

spective evaluation suggest olaparib in combination with radiotherapy +/- bevacizumab is well tolerated and can provide additional benefit in patients with brain metastases secondary to ovarian carcinoma.

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. **METHOD:** 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, segmented. The frequency 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 subtype, 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, cerebellar vermis, and areas 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 midline structure. 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 in peripheral blood were two independent protective factors in determining prognostic outcomes. **CONCLUSION:** The preferred locations of BCBM could be clues of further 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 formation and treatment 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 and survival after BM treatment. **RESULTS:** We included 253 patients. Histology was adenocarcinoma in 223, squamous cell carcinoma in 25 and not otherwise specified (NOS) in five patients. All tumors were analyzed for known alterations in NSCLC by panel sequencing and fluorescence in situ hybridization (FISH). An activating *KRAS* mutation (n=85) was the most prevalent mutation, followed by activating *EGFR* mutation (n=31) and *MET* amplification (n=29). Other mutations were detected in 27 patients. No alterations were found in 102 patients. Time to BM development did not differ between the molecular groups (p=.22), nor did the number (p=.72) or location (supra- vs. infratentorial; p=.76) of the BM. Patients underwent multimodal cerebral treatment comprising surgery followed by radiotherapy and/or stereotactic radiosurgery (n=138), whole brain radiotherapy (n=13) or stereotactic radiosurgery alone (n=102). Systemic treatment was initiated or continued after BM therapy in 169 patients and its frequency did not differ significantly between genotypes (p=.08) while the modality of medical treatment depended on genotype (p<0.0001). The latter showed longer local cerebral control rates compared to other mutations (0.23) and a longer overall survival compared to *KRAS* and wild type genotypes (p=.015). Systemic treatment (HR 2.1 95%CI 1.4-3.0; p<.0001) and a good clinical status (HR 2.1 95%CI 1.2-3.7; p=0.014) were the only independent factors for further survival. **CONCLUSION:** The actual known driver mutations do not influence BM formation. Specific genotypes show a better oncological course, presumably due to available molecular treatment.

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 metastasis 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. **PATIENTS AND METHODS:** We retrospectively analyzed patients treated for BM from non-small lung cancer between 2010 and 2020. Demographics, 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=42) 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 1, maximum 142). Treatment comprised surgical resection (n=218) with radiotherapy, stereotactic radiosurgery (n=125) 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 = 0.234 and p = 0.210, respectively). Controlled systemic disease (HR 0.42; 95% CI 0.2284-0.633; 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 been neglected in the literature. Moreover, while education for neurology 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. **METHODS:** 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. Oncology nursing competencies were scored by medicine and surgical nurses for importance. Mean scores were calculated and ranked. **RESULTS:** Nurses consistently reported care coordination; symptom management and monitoring parameters; knowledge of treatment modalities; and referrals as key competencies. More variably endorsed competencies included access devices (implanted port and Omayia); 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, interdisciplinary clinical practice models with advanced nursing training must occur. As the repertoire of clinical trials for patients with brain metastases continues to expand, future studies should assess the effects of specialized nursing training on clinical outcomes in patients with brain metastases.

MLTI-05. ADJUVANT RE-IRRADIATION IMPROVES LOCAL CONTROL OF SURGICALLY RESECTED RECURRENT BRAIN METASTASES

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