

base tumors.

**Methods:** We analyzed the clinical, radiological, and histopathology data of patients operated in our center for skull base chordoma, chondrosarcoma or parachordoma from 1998 to 2024. Sekhar's chordoma score was assessed.

The chi-square test, ANOVA, ROC curve analysis, and logistic regression were used to identify predictors of GTR and progression-free survival (PFS). Kaplan-Meier and Cox proportional hazards modeling were performed.

The study includes 40 patients who underwent surgery: 30 (75%) with chordomas, 9 (22.5%) with chondrosarcoma, and 1 (2.5%) with parachordoma.

**Results:** The study included 40 patients. GTR was achieved in 10 patients (25%), the adjuvant radiotherapy was used in 32 patients. GTR increased with endoscope.

Significant predictors of radicality of surgery: tumor volume and Sekhar's score ( $p=0.026$ ;  $0.009$ , respectively).

Prediction of the PFS: initial tumor volume, chordoma score, residual volume, extent of surgery were significantly associated with better PFS ( $p=0.12$ ;  $0.012$ ;  $0.02$ ;  $0.033$ , respectively). Cut-off value of chordoma score was " $>8$ ".

Kaplan-Meier analysis revealed significantly better PFS-probabilities for chondrosarcoma and GTR, but no difference for the modality of RT.

**Conclusions:** Our rate of GTR increased to 27% since introduction of endoscope. Factors significantly impacting PFS are radical resection, volume of the tumor, and its extent, but not modality of RT. We are persuaded that Sekhar's chordoma score reflects the extent and technical difficulty of chordomas, thus having prognostic value.

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**Safety, Efficacy And Feasibility Of Hypofractionated Gamma Knife Radiosurgery For Periopic Meningiomas: Results From A Large Series**

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Less than total resections for skull base tumors (Joint Radiosurgery & Skull Base Parallel Session), October 15, 2024, 5:20 PM - 6:50 PM

**Background:** Periopic meningiomas are benign tumors arising in the proximity of the optic pathways. Despite showing non-aggressive features histologically in the majority of cases, they can grow to be a significant burden for patients' quality of life, causing visual deterioration or other neurological deficits or symptoms. Surgical resection has historically been considered the mainstay for the treatment of these tumors but is often associated with non-negligible morbidity and mortality. Radiosurgery with Gamma Knife (GKRS) has progressively emerged as an effective alternative to surgery in some cases and nowadays is preferred when a patient may present contraindications to surgery.

**Methods:** Our population comprised 185 patients harboring 190 meningiomas. Female patients were 139 (75.1%) and mean age of the population at the time of treatment was 56.7 years. One hundred-thirty-two tumors (69.5%) received fractionated GKRS (fGKRS) as primary treatment. At the time of treatment, mean target tumor volume was 7.2 cm<sup>3</sup>. For 89 lesions (46.8%), varying degrees of visual symptoms were present before the treatment. Mean clinical follow-up was 55.8 months and mean radiological follow-up was 46.7 months.

**Results:** At last clinical follow-up, 6 patients had died (none of those died due to the meningioma). Mean overall survival (OS) was 123.6 months. Three-, 5- and 8-years OS was 98.8%, 96.5% and 94.1%, respectively. At last MRI, 95.8% of tumors appeared stable or reduced in size. At volumetric analysis (possible for 119 lesions which represented 62.6% of total tumors), a mean reduction of 18% of total volume was observed after treatment. Six lesions out of a total of 190 (3.2%) needed further treatments after radiosurgical treatment, so at last follow-up overall clinical tumor control (CTC) was 96.8%.

**Conclusions:** Fractionated GKRS represents in our experience an effective treatment for periopic meningiomas with limited morbidity.

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**Anticipating the Clip: Analyzing VR-Guided Clip Placement in Preoperative Planning for Intracranial Aneurysms - A Pilot Study**

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Innovative strategies for neurosurgical education and training (Young Neurosurgeons Parallel Session), October 15, 2024, 5:20 PM - 6:50 PM

**Background:** With increasing complexity and decreasing exposure to aneurysm surgery, innovative technologies facilitating planning, teaching, and preparation of the surgery are emerging. Virtual Reality (VR) enables immersive exploration of patient-specific anatomical structures, facilitating visualization of intricate vascular networks and potential clipping scenarios. We aimed to analyze the degree of predictability of the clip when fully planned in VR, comparing it with the actual postoperative images as a control.

**Methods:** A total of 5 UIA clipping cases from 2022-2023 were randomly selected for analysis. Utilizing SpectoVR, we generated fully immersive 3D VR models. Mesh models of the original Yasargil-Clips were integrated, allowing their incorporation at true-to-life proportions. Three raters placed the clips in VR, assessing the aneurysm intra- and extraluminally and performing precise point-to-point measurements of the 3D anatomy. Different parameters, such as size, type, configuration, and the position of the clip in three-dimensional space, were assessed. Subsequently, these parameters were retrospectively compared to corresponding modalities in actual postoperative imaging data. The comparison of a composite score (number of clips, length, type, expected dog ear) of the clipping was chosen as the primary endpoint.

**Results:** In retrospective comparison, the average composite scoring was 2.8 ( $\pm 1.23$ ) out of 4, with a full score (4 out of 4) in 40% ( $n=6$ ) and 3 out of 4 in 20% ( $n=3$ ) when comparing the planning to the actual clipping.

The clip length was within 1mm in 53% ( $n=8$ ), and the clip type matched in 40% ( $n=6$ ) of the planned case. Image fusion could accurately display the orientation of the planned and real clip in all three dimensions. The average time for clip planning in VR was 3.4 ( $\pm 1.67$  min) per case.

**Conclusions:** Our results show that clip choice and placement in VR correlate well with the actual intraoperative clip placed and chosen. Further prospective studies to underline these findings are warranted.

**Optional Image**



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**3D-Printed Intraventricular Neuroendoscopy Simulator: Development, Validation, and future Training Applications**

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