significant difference was observed between the JC and Fine-tuning models ($P = 0.673$). CONCLUSIONS: Application of the BraTS model to heterogeneous datasets can significantly reduce its performance; however, fine-tuning can solve this issue. Since our fine-tuning method only requires less than 20 cases, this methodology is particularly useful for a facility where there are a few glioma cases.

NIMG-30. PET IMAGING OF ANDROGEN RECEPTOR EXPRESSION IN PATIENTS WITH GBM USING [^{18}F]-FDHT

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BACKGROUND: GBM is associated with poor overall survival partly due to lack of effective treatment. Recently we showed that androgen receptor (AR) protein is overexpressed in 56% of GBM specimens and that AR antagonists induced dose-dependent death in several glioblastoma cell lines. Treatment of mice implanted with human GBM with AR antagonists significantly reduced the growth of the tumor and prolonged the lifespan of the mice. 18f-fluorine-radiolabeled Dihidrotestosteron (DHT), a natural ligand of AR, [16β-18F-fluoro-5α-dihydrotestosterone ([^{18}F]-FDHT)] is one of the PET tracers used to detect AR expression in metastatic prostate cancer. The aim of this study was to identify AR-expressing GBM tumors in real time using PET-CT scan with [^{18}F]-FDHT. MATERIALS AND METHODS: Twelve patients with GBM underwent a dynamic (first 30 min) and whole body static (later 60-80 min) [^{18}F]-FDHT PET/CT (296-370 MBq) scans 2-4 days prior to the surgery or biopsy. Protein was extracted from the tumor and subjected to western blot analysis. AR Protein fold change of each tumor sample was calculated by densitometry analysis compared with that of normal brain, following normalization to GAPDH. RESULTS: At ~60 min after injection, 6 of the 12 patients showed significantly higher tumor accumulation of [^{18}F]-FDHT, compared to reference tissue $(SUV/Control)_{mean}$: 1.33-2.63 fold, $(SUV/control)_{max}$: 1.4-3.43 fold. The patient who had higher tumor accumulation of [^{18}F]-FDHT, demonstrated also high (1.6-2.27 fold/normal brain) AR protein expression within the tumor. Pearson-correlation-coefficient analysis for the $(SUV/Control)_{mean}$ at ~60 min after the injection versus AR protein expression, was positive and significant (R=0.841;p=0.0024). CONCLUSION: This study demonstrated for the first time that [^{18}F]-FDHT PET can identify AR-positive-GBM-tumors (with *sensitivity* and *specificity* at 100%) and may therefore be a powerful tool to select patients eligible for treatment with AR antagonists. It could possibly be employed also to monitor treatment response and/or progression during the course of therapy.

NIMG-31. NON-DIPG PATIENTS ENROLLED IN THE INTERNATIONAL DIPG REGISTRY: HISTOPATHOLOGIC EVALUATION OF CENTRAL NEURO-IMAGING REVIEW

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INTRODUCTION: The role of diagnostic biopsy in diffuse intrinsic pontine glioma (DIPG) remains in question. Distinguishing radiographically between DIPG and other pontine tumors with more favorable prognosis and different therapy is critically important. METHODS: Cases submitted to the International DIPG registry with histopathologic data were analyzed. Central imaging review was performed on diagnostic brain MRI (if available) by two neuro-radiologists; all cases with imaging features or histopathology suggestive of alternative diagnoses were re-reviewed. Imaging features suggestive of alternative diagnoses included non-pontine origin, < 50% pontine involvement (without typical DIPG pattern on follow-up), focally exophytic morphology, sharply-defined margins, or marked diffusion restriction throughout. RESULTS: Among 294 patients with pathology from biopsy and/or autopsy available, 27 (9%) had histologic diagnoses not consistent with DIPG, most commonly pilocytic astrocytomas (n=11) and embryonal tumors (n=9). Of these 294 patients with biopsy and/or autopsy pathologic data, 163 also had diagnostic MRI available for central neuroimaging review and radiographic comparison. Among 81 patients classified as characteristic of DIPG, 80 (99%) had histopathology consistent with DIPG (diffuse midline glioma, H3K27M-mutant, glioblastoma, anaplastic astrocytoma, diffuse astrocytoma). Among 63 patients classified as likely DIPG, but with unusual imaging features, 59 (94%) had histopathology consistent with DIPG. Nineteen patients had imaging features suggestive of another diagnosis, including 13 with non-pontine tumor origin; the remaining 6 patients all had histopathology not consistent with DIPG (embryonal tumors [n=3, including 1 with medulloblastoma], pilocytic astrocytoma [n=1], and ganglioglioma [n=1]). Association between central imaging review and histopathology was significant ($p < 0.001$ by the Freeman-Halton Fischer Exact Probability Test). CONCLUSIONS: The important role and accuracy of central neuroimaging review in diagnosing or excluding DIPG is demonstrated. In patients with pontine tumors for which DIPG is felt unlikely radiographically, biopsy may be considered to guide diagnosis, prognosis, and treatment.

NIMG-32. THE PREDICTIVE CAPACITY OF PRE-OPERATIVE IMAGING ANALYSIS IN DIFFUSE GLIOMA: A COMPARISON OF CONNECTOMICS, RADIOMICS, AND CLINICAL PREDICTIVE MODELS

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BACKGROUND: Radiomics and connectome analysis are distinct and non-invasive methods of deriving biologic information from MRI. Radiomics analyzes features intrinsic to the tumor, and connectomics incorporates data regarding the tumor and surrounding neural circuitry. In this study we used both techniques to predict glioma survival. METHODS: We retrospectively identified 305 adult patients with histopathologically confirmed WHO grade II–IV gliomas who had presurgical, 3D, T1-weighted brain MRI. Available clinical variables included tumor lobe, hemisphere, multifocal nature grade, histology extent of surgical resection, patient age gender. For connectomics, we calculated nodal efficiencies, network size and degree for all pairs of 3^3 voxel cubes spanning the entire gray matter volume using similarity-based extraction and graph theory. Radiomic features were extracted using Pyradiomics and subjected to patient-level and population-level clustering (N=172). These clusters were then used to construct a multi-regional spatial interaction matrix for model building. Cox proportional