

(0.2-39.3 cc). Low SRS dose was justified by larger volume, clinical history and critical anatomical location. Fixation was performed with a 3D-Line invasive frame, and all the patients underwent Angiography/CT/MR fusion for the localization of the target and the organ at risk. SRS was performed with 6 MV LINAC and MMLC of 3 mm. The radiation treatment was administered generally using five noncoplanar arcs with a single isocenter.

**Results:** All the patients completed the SRS procedure without toxicity. Follow-up RM revealed complete obliteration of all AVM nidus in 7 out of 22 patients (32%) after 19 months of median follow up (range 12- 36). Complete response was seen only when 20 Gy were administered. After 12 months of follow up RM documented partial obliteration in 3 patients (13%) treated with 16 Gy. Median 15 months RM (3-24 months) showed persistent AVM nidus in 12 out of 22 patients (55%).

**Conclusions:** In our series good response rate was seen in higher dose SRS (20 Gy) group. Low dose SRS is an effective and relatively safe mean of treating large, complex AVMs that are not suitable to surgery or higher dose SRS; obliteration rates for larger AVM are less than for small AVM according with literature data. AVM shunt regresses slowly over time so overall obliteration rates are further probably limited by shorter gap between SRS and radiological check.

#### EP-1117

**Fractionated stereotactic radiation therapy in patients with optic nerve sheath meningiomas.**

T. Cornelissen<sup>1</sup>, C. Kleynen<sup>2</sup>

<sup>1</sup>UMC Utrecht, Ophthalmology, Utrecht, The Netherlands

<sup>2</sup>UMC Utrecht, Radiotherapy, Utrecht, The Netherlands

**Purpose/Objective:** Our aim is to report the outcome of fractionated stereotactic radiation therapy in the management of optic nerve sheath meningiomas.

**Materials and Methods:** Between March 2007 and September 2010 a total of nine patients with primary benign optic nerve sheath meningioma (ONSM) have been treated with fractionated stereotactic radiotherapy (FSRT). One patient, from who there was no follow up available, was excluded. Results of these patients were analysed in a retrospective single centre study.

**Results:** After a median follow up of 32 months (range 15-55) growth control on MRI was achieved in all 8 patients (100%), and reduction in tumour volume in 2 of these patients (25%). A total of 4 patients showed improvement of their visual acuity of at least two lines on the Snellen chart. A stabilization of vision was seen in 3 patients. 1 patient was already blind before radiotherapy. Five patients had a stable visual field during follow up, 1 patient had an improved visual field and 1 patient had a deterioration of the visual field. Pre-existing clinical symptoms improved or even disappeared in all patients. Acute toxicity was mild and included transient headache in 2 patients, transient orbital pain in 2 patients and edema in 2 patients.

**Conclusions:** In our series we achieved stable disease and stabilisation or improvement of visual acuity in all 8 treated patients. Fractionated stereotactic radiotherapy is an effective and save treatment option in patients with optic nerve sheath meningiomas.

#### EP-1118

**Efficacy of fractionated stereotactic radiotherapy in the treatment of recurrent glioblastoma multiforme**

J. Wurzer<sup>1</sup>, J. Law<sup>1</sup>, C. Norton<sup>1</sup>

<sup>1</sup>Atlanticare Regional Medical Center, Radiation Oncology, EHT, USA

**Purpose/Objective:** Management of recurrent Glioblastoma Multiforme (GBM) following definitive surgical resection, standard post-operative radiation therapy and temozolomide is challenging. This study analyzes the efficacy and morbidity associated with fractionated stereotactic radiotherapy (fSRT) for recurrent GBM.

**Materials and Methods:** From September 2007 to December 2010, 17 patients diagnosed with recurrent GBM after prior treatment with total resection followed by post-operative radiation (60Gy) and temozolomide were treated via re-irradiation using fSRT (including robotic assisted linear accelerator based fSRT and Cyberknife based fSRT). In all cases, recurrence was noted within the high-dose radiation therapy portal. Treatment consisted of a cumulative dose of 2500cGy via 500cGy fractions prescribed to the D95 of the PTV (defined as GTV + 3mm).

**Results:** Of the 17 patients treated, a radiographic response was observed in 8 (47%), while persistent tumor progression was noted in 9 (53%). Median survival was 11.2 months for all patients, while median survival was 15.1 months in patients experiencing a radiographic response. Toxicity included limited alopecia and minor fatigue.

**Conclusions:** Although the clinical management of recurrent GBM is challenging, the present data demonstrates significant salvage rates with acceptable morbidity. Fractionated SRT provides a viable

alternative to other potential treatment options including re-resection and systemic therapy.

