

with and without abscopal responses was respectively of 22.4 months (range 2,5-50,3) and 8,3 months (range 7,6-9,0). 11 out of 13 patients with local response showed an abscopal effect.

Conclusion: The RT after ipilimumab treatment may be an option for further potentiate its effect. Local response to RT might be predictive for the abscopal response and outcome. Further studies are warranted in this field to better understand and define the role of RT in combination or sequencing with ipilimumab treatment.

EP-1393

Radiological responses of melanoma brain metastases to radiosurgery and patient prognosis

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Purpose or Objective: The aim of this study was to analyze differences in radiological responses of melanoma brain metastases after Gamma Knife radiosurgery and their correlation with patient survival.

Material and Methods: We retrospectively analyzed 78 patients treated with Gamma Knife radiosurgery for melanoma brain metastases between 2009 and 2015 in the Radiosurgical centre (Saint-Petersburg, Russia) and subjected to follow-up MRI examinations. Patients receiving BRAF inhibitor therapy or ipilimumab were not included in the study. The study group consisted of 39 men and 39 women with a mean age of 52 years. The median KPS was 80 %. According to RPA, 14 patients were in Class I, 61 patients in Class II, and 3 patients in Class III. Most of the patients presented with multiple brain metastases (87 %). Radiosurgery was performed with Gamma Knife 4C and Perfection units; the mean dose delivered to the tumor margin was 20 Gy at 50 % isodose. After treatment, the patients underwent control MRI examination with standard protocols (2 mm T2 and 1 mm T1 with double contrast enhancement) at 8 weeks and at regular 3-month intervals thereafter. MR images were analyzed with Gamma Plan software. Volumetric measurements of metastases on pre- and post-treatment images were performed in order to determine different types of radiological response. We divided the patients into groups according to the type of radiological response and compared Kaplan-Meier survival curves in these groups with the long-rank test.

Results: We found that patients with melanoma brain metastases had different radiological reactions to Gamma Knife radiosurgery. We distinguished several types of radiation response: sustained decrease in tumor volume, prolonged stabilization of tumor volume, transient increase in tumor volume due to intratumoral bleeding with subsequent decrease in tumor size, transient increase in tumor volume due to radiation-induced necrosis followed by tumor shrinkage. Statistical analysis revealed that a rapid decrease in tumor volume was associated with poor prognosis. Median overall survival of this group of patients was about two times less compared with patients whose radiation response developed slowly after the first 2 months of radiosurgery ($p < 0.0001$). Stratification to RPA classes revealed that patients with a rapid response have poorer survival prognosis than those with a slow response in the corresponding RPA classes.

Conclusion: Melanoma brain metastases showed different radiological responses to radiosurgery. Rapid shrinkage of brain metastases is associated with poor survival, which may indicate more aggressive biological behavior of this tumor subtype. Different radiation sensitivity of melanoma brain metastases to Gamma Knife radiosurgery may be associated with molecular characteristics of cell subpopulations, which determine biological tumor behavior and affect patient prognosis.

EP-1394

Radiotherapy for adult T-cell leukemia-lymphoma: a single institutional experience

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Purpose or Objective: Adult T-cell leukemia-lymphoma (ATLL) is a rare disease and a peripheral T-cell malignancy associated with human T-cell lymphotropic virus type 1 (HTLV-1) infection. ATLL treatment is based on subclassification, and intensive multidrug chemotherapy regimens are often used for aggressive subtypes. However, disease progression occurs in most of patients. There are only a few reports for the radiotherapy in patients with ATLL. Therefore, the role of radiotherapy for ATLL is not well investigated even for the palliation. The purpose of this study was to evaluate the efficacy and toxicity for the radiotherapy in patients with ATLL.

