16th ESBS Congress December 2025

Abstract book

EUROPEAN SKULL BASE SOCIETY

December 4th - 6th, 2025 Zagreb, Croatia

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Thursday 4 December 2025: Free Paper session: 08:00 - 08:30: Videos 1 - Anterior/central skull base

Masseteric schwannoma – Unusual case, unusual approach

Type of abstract:
abstract for video presentation

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Presenting author:
Nair Deepa

Topic:
Anterior/central skull base

Introduction:
This abstract is a video presentation of a relatively rare neoplasm, Masseteric schwannoma, an endoscopic combined approach transnasal and through the buccal space.

Methods:
Most of the cases of masseteric schwannomas are treated with open surgery.
In this patient, to avoid a transfacial scar as per patient's wishes, we explored alternative surgical approaches to completely excise the tumour without any facial paresis.

Results:
Due to the primary epicentre of the lesion being in the intratemporal fossa (ITF), we approached the lesion via an endoscopic transnasal approach after removing the posterior wall of the maxilla. We were able to mobilise the tumour from all aspects medially, superiorly and inferiorly. For the lateral access and delivery of tumour, we placed a mucosal incision in the buccal space and dissected up to the ITF, delivering the specimen transorally. Patient recovered well with no facial paresis.

Conclusion:
An endoscopic combined approach transnasal and through the buccal space is feasible for selective ITF tumours and should be kept in a surgeons' armamentarium.

Retrospective study of 49 cases of spontaneous Medial lamella leak to prove the efficacy of the proposed technique

Type of abstract:
abstract for video presentation

Authors:
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Dr. Achala. G. Kamath, Dr. Kirtane's clinic

Presenting author:
Dr. Achala. G. Kamath

Topic:
Anterior/central skull base

Introduction:
The Spontaneous CSFR contributes to 5% of CSF leaks,most common is Cribriform plate leak.Medial lamella(M.L)leak is the most common site noted, and we have seen various methods like transposition, cutting of Middle turbinate, various flaps, Fascia, cartilage being used. We propose a novel simple technique repair of M.L leak.

Methods:
A retrospective study of the patients who underwent CSFR Leak Repair surgery by retrieving the medical records from January 2001 to August 2023. The patients were contacted through telephone and E-mail to follow-up with pre-operative, recent post-op CT-PNS. Patients with Medial (M.L), Lateral (L.L), Lateral recess of sphenoid(L.R), Roof of ethmoid,Clivus,Frontal sinus CSF leak (F.S),Revision, Recurrence cases were included.The patients lost to contact were excluded. The data collected was tabulated and analyzed with MS-EXCEL 2007 and efficiency of the technique used for repair of Medial lamella leak repair was assessed.

Results:
Out of 108 patients followed up -84 (spontaneous), 20 (traumatic)and 4(Iatrogenic). Based on site of leak -49(M.L) ,30(L.L), 22(L.R), 2(M. L+L.L),5 (F.S). For M.L leak, technique was used, no recurrences noted. All patients were followed for a minimum period of 5 years and the longest duration of follow-up was 22 years.

Conclusion:
The proposed technique is an efficient surgical technique which can be a standardized method for Endoscopic Medial Lamella leak repair.

Optimizing Skull Base Reconstruction: Multiport Precaruncular Approach for Type 4 (Virk's Modified Classification) Lateral Recess Leak.

Type of abstract:
abstract for video presentation

Authors:
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Presenting author:
Ravi Sankar Manogaran

Topic:
Anterior/central skull base

Introduction:
Sphenoidal lateral recess CSF leaks are a rare type associated with idiopathic intracranial hypertension. A recent modified classification (types 1-4) by Virk and colleagues helps guide approach decisions. We report the successful use of a multiport Precaruncular approach for a type 4 left-sided lateral recess leak.

Methods:
A 56-year-old woman with a spontaneous cerebrospinal fluid (CSF) leak originating from the sphenoid sinus, classified as a Type 4 lateral recess leak according to the Virk modified classification, underwent surgical repair of the defect at a tertiary care hospital in India. A multiport approach via the right endonasal route and right medial orbital portal through the Precaruncular access was used to address the defect. Adequate surgical exposure was achieved through right posterior ethmoidectomy, bilateral sphenoidotomy, and right medial orbitotomy utilizing the Precaruncular corridor. The meningocele was ablated using Coblation, and the defect lateral to V2 was repaired with a multilayer technique.

Results:
The Precaruncular approach complements established endonasal techniques and provides a direct path from the caruncle to the lateral recess. It is beneficial because it overcomes the limitations of traditional transpterygoid and middle fossa approaches. During follow-up, the patient experienced no recurrence of leak, no palatal hypoesthesia or lacrimal dysfunction, and preservation of both sphenopalatine arteries with minimal crusting in the nasal cavity.

Conclusion:
The Precaruncular approach is practical in managing Type 4 lateral recess cerebrospinal fluid leaks by offering a less invasive and anatomically direct route for repair. Careful patient

selection, meticulous surgical technique, and multidisciplinary perioperative management are essential for achieving optimal outcomes, minimizing complications, and preventing recurrence.

Thursday 4 December 2025: Free Paper session: 08:00 - 08:30: Videos 2 - Anterior/central skull base

Expanded endoscopic transsphenoidal approach to the optic canal for resection of sphenoid meningioma in a transgender woman

Type of abstract:
abstract for video presentation

Authors:
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Carlo Efisio Marras, Hospital del Mar, Barcelona

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Presenting author:
Paula Garcia Ferreiro

Topic:
Anterior/central skull base

Introduction:
Cyproterone acetate is a drug with anti-androgenic properties and is one of the most widely used drugs in hormone replacement therapy in the transgender female population. Recent studies have shown a dose-dependent association between its prolonged use and an increase in the incidence of intracranial meningiomas.

Methods:
We present the case of a 49-year-old transgender woman who had been treated with cyproterone acetate for 13 years and who consulted for progressive loss of visual acuity in her right eye over a period of two months. Ophthalmological examination revealed compressive neuropathy with an associated campimetric defect. Cranial magnetic resonance imaging (MRI) showed a meningioma with a sphenoid base that partially occupied the optic canal, compressing the right optic nerve at the prechiasmatic level.

Results:
Postoperative MRI studies showed complete resection with correct decompression of the optic nerve. The definitive pathological results were WHO grade I meningioma with extensive expression of progesterone receptors.

Posterior ophthalmological check-ups showed improvement in the patient's visual acuity and visual field defect.

Conclusion:
The endoscopic endonasal extended approach (EEEA) is an established technique for optic canal decompression in lesions medial to the optic nerve. Hormone replacement therapy (HRT) has been linked to increased incidence of intracranial tumours, particularly meningiomas. Nevertheless, no specific clinical guidelines currently exist regarding surveillance or follow-up

Combined endoscopic craniofacial resection in paediatric spindle cell sarcoma – challenges and outcomes

Type of abstract:
abstract for video presentation

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Presenting author:
Nair Deepa

Topic:
Anterior/central skull base

Introduction:
This abstract is a video presentation of a relatively rare neoplasm, spindle cell sarcoma of the frontoethmoidal area, which was treated surgically with a combined endoscopic transnasal and open cranial approach

Methods:
The patient was a 9-year-old female presenting with proptosis, diagnosed as spindle cell sarcoma of the frontoethmoidal area. The lesion was eroding the cribriform plate, the ethmoids and orbital plate of the frontal bone. Patient was planned for Ifosfamide and Adriamycin chemotherapy but had no response to the same, hence planned for surgery.

Results:
Due to the primary epicentre of the lesion being in the frontoethmoid region, we approached the lesion via an endoscopic transnasal approach. After dissecting off the tumour in the ethmoids and lamina papyracea, the periorbita was found to be intact. Superiorly as the bone over the roof of the orbit was involved by tumour, a bifrontal craniotomy was performed for superior control of the disease. Dura was excised at cribriform plate and the defect was repaired with a pericranial flap. The patient received adjuvant radiotherapy and is disease free for 1 and ½ years, with no significant orbital or cranial morbidity.

Conclusion:
An endoscopic combined approach is an oncological safe procedure in children, with minimal morbidity and preserving facial function and growth. The histology, tumour extent and the age of the patient are all important considerations in planning the approach to these malignancies.

Thursday 4 December 2025: Free Paper session 1: 08:00 - 09:00: Oral presentations - Anterior/central skull base

Surgical Outcomes and Prognostic Factors in Traumatic Optic Neuropathy: A Systematic Review and Meta-Analysis

Type of abstract:
abstract for oral presentation

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Presenting author:
Gülpembe Bozkurt

Topic:
Anterior/central skull base

Introduction:
Traumatic optic neuropathy (TON) is a vision-threatening condition with no consensus on optimal management. Corticosteroids and surgical decompression of the optic canal are widely used. We evaluated the effectiveness of endoscopic optic nerve decompression (EOND) on visual acuity (VA) outcomes, comparing it with or alongside medical therapy and assessing the impact of intervention timing.

Methods:
A systematic literature search was conducted across PubMed, Embase, Scopus, Web of Science, and Cochrane Library for relevant studies. Eligible studies included randomized controlled trials, prospective and retrospective cohorts, case series, and case reports that reported baseline and postoperative VA in TON patients undergoing EOND. Data extracted included study design, sample size, baseline VA, postoperative VA, intervention type, and interval between injury and operation. Statistical analyses were performed using random-effects models for pooled estimates with R software. Heterogeneity across studies was assessed using I^2 statistic and chi-square tests. The quality of the included studies was evaluated using tools appropriate for their study designs.

Results:
A total of 42 studies comprising 2,859 patients were included. The baseline visual acuity was mostly at the level of "light perception." Among 772 patients who underwent EOND + SPT, the improvement rate was 26% (95% CI: 0.15–0.38), with significant heterogeneity (I^2 = 84.4%). In the 929 patients treated with EOND alone, the improvement rate was also 26% (95% CI: 0.14–0.38), with high heterogeneity (I^2 = 93.2%). In addition, 809 patients treated with EOND + SPT showed significant postoperative visual improvement (SMD: 0.38, 95% CI: 0.22–0.54), with low heterogeneity (I^2 = 27.3%).

Conclusion:
EOND and related surgical techniques provide a valuable treatment option for TON, particularly in patients with residual vision and when performed early after injury. While spontaneous recovery and medical therapy alone may contribute to improvement in a subset of patients, pooled evidence supports surgical decompression as an effective intervention.

Retrosellar Surgical Access: A Quantitative Comparison of Subtemporal, Transpetrosal, and Anterolateral Approaches

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Giuseppe Carpenzano

Topic:
Anterior/central skull base

Introduction:
Surgical access to the retrosellar retrochiasmatic retroclival spaces can be challenging when resecting lesions extend into this narrow area. Approach selection is dictated by the location of the lesion; the ability of the common approaches to reach lesional extensions into the upper retrosellar-retrochiasmatic areas has yet to be quantitatively compared.

Methods:
We quantitatively assess access to this region provided by the subtemporal, subtemporal transtentorial, anterior transpetrosal transtentorial, frontotemporal (pterional), and frontotemporal-orbital approaches, and compare the length of exposed neurovasculature and working area in order to assist in optimal surgical approach selection. Four cadaveric heads (8 sides) underwent subtemporal, subtemporal transtentorial, anterior transpetrosal transtentorial, and frontotemporal (pterional) and frontotemporal-orbital approaches. The anterolateral approaches were completed with posterior clinoidectomies. The area of exposure of and the working angle within the retrosellar area were evaluated in each, as well as the length of all exposed neurovascular structures.

Results:
The subtemporal transtentorial and frontotemporal-orbital approaches provided the widest overall exposure. The working angle in the subtemporal approach was limited by the need for temporal lobe retraction. The anterior transpetrosal transtentorial approach provided wide access of the upper petroclival and retrosellar regions, and clival drilling allowed for increased medial exposure. The anterolateral approaches with posterior clinoidectomy provided wide exposure and access to the upper retrosellar and retrochiasmatic spaces.

Conclusion:
Petroclival lesions medial to the CN VII-VIII-complex that extend superiorly into the retrosellar region can be accessed via the anterior transpetrosal transtentorial approach. Lesions limited to the upper clivus can be accessed by the subtemporal approach. Sellar or upper-clival lesions that extend superiorly can be accessed via the frontotemporal approaches.

A case series of endoscopic transsphenoidal resection of pituitary macroadenomas in the geriatric population

Type of abstract:
abstract for oral presentation

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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Gross-total tumor resection via endoscopic transsphenoidal approach tends to be the gold standard for the treatment of pituitary macroadenomas in general population. Notwithstanding, there are not sufficient data on the goals of management or the endpoint of the treatment in the geriatric population. We present our experience in managing geriatric patients with a macroadenoma.

Methods:
The present study retrospectively describes the cases of 7 patients >70 years of age with a pituitary macroadenoma who were treated in two different hospitals. The approach that was used in all cases was the endoscopic endonasal transsphenoidal and was performed by a skull base team, composed of one ENT surgeon and one neurosurgeon.

Results:
Although literature proposes to debulk the tumor in patients of extreme age, alleviating the clinical symptoms, we were able to gross-totally remove the tumour. Additionally, all the patients experienced a notable improvement in their neurological deficit, while their hormonal status was either stable or even improved after the surgery.

Conclusion:
The EET approach appears to be a safe and effective treatment option for pituitary macroadenomas in the geriatric population. Thus, the aim of the operation should not only be the reduction of the tumour mass but the gross total resection of the macroadenoma, even in geriatric population.

