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THE ROLE OF HISTONE METHYLATION STATUS AND OSTEONECTIN ON INVASION AND PROGNOSIS IN PITUITARY ADENOMAS

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Update in Skull Base Neurosurgery (Skull Base Plenary Session), September 28, 2023, 10:40 AM - 12:20 PM
Background: Pituitary adenomas are one of the most common intracranial tumors and are usually benign. However, pituitary adenomas tend to show invasive growth and some of them show aggressive behavior with resistance to standard therapies. It is therefore of clinical importance to identify such cases in order to adjust the further clinical management. A prognostic impact of alterations of the histone trimethylation of H3K have been described and osteonectin has been identified as a marker of invasive growth in several other tumor entities.
Methods: We analyzed tumor tissue samples of 927 pituitary adenomas, resected between October 2004 and April 2018 in the authors' institution. Tissue microarrays were constructed and immunohistochemical staining for H3K27me3, H3K36me3 and osteonectin was done and a semiquantitative scoring system applied. Immunohistochemical expression of MIB-1 was quantified digitally using representative images of routine stainings. Clinical data including recurrence-free survival according to radiographic follow-up images was collected. Invasive tumor growth was assessed retrospectively based on surgical reports.
Results: The rate of invasive growth according to surgical reports was 42.61% (395 of 927 cases). The overall recurrence rate was 20.14% (175 of 869 cases with available follow-up data) with a mean follow-up of 2.64 years, ranging from 0.06 to 15.20 years. A MIB-1 expression $\geq$0.6% was associated with a higher rate of invasive growth and a shorter recurrence-free survival in the univariate (p=0.0320 and p=0.0135, respectively) and the multivariate analysis (p=0.0222, odds ratio=1.44 and p=0.0408, hazards ratio=1.58, respectively). Loss of H3K27me3 showed a higher rate of invasive growth in the univariate and the multivariate analysis (p=0.0312 and p=0.0305, odds ratio=2.68, respectively). There was no significant impact of H3K36me3 or osteonectin regarding invasive growth and recurrence-free survival.
Conclusions: MIB-1 expression and loss of H3K27me3 were independent markers for invasive tumor growth but only MIB-1 showed an independent prognostic impact.

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PREDICTION OF GROWTH AFTER NEAR-TOTAL RESECTION OF SPORADIC VESTIBULAR SCHWANNOMAS: A RETROSPECTIVE VOLUMETRIC STUDY

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Update in Skull Base Neurosurgery (Skull Base Plenary Session), September 28, 2023, 10:40 AM - 12:20 PM
Background: Surgical management of vestibular schwannomas(VSs) involves a balance between intended maximal safe resection and full functional preservation. We witness increased subtotal(STR) and near-total resection(NTR) rates in patient-centered care. The objective of our single-center retrospective study is to determine the behavior of residual tumors after STR/NTR and predictors of tumor recurrence.
Methods: A 3D-volumetric retrospective study was performed on clinical-radiological data of patients with sporadic vestibular schwannomas who underwent primary resection (STR or NTR) between January 2008- December 2015. Volumetry was based on pre- and postoperative contrast-enhancedT1-weighted MR imaging (CET-T1wMRI). NTR residue was defined by the absolute volume "<0.35cm3", relative <5% of preoperative volume. Univariate,multivariate regression, ROC curve, and Kaplan-Meier analysis were performed when appropriate.
Results: 93 patients underwent STR or NTR via translabyrinthine approach, among them 76 patients(82%) had NTR.
53 patients(70%) from NTR-group had "not identifiable" residue on the postoperative CET-T1wMRIs.
Median volume of "visible" NTR residues was 0.112cm3(range 0.028-0.317cm3), versus 0.98cm3 in STR-group. The residue regrowth was observed in 1.3% of patients in NTR-group and in 41% in STR-group. Median follow-up(FU) time of 7.2years(range 4.8-13.8yrs). Kaplan-Meier plot progression-free survival rates at 5 and 10 years were 98%,98% in NTR-group versus 70%,45% in STR-group, respectively(p<0.0001,HR=66.8). The median relative growth rate was 39%/year (range 5-331). The significant predictors of recurrence were: STR, larger residue with cut-off volume ">0.2cm3" from ROC curve analysis(p<0.0001).
Facial function at 1year FU was: HB1 (71% patients), HB2 (18.3%),HB3-4 (5.4%), and HB5-6 (4.3%). Importantly, all facial palsies occurred only in the NTR-group, none in STR-group (p=0.025).
Adjuvant radiosurgery was recommended in 41% of STR residues, none in NTR-group.
Conclusions: These results support our long-term strategy favoring NTR over STR in sporadic vestibular schwannomas, if possible. NTR offers both excellent functional preservation and longitudinal tumor control close to the GTR outcome.

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FACTORS INFLUENCING SEPTIC COMPLICATIONS IN OPEN SKULL FRACTURES

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Emerging Therapies to Enhance TBI/SCI Outcome (Trauma Parallel Session), September 25, 2023, 4:50 PM - 6:20 PM
Background: Open skull fractures can develop life-threatening infective complications. Prophylactic antibiotic use and intervention times are not clearly defined, as well as how mechanism of injury and weapon used relate to sepsis. Current guidelines are derived from mainly traffic related incidents in high-resource environments (sepsis rate of 4.9% in 1972). The study aimed to identify factors affecting septic complications in open skull fractures in the largest series to date.
Methods: A retrospective analysis of a prospectively maintained database was done to assess demographic data, clinical and imaging findings, and diagnostic and treatment timelines of all adults admitted to a tertiary neurosurgical service with open skull fractures between 1 January 2018 and 31 December 2021. In-hospital outcome was defined with the extended Glasgow Outcome Score (GOSE). Statistical analysis was performed using IBM SPSS(v 27).
Results: 605 open skull fracture patients were identified with 569 included. Overall mortality rate was 4% (n=23) with 7 deaths due to septic complications and 16 due to severity of primary injury. Assault was the mechanism of injury in 95%(n=540), 4% traffic related incidents and 1% due to falls. The overall sepsis rate was 22.3%. Prophylactic antibiotic administration significantly reduced septic complications (p<0.001). CT evidence of wound contamination, air sinus involvement and time to primary wound closure are significant risk factors for developing septic complications in both uni- and multivariate analysis. Hammers had the lowest sepsis rate (9.5%), with golf clubs and wooden implements the highest risk (36.4 and 45%). Time to definitive surgery >24 hours increased the sepsis rate from 2.3% to 26.4%.
Conclusions: Time to wound closure and definitive surgery > 24 hours, CT evidence of wound contamination and air sinus involvement, and lack of administration of prophylactic antibiotics contribute significantly to developing septic complications in open skull fractures.

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THE ROLE OF INTRACRANIAL PRESSURE VARIABILITY AS A PREDICTOR FOR INTRACRANIAL HYPERTENSION AND MORTALITY IN CRITICALLY ILL PATIENTS

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Emerging Therapies to Enhance TBI/SCI Outcome (Trauma Parallel Session), September 25, 2023, 4:50 PM - 6:20 PM
Intracranial Pressure (ICP) monitoring is an essential tool for monitoring