Material and Methods: Between April 1983 to October 2013, 44 patients with 205 ATLL tumor lesions were treated with radiotherapy at our institution. Sites of tumor lesions were as follows; 184 lesions were in the skin, 13 lesions in the lymph nodes, 6 lesions in the central nerves system, and 2 lesions in the bone. Acute type on ATLL subtypes was seen in 8 patients, chronic type in 7 patients, lymphoma type in 10 patients, smoldering type in 15 patients and others in 4 patients. Median total dose of radiotherapy was 29Gy (range, 2-60Gy), and the median fractionated dose was 3Gy (range, 1-7Gy). For the skin tumor lesions, 45Gy in 15 fractions was selected in 33 lesions, 30Gy in 10 fractions in 38 lesions, 28Gy in 4 fractions in 21 lesions and 20Gy in 5 fractions in 19 lesions and others in 73 lesions. Only 4 of 44 patients were treated with total skin irradiation, and the remaining 40 patients received conventional radiotherapy for local tumor. Efficacy and toxicity of the radiotherapy for ATLL were retrospectively evaluated, and the predictors of a long-term survival were analyzed.

Results: The median follow-up period was 206 days. Objective tumor response rates were 98%. Four of 6 tumor lesions with stable disease or progressive disease on objective tumor response were associated with aggressive subtypes or tumor sites of the central nerves system. In-field recurrence after radiotherapy was recognized in 3 (2%) lesions. Two-year and 5-year overall survival rates were 76% and 44%, respectively. Median overall survival time in patients with indolent subtypes (chronic or smoldering type) of ATLL was 23 months, while that in patients with aggressive subtypes (acute or lymphoma type) was 6 months, and the difference was significant. Acute toxicities of Grade 2 dermatitis were seen in 3 patients. Acute toxicity of Grades 3-5 was not observed. Late toxicity of \geq Grade 2 was also not recognized.

Conclusion: Radiotherapy for ATLL was mainly used for the skin lesion and well tolerated, and could achieve excellent local tumor control without inducing severe toxicity. Radiotherapy should be selected to improve the quality of life, and be incorporated into combined modality therapy for ATLL.

EP-1395

Choroidal melanoma: is radiosurgery more efficient?

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Purpose or Objective: To evaluate local control, enucleation-free survival, toxicity and cost-effectiveness in patients with choroidal melanoma treated with linac-based stereotactic radiosurgery (SRS). GammaKnife® radiosurgery has report very good results for this melanoma treatment.

Material and Methods: Between 2003-2014, 6 patients with choroidal melanoma were treated at NISA Virgen del Consuelo Hospital in Valencia, Spain. Mean age was 59 years (range 43-79). Three were men and three women. Metastatic disease was ruled out in all cases. Two patients had small tumors, two medium sized lesions and two had large lesions according to Collaborative Ocular Melanoma Study Classification. Mean tumor volume was 0,49 cm³ (range 0,17-0,93). Three tumors were localized in the right eye. Visual field previous to treatment was normal in 5 cases and one patient presented complete hemianopsia of the affected eye. Central vision was preserved in all cases. The procedure was made under sedation and retrobulbar blockage, the eye muscles were fixed to Leksell G-Frame with silk sutures. Magnetic resonance (MRI) and computed tomography (CT) were used to contour lesion. CTV minimal marginal dose is 30 Gy, encompassed the 80 % isodose line in 4 patients and the 60% and 55% isodose lines in the other cases. All were treated with 6 MV linac, one isocenter and cone-collimation. Global cost of this method is around 8.000 € (range 7.000-12.000). It is an ambulatory procedure with a total duration of 3 hours or less.

Results: Median follow-up is 19 months (range 1-69). Follow up includes MRI and ophthalmoscopy every 6 months. Complete response in one patient, maximal partial response ($\geq 50\%$) in three patients, partial response ($\leq 50\%$) in other patient and it's too early for response evaluation (less than 6 weeks) in the last one. For lens and optic nerve, the dose constraints were 4 and 18 Gy, respectively. Up to date, no patient has local or distance progression. Enucleation has not been necessary in any patients. Five years after treatment one patient presented retinal scarring in irradiated area. Glaucoma start 9 month after SRS in one patient with previous cataract surgery. No other toxicities were observed.

Conclusion: In our experience, linac SRS is effective eye and vision-sparing method to treat patients with a minimally invasive, safe and cost-efficient alternative to brachytherapy and enucleation in choroidal melanoma with high local control rates and low incidence of toxicities.