Transorbital routes to the skull base: Surgical nuances and institutional experience with 4 transorbital approaches and 212 cases

Type of abstract:
abstract for oral presentation

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Presenting author:
Maria Karampouga

Topic:
Anterior/central skull base

Introduction:
Transorbital approaches have emerged as an innovative and increasingly utilized skull base corridor. This study presents a comprehensive institutional overview of four variations of keyhole transorbital approaches, aiming to delineate their indications, advantages, and limitations.

Methods:
Our institutional experience with the following approaches was reviewed: 1) Eyebrow incision and supraorbital craniotomy (EbSOA), 2) Eyebrow incision and modified orbitozygomatic approach (EbMOZ), 3) Eyelid incision and modified orbitozygomatic approach (ElMOZ) and 4) Lateral Canthus incision + lateral orbitotomy approach (LOA). Out of 212 patients, 152 underwent an eyebrow incision either for tumor (47%) or vascular (44%) pathology, while 11 others had an eyelid incision primarily for tumors (82%) or vascular lesion (18%). The lateral canthotomy was utilized in the remaining 49 patients, primarily for middle fossa tumors (60%), followed by pathologies extending in the intracranial and

intraorbital compartment (32%), and purely intraorbital lesions (8%).

Results:
In total, 127 tumors were treated, and gross total resection was achieved in 71%. Tumors comprised mainly meningiomas (70%), followed by schwannomas (7%) and glial neoplasms (5%). Sixty-two patients harboring 74 aneurysms were treated, with the majority being in the anterior communicating artery complex (43%), followed by the posterior communicating artery (22%). Mean follow-up was 18.9 months, and the average length of stay was 4.4 days. Regarding the cumulative approach-related postoperative complication rates, wound infection occurred in 6% of cases, diplopia in 2%, pseudomeningocele in 2%, ptosis in 2%, and cerebrospinal fluid leak in 1.4%.

Conclusion:
Transorbital approaches offer adequate anterior and middle skull base and anterior circulation vascular exposure while also providing the benefits of a minimally invasive technique. This large series validates previous anatomical studies and confirms the effectiveness of transorbital surgery as a route to the skull base.

Clinical outcome in skull base chordoma, a single-center experience

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Skull base chordoma are rare and complex tumors. Current standard of care is maximum safe resection followed by adjuvant high dose radiation. Still recurrence rates and mortality remain high at follow-up. This study aims to describe the experience of our single center cohort, focusing on survival outcome and complication rates.

Methods:
All consecutive adult patients diagnosed with primary skull base chordoma treated between 1990 and 2024 were eligible for inclusion. Primary outcome measures are progression – and overall survival rates using the Kaplan Meier method. Secondary outcomes are treatment complication rate and improvement of clinical symptoms.

Results:
The cohort consists of 29 patients. The main presenting symptom is diplopia. In total 67 surgeries were performed, with midfacial degloving the most frequent technique utilized,

followed by the endoscopic transnasal approach. Symptoms improved in 34% of the patients and worsened in 10%. The mean follow-up is 116 months. The 5- and 10-year PFS is 42% and 18%, respectively. The 5- and 10-year OS is 75% and 55%, respectively. Surgical complications occurred in 38%, mostly nasal CSF leakage and (transient) cranial nerve palsies. Radiotherapy was administered in 23 patients. Radiation complications occurred in 14 patients, with radiation necrosis being the most common.

Conclusion:
Skull base chordoma are extremely rare, complex tumors. The development of endoscopic surgical approaches has decreased perioperative morbidity and hospitalization duration. Individualized treatment plans at recurrence may still lead to long term tumor control. Radiation side effects may be severe and have a significant impact on the patient's life.

ENT Role in Early Outcomes of a Developing Endoscopic Skull Base Program: 80 Pituitary Adenoma Cases from Mostar

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Josip Lesko

Topic:
Anterior/central skull base

Introduction:
Endoscopic transsphenoidal surgery is today the preferred approach for pituitary adenomas. ENT contribution is fundamental in ensuring safe sinonasal access, anatomical adaptation, and secure reconstruction. This study highlights the ENT experience and sinonasal outcomes from the first 80 patients treated at University Clinical Hospital Mostar (2019–2025).

Methods:
Patients with MRI- and endocrinologically-confirmed pituitary adenomas underwent endoscopic endonasal surgery. The ENT team was responsible for corridor creation (unilateral or binostril approach), sphenoidotomy, correction of septal deviation or concha bullosa, and, when required, transethmoidal extension or resection of middle/superior turbinate. Reconstruction was tailored according to the size and site of the defect, using autologous fascia, fat grafts, and in selected cases nasoseptal flaps. Postoperative follow-up included nasal endoscopy to monitor healing, crusting, flap viability, and sinonasal morbidity.

Results:
Sinonasal morbidity was minimal. Most patients experienced only transient nasal congestion and crusting, which resolved within 4–6 weeks with routine saline irrigations and topical care. No cases of septal perforation, chronic rhinosinusitis, or persistent hyposmia were observed. All reconstructions remained viable, with no postoperative CSF leaks recorded. Donor site morbidity (thigh or abdominal fat) was negligible. Over time, operative exposure became faster and more standardized, reflecting the ENT learning curve.

Conclusion:

From ENT perspective, the establishment of skull base program in Mostar proved both feasible and safe. Reliable sinonasal access and reconstruction were achieved with negligible morbidity, ensuring protection against CSF leaks and rapid sinonasal recovery. These results demonstrate the role of ENT in enabling the success of skull base surgery in a smaller regional center.

Thursday 4 December 2025: Free Paper session 2: 09:00 - 10:00: Oral presentations - Anterior/central skull base

Refined Techniques in Lateral Transorbital Surgery: Approaches to orbit, cavernous sinus, sphenoidal wing, Meckel's cave, temporal lobe, and multi-compartmental skull base lesions

Type of abstract:
abstract for oral presentation

Authors:
Ravi Sankar Manogaran, Additional Professor of Neurootology, Department of Neurosurgery, Sanjay Gandhi Postgraduate Institute of Medical Sciences

Lucknow, India. Awadhesh Kumar Jaiswal, Professor and Head, Department of Neurosurgery, Sanjay Gandhi Postgraduate Institute of Medical Sciences

Lucknow, India. Ramandeep Singh Virk, Professor, Department of ENT, Postgraduate Graduate Institute of Medical Sciences and Research

Chandigarh, India.

Presenting author:
Ravi Sankar Manogaran

Topic:
Anterior/central skull base

Introduction:
This study aims to improve understanding and use of the lateral transorbital surgical technique for complex paramedian, orbital, temporal lobe, and skull base lesions. It demonstrates step-by-step procedures, including incisions, managing the lateral orbital wall and sphenoid wing, and intraoperative landmarks, focusing on minimally invasive, function-preserving methods and potential complications.

Methods:
A retrospective review analyzed the records of patients who underwent lateral transorbital surgeries for paramedian, orbital, temporal lobe, and skull base lesions from January 2023 to July 2025. Preoperative data included demographics, lesion details, radiology, and intraoperative records, covering lesion type and extent, management of the lateral orbital bony corridor, key landmarks, extent of resections, complications, and outcomes.

Results:
25 patients (12 males, 13 females) underwent the lateral transorbital approach for pathologies, including meningioma (9), schwannoma (5), fibrous dysplasia (2), and others. Lateral orbital rim (LOR) mobilization and refixation were performed in 19 cases, with LOR removed and refixed in 3 initial cases and not removed in 3. Lesions were in the orbit (4), cavernous sinus (7), temporal lobe (2), middle cranial base (1), and multicompartmental regions (11), including the posterior fossa in two. Subtotal resection was achieved in 6, and near-total in 18. One patient had a CSF leak repaired. Common complications included transient eyelid edema, ptosis, chemosis, and one pseudo-meningocele.

Conclusion:
The lateral transorbital approach is a safe and effective minimally invasive technique for managing various paramedian, orbital, temporal lobe, and multicompartmental skull base lesions. It provides satisfactory surgical access, high rates of lesion removal, low morbidity, and favorable cosmetic outcomes.

Lymphoepithelial carcinoma in a pediatric patient: case report and literature review

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Maria Magdalena Mazurek

Topic:
Anterior/central skull base

Introduction:
Lymphoepithelial carcinoma is an exceedingly rare malignant neoplasm in the pediatric population. We present the case of a 17-year-old patient with extensive skull base and upper cervical involvement and provide a comprehensive literature review.

Methods:
A 17-year-old patient presented with a left retro-pharyngeal mass extending to the skull base and down to the upper neck. Diagnosis was established by biopsy, confirming lymphoepithelial carcinoma. The patient initially underwent induction chemotherapy followed by definitive surgical resection. A combined open anterior skull base approach was employed, including left facial translocation and midline mandibulotomy to achieve full exposure from skull base to upper neck.

Results:
Surgical excision achieved complete removal of the lesion with negative margins on final pathology. The patient subsequently received adjuvant postoperative radiotherapy. At present, there is no evidence of recurrence. A review of the available literature highlights the extreme rarity of lymphoepithelial carcinoma in pediatric patients, with only isolated reports describing its skull base extension. Optimal management typically requires multimodal therapy, including induction chemotherapy, radical surgical resection, and adjuvant radiotherapy.

Conclusion:
Lymphopithelial carcinoma in pediatric patients involving the skull base and upper cervical spaces is exceptionally rare. Our case demonstrates that aggressive multidisciplinary management - including induction chemotherapy, radical resection and postoperative radiotherapy. We will conduct an extensive review of the literature to further clarify presentation patterns, treatment strategies, and prognosis in this rare disease entity.

Endonasal Transsphenoidal surgery of the Pituitary Adenomas:

Efficacy and Safety in a Large Single-Center Cohort of 1022 Patients

Objective: To evaluate the efficacy, clinical outcomes, and complications of endonasal endoscopic pituitary surgery.

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Bakhtiyar Pashaev

Topic:
Anterior/central skull base

Introduction:
Methods: A retrospective analysis was conducted on 1022 consecutive patients who underwent endonasal transsphenoidal surgery for pituitary adenomas between 2007 and 2025. Demographic data, histopathological findings, extent of resection, complications, and clinical outcomes were analyzed.

Results: The cohort comprised 409 males and 613 females, with a median age of 51.4 years (range 18–87).

Methods:
Based on functional status, the adenomas were classified as: (ACTH)-secreting (n=45), (GH)-secreting (n=283), (PRL)-secreting (n=52), non-functioning (n=640), and adenocarcinoma (n=2). Knosp classification grades were: grade 0 (n=465), grade 1 (n=234), grade 2 (n=154), grade 3 (n=88), and grade 4 (n=63). Tumor size distribution was: microadenomas (n=123), macroadenomas (n=881), and giant adenomas (n=18). Surgical approaches were tailored to the lesion location. GTR was achieved in 691 cases, STR in 261, and partial resection in 70. Selective resection of the medial wall of cavernous sinus was performed in 25 patients.

Results:
Postoperative improvement was observed in pre-existing chiasmal syndrome in 82.5% (n=527) of affected patients, with resolution of cranial nerve (CN) III palsy in 46.5% (n=20) and CN VI palsy in 40% (n=13). CSF-diversion via ELD was required in 18 patients (1.8%). Complications: CSF leak (n=30, 2.9%), meningitis (n=12, 1.2%), vascular injury (n=2, 0.2%), new CN III(n=5, 0.5%) and CN VI deficit (n=4, 0.4%), visual deterioration (n=10, 0.9%), DVT (n=16, 1.5%), and diabetes insipidus (n=52, 5.2%).

Conclusion:
The perioperative mortality rate was 0.8%.

Conclusion: Endonasal endoscopic surgery is a safe technique, providing favorable disease control with an acceptable complication profile. The surgical learning curve remains a critical factor influencing operative results and patient outcomes.

Parasellar region meningiomas with optic canal (OC) invasion: Correlation between the degree of decompression of the OC and the improvement of visual acuity

Type of abstract:
abstract for oral presentation

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Presenting author:
Alessandro Pesaresi

Topic:
Anterior/central skull base

Introduction:
Visual deficits are common in parasellar meningiomas (PMs) due to optic canal invasion, and vision often doesn't improve after surgery. This study evaluates whether a minimum degree of optic canal decompression or specific optic nerve portions decompressed influence visual improvement

Methods:
This is a single-center retrospective study. The visual acuity was

evaluated preoperative and at 3-months after surgery with Snellen acuity test. The degree of decompression of the OC was calculated through postoperative multiplanar CT-scan reconstructions in coronal plane at intraorbital opening (IOO), intracranial opening (ICO) and middle point between them (MP). OC was then divided in two segments (anterior and posterior).

Results:
29 consecutive patients were identified. Improvement of visual acuity was observed in 18 patients (62%). A decompression>90° of the anterior segment of the OC, a decompression>180° of the posterior segment and a full-length decompression>90° were associated visual acuity improvement at univariate analysis (p=0.010, p=0.002 and p<0.001, respectively). A decompression>180° of the posterior segment and a full-length decompression>90° of the OC maintained statistical significance at multivariate analysis (p=0.030 and p=0.035)

respectively).

Conclusion:
Anterior segment decompression>90° and posterior segment decompression>180° were associated with improvement of visual acuity at 3 months after surgery. A full-length decompression of the optic canal>90° showed better visual outcome, while a full-length decompression>180° did not seem to be related to significative improvements in visual acuity.

