METHODS: A single-center retrospective review was performed at an NCI-designated Comprehensive Cancer Center to identify all surgically-resected, previously-irradiated necrotic BrM without admixed recurrent malignancy from 2003–2018. Clinical, pathologic and radiographic parameters were collected. Volumetric analysis determined EOR and longitudinally evaluated perilesional T2-FLAIR signal preoperatively, postoperatively, and at 3-, 6-, 12-, and 24-months postoperatively when available. Rates of time to 50% T2-FLAIR reduction was calculated using cumulative incidence in the competing risks setting with last follow-up and death as competing events. The Spearman method was used to calculate correlation coefficients, and continuous variables for T2-FLAIR signal change, including EOR, were compared across groups. RESULTS: Forty-six patients were included. Most underwent prior stereotactic radiosurgery with or without whole-brain irradiation (n=42, 91%). Twenty-seven operations resulted in gross-total resection (59%; GTR). For the full cohort, T2-FLAIR edema decreased by a mean of 78% by 6 months postoperatively that was durable to last follow-up ($p<0.05$). EOR correlated with edema reduction at last follow-up, with significantly greater T2-FLAIR reduction with GTR versus subtotal resection ($p<0.05$). There was a trend towards decreased steroid use, from 8mg daily dexamethasone-equivalent (range 2–36) preoperatively to 3mg 12-months postoperatively (range 1–8; p=0.063). CONCLUSIONS: RN resection conferred both durable T2-FLAIR reduction, which correlated with EOR, and reduced steroid dependency.

SURG-04. SURGICAL RESECTION OF SYMPTOMATIC BRAIN METASTASIS IN PATIENTS WITH NON-SMALL CELL LUNG CANCER IRRESPECTIVE FROM LESION COUNT

Stephanie T. Jünger, David Reinecke, Anna-Katharina Meißner, Roland Goldbrunner, Stefan Grau; Centre for Neurosurgery, Department of General Neurosurgery, Faculty of Medicine and University Hospital Cologne, University of Cologne, Cologne, Germany

BACKGROUND AND PURPOSE: Current guidelines primarily suggest the resection in case of a limited number of brain metastases (BM). With an increasing number of local and systemic treatment options this approach needs reconsideration. Therefore, we aimed to evaluate the role of metastectomy in patients with non-small cell lung cancer (NSCLC) treated in a comprehensive setting disregarding lesion count. PATIENTS AND METHODS: In this monocentric retrospective analysis, patients receiving surgery for 1–3 BM with available demographic, clinical, and tumor-associated parameters were included. Prognostic factors for local control (LC) and overall survival (OS) were analyzed by Log rank test and Cox proportional hazards. RESULTS: Two-hundred-sixteen patients were included: 129 (59.7%) with single/solitary, 64 (29.6%) with 2–3, and 23 (10.6%) with more than three BM. Resection of the symptomatic BM(s) improved the patients' Karnofsky performance index (KPI) significantly ($p<0.001$), enabling adjuvant radiotherapy in 199 (92.1%) and systemic treatment in 119 (55.1%) patients. After a mean radiological follow-up of eight (1–79) months, LC was observed in 83 (38.4%) patients and was not significantly influenced by BM count (p=0.064). After a mean OS after surgery of 12.7 (0–88) months, 120 (55.6%) patients had died. In univariate analysis, BM count showed no impact on OS (p=0.844), while age ≥/< 65 years (p=0.007), pre- and postoperative KPI ≥70 (p=0.002 and p=0.005, respectively), extracranial metastases (p=0.004), adjuvant radiation therapy ($p<0.001$), and adjuvant systemic treatment ($p<0.001$) did. In regression analysis the presence of extra-cranial metastases (HR 2.30 95%CI 1.53–3.48; $p<0.001$), adjuvant radiation therapy (HR 0.97 95%CI 0.23–0.86; p=0.016), and adjuvant systemic treatment (HR 0.37 95%CI 0.25–0.55; $p<0.001$) remained independent factors for survival. CONCLUSIONS: The indication for resection of symptomatic BM in patients with NSCLC is justified even in case of multiple lesions to alleviate their neurological symptoms and to enable further treatment.

SURG-05. NEUROSURGERY FOR BRAIN METASTASES FROM NON-SMALL CELL LUNG CANCER: SURVIVAL OUTCOME AND PROGNOSTIC FACTORS

De-pei Li, Zhen-ning Wang, Hao Duan, Cheng-cheng Guo, Xiaobing Jiang, Yong-Gao Mou; Department of Neurosurgery and Neuro-oncology, Sun Yat-sen University Cancer Center, Guangzhou, China

