combined with precision radiotherapy and chemotherapy in our orthotopic GBM model is currently being evaluated.
Conclusions: The results of this will be presented.

EP-1352

TBI scheme impacted on relapse in acute myeloid leukemia patients after hematopoietic stem cell transplant

E. Palazzari[1], L. Amico[2], A. Santucci[3], A. Carotti[2], E. Perrucci[4], A. Cavalli[4], A. Velardi[2], C. Aristei[5]
[1]*University of Perugia, Radiation Oncology Department, Perugia, Italy*
[2]*University of Perugia, Division of Hematology and Clinical Immunology Department of Medicine, Perugia, Italy*
[3]*University of Perugia, Hematology and Clinical Immunology Section, Perugia, Italy*
[4]*Santa Maria della Misericordia Hospital, Radiation Oncology Department, Perugia, Italy*
[5]*University of Perugia and Santa Maria della Misericordia Hospital, Radiation Oncology Department, Perugia, Italy*

Purpose/Objective: To evaluate the impact of two TBI schedules on the risk of relapse and transplant-related mortality (TRM) in 61 patients with acute leukemia who received HLA matched T-cell depleted allogeneic hematopoietic stem cell transplantation (matched HSCT).
Materials and Methods: 29 males and 32 females (median age 48 years; range 20-66) were enrolled from January 1999 to October 2013. 41 (67.2 %) patients had acute myeloid leukemia (AML) and 20 (32.8%) acute lymphoid leukemia (ALL). 43 patients were in first complete remission (CR1), 8 in CR2 and 10 had persistent disease. Patients in CR1 and CR2 were analyzed as one group. Group 1 (31 patients) conditioning was a hyperfractionated schedule (HTBI) (1.2 Gy 3 times a day for 4 days up to 14.4 Gy; lung dose 9 Gy) from day -10 to day -7. Group 2 (30 patients) conditioning was a single TBI (STBI) schedule (8 Gy, at a median dose-rate of 10.7 cGy/min, lung dose 4 Gy) delivered on day -9. All patients received Thiotepa (10 mg/kg) and Fludarabine (160 mg/m^2) consecutively from day -6 to day -3 after HTBI and from day -8 to day -2 after STBI. Anti-thymocyte globulin (ATG) was administered to 27 patients to strengthen the immunosuppressive effect of the conditioning regimen. No immunosuppressive drug was administered post-transplant as prophylaxis for Graft *versus* Host Disease (GvHD). All patients received anti-bacterial, antifungal, antiviral, anti-Pneumocystis prophylaxis.
Results: Median follow-up was 63.53 months (range 2.53-186.77). No patient rejected the transplant. Acute GvHD occurred in 11/61 patients (18%; 8 Grade I-II and 3 Grade III). Four were in the HTBI group and 7 in the STBI group; no cases of chronic GvHD were observed. Relapse developed in 18 patients (29.5%). The 5-year probability of relapse was 28% (CI 95% 0.17-0.41). Univariate analysis showed disease impacted significantly on the cumulative incidence of relapse with AML relapsing less than ALL (p=0.035). Overall, HTBI tended to be better than STBI (p=0.11). Age, disease stage, ATG administration, GvHD did not impact upon the risk of relapse. The Fine and Gray model with disease and TBI as main factors confirmed the results of the univariate analysis. With a different parametrization an even lower risk of relapse in AML patients who received HTBI not STBI (p=0.015) was found. TRM occurred in 10 patients (16,39%, 4/31 after HTBI; 6/30 after STBI). Causes of death were infection in 8 patients and GvHD in 2 patients. The 5-year probability of TRM was 18%. Univariate analysis showed age, disease and disease stage, ATG administration, TBI schedule, GvHD had no impact on TRM.
Conclusions: In AML patients HTBI in the conditioning regimen for HLA matched T-depleted HSCT is more efficacious than STBI in reducing the risk of relapse.