Transnasal adenomectomy with medial cavernous sinus wall resection for hormone-secreting pituitary adenomas: safety and short-term outcome

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Michel Roethlisberger, MD

Topic:
Anterior/central skull base

Introduction:
Hormone-secreting pituitary adenomas (HsPA) frequently involve the medial wall of the cavernous sinus (MCSW), even when this is not expected on the basis of the MR findings. We analyzed the safety and short-term outcome of adenomectomy with systematic MCSW resection in a consecutive cohort of patients with HsPA in contact with the MCSW.

Methods:
We changed our surgical standard in February 2024 and performed from then onward, in addition to the classic endoscopic adenomectomy (in one case microscopic), a systematic MCSWR in all patients harboring an HsPA (9 acromegaly, 6 prolactinoma and 1 Cushing, 50% macroadenomas) in contact with the MCSW as seen on the preoperative MRI. All 16 patients who underwent adenomectomy with MWCSR in the year from 1 February 2024 to 31 January 2025 were included in the analysis. The preoperative data included the demographic information, clinical presentation, imaging, Knosp grade, and endocrine profile of each patient. Perioperative complications and short-term endocrinological outcomes were assessed prospectively.

Results:
Knosp grades 0 was found in 4/16 patients, I in 5/16, II in 5/16, and III in 2/16 (25%, 31%, 31%, and 12.5%). Gross-total resection was achieved in all cases. There were no permanent or major surgical complications. Cavernous sinus involvement was identified by intraoperative visual inspection in 10/16 patients (63%). MCSW involvement was confirmed by histology in 7 cases (3 of them with Knosp Grade 0). There was no new postoperative pituitary insufficiency. Short-term endocrinological follow-up (mean 3.2 months) was available for the 15 patients, 14 of which were all in full remission.

Conclusion:
Endoscopic adenomectomy with systematic MCSWR according to published standards was safe. The histological confirmation of Cavernous sinus invasion, even in four tumors with low Knosp grades, and the excellent short-term endocrinological outcomes that we observed suggest that MRI underestimates CS involvement and that overall long-term remission rates can be improved by systematic MCSWR.

Spontaneous shrinkage in sporadic extrameatal vestibular schwannomas: a longitudinal volumetric study

Type of abstract:
abstract for oral presentation

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Presenting author:
Sammy M. Schouten

Topic:
Lateral skull base

Introduction:
Spontaneous tumour shrinkage during wait-and-scan management of sporadic vestibular schwannoma is still generally considered an uncommon phenomenon. The aim of the current study is to evaluate the occurrence of shrinkage using volumetric measurements and possible predictors for shrinkage in specifically extrameatal tumours.

Methods:
Volumetric tumour measurements from serial MRI studies were analyzed from 877 patients with unilateral extrameatal sporadic vestibular schwannoma undergoing initial wait-and-scan management between January 2001 and January 2022. Uni- and multivariable Cox proportional hazard regression models were performed to evaluate possible predictors for shrinkage.

Results:
Among the 877 tumors (median volume 0.7 cm^3, IQR 0.3–1.7), 255 (29%) demonstrated significant shrinkage at some point during follow-up. Of these, 162 (18% of total cohort) exclusively demonstrated tumour shrinkage with or without subsequent stabilisation, 61 tumours (7%) demonstrated initial growth followed by continuous shrinkage, and the remaining 32 tumours (4%) had an alternate pattern. Further analyses are ongoing, and the complete results will be presented at the meeting.

Conclusion:
Spontaneous shrinkage in VSs occurs more frequently than previously reported. These findings support the concept that tumours may eventually reach an indolent state, with the majority eventually regressing after long-term observation. This further justifies an initial wait-and-scan strategy in extrameatal tumours, provided no significant mass-effect symptoms that warrant intervention are present.

Thursday 4 December 2025: Free Paper session 3: 10:30 - 11:30: Oral presentations - Anterior/central skull base - Lateral skull base

Metastatic lesion mimicking pituitary macroadenoma: case report and literature review of sellar metastatses

Type of abstract:
abstract for oral presentation

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Presenting author:
Ph.D Pawel Szmygin

Topic:
Anterior/central skull base

Introduction:
Sellar metastases are rare but clinically significant entities that can mimic pituitary macroadenomas of imaging and presentation. We report a case initially treated as macroadenoma and provide a literature review to clarify distinguishing features, diagnostic strategies and management

Methods:
A patient with progressive visual loss underwent transnasal endoscopic surgery for radiographically suspected macroadenoma. Clinical data, radiology, operative course and pathology were reviewed. A literature search (PubMed, Embase) identified reports of sellar metastases mistaken for macroadenomas. Extracted data included presenting symptoms, imaging features, primary tumor sites and diagnostic approaches

Results:
In the presented case, histopathology confirmed metastatic carcinoma rather than pituitary adenoma. Visual function did not improve postoperatively, consistent with malignant infiltration. Literature review revealed that sellar metastases often present with rapid progression, cranial nerve involvement, or disproportionate pain. Radiographic red flags compared with benign adenomas include heterogeneous enhancement, irregular margins, bone destruction, and early cavernous sinus invasion. Reported primaries most commonly arise from lung, breast, kidney, prostate, and melanoma. Diagnostic workup strategies include whole-body PET-CT, targeted systemic imaging, and immunohistochemistry to determine tumour origin.

Conclusion:
Metastatic disease should be considered when evaluating presumed pituitary macroadenomas, especially in cases with atypical or aggressive features. Awareness of clinical and radiological red flags, combined with systematic diagnostic workup, can avoid misdiagnosis, guide appropriate oncological management, and prevent unnecessary or incomplete surgical interventions.

Endoscopic surgical treatment of juvenile nasopharyngeal angiofibroma in pediatric patients: a 10-year single-center experience

Type of abstract:
abstract for oral presentation

Authors:
Krystian Tywoniuk[1], Maria Magdalena Mazurek[1], Andrew J. Fishman[1,2,3], Józef Mierzwiński[1]

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Presenting author:
Krystian Tywoniuk

Topic:
Anterior/central skull base

Introduction:
Juvenile nasopharyngeal angiofibroma (JNA) is a rare, benign but locally aggressive tumor that occurs almost exclusively in adolescent males. This study evaluates a decade of single-center experience using endoscopic resection techniques in pediatric patients.

Methods:
Between 2014 and 2024, 20 children aged 7–17 years underwent endoscopic resection of JNA at our institution. All patients underwent preoperative CT or MRI and angiographic embolization. Advanced-stage cases were managed by an interdisciplinary team. Data on patient age, tumor stage (Radkowski classification), recurrence, and complications were retrospectively analyzed. Follow-up included regular endoscopic and imaging assessments.

Results:
Complete tumor removal was achieved in 85% of patients with a single procedure. No permanent complications or perioperative deaths occurred. Younger age correlated with a higher recurrence rate: patients under 12 years had a significantly increased risk of local recurrence requiring revision surgery. Most recurrences were identified within the first two years postoperatively.

Conclusion:
Endoscopic surgery is a safe and effective treatment for JNA in children. Younger patients appear to be at higher risk of recurrence, emphasizing the need for long-term follow-up and vigilant postoperative monitoring.

Transfrontal sinus approach for anterior cranial fossa tumors: clinical application in olfactory groove meningioma

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Ryokichi Yagi

Topic:
Anterior/central skull base

Introduction:
The optimal approach to anterior cranial fossa tumors remains debated. For olfactory groove meningiomas, minimal brain retraction, early feeder control, and Simpson grade I resection are required. We evaluated the transfrontal sinus approach (TfSA) in selected cases.

Methods:
We retrospectively analyzed five cases treated with TfSA: four olfactory groove meningiomas and one osteoma extending from the frontal sinus into the orbit. Surgical outcomes, complications, and radiological findings were reviewed. We focused on the extent of resection, brain protection, perioperative morbidity, and postoperative cosmetic results.

Results:
Gross total resection was achieved in all cases. No cerebrospinal fluid leakage or wound complications occurred. In three cases of meningiomas with cerebral edema, peritumoral edema markedly improved, and no brain contusion from retraction was observed. Cosmetic outcomes were favorable. These findings suggest that TfSA enables safe tumor removal with adequate protection of normal brain tissue.

Conclusion:
Although indications are limited, TfSA is technically straightforward and allows Simpson grade I resection with minimal brain retraction. It represents a safe and valuable option for selected anterior cranial fossa tumors.

Vestibular Function and Complaints in Patients with Untreated Unilateral Vestibular Schwannoma

Type of abstract:
abstract for oral presentation

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Presenting author:
Constanza Fuentealba Bassaletti

Topic:
Lateral skull base

Introduction:
Vestibular schwannomas (VS) are benign tumors often causing hearing loss, tinnitus, and vestibular symptoms that impair quality of life. Evidence on vestibular function in VS is limited, with heterogeneous, often inconclusive results. This prospective study assesses objective vestibular function, correlates it with patient-reported complaints and QoL, and explores influencing factors.

Methods:
In this prospective cross-sectional study, patients with untreated unilateral VS aged ≥18 years were included and evaluated using caloric test, vHIT, cVEMP, DHI, PANQOL and SF-36. Tumor and patient characteristics were retrieved from the patient files. Linear regression analyses were performed to identify predictors for vestibular function.

Results:
Objective vestibular abnormalities were present in 89% of patients. Lateral and anterior vHIT gains correlated with caloric test outcomes, hearing loss (lower gain associated with higher hearing thresholds; $r=–0.57$, $p<0.001$), and tumor size (lower gain associated with larger tumors; $r=–0.41$, $p=0.003$). No significant associations were observed between objective

vestibular test results and subjective complaints (dizziness, unsteadiness) or quality of life (QoL). Similarly, tumor characteristics showed no correlation with subjective outcomes. Nevertheless, subjective vestibular impact strongly related to QoL, as demonstrated by a robust correlation between DHI and PANQOL scores (χ^2=28.6, p<0.001).

Conclusion:
Vestibular complaints have a significant impact on the quality of life in vestibular schwannoma patients. Whereas vHIT does correlate with tumor size and hearing loss, neither objective vestibular function tests nor tumor characteristics correlate significantly with vestibular complaints or quality of life in this patient group.

The management of vestibular schwannomas: impact of age and era

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
de Boer N.P.

Topic:
Lateral skull base

Introduction:
Evaluation of 30 years of multidisciplinary vestibular schwannoma care at the Leiden Skull Base Center, Leiden University Medical Center. All treatment strategies, i.e., active surveillance, radiotherapy and surgery, were evaluated with a focus on patient age, long-term treatment outcome and survival.

Methods:
Cancer registries were reviewed for patients treated for vestibular schwannoma Leiden University Medical Center from 1990 to 2020. A total of 3141 patients were included for analysis, with long-term follow-up of 139 months. Data on demographics, tumor size, treatment modality and survival from all patients with a vestibular schwannoma were included.

Results:
The average age at diagnosis was 56 years, with a shift towards an older age at diagnosis in recent times. Since 2000-2004 active surveillance is most often indicated as initial treatment strategy, up to 89% between 2015-2020. Overall, 25% of patients underwent radiotherapy or surgery after a period of active surveillance, and 75% of all patients were not treated. No intervention was performed during follow-up in 44% of patients <30 years and 75% in patients ≥70 years. The diagnosis of a vestibular schwannoma nor its treatment had a significant negative impact on survival and no significant differences were found between treatment modalities.

Conclusion:
The treatment paradigm has shifted from active treatment to a conservative initial strategy of active surveillance. The majority of young patients (66%) require active intervention during follow-up. Patients presenting at an older age (≥70 years) still require active treatment in 25%. Survival is not significantly impacted by the vestibular schwannoma diagnosis or treatment strategy.

Necrotizing otitis externa and skull base osteomyelitis; a systematic clinical pratice guideline

Type of abstract:
abstract for oral presentation

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Presenting author:
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Topic:
Lateral skull base

Introduction:
Necrotizing otitis externa (NOE) is a severe infection of the external auditory canal, skull base and adjacent structures. However, there is a high variety of case definitions, diagnostics and treatment modalities. This study was done to create a clinical practice guideline, with the aim of informing best practice for diagnosis and management of NOE.

Methods:
A multidisciplinary guideline development group was created with specialist from ENT, radiology nuclear physics, microbiology and infectious diseases. A total of nine systematic reviews were carried out, each addressing a specific research question. The databases [Medline (via OVID) and Embase (via Embase.com)] were searched until varying periods in

2023 and 2024. The selection and assessment of literature was performed in accordance with de GRADE (Grading of Recommendations Assessment, Development and Evaluation)-method. Only research that reported (and compared) pre-defined outcomes were selected. Each research question was answered with a set of considerations and recommendations, combining evidence from literature with expert opinion.

Results:
The systematic search of literature yielded a total of thirteen articles. With added expert opinion and literature, a set of considerations and recommendations were made for the following subjects: definition and limiting doctor's delay in diagnosing necrotizing otitis externa, diagnostic imaging for primary diagnosis, microbiology and histopathology, antimicrobial treatment, surgical treatment, hyberbaric oxygen therapy, duration of therapy, imaging to monitor treatment response and additional conditions for optimizing care.

Conclusion:
This clinical practice guideline was formulated to provide evidence-based recommendations to assist with clinical decision-making in patients with necrotizing otitis externa.

Thursday 4 December 2025: Free Paper session 4: 11:30 - 12:30: Oral presentations - Lateral skull base

Unusual cases of CSF Otorrhoea

Type of abstract:
abstract for oral presentation

Authors:
Dr. Milind V. Kirtane , Dr. Kirtane's clinic
Dr. Achala G. Kamath, Dr. Kirtane's clinic

Presenting author:
Dr. Achala G. Kamath

Topic:
Lateral skull base

Introduction:
To report the mechanism of causes of csf otorrhea with no history of trauma or cochlear malformations.