BACKGROUND: Surgery is an important approach to treat non-small cell lung cancer (NSCLC) brain metastases (BM). Here, we analyzed the survival outcome and prognostic factors for patients with NSCLC after BM resection. METHODS: The Surveillance Epidemiology and End Results (SEER) database was employed to address the incidence of BM from NSCLC and the current prognosis at population level. 674 contemporaneous NSCLC patients received BM resection at Sun Yat-sen University Cancer Center (SYSUCC) were used for survival comparison and Cox proportional hazards model was applied for identifying prognostic factors. RESULTS: 60,436 NSCLC patients diagnosed between 2010 to 2017 were enrolled from SEER database. Among them, 8,708 (14.4%) BM were identified at primary NSCLC diagnosis (synchronous BM, SBM). Median overall survival (OS) of SBM was 6 months with 1-, and 3-year survival percentages of 30.3% and 9.8%, respectively. Furthermore, the survival of BM patients without extracranial metastasis is significantly longer than those with extracranial metastases (median OS: 10 versus 5 months, $P<0.001$). 225 SBM (cohort A) and 449 BM with treatment history on primary NSCLC (cohort B) were collected from SYSUCC. In cohort A, 86 BM with extracranial metastases were found (38.2%) and the median OS was significantly shorter than those without extracranial metastases (15.2 versus 23.7 months, $P<0.001$). In cohort B, 255 cases with extracranial metastases were found (56.8%) and their prognosis was also worse than cases without extracranial metastases (median OS: 18.3 versus 22.1 months, P=0.002). Multivariate analyses revealed that younger age (HR=0.71, P=0.003), without extracranial metastases (HR=0.65, $P<0.001$) and radiation for BM (HR=0.78, P=0.005) were independent factors for better OS. CONCLUSION: Improved survival of patients received BM resection was observed in SYSUCC cohort as comparison with SEER patients with NSCLC and BM. Aggressive local treatment including surgery and radiation is still important in Modern management of BM from NSCLC.

SURG-06. METASTASES IN THE PINEAL REGION: A SYSTEMATIC REVIEW OF CLINICAL FEATURES, TREATMENT STRATEGIES AND SURVIVAL OUTCOMES

Paolo Palmisciano[1], Ali S. Haider[2], Christian Ogasawara[3], Chibueze D. Nwagwu[4], Waseem Wahood[5], Navraj S. Sagoo[6], Tarek Y. El Ahmadieh[7]; [1]Department of Neurosurgery, Trauma, Gamma Knife Center, Cannizzaro Hospital, Catania, Italy, [2]Texas A&M University College of Medicine, Houston, TX, USA, [3]John A. Burns School of Medicine, University of Hawai'i, Honolulu, HI, USA, [4]Emory University School of Medicine, Atlanta, GA, USA, [5]Dr. Kiran C. Patel College of Allopathic Medicine, Nova Southeastern University, Davie, FL, USA, [6]University of Texas Medical Branch School of Medicine, Galveston, TX, USA, [7]Department of Neurological Surgery, University of Texas Southwestern Medical Center, Dallas, TX, USA

BACKGROUND: Pineal region metastases are rare but often lead to severe neurological deficits. Surgical resection may play a therapeutic role. METHODS: We searched PubMed, EMBASE, Scopus, and Cochrane according to PRISMA guidelines. Studies reporting clinical outcomes data of patients with pineal region metastases were included. Clinical characteristics, management strategies, and survival data were reviewed. RESULTS: We included 30 studies comprising 46 patients. The median age at diagnosis was 58 years (range 27–82). Lung cancer (30.4%) and carcinomas of unknown origin (15.2%) were the most frequent primary tumors. In 50% of patients, symptomatic pineal metastases preceded primary tumor diagnosis. Headache (66.7%) and confusion (45.2%) were the most common presenting symptoms. Parinaud's syndrome (47.6%) and hydrocephalus (87%) were commonly noted. Biopsy (67.4%) was preferred over surgical resection (32.6%). The most common CSF diversion protocols were endoscopic third ventriculostomy (45%) and ventriculoperitoneal shunting (27.5%). Eleven patients received adjuvant chemotherapy and 31 underwent radiotherapy. At post-treatment follow-up, symptomatic improvement (55.2%) and hydrocephalus reduction (80%) were described. Post-treatment performance status scores were statistically superior that pre-treatment scores for patients undergoing biopsy ($P<0.001$) and tumor resection (P=0.007) coupled with adjuvant chemo/radiotherapy. Mean follow-up was 8 months, and median overall survival was 3 months. Only two cases (4.8%) of pineal metastases recurrence were reported, and median progression-free survival was 3 months. In patients receiving adjuvant chemo/radiotherapy, no survival differences were reported between surgery and biopsy (P=0.912), nor between gross-total and subtotal resection (P=0.220). Overall survival was neither correlated with surgical approach (P=0.157), nor with CSF diversion protocol (P=0.822). CONCLUSION: Pineal region metastases can severely impair clinical status. Biopsy or surgical resection may significantly improve symptoms and baseline performance status when combined with adjuvant chemo/radiotherapy and CSF diversion.

SURG-07. PLASMONIC GOLD NANOSTARS TO INCREASE THE EFFICIENCY AND SPECIFICITY OF LASER INTERSTITIAL THERMAL THERAPY (LITT) IN THE TREATMENT OF BRAIN TUMORS

Ethan Srinivasan[1], Pakawat Chongsathidkiet[2], Ren Odion[3], Yang Liu[3], Eric Sankey[2], Tuan Vo-Dinh[2], Peter Fecci[2]; [1]Duke University School of Medicine, Durham, NC, USA, [2]Duke University Medical Center, Department of Neurosurgery, Durham, NC, USA, [3]Duke University, Department of Biomedical Engineering, Durham, NC, USA

INTRODUCTION: Laser interstitial thermal therapy (LITT) is an effective minimally-invasive treatment option for intracranial tumors. Our