EP-1396

Radiosurgery/Stereotacticradiotherapy with Cyberknife and immunotherapy in melanoma brain metastases
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Purpose or Objective: The immunotherapy improves survival in patients (pts) with metastatic melanoma, but there is insufficient data on the efficacy in pts with brain metastases. SRS and SRT allow greater local control in pts with melanoma brain metastases, with not significant impact on prognosis. Our analysis evaluated survival and local control in pts treated with SRT/SRS with Cyberknife® system and Immunotherapy.

Material and Methods: From November 2012 to September 2015 we treated 47 pts (26 M and 21 F) with melanoma brain metastases. The median age was 59 years (28-81y). 28 pts received immunotherapy pre (pre-RT), concomitant and post radiation treatment (post-RT). 26 pts received Ipilimumab: 14 pts pre-RT, 5 pts concomitant-RT, 7 pts post-RT; 2 pts received Nivolumab: 1 pt pre-RT and 1 pt concomitant-RT; 11 pts received Pembrolizumab: 3 pts pre-RT, 4 pts concomitant RT, 4 pts post-RT. we treated 91 lesions of average size 13.5 mm (2-36). Based on the number of lesions, size and

location, 69 lesions were treated with SRS (10-24Gy), 22 with SRT (18-24Gy/2-3-5 fractions). We evaluated the local response according to RECIST criteria (complete response CR: disappearance of the lesion; partial response PR: at least a 30% decrease in the diameter of lesion; progression disease PD: increase in the diameter of the lesion $> 20\%$; stable disease SD: everyone else). We assessed overall survival, local control (LC) as the sum of CR, PR and SD, and the impact on LC of the association Radiotherapy (RT) and immunotherapy.

Results: 41 pts were evaluable for follow-up (FU). The 6-month survival was 58%. 11 patients died and 11 pts received Whole Brain RT for progression disease. At two months FU, of the 39 pts evaluable (24 treated with RT and immunotherapy), 85% had LC; at four months FU, of 29 pts evaluable (20 treated with RT and immunotherapy), 81% had LC; at six months FU, the 24 pts evaluable (15 treated with RT and Immunotherapy) 100% had LC.

Conclusion: Our analysis seems to confirm the literature data in terms of overall survival. The results showed a good disease local control in pts treated with SRT/SRS and immunotherapy, demonstrating a potential role of immunotherapy in the treatment of melanoma brain metastases. the recruitment of a greater number of pts, a longer follow-up and new prospective studies of combination RT and immunotherapy are needed to demonstrate the immunotherapy role in the treatment of melanoma brain metastases.

EP-1397

Patterns of failure in patients treated with adjuvant radiotherapy post lymphadenectomy for melanoma
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Purpose or Objective: Adjuvant radiotherapy is proven to prevent lymph-node field relapse after therapeutic lymphadenectomy for melanoma, but does not improve overall survival. Risk factors for lymph-node field recurrence include presence of extracapsular extension, number and size of lymph nodes at dissection. This study reports patterns of failure in patients treated with adjuvant radiotherapy post lymphadenectomy for melanoma.

Material and Methods: This retrospective study included all patients in three institutions treated with adjuvant radiotherapy post lymphadenectomy for melanoma between June 2012 and March 2015. Patients who received radiotherapy were those with high risk of lymph node field recurrence, as per the findings of Burmeister et al in 2012. Patients received radiotherapy to the head & neck (55%), groin (30%) and axilla (15%). All were staged with PET or CT. Both IMRT (50%) and 3D conformal (50%) techniques were used.

Results: 20 patients were treated during this period (see table). Median follow up was 16 months (range 6.7 - 32 months). There were no lymph node field recurrences. Local recurrence rate was 10%. Distant recurrence rate was 35%, all occurring within 4 months from completion of radiotherapy. Distant recurrence rate was 53.8% in patients with extracapsular extension. All patients with local or distant relapse had extracapsular extension. 71% of patients with distant recurrence had PET staging. 8% of patients experienced grade 3 radiotherapy toxicity.