benefits in this retrospective review. Difficulties separating toxicity due to retreatment versus tumor progression and limited patient survival following retreatment preclude definite conclusions. Radiation necrosis was infrequent. Inspite of multimodality treatment, the treatment outcome remains dismal.

EP-1225 Stereotactic Radiotherapy for Spine metastases using Brainlab® Elements Spine: preliminary results

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Purpose or Objective

Stereotactic body radiation therapy is an emerging treatment option in several anatomical sites. Recently a new dedicated software (Brainlab® Elements Spine SRS™) has been developed in order to optimize the stereotactic body radiation treatment (SBRT) workflow in oligometastastic patients with spinal lesions. The prescription of ablative radiation dose to spine allows to potentially increase the probability to eradicate the metastatic disease and consequently improved local control. We report the initial experience of SBRT in spine metastases.

Material and Methods

Between March and September 2018, 27 spinal metastases on 16 patients underwent to spinal SBRT. The clinical target volume (CTV) was automatically generated on CT scan with fusion-image magnetic resonance imaging (MRI) and or PET-CT according to international spine radiosurgery consortium consensus[1]. A margin of 1 mm in all directions was added for the planning target volume (PTV). Dose prescription varied between 12 Gy to 30 Gy in 1 to 3 fractions. The dose-volume constraints for spinal was D_{1cc}< 13 Gy in single fraction and D_{1cc}< 20 Gy in 3 fractions. SBRT was delivered with volumetric modulated arc technique (VMAT) using multiple Arcs. Daily CBCT was performed. The patients were evaluated at the end of treatment, 3 months for toxicity and treatment response with MRI or PET-CT.

Results

The main patients' and lesions' characteristics are summarized in **Table 1**. In 4 patients a previous conventional radiation treatment to the vertebra was performed and a SBRT re-treatment was proposed. Before SBRT treatment median Numerical Rating Scale (NRS) was 2 (range 0-7). This value was confirmed at the end of SBRT. At the time of follow-up, we evaluated 10 patients out of 16. Median follow-up was 3 months (range 2-6 months). Local control of the spinal metastatic site was observed in all cases and at the time of follow-up NRS was 0 (range 0-3). No cases of ≥G3 toxicity were reported.

Table 1 Summary of patients' and lesions' characteristics

Patients' and lesions' number	16 and 27
Mean age (range) [years]	66 (45-83)
Gender (M:F)	11:5
Primitive cancer (lesions' number)	
Prostate	9
Breast	9
Lung	4
Pancreas	1
Melanoma	1
Renal	3
Metastatic vertebra	
Cervical	5
Dorsal	18
Lumbar	4

Conclusion

SBRT by means of Brainlab® Elements Spine SRS™ seems to be a feasible, safe and effective treatment in oligometastastic patients with spinal metastases. A higher accrual and longer follow-up are necessary to establish its role in spinal oligometastatic patients.

EP-1226 Survival in patients with melanoma brain metastases treated by stereotactic radiotherapy

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Purpose or Objective

The development of immunotherapy or targeted therapies improved survival of patients treated for melanoma in last decade. Brain is one of the most frequent site of metastases in melanoma, treated by stereotactic radiotherapy (SR) whenever possible. The main side effect of this treatment is the development of radionecrosis in the irradiation field. The objective of this retrospective study is to evaluate the Overall Survival (OS), the event-free survival (EFS) (progression or radionecrosis) inside the radiation field, and the progression-free survival outside the radiation field, in patients treated for melanoma's brain metastases by SR.

Material and Methods

Ninety Four patients treated by SR, in our center, between first January 2011 and 31 december 2017 were included. Patients's prognostics caracteristics before irradiation: number of metastases, Karnofsky Performance status (KPS), and the Graded prognostic assessment (GPA) score were collected for all of them. Datas about progression or radionecrosis were registered from radiologist's reports of follow-up's MRI after SR. Survival was calculated from the last irradiation day, with a Log-Rank method.

