METHODOLOGY:** We retrospectively analyzed patients treated for BM from non-small lung cancer between 2010 and 2020. Demographic, baseline characteristics, and tumor-associated parameters were retrieved from an electronic database. Prognostic factors for local cerebral control and survival were identified using the log-rank test and Cox regression analysis. **RESULTS:** We included 343 consecutive patients (male n=187, female n=156; median age 61 years). Histological subtypes were adenocarcinoma (n=283), squamous-cell carcinoma (n=43) and neuroendocrine carcinoma (n=18). The median number of BM was one (range 1–20). Single (n = 189), oligo (n=110) and multiple BM (n=44) showed in total a median follow up of 10 months (minimum, maximum 142). Treatment comprised surgical resection (n=218) with radiotherapy (n=37) and stereotactic radiosurgery (n=123) and adjuvant systemic therapy (n=203). The median local cerebral control was 11 months (95%CI 8.5 – 13.5) and the median overall survival was 16 months (95%CI 12.8 – 19.2). The number of BM did not influence local control and overall survival rates (p=0.24 and p=0.21, respectively). Controlled systemic therapy (HR 0.42; 95% CI 0.228-0.633; p=0.0001), clinical status (Karnofsky Performance Score > 70; HR 0.41; 95% CI 0.265-0.661; p=0.0001) and adjuvant systemic therapy (HR 0.38; 95% CI 0.279–0.530; p<0.0001) were independent prognostic factors for survival. **CONCLUSIONS:** The mere number of brain metastases is not a prognostic factor for survival and local cerebral control in a multimodal treatment setting.

**MLTI-04. THE ROLE OF THE OUTPATIENT REGISTERED NURSE IN THE CARE OF BRAIN METASTASES**

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**INTRODUCTION:** Brain metastases is a complex disease, requiring a skilled clinical team to deliver medical and surgical care. The nurse is an integral member of the interdisciplinary team. Despite this, the role of the nurse in brain metastasis care has not been established in the literature. Moreover, while education for nursing nursing exists, there is a paucity of literature defining the nursing care specific to brain metastases. The aim of this study was to describe the essential nursing functions in brain metastases within medical and surgical clinics. **METHODOLOGY:** A working-group comprised of 2 registered nurses and a clinical nurse specialist in specialty brain metastases at Memorial Sloan-Kettering Cancer Center was formed. A KSA framework was used to develop a survey to assess nurses’ knowledge, skills, and attitudes regarding care of patients with brain metastases. 2 nurses were surveyed. **OBJECTIVE:** Oncology nursing knowledge was surveyed by medicine and surgical nurses for importance. Mean scores were calculated and ranked. **RESULTS:** Nurses consistently reported care coordination; symptom management; and referrals as key competencies. More variably endorsed competencies included access devices (implanted port and Omaya); managing immunocompromised patients; and legal issues (consent). The nurses reported important knowledge includes screening and treatment guidelines; epidemiology; disease states including brain metastases and leptomeningeal disease; and tumor histology. Important skills include neurological exam; triage; critical thinking; and patient education. Important attitudes include being empathetic, communicative, positive, truthful, and realistic. **CONCLUSION:** As the care of the patient with brain metastases evolves, more nurses are needed and the role of the outpatient registered nurse to deliver medical and surgical care. The nurse is an essential member of the interdisciplinary team.