another with IMRT. The original plans delivered to the patients were not considered in this study because treatment techniques have been changing since 2000 and were not uniform within the selected group. All plans assured PTV coverage according to ICRU 83 criteria. Cochleas and supratentorial brain mean doses, as organs, were analyzed using QUANTEC values and compared for each plan.

Results: Among 29 children, 22 were males. The median age at diagnosis was 8.66 years. At the beginning of treatment, their age range was from 3.26 to 15.47 years old. The average mean dose to the OAR analyzed are presented in Table 1.

<table>
<thead>
<tr>
<th>Mean Dose (Gy)</th>
<th>High Risk</th>
<th>Standard Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CRT 3D-CRT IMRT</td>
<td>CRT 3D-CRT IMRT</td>
</tr>
<tr>
<td>Right Cochlea</td>
<td>17.6</td>
<td>11.0</td>
</tr>
<tr>
<td>Left Cochlea</td>
<td>17.4</td>
<td>11.0</td>
</tr>
<tr>
<td>Supratentorial Brain</td>
<td>6.0</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Conclusion: The plans for the CRT technique, with 2 parallel opposed fields, produced worst results for both OARs. The IMRT technique was slightly superior to the 3D-CRT in terms of mean dose of cochleas but conducted, in average, to higher dose values to the supratentorial brain. Based on these results we decided to adopt the 3D-CRT technique for the boost phase in high-risk group and IMRT for the standard-risk group, considering the higher potential impact in the cochleas mean doses in this risk-group.

PO-0867
Treatment planning study for spatially fractionated mini-beam radiotherapy
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Purpose or Objective: This work is to present the treatment planning workflow and delivery technique for the first application of linac based spatially fractionated mini-beam radiotherapy within a clinical trial of canine brain tumor treatments. The motivation for this investigation originates from work performed using synchrotron generated micro-beams (MRT) which have shown promising results in preserving brain architecture while killing tumor cells. Spatial fractionation of radiation using arrays of parallel micro-planar beams is a developing technique with many unknowns and limitations. To further research this technique and to potentially enable MRT for human treatments, a mini-beam collimator has been designed for use with a linac and a Monte Carlo (MC) beam model has been commissioned for clinical treatment planning.

Material and Methods: Patient population was selected from client-owned canines with spontaneously occurring brain tumors. Patients were placed under general anesthesia and positioned prone within stereotactic immobilization equipment during imaging and treatment delivery. CT and MRI images were used for contouring. The planning technique utilized an arrangements of static mini-beams. Beam angles were chosen such that the treatment depth was within 20% for each beam to minimize beam broadening with depth and blurring of the peak and valley doses. Beam apertures were defined with the MLC leaves set 3 mm back from the PTV. The mini-beam collimated dose distributions were calculated to a statistical uncertainty of ±1.0 % within a voxel size of 0.5 mm. Beam weighting was equalized and the plan normalized such that the prescription dose was delivered to an ICRU dose reference point within the PTV. Deliver quality assurance (DQA) was performed by measuring the absolute dose from each beam using an ion chamber within a solid water phantom.

Results: Contouring and beam arrangement, which included MLC placement, was performed within the clinical treatment planning system (TPS). The DICOM plan was then exported to the MC treatment planning system for mini-beam dose calculation. The distribution was reviewed and DVHs assessed for normal tissue tolerances. The final step was to transcribe the calculated MUs back to the original TPS. Planning turnaround time was 2 days. The MC calculations were initiated overnight at the end of day 1. Day 2 was spent reviewing the plan, generating the DQA plan, and finalizing the treatment parameters into the record-and-verify system (RVS). DQA output measurements of the treatment fields agreed with the calculated dose to within 1.5%. An image of the patient dose distribution and setup is shown in figure 1.

Conclusion: A workflow for mini-beam treatments that includes the planning technique, MC dose calculation method, DQA process, and data integration into a RVS has been established. This clinical dataset represents the first treatment planning study of linac based mini-beam patients.

PO-0868
A method to define isodose-based structures in Dose Painting treatment of GBM in Tomotherapy.
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Purpose or Objective: The aim of this study is to investigate different strategies in choosing, in a mathematical way, the structure set that best fit a Dose Painting (DP) distribution, based on ADC maps, to be submitted to the optimization process within the TomoTherapy TPS.

Material and Methods: Hypofractionated Stereotactic Radiation Therapy plans in 5 fractions of intracranial GBM for six patients were retrospectively realized.