Results

With a median follow up of 11, 2 months. The KPS was at least 80% for 87 patients (93%), the number of brain mestastasis was less than 3 for 88 patients (94%), and 69 patients (74%) had a GPA score of 3 or 4. The median OS was 12,2 months, with a 1-year OS and a 2 years OS respectively of 51% and 38%.The median EFS inside the radiation field was 14,9 months with a 1-year EFS and a 2 years-EFS of respectivly 56% and 36%.The median progression-free survival outside the radiation field was 50% with a 1-year and 2-years progression-free survival of respectivly 37% and 30%.

Conclusion

With an OS, at one and two years of respectively 51% and 38%, our results are similar to recent studies and confirm an improve of survival for melanoma patients with brain metastases treated by stereotactic radiotherapy.

EP-1227 The impact of first MR in clinical decision making of patients with HGG treated with RTCT

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Purpose or Objective

Standard up-front therapy of high grade glioma (HGG) is focused on the so called Stupp protocol, that includes surgical resection followed by radiotherapy (RT) combined with concomitant and adjuvant chemotherapy with temozolomide (TMZ). As supported by several international guidelines, disease assessment is performed using magnetic resonance (MR) one month since the end of RT and then every 3 months: in case of tumour progression the administration of temozolomide (the most active agent against glioma) is interrupted and salvage therapy or best supportive care are recommended.The aim of this study is to investigate in a retrospective

manner the real value of first MR following RT and its relevance in clinical decision making about up-front therapy.

Material and Methods
Between April 2005 and July 2017, data of 78 patients (pts) with a proven diagnosis of HGG and treated with Stupp protocol at the University Hospital of Pisa were collected. Tumor progression was defined according to Mac-Donald's Criteria. Considering the potential presence of pseudo-progression (PSP) and the evolutionary pattern of the suspected recurrences, lesions suggestive for tumor progression inside the radiotherapy field were investigate with a new MR after 6-8 weeks. Otherwise, the presence of new lesions outside the radiotherapy field was interpreted as disease progression (PD) and patient's therapy was changed. Presence or absence of symptoms, extent of surgery and MGMT methylation status were recorded.
Results
The first MR after RT-CT evidenced infield progression (interpreted as PSP) in 16 pts (20,5%) and outfield progression in 8 (10.2%).Three out of 8 patients with outfield progression were symptomatic for the tumor growth. The second MRI confirmed the presence of PSP in 10 pts out of 16 pts whereas in 6 patients a true progression (PD) was present since the first MR.
Conclusion
In absence of symptoms, the first MR after radio-chemotherapy influenced clinical decision making (sending the patients to further salvage therapy or BSC) only in 5 out of 78 patients (6.4%). In 72 patients, even in presence of radiological signs suggestive for disease progression inside the RT field, clinical decision making did not change. Further studies involving a higher number of patients are required in order to confirm our findings.