Methods:
Case report -

Three patients presented to us with CSF Otorrhoea.

There were no history of trauma or any inner ear malformations found in any of the patients.

Results:
HRCT temporal bone / CT CIsternography /MRI CIsternography confirmed the site of the leak. Defects we're seen on imaging at retrosigmoid,sinodural angle and petrous Apex all caused by pacchionian bodies.

In 2 patients, the CSF leak was surgically repaired by the transmastoid approach with the help of fat, fascia, tissue glue, gelfoam. In 1 patient the leak was repaired with the help of neurosurgeon by middle cranial fossa approach.

Post operative HRCT temporal bone was done after 3 months confirmed that the leak was sealed completely.

Conclusion:
CSF Otorrhoea can be due to erosion caused by Pacchionian bodies which are hypertrophied arachnoid villi granulations. These arachnoid villi help in draining CSF of subarachnoid space into dural venous sinuses. This paper discusses this unusual etiology for CSF Otorrhoea.

Pediatric spontaneous cerebrospinal fluid leaks with recurrent meningitis: case series and literature review.

Type of abstract:
abstract for oral presentation

Authors:
Andrzej Kucharski[1], Michał Kotowski[2], Oskar Rosiak[3], Andrew J. Fishman[1,4,5], Justyna Tyra[6], Józef Mierzwiński[6], Marcin Szymański[1]

Affiliations

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Presenting author:
Andrzej Kucharski

Topic:
Lateral skull base

Introduction:
Spontaneous cerebrospinal fluid (CSF) leaks in children are rare but potentially life-threatening due to their association with recurrent bacterial meningitis. We present a case series and review of predisposing lesions and surgical strategies.

Methods:
We retrospectively reviewed four pediatric cases of CSF leaks presenting with meningitis or chronic otitis media. Clinical histories, radiographic findings, intraoperative approaches, and outcomes were analyzed. Literature was reviewed (PubMed, Embase) to identify patterns of inner ear malformation, perilabyrinthine fistulas, and temporal bone defects associated with CSF leakage.

Results:
The first case involved an infralabyrinthine/infracochlear CSF leak with imaging revealing a geniculate ganglion defect. The second patient demonstrated a perilabyrinthine congenital fistula presenting with recurrent meningitis, repaired via a transmastoid/middle fossa combined approach. A third case involved a congenital defect surgically closed with multilayer repair. The fourth case was confirmed as a CSF leak related to a cochlear aqueduct abnormality and managed with posterior semicircular canal partial obliteration. All patients underwent successful surgical closure. Literature review confirmed that congenital perilabyrinthine leaks and defects of the geniculate ganglion region are common etiologies in pediatric patients, with recurrent meningitis often the sentinel presentation.

Conclusion:
Spontaneous pediatric CSF leaks are rare, frequently underdiagnosed, and associated with significant morbidity. High suspicion, careful radiologic assessment, and early surgical repair are essential. Awareness of congenital pathways such as widened cochlear aqueducts, geniculate ganglion defects, and persistent embryonic fissures can guide tailored management and prevent recurrence of meningitis.

Cochlear implantation after small vestibular schwannoma resection: feasibility and monitoring implications

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Aleksandar Milenković

Topic:
Lateral skull base

Introduction:
To evaluate the feasibility and outcomes of cochlear implantation after removal of small vestibular schwannomas involving the vestibule or basal cochlea portion, and to discuss intra- and postoperative monitoring challenges in this context.

Methods:
Four patients were included: two with intravestibular schwannomas extending into the basal turn of the cochlea, and two with small intracanalicular tumors and poor preoperative hearing. Tumor resection was performed followed by cochlear implantation either in a single stage or, when intraoperative electrophysiological signals were indeterminate, via a staged approach with insertion of a dummy electrode initially. Intraoperative neural response telemetry (NRT) and electrophysiological monitoring guided the decision to implant.

Results:
All four cases yielded reliable intraoperative NRT, stable electrode impedances, and favorable postoperative auditory performance. However, the presence of the electrode array complicates postoperative imaging and tumor surveillance.

Conclusion:
Cochlear implantation is feasible after vestibular schwannoma resection in select patients. While single-stage implantation is often viable, a staged approach is prudent when monitoring is equivocal. Because electrode arrays may interfere with postoperative imaging, rigorous patient selection, precise surgical technique, and customized follow-up protocols are essential to safely expand indications in this setting.

Deep Learning for Predicting Vestibular Schwannoma Growth

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Larissa Nagtegaal

Topic:
Lateral skull base

Introduction:
To develop and evaluate a deep learning model that predicts vestibular schwannoma (VS) growth over time using longitudinal MRI.

Methods:
In this retrospective study, a deep learning model was developed to predict VS growth by generating future tumor segmentations. Tumor predictions were evaluated using Dice coefficient, 95% Hausdorff distance (95HD) and relative volume error (RVE). Tumor diameters were measured and compared to reference measurements using Bland-Altman plots. Tumor progression was determined by classifying changes in diameter or volume and assessed using the Receiver Operating Characteristic curve and Cohen's kappa.

Results:
1488 longitudinal contrast-enhanced T1-weighted MRI scans from 316 VS patients were collected from multiple centers. The deep learning model outperformed existing methods in volumetric tumor growth prediction, achieving a Dice score of 0.788 ± 0.090, 95HD of 1.86 ± 0.92 mm, and RVE of 26.7% ± 27.2%. For follow-up intervals under two years, diameter predictions showed strong agreement with reference measurements (95% limits of agreement: –0.134 ± 2.62 mm). Using diameters, tumor progression was identified with 92.6% accuracy, 96.2% specificity, and 62.5% sensitivity, showing moderate agreement with the ground truth (Cohen's kappa = 0.604).

Conclusion:
Deep learning applied to longitudinal MRI scans enables prediction of vestibular schwannoma shape within a two-year follow-up period, supporting personalized monitoring and early detection of tumor progression.

Pseudoprogression in Koos grade 4 vestibular schwannomas following radiosurgery: temporal dynamics and radiological predictors

Type of abstract:
abstract for oral presentation

Authors:
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Stefan Cornelissen, Gamma Knife Center Tilburg, Eindhoven University of Technology, The Netherlands;

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Presenting author:
Sammy M. Schouten

Topic:
Lateral skull base

Introduction:
Particularly in larger VSs, the potential occurrence of pseudoprogression following stereotactic radiosurgery (SRS) may influence clinical decision-making. The main aim of this study is to gain insight in the temporal response dynamics following primary SRS and to evaluate possible MRI-derived predictors at time of treatment for pseudoprogression in sporadic Koos grade 4 VSs.

Methods:
Patients treated with Gamma Knife radiosurgery between January 2004 and January 2021 for a unilateral sporadic Koos grade 4 VS, larger than 4 cm3 at time of treatment, were included. Pseudoprogression was defined as a significant volume increase post-SRS followed by significant regression. In tumors with cystic components, separate annotations of the solid and cystic components were additionally obtained. Uni- and multivariable logistic analyses were performed to evaluate possible predictors for pseudoprogression.

Results:
A total of 258 patients with a median tumour volume of 6.8 cm3 (IQR 5.1-8.9) were included in the study. Pseudoprogreussion was observed in 75 tumours (29%) with a median time-to-peak of 8 months (IQR 6-14) and a median relative increase of 23% (IQR 15-34) at peak. In 19 out of 39 macrocystic tumours, the solid versus cystic components exhibited distinct response dynamics. Multivariable logistic regression analyses revealed that only the presence of microcystic components was significantly inversely associated with pseudoprogression with an adjusted OR of 0.15 (CI 95% 0.05-0.46; P=<.001).

Conclusion:
Pseudoprogression rates in Koos grade 4 VSs are comparable to smaller tumours. Age, size, degree of compression, edema, and pretreatment growth rate showed no significant correlation. Microcystic tumours exhibited significantly significantly lower pseudoprogression rates, suggesting greater suitability for SRS, whereas macrocystic tumours displayed more variable dynamics, warranting careful monitoring in these tumours.

Primary intralabyrinthine schwannomas: presentation, clinical course and treatment

Type of abstract:
abstract for oral presentation

Authors:
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4 Rare Cancers, Radboud Institute for Health Sciences, Nijmegen, The Netherlands

Presenting author:
Walter Szweryn

Topic:
Lateral skull base

Introduction:
Objective: To examine presentation, clinical course and treatment outcomes of patients with intralabyrinthine schwannomas (ILS).

Methods:
Method: This is a multicenter retrospective cohort study. Patients with primary ILS were included. The primary outcomes were the progression of hearing, tinnitus and vertigo in patients with ILS. The secondary outcomes were the development of tinnitus and vertigo during follow-up.

Results:
Results: 50 patients were analyzed, median follow-up time was 70.5 months (range 2-240 months). Most common tumor subtype was intracochlear (62%). Thirty-eight (76%) received solely wait and scan (WS), twelve patients (24%) underwent (radio)surgery. Most reported symptoms at presentation were hearing loss (98%, n=49), tinnitus (74%, n= 37) and vertigo (30%, n=15). Only 8,3% of patients (4/48) preserve servicable hearing during follow-up. Perceived symptom burden of tinnitus generally suggests stabilization. Perceived symptom burden of vertigo generally suggests improvement.

Conclusion:
Most primary intralabyrinthine schwannomas progress to non-serviceable hearing over time. Wait-and-scan seems to be the most fitting management strategy for patients with ILS. Intervention can be considered in patients with severe complaints and non-serviceable hearing. We recommend audiometry for patients during follow-up, and monitoring of tinnitus and vertigo with questionnaires.

Thursday 4 December 2025: Free Paper session 5: 13:30 - 14:30: Oral presentations - Lateral skull base

Post-traumatic facial nerve decompression: an international cohort study and literature-derived individual patient data meta-analysis

Type of abstract:
abstract for oral presentation

Authors:
Madelon Thevis a b c , Corinne Delsing a b , Daniele Borsetto e , Thijs T.G. Jansen a b , Christian Saris d , Amanda Cheang f , Rupert Olbholzer f , Neil Donnelly e , Henricus P.M. Kunst a b c

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Presenting author:
Madelon Thevis

Topic:
Lateral skull base

Introduction:
When presenting with post-traumatic facial nerve paralysis

(TFNP), facial nerve decompression (FND) can be indicated. The timing of FND is controversial. Prognostic factors are not well characterized.

Objective: create a large study population to valid investigate the timing of FND along with other prognostic factors, including age, gender, surgical findings and facial physiotherapy adherence.

Methods:
This is an international multicentre retrospective cohort study combined with an literature-derived individual patient data (IPD) analysis. The cohort study examined all cases undergoing FND for a total (TFNP) in Nijmegen, Cambridge and London between 2010 and 2023. Data was collected, stored and analyzed. Data sources, study selection and data extraction Electronic patient files of three different hospitals were used for the retrospective multicentre study. PubMed® was used for the literature-derived IPD analysis. Patient data, details about the studies and literature-derived case specific variables were collected and analyzed with Microsoft Office Excel and SPSS

IBM.

Results:
A total of 99 patients were included: 22 cases within the multicentre cohort study group and 77 cases within the literature-derived IPD meta-analysis group. Of the total FND group (n=99), cases operated within 30 days, more often showed excellent facial nerve recovery (HB 1), p=<0.001, compared to those who had FND within 31-42 days (resp. 73%, n=11/15; and 0%, n=0/15). Being female and no/non-complete transection, more often gave good FN recovery (p=.005 and p=.018), just as facial physiotherapy.

Conclusion:
When FND is indicated, it should be performed within 30 days

post-trauma, to strive for excellent post-op FN function. Predictive factors for a more favourable recovery, are female gender and/or no/non-complete transection. Facial physiotherapy adherence is important to prevent chronic synkinesis.

Cerebrospinal fluid leakage in lateral skull base: surgical approach and treatment strategy

Type of abstract:
abstract for oral presentation

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Presenting author:
Hans Thomeer

Topic:
Lateral skull base

Introduction:
describe a cohort of patients with spontaneous cerebrospinal fluid (sCSF) otorroea. To report surgical outcome and provide a treatment algorithm

Methods:
Between 2015 and 2025 all patients presenting with sCSF were collected and data assessment was performed including clinical symptoms (hearing loss, aural fullness, meningitis, recurrent otitis media), preoperative audiometry, CT and MRI scanning. According to the site and size of the dural defect, different surgical approaches were applied

Results:
A total of 45 patients were included. All BTP testings were positive. Surgical approaches: middle fossa approach (15 patients), transmastoid approach with bony obliteration of the cavity (26 patients) and 4 patients underwent a subtotal petrosectomy procedure. Two cases underwent revision surgery (MFA) due to residual disease (CFS leakage). After follow up duration of 12 months (6.5 months SD), no recurrence was observed. Transient word finding disorder (spontaneous recovery time period 2 weeks after onset) occurred in one patient after MCFA. Severe adverse events such as cerebrovascular injury, meningitis, wound infection or headache was observed after long term follow up.

Conclusion:
Spontaneous cerebrospinal fluid leakage is a rare but manageable pathology with severe possible complications without treatment. In time diagnosis, laboratory testing and imaging is primordial to obtain the best treatment option with optimal patient outcome.

How to Achieve Better Outcomes in Vestibular Schwannoma Surgery – The Impact of Intraoperative Neuromonitoring (IONM) and Optimal Surgical Approach Selection on Improving Procedure Effectiveness and Safety

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Grzegorz Turek

Topic:
Lateral skull base

Introduction:
Surgical treatment of vestibular schwannomas (VSs) is challenging due to their location. Preserving cranial nerve function, especially VII and VIII as well as the lower cranial nerves, is a key goal. Intraoperative neuromonitoring (IONM), combined with surgical expertise, enhances both safety and effectiveness.