EP-1353

Towards predictive models: standardize data collection for brain cancer

S. Chiesa[1], M. Balducci[1], R. Gatta[1], N. Dinapoli[1], A. Damiani[1], E. Meldolesi[1], M. Ferro[1], V. Valentini[1]
[1]*Radiation Oncology Department Gemelli-ART, Università Cattolica S. Cuore, Rome, Italy*

Purpose/Objective: Even if brain cancer is a rare disease, its rising trend of the last three decades with its poor survival rate needs further analysis, possibly based on large randomized trials conducted on population-based data. Moreover, because of few available standard therapeutic strategies the identification of prognostic and predictive factors is a recent field of interest towards personalized treatments. The effort should be the storage of a large database coming from several datasets avoiding semantic difference and in concepts description through the adoption of a uniform language. Therefore our aim is to build a brain cancer ontology to standardize data, creating a consistent and specific large database in order to produce predictive models, useful to implement a Decision Support System (DSS).
Materials and Methods: A multi-professional team, involving medical doctors, a mathematician and an engineer, was employed to design an ontology in which concepts and data related to brain cancer are standardized and organized in order to create a storage of knowledge and data. Three different levels of analysis were considered to classify the all concepts. Some of them are related to general information in common with other cancer types, others are brain cancer related. In a next step, 'atomic' data type (i.e. integer, real, datatime) or structured data type (i.e.: a DICOM file, an XML structure, etc...) were added in order to provide a range for the predicates.
Results: More than 200 clinical, bio-molecular, neuropsychological and imaging features related to brain cancer were selected and classified according to three different levels. The first, the Registry level, includes general and epidemiological information as patient code, sex, age, gender, ethnicity, site and histology of the tumor, institution, the death and its cause. This level can probably be shared with ontologies related to other cancer sites. The second, the Procedure level, reports variables related to the muti-discipinary management of patients and brain cancer specific. It includes information about clinical presentation of the tumor, about surgery, radiotherapy or chemotherapy treatment, about outcomes evaluation and toxicity. We represented toxicities according to CTCAEv4 and RTOG scales and we provided also a description of therapeutic relationship between the two standards. The third is the Research level considering the elements useful for advanced

research project as clinical data, imaging features and quality of life evaluation.
Conclusions: The creation of a formal ontology is the starting point to share and collect data from multiple datasets. It allows to obtain a clear and a common interpretation of concepts, to report information in standardized large database. Along these lines the multi-professional team has in use a suitable support to implement decision support system based on predictive models.

EP-1354

Impact of evaluation timing in determining patterns of failure in glioblastoma

M.H. Seaberg[1], T. Kazda[2], N.N. Laack[1], D.H. Pafundi[1], S.K. Anderson[3], J.N. Sarkaria[1], P.D. Brown[4], E. Galanis[5], D.H. Brinkmann[1]
[1]Mayo Clinic, Radiation Oncology, Rochester, USA
[2]Masaryk Memorial Cancer Institute, Radiation Oncology, Brno, Czech Republic
[3]Mayo Clinic, Health Sciences Research, Rochester, USA
[4]University of Texas MD Anderson Cancer Center, Radiation Oncology, Houston, USA
[5]Mayo Clinic, Medical Oncology, Rochester, USA

