**3180**

**Proton Therapy for Adult Craniopharyngioma**

N. Scher,1 G. Bentahila,1 A. Beddok,1 C. Alapetite,1 S. Helfre,1 S. Bolle,1,2 H. Mammar,1 R. Dendale,1 V. Calugaru,1 and L. Feuvret1,1;1 Department of Radiation Oncology, Institut Curie, Paris, France, 2Department of Radiation Oncology, Institut Gustave Roussy, Paris, France, Paris, France, 3Department of Radiation Oncology, AP-HP, Hôpitaux Universitaires La Pitié Salpêtrière - Charles Foix, Sorbonne Université, Paris, France

**Purpose/Objective(s):** Proton therapy (PT) is being increasingly used for craniopharyngioma. Most series focus on pediatric population. Real therapeutic gain of PT in adults has yet to be demonstrated. We evaluated the outcomes of all adult craniopharyngioma patients treated at our institution using PT to report outcomes for disease control, tumor response and treatment-related toxicity.

**Materials/Methods:** We reviewed medical records from 93 histological proven adult craniopharyngioma patients treated with PT at our institution from December 2006 to November 2018. Endpoints were overall survival, disease control and toxicity. The median age at PT was 36.5 years (18-82). Ninety patients were treated after at least one tumor resection prior PT (20 disease control and toxicity. The median age at PT was 36.5 years (18-82). Ninety patients were treated after at least one tumor resection prior PT (20 patients as adjuvant treatment after incomplete surgery, 70 for recurrent disease) and 3 as exclusive PT. Patients received double-scattered conformal proton therapy to a mean dose of 54 GyRBE in 1.8 GyRBE/fraction (range 52.2-54 GyRBE). Toxicity was collected according CTCAE v5.

**Results:** With median clinical and radiographic follow-up of 37 and 31 months, respectively, the 3-year local control and overall survival rates were 100% and 93.5%, respectively. At last follow up, 16 patients remained in complete remission, 47 in partial remission, 24 with stable disease and 6 patients had a local relapse. Six patients required treatment replanning due to tumor changes during radiotherapy. There were two acute grade 3 toxicity events (one visual field decline and one headache). Two late grade 2 side-effects occurred (one visual field decline and one visual acuity deterioration) and one grade 3 neurocognitive dysfunction following radiotherapy. One patient with pre-existing visual field declines experienced grade 4 visual loss five months after PT and after receiving bevacizumab. No late grade 3 toxicity events were observed.

**Conclusion:** Fractionated PT appears as an effective and safe treatment for adult craniopharyngioma compared to IMRT and 3DRT. Although the integral dose in normal tissues decreases drastically, the benefit of PT remains uncertain in adult patients. Prospective quality-of-life and neurocognitive studies are needed to better define late toxicity. Only prospective trials in adult population should define the role of RT in terms of techniques, prescribed doses, fractionation and sparing of organs at risk.

**Author Disclosure:** N. Scher: None. G. Bentahila: None. A. Beddok: None. C. Alapetite: None. S. Helfre: None. S. Bolle: None. H. Mammar: None. R. Dendale: None. V. Calugaru: None. L. Feuvret: None.

**3181**

**Post SRS Serial Cellular Density Mapping for Response Assessment in Vestibular Schwannoma**

V. Shankar,1 V. Sai Shreya,2 R. Kumar,1 C. Haritha,1 A.K. Karthikayan,3 R. Adhityan,4 P. Bhavya,4 H. Vyas,4 and A. Bhange1;1 Apollo Cancer Center, Teynampet, Chennai, India, 2ACSR Govt. Medical College, Nellore, India, 3Department of Neurosurgery, Apollo Proton Cancer Center, Chennai, India, 4C.R.Reddy Cancer Center, Nellore, India, 5Department of Radiology, Apollo Proton Cancer Center, Chennai, Chennai, India, 6HCG Cancer Centre, Mumbai, India, 7CIMS, Ahmedabad, India, 8HCG Cancer Center, Nagpur, India

**Purpose/Objective(s):** Diffusion-weighted (DW) imaging detects cellular changes. Loss of tumor cells post radiosurgery results in alteration in the Cellular density and thus changes in apparent diffusion coefficients (ADCs). Low ADC values represent a higher tumor cellularity, a higher tumor-grade and may even be a marker for a higher tumor activity. Purpose of the study is to investigate the clinical usefulness of ADC values for evaluating VSs and to assess the correlation of DW imaging measurements with radiosurgical effects on the tumors.