Methods:
Fifty-four patients (17 men, 37 women; mean age 49.8 years) with vestibular schwannomas underwent subtotal resection (STR), with optional adjuvant stereotactic radiosurgery (performed in 88% of cases), supported by intraoperative neuromonitoring (IONM). Modalities of IONM included EMG, SEP (spontaneous and evoked somatosensory evoked potentials), MEP (motor evoked potentials), and DNS (direct nerve stimulation); BAEP (brainstem auditory evoked potentials) was additionally applied in 19 patients with

preserved hearing. The facial nerve was identified intraoperatively in 81.5% of cases. Postoperative outcomes focused on cranial nerves VII and VIII, assessed using the House–Brackmann and Gardner–Robertson scales.

Results:
Completeness of tumor resection was 93%. Facial nerve function (House–Brackmann I–III) was achieved in 89%, while hearing preservation (Gardner–Robertson I–II) was maintained in 36%. Intraoperative BAEP revealed hearing dysfunction in 8 of 19 patients, with a significant correlation between VIII nerve injury and AEP deterioration ($\rho<0.05$). Patients with AEP deterioration showed worse postoperative facial nerve outcomes (mean House–Brackmann 2.67, $p=0.12$). No significant association was found between intraoperative facial nerve identification and postoperative function ($p=0.95$). MEP lacked prognostic value ($p = 0.39$), while SEP changes were relevant in thermal injury, observed in one patient.

Conclusion:
Subtotal resection with concomitant precise intraoperative identification of cranial nerves, particularly VII and VIII, supported by intraoperative neuromonitoring (IONM) during VSs resection, translates into better functional outcomes and improved quality of life for patients

Head and Neck Schwannomas in the Pediatric Population – A Case Series Review

Type of abstract:
abstract for oral presentation

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Presenting author:
Justyna Tyra

Topic:
Lateral skull base

Introduction:
Cranial nerve schwannomas, particularly vestibular schwannomas or facial nerve, are extremely rare in the pediatric population. Early diagnosis is often challenging due to non-specific symptoms and limited cooperation during examinations.

Methods:
To present a series of pediatric patients diagnosed with schwannomas, with emphasis on clinical presentation, imaging findings, and therapeutic management.

We analyzed pediatric patients hospitalized in our department between 2000 and 2025 with a diagnosis of cranial nerve schwannoma. Data included age at diagnosis, initial symptoms, results of audiological and imaging studies, and treatment approach (observation, surgery, or radiotherapy).

Results:
The most common presenting symptoms were unilateral hearing loss, tinnitus, and balance disturbances. Diagnosis was based primarily on contrast-enhanced MRI. In selected cases, surgical treatment was performed with preservation and/or reconstruction of facial nerve function.

Conclusion:
Head and neck schwannomas in children are rare but demand special attention from otolaryngologists and audiologists. Early recognition and interdisciplinary management are essential to preserve function and ensure optimal quality of life.

Investigating the role of [18F]-FDG PET-imaging in the treatment of necrotizing external otitis

Type of abstract:
abstract for oral presentation

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- Robin Jansen, MD PHD, Department of Otorhinolaryngology and Head and Neck Surgery, Amsterdam University Medical Center

Presenting author:
Jérôme Waterval

Topic:
Lateral skull base

Introduction:
Necrotizing otitis externa (NOE), is a rare and severe infection of the external ear that poses significant risks, particularly to elderly patients. This study aims to identify whether [18F]-FDG-PET imaging-derived parameters can serve as cutoff points to predict the successful treatment of necrotizing external otitis.

Methods:
A total of 47 patients with NOE from three academic medical centers were included in this retrospective study. The maximal standard uptake values (SUVmax) of the unaffected side, as well as the mean and peak standard uptake values (SUVmean and SUVpeak) of the affected side, were measured. Additionally, the metabolic tumor volume (MTV) and total lesion glycolysis (TLG) were determined. The mean percentage reductions in these [18F]-FDG-PET imaging-derived parameters at baseline and after treatment were compared.

Results:
In the remission group, the mean reductions in SUVmax, SUVmean, SUVpeak, MTV, and TLG were 42.2%, 19.1%, 42.1%, 75.6%, and 77.6%, respectively. There was a statistically significant difference in SUVmax, SUVpeak, MTV, and TLG compared to the recurrence group ($p = .033$, $p = .040$, $p = .022$, $p = .026$). Diagnostic accuracy was measured, with optimal values resulting in a sensitivity and specificity of 100% and 72,5%, in SUVpeak values below 3.44.

Conclusion:
The [18F]-FDG-PET imaging-derived parameters such as SUVmax, SUVpeak, SUVmean, MTV, and TLG can be of value in predicting the successful treatment of NOE.

Diagnostic and Therapeutic Challenges in Patients with Simultaneous Vestibular Schwannoma and Cholesteatoma

Type of abstract:
abstract for oral presentation

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Prof. Marcin Szymański. Department of Otolaryngology-Head and Neck Surgery, Medical University of Lublin, Poland

Presenting author:
Monika Zaborek-Lyczba

Topic:
Lateral skull base

Introduction:
Vestibular schwannoma (VS) is the most common cerebellopontine tumor, causing sensorineural hearing loss, tinnitus, and vertigo. Chronic otitis media with cholesteatoma presents with recurrent ear discharge and hearing loss, typically requiring surgical intervention. Although the coexistence of VS and cholesteatoma is rare, it creates complex diagnostic and therapeutic challenges that necessitate individualized management approaches.

Methods:
We reviewed four patients with simultaneous VS and cholesteatoma. One patient presented with cholesteatoma in one ear and VS in the contralateral ear, and underwent middle ear cholesteatoma removal with tympanoplasty and atticoantrotomy, followed by translabyrinthine VS resection. The other three patients had ipsilateral lesions. Two were treated with a transotic approach, allowing simultaneous removal of both pathologies with cavity obliteration. One patient underwent closed-cavity cholesteatoma surgery, after which a cerebellopontine angle tumor was detected and managed with gamma knife radiosurgery. Clinical presentation, radiological findings, surgical approaches, and follow-up outcomes were analyzed.

Results:
During a follow-up period of 2 to 4 years, no residual or recurrent cholesteatoma was observed. Tumor control was achieved in all patients, with the gamma knife–treated patient remaining clinically and radiologically stable.

Conclusion:

The coexistence of vestibular schwannoma and cholesteatoma should be included in the differential diagnosis of temporal bone pathology. Management must be individualized based on tumor size, hearing status, patient age, and cholesteatoma extension. Both simultaneous and staged surgical approaches can provide favorable results, while stereotactic radiosurgery may be considered in selected cases.

Thursday 4 December 2025: Free Paper session 6: 14:30 - 15:30: Oral presentations - New Technologies and Materials in Cranial base Surgery & Oncology

Objective Evaluation of Facial Nerve Function Using Software Processing

Type of abstract:
abstract for oral presentation

Authors:
Vlasak Ales 1, Fik Zdenek 2, Peterkova Lenka 2, Subrtova Adela 3, Matas Jiri 3

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2 Department of Otorhinolaryngology and Head and Neck Surgery, First Faculty of Medicine, Charles University and Motol University Hospital

3 Department of Cybernetics, Czech Technical University in Prague, Faculty of Electrical Engineering

Presenting author:
Vlasak Ales

Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
Facial nerve palsy is a common and important complication after several skull base surgeries. Existing grading systems —HB, Fisch, Sunnybrook— depend on subjective assessment and are prone to inter-rater variability. Standardized, quantitative facial analysis with dedicated software could overcome these limitations. Patients with vestibular schwannoma provide a useful model for investigating facial nerve paresis.

Methods:
Skull Base Group of Motol University Hospital, performs 40-50 vestibular schwannoma surgeries annually. In collaboration with the Dpt. of Cybernetics, Visual Recognition Group, Faculty of Electrical Engineering, a regression model was developed, estimating HB scores from facial images. Using the STAR detector, 68 landmarks per image were identified, allowing the calculation of asymmetry features.

Results:
We developed a user-friendly mobile application that enables patients to self-assess facial nerve function using their smartphones, with automated post-processing of the recordings. Preliminary results show that the regression model closely replicates clinician-assigned House-Brackmann scores and is sensitive to subtle changes in function. Although the dataset is currently limited, this approach appears promising as a complementary, objective tool for monitoring facial nerve status.

Conclusion:
Objective assessment methods have the potential to improve diagnosis and treatment by providing more accurate evaluation of facial nerve function. Our goal is to raise awareness of our software and establish international collaborations to promote its wider adoption.

Optical Biopsy of Sinonasal Tumors using Confocal Laser Endomicroscopy: A Clinical and Deep Learning-based Assessment and Visualization

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Miguel Goncalves

Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
To validate intraoperative confocal laser endomicroscopy (CLE) as real-time, in-situ optical biopsy for sinonasal/skull base tumours and to integrate CLE with image-guided navigation for margin assessment. The DFG (German Research Foundation) has approved this 2025–2028 prospective study (planned n=80) at a certified skull base centre.

Methods:
Prospective diagnostic-accuracy study in adults undergoing endoscopic sinonasal/skull base surgery. Fluorescein-aided CLE is acquired at tumour–skull base interfaces and co-registered to CT/MRI navigation. Targeted biopsies/frozen sections serve as intraoperative references; paraffin histopathology is the gold standard. Primary outcomes: sensitivity, specificity, accuracy and predictive values for malignancy/margins; inter-rater agreement. Secondary outcomes: time-to-decision and sampling behaviour. AI pipeline: quality filtering, per-frame and per-sequence classification with calibrated malignancy probabilities, domain adaptation across sites and 3D visualisation overlays on a segmented sinonasal model.

Results:
Preliminary blinded analyses show CLE is able to distinguish between tumour, dura, brain parenchyma and benign/inflamed nasal mucosa in real time. Across 42 sequences (3,792 frames), diagnostic accuracy for malignancy was 84.1%, sensitivity 85.4%, specificity 83.1%,

PPV 72.5%, NPV 92.1%; inter-rater reliability was substantial (Fleiss' κ=0.62). The 2025–2028 study will quantify accuracy versus frozen section and effects on margin assessment and biopsy number at the skull base.

Conclusion:
We hypothesise that CLE integrated with navigation will improve intraoperative tissue discrimination and margin control compared with standard practice, reduce unnecessary sampling and delays, and support more precise resections; the DFG-approved 2025–2028 programme will quantify clinical utility.

Artificial Intelligence in cranial base surgery – planning, prediction and understanding. Where are we headed?

Type of abstract:
abstract for oral presentation

Authors:
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Gheorghe Mühlfay/”Geroge Emil Palade” University of Medicine, Pharmacy, Science and Technology of Târgu Mureș, Romania

Presenting author:
Cristian-Norbert Ionescu

Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
The rapid growth of advanced technology and imaging is reshaping the classical medical aspect. Cranial base surgery with its complex anatomy may particularly benefit from the new deep learning (DL) and artificial intelligence (AI) models in preoperative planning and risk stratification.

Methods:
We report our experience in preoperative modelling and volume segmentation of pneumatization of cranial base bones using 3D slicer version 5.2.2. along with open access deep learning modules and integrated computed tomography (CT) and magnetic resonance images (MRI). The efficacy of DL modules was also tried in cranial nerve mapping and anticipation of postoperative complications like CSF fistula. A targeted PubMed review of relevant literature from the last five years was also performed.

Results:
In our case series we have established 3D volumetric measures of the pneumatization of the temporal bone along with other paranasal sinuses including the sphenoidal, frontal and maxillary and compared with the traditional spherical measures. Volumetric assessment demonstrated greater sensitivity to morphological change over time (CT scans ≥4 years apart), improving characterization of continuous pneumatization. The volumetry of the temporal bone had better delineation of anatomical borders in osteolytic lesions. DL analysis of the peritumoral activity on MRI in pre and postoperative iconography facilitated a more

objective definition of resection extent, residual tumor, and longitudinal follow-up using ROI segmentation.

Conclusion:
The integration of artificial intelligence mostly in neuro-radiologic modules is a useful assistant tool in treating and understanding the modified anatomy in cranial base pathologies. Although the implementation in the surgical field still needs a wider open source data base.

Patient-Specific 3D-Printed Peek Implants in Anterior Skull Base Oncological Reconstruction: a Single-Centre Case Series

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Boris Kos

Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
Objective

To report our initial experience with patient-specific, 3D-printed polyetheretherketone (PEEK) implants for reconstruction of anterior skull base defects following oncological resection of cranial base malignancies.

Methods:
We present a case series of three patients who underwent resection of malignant cranial base neoplasms, resulting in complex composite defects involving the anterior skull base. In all cases, delayed reconstruction was carried out using custom-made PEEK implants. High-resolution preoperative CT imaging was utilised for virtual planning using computer-aided design and manufacturing (CAD/CAM) technology. Implant design was conducted in collaboration with biomedical engineers.

Results:
All three patients underwent successful reconstruction with patient-specific PEEK implants. Intraoperative assessment confirmed stable implant positioning without the need for major adjustment. No implant-related complications or early postoperative adverse events were observed. Both structural and aesthetic outcomes were considered satisfactory across the series.

Conclusion:
Delayed reconstruction of anterior skull base oncological defects using 3D-printed, patient-specific PEEK implants is a feasible and safe approach. This technique offers precise anatomical reconstruction in complex cases and represents a valuable adjunct in the multidisciplinary management of skull base malignancies.