EP-1228 Omission of WBI does not impair cerebral control in solitary brain mets treated with focal RT
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Purpose or Objective
Does omission of whole brain irradiation (WBI) lead to inferior neuro-cerebral control (NC) in unselected patients with singular brain metastasis?
Material and Methods
This is a retrospective study of 166 consecutive patients treated for singular brain metastasis from 1.1.2010 to 31.7.2017 at the radiotherapy department of Klinikum Augsburg. As endpoints overall survival (OS), local (LC) and distant (DC) cerebral control rates as well as the definitive NC were analyzed. 45 patients had a neurosurgical resection and a whole brain irradiation (OP+WBI/ median FU 8.1 months), 23 patients received a percutaneous stereotactic irradiation of the tumor cavity after resection (OP+SX/ median FU 11.3 months). 13 patients had an intraoperative radiotherapy of the tumor cavity with 50kV X-rays (OP+IORT/median FU 13.9 months). 85 patients were treated with radiosurgery alone (SX/ median FU 8.1 months). 128 patients (OP+WBI 29/OP+SX 18/ OP+IORT 13/SX 68) with available MR FU were used for the Kaplan-Meier estimation of LC, DC and NC. The term neuro-cerebral control (NC) - was introduced to evaluate the efficiency of all treatment strategies including salvage therapies (SX/OP/WBI) with regard to tumor control in the brain during the total course of disease. In this context NC is not achieved, if the last MRI of the CNS shows progressive disease independent of the patient´s definitive cause of death.
Results
1-year OS (2-years OS) for OP+ WBI was 46% (33%), for OP+SX 82% (67%), for OP+IORT 92% (82%) and for SX 62% (41%). 1y LC for OP+WBI was 69.4%, for OP+SX 79.4%, for OP+IORT 82% and 84.4% for SX. As expected 1y-DC of the OP+WBI patients (88.7%) was better than the 1y-DC of the focally irradiated patients (72.7% OP+SX/ 40% OP+IORT/50.9% SX). All patients with cerebral recurrences were treated with salvage therapy according to their pattern of relapse (SX/ WBI/ OP+/- IORT or SX). As a result of all treatments following 1y-NC were achieved: 68.9% OP+WBI, 88.9% OP+SX, 78.8% OP+IORT and 88.2% SX. 2y-NC was: 63.6% OP+WBI, 71.1% OP+SX, 78.8% OP+IORT and 88.2% SX. WBI could be avoided for most of the patients within the first (2nd) year: OP+ SX 94.4% (85.0%), OP+IORT 72.9% (72.9%), SX 74.8 % (60.4%).
Conclusion
This data provides further evidence for safe omission of WBI even in an unselected patient group with singular brain metastasis. All focal forms of radiotherapy +/- surgery used at the Klinikum Augsburg lead to a good persistent cerebral control (NC), despite of inferior DC compared to patients treated with WBI. For 2 out of 3 patients WBI was never necessary in the whole course of disease. However, regular MR Imaging is essential to detect and treat frequent distant relapses before they get symptomatic for the patients.

EP-1229 Repeated intracranial radiotherapy/SRT-Analysis of efficacy and safety including EQD2 sum plans
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Purpose or Objective
The number of patients receiving cranial re-irradiation for primary or metastatic lesions is rapidly growing since the introduction of stereotactic radiation techniques. Hence, it is possible to deliver multiple treatments in a very localized way, therefor sparing organs at risk and allowing for repetitions. Still the effect of multiple stereotactic treatments has to be carefully evaluated regarding safety and efficacy. We therefore analyzed diametrical and clinical data of patients receiving repetitive cranial irradiation using EQD2 sum plans created with non-rigid-registration to allow for optimal dose summation.
Material and Methods
We retrospectively analyzed the data of 76 patients that received repeated cranial radiotherapy from February 2013 to September 2016. 34 of those patients suffered from primary brain lesions (e.g. Glioblastoma), 42 from brain metastases. Patients with primary brain tumors received stereotactic radiotherapy to the GTV defined in a treatment-planning MRI plus a 3mm margin to derive the PTV, those with brain metastases to the GTV plus a 1 mm (definite RT) or 2 mm (adjuvant RT) margin.
EQD2 sum plans using non-rigid registration were calculated for all courses of intracranial radiotherapy using Aria Eclipse (Varian Medical Systems, Version 10) and MIM (MIM Software Inc. Version 6.7.9). Dose parameter were calculated for common organs at risk (e.g. brainstem) and target volumes (PTV). Clinical and radiological data was collected at regular follow-up appointments including toxicity, local control and survival.
Results
In total 76 patients received at least 2 courses of intracranial radiotherapy. 23 a third, 8 a fourth and 3 a fifths course of radiotherapy. The median prescription dose was 30 Gy for all RT courses combined. The median Dmean of the brain was 35 Gy (range 0.9 – 57.7 Gy) with a median D(1cc) of 99.1 Gy (range 40.9 – 142.2). The median D(1cc of the brainstem was 38.4 (range 0.1 – 94.6 Gy), the median D(0.1cc) for the Chiasm was 33.2 (range 0.04 - 72.2 Gy). 74 % of patients suffered from low grade (G1-G2) acute toxicity, usually in the form of headache (18.4