#### EP-1119

**CyberKnife radiotherapy for brain metastases: experience of European Institute of Oncology, Milan, Italy**

A. Ceccconi<sup>1</sup>, B.A. Jereczek-Fossa<sup>1</sup>, A. Ferrari<sup>1</sup>, C. Fodor<sup>1</sup>, G. Piperno<sup>1</sup>, S. Vigorito<sup>2</sup>, E. Rondi<sup>2</sup>, A. Surgo<sup>1</sup>, M. Dispinzieri<sup>1</sup>, R. Orecchia<sup>1</sup>

<sup>1</sup>European Institute of Oncology, Advanced Radiotherapy Center, Milan, Italy

<sup>2</sup>European Institute of Oncology, Medical Physics, Milan, Italy

**Purpose/Objective:** Linac-based stereotactic radiotherapy (SRT) has been employed in the Department of Radiation Oncology, of European Institute of Oncology, EIO, Milan, Italy since 3/2003 and more than 400 patients (pts) have been treated so far for brain metastases. In 12/2011 CyberKnife Unit was installed in EIO. The objective of this study is to evaluate feasibility and acute toxicity profile of CBK-SRT for brain metastases in the first 8 months of clinical activity of the EIO CyberKnife.

**Materials and Methods:** Inclusion criteria: for this retrospective study were as follows: 1) adult patients; 2) with up to 3 brain metastases (mets); 3) that underwent CBK-SRT at EIO between 12/2011 and 10/2012 and 4) gave written informed consent for the treatment. Previous radiotherapy or concomitant systemic therapy was allowed. Treatment protocol: Contouring was based on the computer tomography (CT) and contrast medium magnetic resonance (MR). Treatments planning was performed using a MultiPlan® 4.5 treatment planning system (Accuray, Inc.). Sequential Optimization inverse planning algorithm was used: treatment plan typically involved 100-200 beams, using 1-3 fixed circular collimators, which ranged in size from 5-60 mm. 6D skull tracking was used for intracranial lesions. It was based on rigid body registration of bony landmarks of the patient's head to track intracranial targets and automatically correct for the translational or rotational shift that occurs during the treatment. Clinical monitoring: CBK-SRT was performed on the outpatient basis. Steroid premedication was administered. The toxicity was evaluated with use of Radiation Therapy Oncology Group/European Organization for Research and Treatment of Cancer (RTOG/EORTC) criteria.

**Results:** Between 12/2011 and 10/2012 consecutive 85 pts were treated: primary diagnosis included lung (38 pts), breast (29 pts) and other malignancies (18 pts). Median age was 60 years (range, 37-82 years). In all pts single brain metastasis was treated, while in 16, 4 and 1 pts - 2, 3 and 4 lesions were treated, respectively (in 1 pt lesions were treated metachronously). CBK-SRT consisted in first radiotherapy and re-irradiation in case of 78 (92%) and 7 lesions, respectively. Median CBK-SRT dose was 20 Gy (range, 8-25 Gy)/1 fraction (range, 1-5 fractions). All patients completed planned CBK-SRT and no acute toxic event was registered.

**Conclusions:** CyberKnife-based SRT is a feasible approach for limited brain metastatic disease offering short and well accepted treatment with low toxicity profile. Further investigation is warranted in order to evaluate the tumor control and late toxicity. The optimal combination with systemic treatment or surgery should also be defined.

#### EP-1120

**Stereotactic ablative radiotherapy for small lung tumors by means of TomoTherapy: preliminary results and toxicity**

I. Dell'Oca<sup>1</sup>, M. Pasetti<sup>1</sup>, M. Cattaneo<sup>2</sup>, A. Fodor<sup>1</sup>, G. Berardi<sup>1</sup>, B. Noris Chiorda<sup>1</sup>, L. Perna<sup>2</sup>, S. Broggi<sup>2</sup>, R. Calandrino<sup>2</sup>, N. Di Muzio<sup>1</sup>

<sup>1</sup>San Raffaele Scientific Institute, Radiotherapy, Milano, Italy

<sup>2</sup>San Raffaele Scientific Institute, Medical Physics, Milano, Italy

**Purpose/Objective:** Stereotactic ablative body radiotherapy (SBRT, SABR) is being increasingly applied because of its high local efficacy, for small lung tumors and oligometastatic patients (pts). However, the optimum dosage is still under discussion. Here, we report data on 30 lung lesions [non-small cell lung cancer (NSCLC) or metastases] in 26 patients, as part of a dose escalation study program, treated between 2007 and 2011 by TomoTherapy SBRT.

**Materials and Methods:** SBRT was performed with total doses of 54 Gy in 6 fractions. Eight pts were affected by stage I NSCLC, 18 were pts with oligo-recurrence cancer in the lung. Median age was 69.7 yrs (45-91). In each patient a planning 18FDG-PET/CT was acquired in 4D-mode to define a personalized ITV as a GTVs sum and the PTV with appropriate ITV expansions. Before each fraction a Mega-Voltage CT (MV-CT) was acquired for patient repositioning. Three-monthly follow-up CT scans were supplemented by FDG-PET/CT if clinically indicated. **Results:** The median follow-up period was 22 months (range, 2-46 months). Local progression-free survival rates was 70%, Overall survival rates was 96%. 21 and 20 pts had G0 acute and late toxicity, while 5 and 6 patients experienced respectively acute and late G1