The Diagnostic Value of Cochlear Nerve Action Potential in Hearing-Preservation Surgeries of Vestibular Schwannomas

Type of abstract:
abstract for oral presentation

Authors:
Viktor Procházka, Aleš Vlasák, Zdeněk Fík, Vladimír Beneš

Presenting author:
Viktor Procházka

Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
In vestibular schwannoma (VS) surgery, facial nerve preservation has become the gold standard. Hearing preservation remains challenging, attempted only in selected cases with variable outcomes. Routine intraoperative monitoring may improve results. While auditory brainstem responses (ABR) are traditional, cochlear nerve action potential (CNAP) is increasingly adopted. Our lecture will address its predictive value.

Methods:
Twenty-three patients with serviceable hearing underwent vestibular schwannoma resection with intraoperative monitoring of auditory brainstem responses (ABR, wave V) and cochlear nerve action potentials (CNAP). Electrophysiological findings at the end of surgery were correlated with postoperative hearing preservation.

Results:
A clear and expected finding was the direct dependence of preoperative hearing quality on postoperative preservation of serviceable hearing ($p = 0.032$). CNAP persistence at the end of surgery was significantly associated with useful hearing preservation ($p = 0.0497$), while ABR wave V showed no significant correlation. Shorter baseline CNAP latency was linked to ABR wave V loss ($p = 0.0039$). A major distinction was, of course, the difference in response latency between ABR and CNAP.

Conclusion:
CNAP monitoring showed stronger predictive value for hearing preservation than ABR, while good preoperative hearing remained the key prognostic factor. Device-related differences may warrant standardization. CNAP appears to be a promising tool for intraoperative prediction of hearing outcomes in vestibular schwannoma surgery. And our results support the routine use of this method.

Craniopharyngioma in children younger than 6 years old – What is the best management?

A clinical and surgical analysis

Type of abstract:
abstract for oral presentation

Authors:
Rina Agushi, Mirko Scagnet, Federico Mussa, Filippo Giovannetti, Regina Mura, Lorenzo Genitori

Presenting author:
Rina Agushi

Topic:
Oncology

Introduction:
Craniopharyngiomas represent one of the most common tumors of the hypothalamo-pituitary region in childhood. Eventhough there are different surgical techniques to treat this type of tumor, the timing and approach of choice in children younger than 6 years old is still debated.

Methods:
For this retrospective study, the databank of Meyer Children's Hospital IRCCS

the was used. 129 consecutive pediatric patients (0-18 years old) with a craniopharyngioma were referred to our centre between January 1994 and January 2024. Of these 22 patients were younger than 6 years old upon diagnosis. All patients underwent endocrinological, ophtalmogical and radiological examination upon admission. Standard follow-up appointments at the outpatient clinic were given to the patients.

Results:
The mean follow-up was 10 years ± 1.4 years. Postoperatively, incidence of panhypopituitarism or diabetes insipidus developed in 84% and 91% of patients, respectively. 5 patients underwent only an Ommaya reservoir positioning, 4 had an endoscopic fenestration first and craniotomy for craniopharyngioma removal. 5 patients were operated via transsphenoidal endonasal approach whilas 12 patients underwent a subfrontal approach. We noticed no significative differences in terms of resection and outcome between the patients operated via craniotomy versus endoscopy. Recurrence rate and need for adjuvant radiation is quite similar in both groups.

Conclusion:

Considering the very young age, the choice of the treatment should aim to preserve the hypothalamic function of the child. The least invasive approach is often the best approach. Given the similarity in terms of outcome between the craniotomy and endoscopic approach we believe that the latter should be the treatment of choice.

Thursday 4 December 2025: Free Paper session 7: 16:00 - 17:00: Oral presentations - Oncology

Outcomes of Gross Total versus Partial Transsphenoidal Resection in Non-functioning Pituitary Adenomas: A Comparative Systematic Review

Type of abstract:
abstract for oral presentation

Authors:
Authors

Daniel Alvarado1,2, Denzel Siera1, Pawan Kishore Ravindran1,2, Cheng Yang1,2, Max E. Keizer1,2, Koos Hovinga1,2, Jasper van Aalst1,2, Henricus P. M. Kunst4,5,6, Yasin Temel1,2,7,

Affiliations

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7 Istanbul Atlas University, 34406 Istanbul, Turkey

Presenting author:
Daniel Alvarado

Topic:
Oncology

Introduction:
Nonfunctioning pituitary adenomas (NFPAs) present a routine operative choice, to pursue gross-total resection to maximize oncologic control or perform a subtotal resection when tumor extension toward important structures makes radical removal unsafe. To support

these decisions we conducted a comparison between GTR and non-GTR using outcomes such as recurrence and procedure related complications.

Methods:
We performed a PRISMA-guided systematic review comparing gross-total resection (GTR) with non-gross total resection (non-GTR) for non-functioning pituitary adenomas (NFPAs). We searched MEDLINE (PubMed), Embase, Cochrane CENTRAL and Web of Science. Adults undergoing transsphenoidal surgery were eligible when outcomes were reported separately for GTR and Non-GTR. Pediatric, non-NFPA studies were excluded. Two reviewers independently screened records and extracted data with adjudication by a third reviewer. Prespecified outcomes were radiographic recurrence/progression, reoperation or adjuvant radiotherapy, new postoperative hypopituitarism, diabetes insipidus (transient or persistent), visual deficits after surgery and cerebrospinal-fluid leak. We used R to analyze the data.

Results:
In 2530 patients (GTR 1,466 non-GTR 1,064), recurrence in 120 (8.2%) after GTR versus 335 (31.5%) after non-GTR; risk ratio 3.60 (95% CI 2.97–4.35). In studies with assessable follow-up, rates were 120/1,232 (9.7%) for GTR and 335/956 (35.0%) for non-GTR. Complications varied: overall totals were 78 (5.3%) after GTR and 64 (6.0%) after non-GTR. Among studies reporting complications (n737; GTR 476; non-GTR 261), events were 78/476 (16.4%) versus 64/261 (24.5%); risk ratio 1.50 (95% CI 1.12–2.01).

Conclusion:
In NFPAs, GTR had better tumor control than non-GTR without increases in major complications. Aim for GTR when safely achievable, reserve limited resection for high risk cases. Further studies should assess why non-GTR, despite its perceived safety, did not reduce complications, accounting for case selection, invasion grade, surgical approach, surgeon experience, data reporting.

Clinical outcomes in patients with multiple surgeries for clival chordomas

Type of abstract:
abstract for oral presentation

Authors:
Barbara Buchalska1, Michał Wągrodzki2, Wiesława Grajkowska1,2, Tomasz Skóra3, Tomasz Mandat1, Jacek Kunicki1

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Presenting author:
Barbara Buchalska

Topic:
Oncology

Introduction:
Chordomas are rare malignant tumors arising mainly in the clivus. The gold standard in treatment of these tumors is surgery. However, complete resection is often not achievable and local recurrences are common. The aim of this study was to assess the surgical results in patients treated for recurrent clival chordomas.

Methods:
The study is a retrospective analysis of a series of 38 patients (19 women and 19 men) treated from the 2009 to 2025 by at least 2 surgeries for clival chordomas. The first surgery was endoscopic transnasal transsphenoidal resection in all the patients. The patients were selected from 94 patients treated endoscopically for clival chordomas (40.4%). The mean age of the patients was 52 years (22-80 years), and the mean follow up period was 6.7 years (0-15 years).

Results:
As a result of the first surgery in most of the patients subtotal resections (65.8%) were achieved. Partial resections were achieved in 23.7% of the patients, and gross total resections in 10.5%. The patients had on average 2.6 surgeries (1-9 surgeries) after the first resection. Endoscopic transnasal surgeries were most common among subsequent surgeries (70.1%). The mean time to the second surgery was 16.7 months (1-133 months). Sixteen patients died during the follow-up period (42.1%). The mean time from the second surgery

to death was 69 months.

Conclusion:
Multiple surgeries can be used in patients with clival chordomas to control the disease which is often recurrent. This treatment method is safe and may prolong the patients' lives.

Management of Vagal Nerve Paraganglioma: a three-decade retrospective cohort

Type of abstract:
abstract for oral presentation

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Presenting author:
Djenghiz Samlal

Topic:
Oncology

Introduction:
Vagal nerve paragangliomas (VPGLs) are rare, slow-growing tumors of the head and neck. No international consensus regarding VPGL management exists. Active surveillance is increasingly adopted as a primary management strategy for head and neck paragangliomas. This study aimed to evaluate tumor progression and cranial nerve function during active surveillance, and after radiotherapy or surgery.

Methods:
Retrospective single center cohort study in a tertiary care hospital. Primary outcomes were tumor growth incidence, tumor growth rate and vagal nerve function.

Results:
(Preliminary results based on 40 patients) A total of 106 VPGLs were identified in 87 patients of which most (75%) had multiple head and neck paragangliomas. All tumors were initially managed with active surveillance. Growth was observed in 46.2% of VPGL after a median follow-up of 4.8 years, with a median growth rate of 1.12 mm/year (range 0.45-11.30). Vagal nerve dysfunction at diagnosis was seen in 10.8%. No patients developed new CN X deficits during follow-up.

Conclusion:
Based on these preliminary results, active surveillance is a safe and effective primary management for VPGL. Tumor growth and deterioration of vagal nerve function did not appear to be directly correlated, questioning (solely) tumor growth as a treatment indication for VPGL. Further analysis is required to validate these findings.

Efficacy and Toxicity of Bevacizumab in Children with NF2-Related Schwannomatosis: A Systematic Review

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Annemijn L Tops

Topic:
Oncology

Introduction:
NF2-related schwannomatosis (NF2) is a tumor predisposition syndrome, marked by bilateral vestibular schwannomas and other intracranial or spinal tumors. In adults, bevacizumab can improve hearing and reduce tumor size. However, pediatric evidence remains limited. This review investigates outcomes on hearing, tumor response, and toxicity of bevacizumab in children with NF2.

Methods:
A literature review was performed according to PRISMA guidelines. Searches were conducted in PubMed, Embase, Web of Science, Cochrane Library, Emcare, and Academic Search Premier. Eligible studies included patients ≤18 years with confirmed NF2 who received bevacizumab. Two independent reviewers extracted data and assessed study quality. Reported endpoints were hearing outcomes, radiological tumor response and adverse events.

Results:
Seventeen studies comprising 62 pediatric patients met the inclusion criteria. Reported treatment regimens and endpoints varied widely. Tumor regression occurred in 6/56 patients (11%), stable disease was observed in 38/56 (68%). Hearing improved in 15/45 patients (33%) and did not further deteriorate in 27/45 (60%). Five studies documented adverse events: 13 events in 28 patients, ranging from grade 1 to 3. Two patients discontinued

treatment due to grade 3 toxicity.

Conclusion:
Bevacizumab appears effective in pediatric NF2 patients. Most patients (77%) achieve at least tumor stabilization and nearly all (93%) experience hearing preservation or improvement. Most adverse events were mild to moderate, but some necessitated treatment discontinuation. Overall, bevacizumab represents a viable non-invasive therapeutic option for children with NF2.

Spatial analysis of meningeal attachment sites in skull base meningiomas: association with long-term tumor control rates

Type of abstract:
abstract for oral presentation

Authors:
Cheng Yang1, Daniel Alvarado1, Hengjian Liu2, Max E. Keizer1, Pawan Kishore Ravindran1, Henricus P. M. Kunst3,4 and Yasin Temel1*

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Presenting author:
Cheng Yang

Topic:
Oncology

Introduction:
While WHO grade and extent of resection are established prognostic factors, the role of anatomical origin in skull base meningiomas remains underreported. Here, we aim to test whether meningeal origin sites independently predict long-term tumor control, and using voxel-based segmentation to generate spatial heatmaps of tumor origin.

Methods:
We retrospectively screened 174 treated meningioma and included those with complete follow-up. Tumor origin was segmented voxel-wise to generate origin heatmaps. Clinical variables were age, sex, WHO grade, gross total/subtotal resection(GTR/STR), radiotherapy (RT) and tumor origin. Tumor origin was classified into eight anatomical subgroups and further into four categories for multivariable analysis. The primary outcome is radiological progression. Univariable and multivariable logistic regressions identified predictors of recurrence.

Results:
137 patients (median age 58 [IQR 49–65], 82.5% female), all underwent surgery, 18 received postoperative RT. Over 69 months [41–113] median follow-up, long-term control was 73.0%. On univariable analysis, STR (OR 2.49, p=0.030), higher WHO grade (OR 23.7, p=0.004), and tumor origin (p=0.028) were associated with recurrence. Multivariable analysis identified higher WHO grade (aOR 72.6, p=0.005), parasellar–cavernous–clinoid (aOR 6.05, p=0.024), and posterior fossa (aOR 4.07, p=0.032) as independent predictors.

Conclusion:
Beyond WHO grade, tumors from the parasellar–cavernous–clinoid region and posterior fossa carry the highest risk for recurrence/regrowth. Anterior cranial fossa tumors show more favorable control. Findings support incorporating location into prognostic assessment and treatment planning.

