emission tomography (Met-PET). Data regarding the pattern of recurrence and overall survival were collected. RESULTS: Among 247 cases with glioblastoma, total resection of CE was achieved in 112. Preoperative Met-PET was performed in 30 out of 112. The median age at operation, a period of follow-up, and the preoperative tumor volume in 30 patients were 56 year-old, 17.9 months, and 18.8 cc respectively. The promoter region of the O6-methylguanine-DNA methyltransferase was methylated in 37%. Radiological comparison revealed that Met uptake was detected beyond the CE area in 13 out of 30, and the Met uptake was also resected with awake mapping technique in 7 patients (supratotal resection group; STR). The median progression-free survival (PFS) in STR was 23 months, and all the patterns of recurrence were distant recurrence. In contrast, the PFS in total resection group (TRG) was 9 months (p=0.09, Wilcoxon). Furthermore, 14 out of 17 recurrence were local in TRG subgroup. While the median OS in TRG was 18 months, it has not reached in STR (p=0.04, Wilcoxon). CONCLUSIONS: The resection of both of CE and MU was associated with better PFS and OS. This finding must be validated in a larger cohort with a multicenter study.

RADIATION THERAPY (RT)

RT-01

TREATMENT RESULTS OF SALVAGE GAMMA KNIFE AND BEVACIZUMAB (AVAGAMMA THERAPY) FOR RECURRENT GLIOBLASTOMA

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PURPOSE: We report the treatment results of AVAgamma therapy combining gamma knife (GK) and bevacizumab for recurrent glioblastoma. Subjects: From August 2013 to April 2020, 44 patients (88 lesions) with recurrent glioblastoma treated with AVAgamma therapy as salvage therapy at the time of relapse after initial treatment. The average age is 61.5 years, with 26 men and 18 women. The tumor volume is 150 ml or less, and KPS is 40% or more as the indication of AVAgamma therapy. When the irradiation volume of GK is 15 ml or less, a single irradiation with a boundary dose of 20 to 26 Gy was performed, and when the irradiation volume was 15 ml or more, a single irradiation boundary dose was divided into two divided irradiations of 12 to 15 Gy. The mean therapeutic borderline dose was 24 Gy. Bevacizumab was administered 10 mg / kg or 15 mg / kg 1 to 10 times after GK. METHODS: Median progression-free survival (mPFS), 6-month progression-free survival (PFS-6m), 6-month survival (OS-6m), median survival (mOS) from treatment with AVAgamma Considered mOS from initial treatment. RESULTS: The mPFS from AVAgamma therapy was 5 months, PFS-6m was 37%, OS-6m was 79%, and mOS was 9 months. The mOS from initial treatment were 25 months. In relapsing glioma RPA classification, NABTT CNC class 5 mOS is 5.6 months, class 6 mOS is 6.4 months, but mOS from AVAgamma therapy is 9 months in class 5, 9 months in class 6. The survival time has been extended. DISCUSSION: By AVAgamma therapy, it was thought that recurrent lesions were locally controlled and life prognosis was prolonged. CONCLUSION: AVAgamma therapy is thought to prolong the survival of recurrent glioblastoma and play an important role as salvage treatment.

10031-RT-02

RESULTS OF REACTOR-BASED BNCT FOR 44 CASES OF RECURRENT AND REFRACTORY HIGH-GRADE MENINGIOMAS AND ROAD TO ACCELERATOR BASED BNCT

