2011
Paris, France
ISRS

May 8-12, 2011
Paris
Marriott Rive Gauche Hotel
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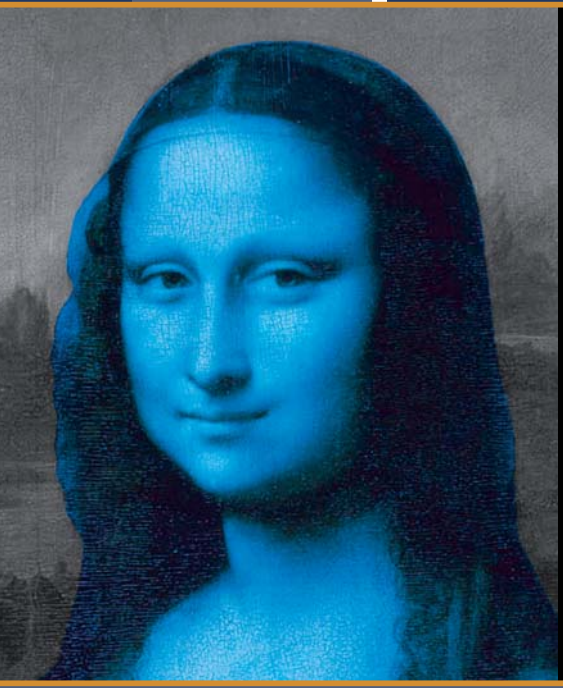

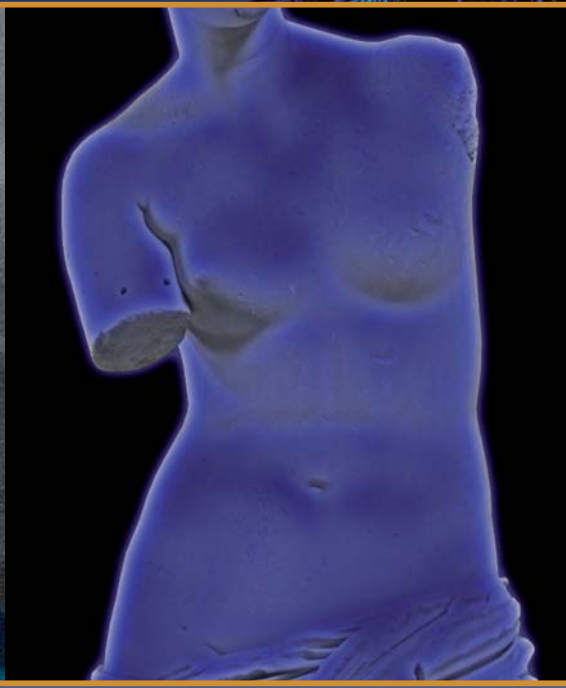

10TH INTERNATIONAL STEREOTACTIC RADIOSURGERY SOCIETY CONGRESS

Brain & Body Radiosurgery

ABSTRACTS BOOK

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P1002

TUMOR PSEUDOPROGRESSION FOLLOWING RADIOSURGERY FOR VESTIBULAR SCHWANNOMA: A VOLUMETRIC ANALYSIS

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Objective: Transient expansion, or pseudoprogression following radiosurgery for vestibular schwannoma (VS) is becoming increasingly recognised, but remains poorly understood in terms of natural history and pathophysiology. Failure to recognise pseudoprogression will lead to unnecessary second intervention. This study aims to characterize pseudoprogression to assess the incidence, causative factors and its association with radiation induced adverse effects.
Methods: A single institution retrospective study of 200 VS treated with Gamma Knife radiosurgery between 2005 and 2009. 75 patients had at least 24 months clinical and radiographic follow-up (median 29 months) and were included. Tumor response was calculated volumetrically using Gammaplan software on consecutive MR FIESTA imaging. Tumor response was categorised as stable, regression, pseudoprogression or sustained growth. A significant change in tumor volume was defined as a 10% change. All treatment plans were reviewed for dosimetry characteristics; including homogeneity, gradient index, conformity index, isocentre number and dose rate.
Results: 49 (65%) of VS were stable or regressed after treatment. 17 (23%) underwent pseudoprogression, with onset of enlargement at 6 months. 7 (9%) remained larger than initial treatment volume at last follow-up. 9 (12%) demonstrate persistent growth. 3 patients underwent subsequent microsurgery. One patient required urgent intervention at 3 months for cystic enlargement, otherwise all patients with progressive enlargement had stable VS until at least 24 months. 26 (34.7%) patients developed non-auditory adverse radiation effects following treatment. There was no statistical association between onset of clinical deterioration and tumor response. There was no significant correlation between patient age, tumor size and morphology, or radiosurgical dosimetry parameters and tumor response on multivariate analysis.
Conclusion: Pseudoprogression should be an expected phenomenon after radiosurgery for VS. Volume changes in the first 24 months following radiosurgery rarely herald treatment failure and follow-up imaging can be safely delayed until 24 months. There are no tumor related or dosimetric variables which predict tumor response in this series.