Purpose/Objective: To determine patterns of failure (POF) and survival outcomes in newly-diagnosed glioblastoma (ND-GBM) patients treated on prospective phase I and II clinical trials using standard chemoradiotherapy in combination with novel chemotherapy.
Materials and Methods: POF of 77 patients with ND-GBM enrolled in prospective clinical trials were reviewed. Patients received the current standard of care, including surgical debulking, conformal radiation therapy (RT), and temozolomide, as well as an investigational chemotherapy agent (everolimus, erlotinib, or vorinostat). Patients received follow-up MR imaging per protocol at 2-month intervals following treatment to evaluate response. Contrast enhancement (CE) from T1-weighted post-contrast MRI scans was used to define each recurrence volume at the time of progression ($RecVol_p$). Additionally, the first suspicious scan containing new or increased CE was used to define the initial recurrence volume ($RecVol_i$). MRI scans were registered to the RT planning CT and dose volume histograms were calculated for each RecVol. POF at the time of progression (POF_p) and initial indication (POF_i) were characterized by the percent volume encompassed within the 95% dose region as central ($V_{95\%} \geq 95\%$) or non-central ($V_{95\%} < 95\%$). Here, POF_p and POF_i of each patient were categorized as central only, non-central only, or both central and non-central.
Results: Of the collective patient cohort, POF appeared to become increasingly non-central and multifocal with time. Recurrence with a non-central component increased from 14% to 27% ($p = 0.07$) and multifocal recurrence increased from 6% to 16% ($p = 0.12$) from the time of initial indication to progression, respectively. POF depended on the novel chemotherapy agent given. POF_i were (94% central, 6% non-central, 0% both) for erlotinib, (79%, 0%, 21%) for everolimus, and (77%, 18%, 5%) for vorinostat patient cohorts. Patients with unmethylated MGMT promoter had a higher percentage of multifocal recurrence (40%) compared to those with methylated MGMT promoter (0%) at the time of progression ($p = 0.01$). The overall median PFS_i, PFS_p, and OS were 4.5, 8.6, and 17.4 months, respectively. Survival outcomes based on the novel chemotherapy agent given were not significantly different.
Conclusions: POF for this ND-GBM cohort treated with novel chemotherapy agents were predominantly central, but were influenced by the time point of analysis. POF of the overall cohort were increasingly non-central at progression as compared with initial progression, suggesting that recurrence originates from the central region. POF differed between novel agents despite similar survival outcomes. Robust and properly-timed dosimetric POF analysis may be helpful to evaluate biologic aspects of novel therapeutic agents.

EP-1355

How could low-dose fractionated radiotherapy change outcome in unresectable GBM? Analysis between two schedules

M. Ferro[1], S. Chiesa[1], B. Fionda[1], A. Mangiola[2], B. Diletto[1], C. Mazzarella[1], V. Frascino[1], C. Anile[2], V. Valentini[1], M. Balducci[1]
[1]Università Cattolica del Sacro Cuore, Radiation Oncology Department Gemelli-ART, Rome, Italy
[2]Università Cattolica del Sacro Cuore, Neurosurgery, Rome, Italy

Purpose/Objective: To compare two schedules of hypofractionated radiochemotherapy in naive unresectable GBM in terms of toxicity, response and survival: the first one was followed by low dose radiation therapy (Hypo-RT-CT+LDRT), in the second schedule no low dose radiation therapy was administered (Hypo-RT-CT).
Materials and Methods: Patients (KPS > 70, age >18 years) underwent biopsy or with gross residual tumor after surgery were enrolled in these two studies. In the first study (Hypo-RT-CT), patients received hypofractionated radiotherapy (35 Gy in ten fractions) combined with Temozolomide (75 mg/mq from the start to the end of RT); in the second study (Hypo-RT-CT+LDRT) patients received hypofractionated radiotherapy (30Gy in ten fractions) with concomitant Temozolomide. In both studies adjuvant Temozolomide (Stupp like) was administered but it was combined with low dose radiation therapy (40 cGy twice on day for 5 days) only in Hypo-RT-CT+LDRT study. In all cases clinical target volume (CTV) was ring enhancement with residual tumor plus 3 cm. Acute and late toxicities were evaluated according to Common Terminology Criteria for Adverse Events version 4.0. MRI was used in order to evaluate the response to the treatment, according to RECIST Guidelines. Moreover overall survival (OS) and progression-free survival (PFS) were calculated by the Kaplan-Mayer method.
Results: Forty-two patients (M/F: 25/17) were enrolled from June 2010 to May 2014. Twenty-two out of 42 patients were enrolled in Hypo-RT-CT while 20 pts in Hypo-RT-CT+LDRT study. Most of them (57%) was submitted only to a biopsy (Table 1). Two out of 22 patients (9%) of Hypo-RT-CT study presented acute toxicities G2 (seizure and headache); in Hypo-RT-CT+LDRT we recorded G2 acute toxicities in 4 patients (10%): 2 thrombocytopenia and 2 leucopenia; G3 acute toxicity was observed only in one patient. After hypofractionated radiochemotherapy, partial response (PR) and stable disease (SD) were of 22% and 40% respectively in Hypo-RT-CT study, 9% and 14% in Hypo-RT-CT+LDRT. Median follow-up was of 24 months (range 6 - 53). Median OS and 1-yrs survival were of 15 months and 75% respectively for Hypo-