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INTRODUCTION: High-grade meningioma (HGM) is difficult clinical entity to treat. Especially recurrent HGM after some radiotherapy has very miserable prognosis. For example median overall survival (mOS) of recurrent HGM after radiotherapy is reported as 2 years. We applied tumor-selective particle radiation BNCT using nuclear reactor for 44 recurrent HGMs. METHODS: From 2005 to 2019, we treated 44 recurrent and refractory HGMs by reactor-based BNCT. The patients' WHO grades are grade 2:20 cases, grade 3:24 cases. Prior to BNCT, totally 114 times operations and 72 times SRS and 14 times external beam radiotherapy were applied for them. OS, tumor shrinkage, causes of treatment failure were analyzed. RESULTS: Median follow-up was 26.0 months. MOS after BNCT was 29.6 (95% CI:16.1–40.4) months. Grade 2 and 3 showed mOS as 44.4 (27.4-) and 21.55 (10.6–30.6) months, respectively and there is statistically significance (p=0.0009). All treated tumor showed rapid shrinkage on MRI. Treatment failure patterns are local recurrence, out of field recurrence, systemic metastasis, CSF dissemination, as 35.5%, 20.6%, 17.6%, 8.8 %, respectively. These results showed good local tumor control and prolonged survival for recurrent HGM cases. CONCLUSIONS: Our cases were heavily treated with repetitive surgeries and repetitive radiotherapy. In addition the rate of grade 3 patients was extremely high. In a word our cases seemed to have poor prognosis. In spite of these poor condition, reactor-based BNCT exerted good local control and prolonged survival for recurrent and refractory HGMs. Depending on the clinical results, PMDA gave us the permission to apply investigator-lead clinical trial for recurrent and refractory HGMs using accelerator-based BNCT with financial support from AMED (one of the agency of Japanese government). In our talk, let us open some results from this trial.

RT-04

STEREOTACTIC IRRADIATION FOR 2 - 3 CM BRAIN METASTASES: A MULTICENTER RETROSPECTIVE COHORT STUDY

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PURPOSE: We retrospectively analyzed the treatment outcomes of Stereotactic irradiation (STI) for large size (2–3 cm) brain metastasis. Materials and METHODS: One hundred and sixty-nine lesions with 156 patients who underwent STI from January 1, 2013 to December 31, 2015 at 21 institutions participating in the Japanese Radiation Oncology Study Group were included in the study. Patients who had a history of whole-brain irradiation in the past and those who received whole-brain irradiation sequentially with STI were excluded. RANO-BM was used to evaluate the effect on each lesion, and the survival time or time to occurrence of local failure was defined as the number of months from the initial day of STI to the day of the events. RESULTS: The median age was 66 (33–87) years. The median follow-up time was 14 (1–52) months. Male/female = 95/61 cases. The number of brain metastases was 1/2/3/4 or more = 93/35/14/14 cases. The median doses and fraction size were 30 Gy in 3 fractions. The primary site was lung/breast/colon or rectum/others = 95/14/14/33 cases. The median survival time was 16 months. A 1-year overall survival rate was 62% and a 1-year local control rate was 77%. Comparing the 1-year local control rate by the fraction size, single/3 or 4 /5 or more = 66/86/75%, the rate was better in the 3–4 fractions group (Log-rank test, p = 0.069). Cerebral necrosis (Grade 1/2/3/unknown = 9/10/8/3 cases) was observed in 30 lesions (18%), and the median time to diagnosis of brain necrosis was 9 (1–41) months. The incidence of necrosis in the single fraction cases was 29%, which was significantly higher than that in the fractionated irradiation cases (15%) (p = 0.039). CONCLUSION: Fractionated STI seems to be more favorable than single fraction STI for large brain metastases.

MOLECULAR PATHOLOGY/CLASSIFICATION (MPC)

MPC-02

PROGNOSTIC EFFECTS OF MOLECULAR FACTORS IN ELDERLY PATIENTS WITH IDH-WILDTYPE GLIOBLASTOMAS

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BACKGROUND: Geriatric neuro-oncology is an important research field, because the elderly patients is growing at a very rapid rate. This study investigates molecular features and their prognostic effects in the elderly glioblastomas (GBM). METHODS: We collected adult cases diagnosed with IDH-wildtype GBM and enrolled in Kansai Molecular Diagnosis Network for CNS Tumors (212 cases). Clinical and molecular features were analyzed retrospectively and independent prognostic factors were identified statistically. Focusing on the elderly (>=70 years) cases, the association between molecular factors and overall survivals (OS) was examined. RESULTS: Included in the study were 92 elderly cases (43.4%) and median OS was 12.8 months. MGMT promoter was methylated in 50 (54.3%). Triple CNA (EGFR amplification/gain & PTEN deletion & CDKN2A deletion) was detected in 23 (25.0%). NFKBIA was deleted in 23 (25.0%). In the elderly cases, adjuvant radiation and temozolomide (RT+TMZ) was performed in 39 (42.4%) (mOS = 17.1 months). Statistical analyses of the elderly plus non-elderly cases treated with RT+TMZ (148 cases), MGMT promoter, triple CNA and NFKBIA were identified as independent