Outcomes of Skull Base Chondrosarcoma Surgery: A Retrospective Analysis of Multicenter Registry

Type of abstract:
abstract for oral presentation

Authors:
Ivo Petoe, MD(1); Hanna Algattas, MD(1); Franco Rubino, MD(2); Juan Pablo Zuluaga Garcia, MD(2), Carl H. Snyderman, MD, MBA(3); Paul A. Gardner, MD(1); Eric W. Wang, MD(1); Garret Choby, MD(1); Vigo Vera, MD(4); Franco DeMonte, MD(2); Shaan Raza, MD(2); Juan C. Fernandez-Miranda, MD(4); Georgios A. Zenonos, MD(1)

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Presenting author:
Georgios A. Zenonos, MD

Topic:
Oncology

Introduction:
Skull base chondrosarcomas (SBCS) are rare tumors with clinical course depending on the histological subtype. Surgical resection plays a pivotal role in their treatment, however its role in the era of endoscopic endonasal surgery (EES) is incompletely understood.

Methods:
A total of 149 patients with SBCS (grade 1 [28.9%], grade 2 [58.4%], grade 3 [6.7%], and mesenchymal [6.0%] subtypes) undergoing 206 surgical resections at three quaternary centers (1983-2023) were reviewed. Outcomes were evaluated across individual histological subtypes, comparing EES versus open approaches for extent of resection rates, surgical morbidity, progression-free survival (PFS), and overall survival (OS).

Results:
Gross total resection (GTR) was achieved in 46.3% of primary and 29.8% of recurrent tumors ($p = 0.03$). GTR was independently associated with prolonged PFS in conventional grade 2 tumors (median 201 vs. 30 months; HR 0.30, $p = 0.01$) but not grade 1 tumors. In grade 1, patients >51 years had shorter PFS ($p = 0.048$), a finding mitigated by RT. EES independently predicted GTR in primary tumors (OR 4.8, $p = 0.02$) and reduced complication odds by 65% compared to open surgery ($p = 0.01$). Complication risk increased with intracranial extension and basilar or carotid artery encasement.

Conclusion:
In grade 2 tumors, safe GTR is the principal determinant of local control and may allow RT deferral. Older grade 1 patients might benefit from RT even after GTR. EES achieves high GTR rates with low morbidity in selected cases, representing a paradigm shift in SBCS surgery.

Thursday 4 December 2025: Free Paper session 8: 17:00 - 18:00: Oral presentations - Basic Science - Radiotherapy - Imaging & interventional radiotherapy

Composition of immune cell repertoire in vestibular schwannomas with different tumor volumes

Type of abstract:
abstract for oral presentation

Authors:
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Presenting author:
Sandra Leisz

Topic:
Basic science

Introduction:
Vestibular schwannoma (VS) is the most common benign tumor in the cerebellopontine angle. Macrophage infiltration has been suggested to influence disease progression in preliminary studies. However, the infiltration of other immune cells in VS remains largely unexplored. Therefore, the aim of this study was to characterize the immune cell infiltrate in VS.

Methods:
Cryosections of VS tumor samples with different tumor volumes were examined. The abundance of 14 immune cell markers, one vascular marker and two tumor markers were detected using multi-epitope ligand cartography (MELC). Using bulk RNAseq and qPCR, the mRNA levels of the immune cell markers were examined in VS samples of different tumor sizes.

Results:
Large VS contained a higher number of immune cells, more precisely T helper cells (TH cells), cytotoxic T cells (Tc cells), CD68+ and CD163+ macrophages, as well as CD279+ and CTLA4+ cells. These findings were supported by higher mRNA levels of immune cell markers in large VS compared to small VS. Immunofluorescent imaging reveals a greater number of distinct immune cells in VS than previously recognized. In addition to tumor-associated macrophages, proinflammatory and immature macrophages, TH cells and Tc cells were detected.

Conclusion:
These results indicate that it is not only the macrophages; rather, an increased diversity of immune cell subtypes influences VS tumor size. Thus, novel diagnostic and therapeutic options could be developed by targeting the immune cell populations in VS.

Bibliometric analysis of endoscopic skull base surgery: trends and thematic evolution

Type of abstract:
abstract for oral presentation

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Borna Miličić, Department of Otorhinolaryngology – Head and Neck Surgery, University Clinical Hospital Center Zagreb, Croatia,

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Goran Mrak – Department of Neurosurgery, University Clinical Hospital Center Zagreb, Croatia

Presenting author:
Marcel Marjanović Kavanagh

Topic:
Basic science

Introduction:
To characterise longitudinal growth and thematic shifts in endoscopic skull base surgery (ESBS) literature from 1990s to 2025 and to identify drivers of change such as reconstructive techniques and technological innovation.

Methods:
A PubMed search for “endoscopic skull base surgery” retrieved publications from 1991–2025. Annual publication numbers were recorded and articles were categorised by pathology (pituitary adenomas, meningiomas, chordomas, craniopharyngiomas) and reconstruction (CSF leak prevention, flaps). Findings were contextualised with reported milestones in ESBS evolution, including the introduction of vascularised nasoseptal flaps, development of free flaps and adoption of indocyanine green fluorescence for intraoperative perfusion assessment.

Results:
Annual publication output increased exponentially, rising from fewer than 20 papers in the early 1990s to more than 650 papers in 2021. Pituitary adenomas remained the most studied

entity, yet the proportion of papers on meningiomas, chordomas and craniopharyngiomas increased steadily. After the nasoseptal flap was described, reconstruction and CSF leak prevention became dominant themes, with multilayer repairs reducing postoperative leak rates to below three percent. Free flaps were reported for large defects. Indocyanine green fluorescence enabled real-time assessment of flap perfusion. Recent papers discuss 3D endoscopy, robotic assistance and AI, although access to such technologies remains limited; many patients lack advanced endoscopic equipment.

Conclusion:
ESBS has evolved from a niche technique for pituitary adenomas into a mature, multidisciplinary field. Thematic shifts parallel technical innovations: adoption of vascularised pedicled flaps and free flaps, integration of perfusion imaging and emergence of extended approaches. Ongoing challenges include equitable access, training and validation of emerging technologies.

Stereotactic Radiosurgery for Vestibular Schwannomas - an interdisciplinary challenge

Type of abstract:
abstract for oral presentation

Authors:
Izabela Baranowska

Presenting author:
Izabela Baranowska

Topic:
Radiotherapy

Introduction:
Vestibular Schwannomas (VS) are relatively rare, slow-growing, intracranial, tumors that develop from the myelin sheath of the vestibular branches of the eighth cranial nerve (CN VIII).

Although the benign in nature VS still pose a significant neurosurgical challenge because of their anatomical location (i.e. in proximity to the brainstem and multiple cranial nerves).

Methods:
The main difficulties and serious questions related to the stereotactic radiosurgery for VSs lie in the following aspects:

- Measurement of the tumor size;
- Volumetric assessments;
- Extensiveness of surgical resection;
- Pre-treatment and post-treatment follow-up MR imaging;
- SRS treatment planning (precise fusions with distortion correction; fractionation scheme; dose prescription; dose optimization to achieve high dose in the regret volume and a steep dose gradient outside the target resulting in the reduction of the dose delivered to the brainstem and inner ear; tumor control and functional preservation; risk of brainstem compression due to post-treatment edema; minimizing the dose to the cochlea),
- technological quality requirements.

Results:
In small tumors (<3 cm), SRS provides a local control rate exceeding 90%, which appears comparable to that of microsurgery and is associated with a good tolerance profile.

SRS has been shown to halt growth in up to 98% of patients when evaluated over a period of 10-15 years. Most patients who choose an approach of 'wait and scan' note a gradual decline in hearing function resulting in a significant loss of useful hearing within 5 years.

Contrary to this, according to current studies, up to 80% of patients who undergo Gamma Knife SRS are able to maintain useful hearing within 3–5 years.

Conclusion:
Stereotactic radiosurgery for VS has been widely used for decades and due to its excellent tumor control, non-invasive nature, and favorable safety profile with high rates of hearing preservation and facial nerve function preservation, it has become an effective treatment modality for the majority of cases.

Lutathera Therapy in Olfactory Neuroblastoma

Type of abstract:
abstract for oral presentation

Authors:
Carl H. Snyderman, MD, MBA(1), Ashok Muthukrishnan, MD(2), Matthew Lechner, MD(3), Dominiek Monserez, MD(4), Matheus Sewastjanow-Silva, MD(5), Ehab Y. Hanna, MD(5), Shirley Y. Su, MD(5)

(1) Department of Otolaryngology, University of Pittsburgh School of Medicine, (2) Department of Radiology, University of Pittsburgh School of Medicine, (3) University College London, (4) Erasmus University Rotterdam, (5) The University of Texas at MD Anderson Cancer Center

Presenting author:
Carl H. Snyderman, MD, MBA

Topic:
Radiotherapy

Introduction:
In patients with olfactory neuroblastoma (ONB), treatment options for multiply recurrent disease or distant metastases are limited. Most tumors express somatostatin receptors (SSTR), providing a target for peptide-radionuclide receptor therapy (PRRT). Lutathera PRRT specifically targets the SSTR receptor. Its benefit in treating ONB remains unclear.

Methods:
A multi-institutional retrospective review of recurrent and metastatic ONB treated with Lutathera was performed. Patients with available DOTATATE imaging were included. Demographics, tumor location and grade, metastasis/recurrence information, previous therapy, imaging modalities, complications, and pathology information (e.g. SSTR expression) were extracted from patient charts. A full course of Lutathera was defined as 4 treatments. Patients had a complete blood count and metabolic panel during therapy. Response to therapy was monitored with DOTATATE imaging.

Results:
23 patients received Lutathera therapy and were included. All patients had recurrent metastatic ONB and had received prior therapy. Treatment sites included intracranial and extracranial disease. Treatment was generally well tolerated. Although myelosuppression of bone marrow and other toxicities were observed, therapy was discontinued in only 2 patients. With ongoing follow-up of up to 4 years, significant and sustained responses to treatment have been observed.

Conclusion:
Lutathera was generally well-tolerated in this cohort, with few patients requiring cessation of therapy. While our sample size is limited, it represents the largest cohort of ONB treated with Lutathera. Initial responses to Lutathera are promising and support larger clinical trials for recurrent or metastatic ONB.

From Open Surgery to Radiosurgery: A Network Meta-Analysis of Interventions for Medication-Refractory Trigeminal Neuralgia

Type of abstract:
abstract for oral presentation

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Presenting author:
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Topic:
Imaging & interventional radiotherapy

Introduction:
Trigeminal neuralgia (TN) is a chronic neuropathy marked by sudden, severe facial pain often resistant to medication. For refractory cases, surgical options vary in efficacy and risk. We conducted a systematic review and network meta-analysis to compare outcomes across available interventions in medication-refractory TN.

Methods:
A systematic search was conducted in PubMed, Embase, and the Cochrane Library through July 2025. Risk of bias was assessed using Cochrane's tool. We conducted frequentist random-effects NMA and calculated risk ratios (RRs) with 95% confidence intervals (CIs) for binary outcomes.

Results:
Eleven studies (n=10,741) assessed MVD, PP, GKS, and MVD+PP. Complications: lowest with GKS (RR 0.24) and PP (RR 0.34), highest with MVD+PP (RR 4.27). Pain relief (BNI I): MVD+PP highest, GKS lowest (RR 0.52). Poor outcomes (BNI IV–V): MVD+PP lowest, GKS highest (RR 2.65). Recurrence: lowest with MVD+PP, highest with GKS (RR 3.14). Numbness: lowest with MVD, highest with MVD+PP (RR 11.08). P-scores confirmed MVD+PP best efficacy, GKS safest for complications, and MVD most favorable for numbness.

Conclusion:
In patients with medication-refractory trigeminal neuralgia, MVD+PP achieved the best pain-related outcomes with higher risk of numbness. GKS had the lowest complication rates, though less effective for pain control and recurrence. MVD alone provided a balance between efficacy and safety. Treatment choice should consider the trade-off between effectiveness and adverse effects.

EXPLORING THE SYNERGY OF ENT AND INTERVENTIONAL RADIOLOGY- A CASE SERIES

Type of abstract:
abstract for oral presentation

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Presenting author:
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Topic:
Imaging & interventional radiotherapy

Introduction:
Highlighting the role of collaboration with Interventional Radiology in the treatment of vascular lesions of nose and paranasal sinuses. Angioembolisation involves the targeted occlusion of blood vessels using embolisation agents, effectively controlling hemorrhage in cases of severe epistaxis or vascular anomalies. This procedure offers a swift and efficient means of hemostasis while minimizing surgical intervention.

Methods:
Angioembolization and Sclerotherapy have emerged as an alternative approach in managing vascular malformations within the ENT domain. By injecting sclerosing agents into abnormal blood vessels or venous malformations, this technique induces vessel fibrosis and subsequent reduction in blood flow. Sclerotherapy proves particularly beneficial for select cases of vascular anomalies in the head and neck region, where surgery might pose greater risk to vital structures. In this presentation, we discuss three different cases that were managed in collaboration with IR team.

Results:
By combining the expertise of ENT specialists and interventional radiologists, patients can benefit from tailored, minimally invasive treatment plans that result in reduced morbidity, shorter hospital stay and improved quality of life.

Conclusion:
Both Angioembolization and Sclerotherapy underscore the trend towards minimally invasive procedures. As these techniques continue to evolve, their roles in ENT are poised to expand, offering innovative solutions for vascular lesions.

Poster presentations

The natural history of residual pituitary adenomas and risk factors associated with tumor progression after previous surgical treatmen

Poster number 1

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
Pituitary adenomas account for approximately 10% to 20% of primary intracranial tumors. A complete endoscopic transsphenoidal surgical resection is not always achievable and 50% to 60% of adenomas continue to develop after subtotal resection. The natural history of these residual tumors remains poorly understood and their best treatment is not established.