**Materials/Methods:** The authors conducted a retrospective evaluation involving 36 patients harboring solid (28 pts.) or cystic vestibular schwannomas (8 pts.) who underwent single fraction Linac based SRS. The patients underwent serial MR imaging, including DW imaging, before SRS and at 6mo. intervals thereafter following the procedure. The ADCs were calculated from echo-planar DW images, and mean ADC values were compared at each follow-up. To minimize the effect of diffusion anisotropy, an average of the values obtained for the 3 diffusion directions was calculated to provide the trace of the diffusion tensor. Data were analyzed using a t-test to compare the mean ADC values obtained before & after SRS.

**Results:** The mean follow-up period in this study was 32.5 months (range 16−56 months). Imaging studies demonstrated a reduction in tumor volume in 22 patients (61.3%) and tumor growth arrest in 11 patients (33%). There was tumor enlargement at 18, 36, and 42 months in the remaining 3 patients (8.3%). The mean ADC value before SRS for all solid VSs was 1.2 ± 0.17 × 10−3 mm²/second, which significantly increased 6 months after SRS and continued to increase with time (P = 0.0076). The mean ADC value for treated solid tumors as of the last mean follow-up of 36 months (range 18−60 months) was 1.92 ± 0.26 × 10−3 mm²/second (range 1.60−2.7 × 10−3 mm²/second), which was significantly higher than that before SRS (P = 0.0001). Tumor volumes were positively related to ADC values (P = 0.03). The mean ADC value before SRS for all cystic VSs was 2.09 ± 0.24 × 10−3 mm²/second (range 1.80−2.58 × 10−3 mm²/second). The mean ADC value for treated cystic tumors as of the last mean follow-up of 38 months (range 18−48 months) was 1.9 ± 0.42 × 10−3 mm²/second. In 3 patients harboring solid VSs, the tumor enlarged after SRS but the ADC values were higher than those before SRS.

**Conclusion:** ADC changes precede the real change in tumor size detected on routine follow-up MR images. ADC values of solid tumors significantly increased, even before a change in tumor volume was evident and should be incorporated in VS routine MR imaging post SRS.

**Author Disclosure:** V. Shankar: None. V. Sai Shreya: None. R. Kumar: None. C. Haritha: None. A.K. Karthikayan: None. R. Adhityan: None. P. Bhavya: None. H. Vyas: None. A. Bhange: None.

**3182**

**Automatic Differentiation of Grade I and II Meningioma on Magnetic Resonance Image Using an Asymmetric Convolutional Neural Network**

A. Vassantachart,1 Y. Cao,2 M. Gribble,3 S. Guzman,4 J.C. Ye,5 K. Hurth,4 A. Matthews,1 G. Zada,1 Z. Fan,1 L.E. Chang,1 and W. Yang1;1 Department of Radiation Oncology, LAC+USC Medical Center, Los Angeles, CA, 2Department of Radiation Oncology, University of Southern California Keck School of Medicine, Los Angeles, CA, 3Keck School of Medicine, University of Southern California, Los Angeles, CA, 4Department of Pathology, Keck School of Medicine, Los Angeles, CA, 5Department of Neurosurgery, University of Southern California Keck School of Medicine, Los Angeles, CA

**Purpose/Objective(s):** The grade of meningioma has significant implications on the selection of treatment regimens ranging from observation to surgical resection with adjuvant radiation. For most patients, meningiomas are diagnosed radiologically and grade is not determined unless a surgical procedure is completed. We hypothesize that the use of a 3D convolutional neural network (CNN) architecture with two encoding paths will provide the trace of the diffusion tensor. Data were analyzed using a t-test to compare the mean ADC values obtained before & after SRS.

**Materials/Methods:** Sixty-nine consecutive treatment naïve patients with pre-operative T1-CE and T2-FLAIR MR images from 2010 to 2019 were evaluated. The patients underwent surgical resection resulting in a