P1003

COMPARISON OF INTENSITY MODULATED STEREOTACTIC RADIOSURGERY WITH CONVENTIONAL STEREOTACTIC CONFORMAL BEAM RADIOSURGERY IN VESTIBULAR SCHWANNOMAS

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Objective: To compare the treatment plans using conventional stereotactic conformal beams and intensity modulated beams with inverse planning software on BrainLab, iPlan planning system for the stereotactic radiosurgery treatment of vestibular schwannomas.
Methods: Five patients of vestibular scwannomas with intracanalicular extension were treated with stereotactic radiosurgery on Novalis Tx linear accelerator. All patients had non-serviceable hearing loss. Volumetric MR imaging and high resolution CT scans were fused on BrainLab, iPlan planning system. Initially conformal beam radiosurgery (CBRS) planning was done using non-coplanar stereotactic conformal beams. Subsequently, intensity modulated radiosurgery (IMRS) plans were generated using inverse planning Methods. Constraints were given for adjacent structures such as brain stem and cochlea. Additionally a wall of 2 to 3 mm was created around the target and constraints were given to achieve better conformity. Dose distribution of the optimum IMRS plans were compared with the CBRS plans.
Results: Mean volume of the target was 2.26cc (range 0.3-3.9cc). Four patients were treated with 12Gy and one with 13 Gy in single fraction. Mean value of isodose chosen for dose prescription was 90%. Six to nine beams were used in both types of plans. Mean value of maximum dose in PTV in CBRS and IMRS plans was 14.69Gy and 13.96Gy, respectively. Mean dose to the PTV in CBRS and IMRS arm was 13.63 and 13.22Gy, respectively. Conformity index for PTV dose coverage was 1.74 and 1.28 in CBRS and IMRS plans, respectively. Mean and maximum doses to brainstem were 1.73 and 6.35Gy in CBRS and 1.42 and 5.79Gy in IMRS plans respectively. Mean of maximal dose to cochlea was 12 and 10Gy in CBRS and IMRS plans respectively.
Conclusions: Intensity modulated radiosurgery plans were better as compared to conformal beam radiosurgery plans in terms of homogeneity and conformity of the prescribed dose to PTV. There was minimal improvement in doses to normal structures such as brainstem and cochlea.

P1004

MR IMAGING FOR VESTIBULAR SCHWANNOMA: COMPARISON OF MR IMAGING SEQUENCES USED FOR SRS PLANNING

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Objectives: MR imaging is used to identify the target volume used when planning vestibular schwannoma cases for stereotactic radiosurgery [SRS] treatment. At Prince of Wales Hospital we have been delivering SRS to selected patients since 1990. We use an MRI data set which is fused to a stereotactically localised CT scan. The MR sequence that we use is MPRAGE, a volumetric T1 weighted sequence with contrast. Recently, we were advised that a CISS sequence would give better definition of the target volume. The purpose of this study is to compare the volume marked on each of the data sets and determine volumetric and positional differences to decide whether to incorporate this data set when planning cases for SRS.
Methods: Two MRI data sets were acquired for a patient with a small vestibular schwannoma with a maximum dimension of 14mm. The MPRAGE data set covers the entire skull with slices reconstructed at 3mm spacing. The CISS data set is a 20mm block centred on the target with slices at 0.5mm spacing. The localised CT data set includes the entire skull at 3mm spacing. These two