Methods:
121 patients with residual pituitary adenomas who had not undergone postoperative radiotherapy and pharmacotherapy were studied retrospectively. The clinical follow-up period ranged from 20 to 180 months and the radiological period ranged from 9 to 162 months. Age, gender, type of surgery, preoperative tumoral volume and dimensions, residual volume and its localization, preoperative bleeding, T2 signal, and contrast enhancement pattern along with immunohistochemical findings such as Ki-67, p53, CAM 5.2, and SF-1 were studied as possible risk factors for tumor progression. The tumor growth-free survival rate (TGFSR) and residual tumor volume doubling time (TVDT) were calculated and correlated to them.

Results:
108 non-functioning and 13 functioning tumors were included. The median TVDT was 25.9 months. The reactivity to FSH/LH was the only variable with statistically significant correlation with the TVDT(p=0,024): age (p=0.232), type of surgery (p=0.935), cavernous sinus (p=0.818) or sphenoidal invasion (p=0.106), suprasellar extension (p=0.632), preoperative tumor volume (p=0.542), intratumoral bleeding (p=0.626), tumor T2 signal (p=0.851), contrast enhancement pattern (p=0.337) Ki-67 (p=0.833), p53 (p=0.386), SF-1 (p=0.560) and CAM 5.2 (p=0.328).

Conclusion:
Evidence on the natural history of the residual pituitary tumors is scarce. Apart from the immunohistochemical detection of FSH/LH receptors, no other risk factors for tumor progression were identified. Therefore, decision-making on their treatment remains difficult and complex. It must be made on a case-by-case basis

Proton Beam Radiotherapy versus Intensity-modulated Radiotherapy in Olfactory Neuroblastoma: A Multi-Institutional Propensity Matched Study

Poster number 2

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
Garret Choby, MD

Topic:
Anterior/central skull base

Introduction:
Adjuvant therapy for olfactory neuroblastoma (ONB) often includes radiotherapy. Radiotherapy delivery options include proton-beam radiotherapy (PBRT) and intensity-modulated radiotherapy (IMRT). The purpose of this study is to compare the differences in survival and recurrence for ONB patients being treated with PBRT and IMRT using propensity-matched cohorts from a multi-institutional database.

Methods:
This modern-era multicenter data originated from the retrospective review of all patients who presented with ONB between 2005-2021 at 9 academic, tertiary care centers within North America. Clinicopathologic features included treatment modalities, pathologic and MRI imaging status, modified Kadish staging systems, Hyams grading, margin status, and follow-up time. Outcomes collected for analysis included local recurrence-free survival (Local-RFS), regional recurrence-free survival (Regional-RFS), total recurrence-free survival (RFS), and overall survival (OS). Propensity matching of age, gender, Hyams grade, modified Kadish staging, resection margin-status, and chemotherapy use between treatment modalities was confirmed with chi-square and fisher exact tests.

Results:
Of 205 ONB patients, 18 were identified to receive PBRT. This cohort was matched to IMRT at a 1:1 ratio for a total of 36 patients. For IMRT, the 5-year local-RFS, Regional-RFS, RFS and 5-year OS were 69.2%, 92.9%, 64.8%, and 80.8%. For PBRT, the 5-year local-RFS, Regional-RFS,

RFS and 5-year OS were 90.9%, 79.7%, 56.7%, and 85.7%. Similarly, there were no differences in local RFS (P=0.34), regional RFS (P=0.29), total RFS (P=0.4), and OS (P=0.52) between groups.

Conclusion:
These findings support that IMRT and PBRT are comparable in overall survival and recurrence-free survival as treatment methods for advanced stage/grade olfactory neuroblastoma. Future investigations comparing quality-of-life outcomes between these radiotherapy modalities are needed to better delineate patient-centered treatments for ONB.

Carotid Plexus Sympathetic Nerves as a Landmark for the Abducens Nerve within the Cavernous Sinus during Endoscopic Endonasal Surgery: Cadaveric Anatomical Study and Surgical Consideration

Poster number 3

Type of abstract:
abstract for poster presentation

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Presenting author:
Paul A. Gardner, MD

Topic:
Anterior/central skull base

Introduction:
The abducens nerve is vulnerable to injury during endoscopic endonasal transcavernous surgery. In this study, the authors aimed to develop the surgical anatomical landmark and the relationship between the sympathetic nerves around the internal carotid artery (ICA) and abducens nerve within the cavernous sinus (CS).

Methods:
The relationship and patterns between the sympathetic nerves and abducens nerve were investigated in 15 cadaveric specimens (thirty sides). Intraoperative examples of this anatomical landmark are included.

Results:
The ascending sympathetic nerves were divided into 3 types: 1) Type I has 2 subtypes: Type IA, a single ascending branch that ran into the abducens nerve (17/30, 56.7%), and Type IB, a single ascending branch with a terminal bifurcation before merging into the abducens nerve or lateral cavernous sinus wall (4/30, 13.3%), 2) Type II, 2 ascending branches that extend to the abducens nerve and the lateral cavernous sinus wall (7/30, 23.3%), and 3) Type III, 3 ascending branches that connect to the abducens nerve and lateral CS wall (2/30, 6.7%).

Conclusion:

The relationship of the paraclival internal carotid artery sympathetic nerves and the abducens nerve within the CS as approached during endoscopic endonasal surgery was classified. The consistent relationship of ascending sympathetic nerves and the abducens nerve within CS provides a reliable anatomic landmark during the endonasal approach to the CS.

Limits of Endoscopic Contralateral Transmaxillary Approach to Jugular Foramen: An Anatomical Study

Poster number 4

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
Lesions of the jugular foramen (JF) pars nervosa pose surgical challenges due to its anteromedial position and lateral restriction by the pars venosa. The contralateral transmaxillary approach offers direct ventral access, but its anatomical limits remain undefined. We conducted a cadaveric study to delineate these boundaries and quantify exposure.

Methods:
Five latex-injected cadaveric heads (ten sides) were dissected using 0° and 45° endoscopes via binostril endonasal and contralateral transmaxillary routes. Pre-dissection volumetric CT scans were registered to intraoperative navigation (Q Guidance, Stryker©). After maximal exposure, measurements included: pterygoid tubercle to the distal superior medial jugular tubercle; jugular foramen (JF) upper lip to internal auditory canal (IAC) lower lip; and JF lower lip to hypoglossal canal upper lip. Length of JF exposure and maneuverability along its cranial nerves were recorded before and after transection of the pterygosphenoidal and petroclival synchondroses to quantify surgical access improvements.

Results:
Superior exposure reached the IAC (mean 8.1 mm, range 7.3–10.8), while inferior exposure was limited by the hypoglossal canal (mean 8.1 mm, range 7.3–10.8). The pterygoid tubercle to superior medial jugular tubercle distance averaged 30.8 mm (26.1–35.3). JF exposure

increased from 9.15 mm (6.6–11.7) to 13 mm (9.4–20) after synchondrosis transection. Freedom of motion improved from 21.3° (16.1–28.6°) to 28.5° (20.1–36.5°). Lateral JF exposure significantly increased with greater pterygoid–jugular tubercle distance after transection ($p = 0.04$).

Conclusion:
The contralateral transmaxillary endonasal approach provides direct access to the jugular tubercle and medial JF. Transection of pterygosphenoidal and petroclival synchondroses significantly increases exposure and maneuverability. However, surgical reach remains constrained by the narrow corridors between the IAC and JF, and between the JF and hypoglossal canal.

Endoscopic Endonasal and Transcranial Approaches to Sellar/Suprasellar Arachnoid Cysts: Indications and Outcomes

Poster number 5

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Distinguishing between sellar/suprasellar arachnoid cysts (AC) and Rathke's cleft cysts (RCC) can be challenging due to their similar clinical presentations and imaging characteristics. This study aims to identify indications and outcomes of Endoscopic endonasal approaches (EEA) vs transcranial (TCA) for sellar/suprasellar AC management.

Methods:
The authors performed a retrospective analysis of records from the University of Pittsburgh Medical Center (UPMC), focusing on patients with sellar/suprasellar AC who underwent surgical intervention. The primary outcomes evaluated included indications, clinical outcomes, and complications.

Results:
A total of 17 patients underwent surgical treatment of sellar (n = 6) or suprasellar extension (n =11) ACs. Most patients presented with visual deficits (88.2%). EEA was utilized in 11 cases, while TCA was used in 6 cases. The most common indications for EEA were an initial impression of RCC (n = 9), or cystic pituitary adenoma (n = 2). During a follow-up of 38.9 months, vision improved in all patients who underwent either TCA or EEA. Complications in the EEA group included CSF leakage in 6 patients. The TCA group reported one recurrence, managed by an EEA.

Conclusion:

Both EEA and TCA provide favorable visual outcomes in the management of sellar/suprasellar arachnoid cysts. EEA offers a viable option, particularly for cases initially labeled as Rathke's cleft cysts or pituitary adenomas, given its minimally invasive nature, safety, and efficacy.

Treatment Strategies for Recurrent Olfactory Neuroblastoma

Poster number 6

Type of abstract:
abstract for poster presentation

Authors:
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Carl H. Snyderman, MD, MBA

Topic:
Anterior/central skull base

Introduction:
Recurrent disease following treatment for olfactory neuroblastoma (ONB) is not uncommon, occurring in 30-50% of cases. Detailed management of recurrences stratified as local to or distant from the primary tumor has not been previously reported. The present study summarizes the treatment of recurrent olfactory neuroblastoma from one institution.

Methods:
A single-institution retrospective review study design was used. Patients presenting with recurrent ONB from April 2006 to February 2021 were included. Demographics and disease-specific history were reviewed. Treatment history is described. Descriptive statistics were used.

Results:
There were 27 cases with mean time to recurrence of 59 months. Location of recurrence was local (sinonasal/orbital) in 48%, local intracranial in 41%, distant intracranial in 33%, regional in 48%, and distant extracranial in 11%. Treatment of recurrence included surgery: 16 local disease, 2 distant intracranial disease, 12 regional disease; irradiation: 14; chemotherapy or immunotherapy: 2; radioligand therapy: 7. At one year, 20% had no evidence of disease (NED); at 5 years, 16% were NED. 28% had at least one additional recurrence; 48% had persistent disease. Additional recurrences occurred a mean of 39 months after treatment of prior recurrences.

Conclusion:
Surgery, radiation and radioligand therapy were the most common salvage treatments for recurrent olfactory neuroblastoma. Persistent disease and additional delayed recurrences were not uncommon. Distant intracranial disease was addressed surgically in two cases; however, it was more frequently managed with radiation and radioligand therapy.

Expanding the Limits of the Endoscopic Endonasal Approach to the Petrous Apex through the Addition of the Contralateral Transmaxillary Corridor and Stepwise Mobilization of the Paraclival Internal Carotid Artery

Poster number 7

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
Paul A. Gardner, MD

Topic:
Anterior/central skull base

Introduction:
Petrous apex access via the endoscopic endonasal approach (EEA) is limited, constrained by the internal carotid artery (ICA). The contralateral transmaxillary approach (CTMA) was developed to enhance petrous apex exposure, parallel to the petrous ICA through the anteromedial petrous triangle. This study defines the petrous apex resection via EEA and CTMA, incorporating stepwise ICA mobilization.

Methods:
Endoscopic anatomic dissections were performed in five latex-injected cadaveric heads (10 sides). The ICA (parasellar to horizontal petrous segment) was mobilized in 3 steps, with 4 volumes obtained (before mobilization and after each step): 1. lingual process removal, 2. dissection of the pterygosphenoidal fissure, removal of the pterygoid tubercle, and partial detachment of the Eustachian tube, 3. sectioning of the parasellar ligaments. Bone removal was achieved via the CTMA, with endoscopic visualization and dissection through the EEA. The degree of ICA lateralization and the pyramidal bone volume removed in each step were calculated using stereotactic measurements taken with image guidance.

Results:
The mean distance of ICA mobilization, measured at its midclival portion, was 3.01 mm, 6.74 mm, and 10.08 mm in after steps 1, 2, and 3, respectively. This significantly increased the exposure and resection volume of the petrous apex, from 187.78 mm^3 prior to mobilization, up to 332.70 mm^3, 509.00 mm^3, and 869.59 mm^3 after each ICA maneuver. These maneuvers allowed for progressively greater petrous bone removal. Additionally, a structure referred to as the Supramedial Petrous Pyramid has been proposed, representing the maximum pyramid-shaped bone removal achievable through EEA and CTMA when combined with ICA mobilization.

Conclusion:
Mobilization of the paraclival ICA via EEA and CTMA provides greater access to the petrous apex and paraclival regions. This technique significantly expands the lateral surgical exposure of ventral endoscopic skull base procedures but has a steep learning curve requiring further clinical study.

Lateral orbitotomy for trigeminal schwannomas: surgical technique, clinical outcomes, and limitations

Poster number 8

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
Trigeminal Schwannomas (TSs) are rare, mostly benign tumors that exhibit an indolent clinical course. The lateral orbitotomy approach (LOA), with or without endoscopic assistance, has emerged as a novel skull base route, particularly for accessing lesions confined to the middle cranial fossa.

Methods:
All TS cases that underwent LOA through a lateral canthus incision during the last decade in our department were retrospectively reviewed. The operative technique was detailed, and clinical outcomes were analyzed. Eight patients (4 females) with an average age of 37 years were included. The mean maximum tumor diameter was 2.7cm (range:1.8-3.7cm). Seven were primary and one was recurrent, the latter in a patient with neurofibromatosis type 2.

All tumors were predominantly in the middle cranial fossa, with four having either a small or medium posterior fossa component (6: Samii Type A; 2: -Type C).

Results:
Clinical presentation consisted of trigeminal neuralgia (n=6), facial hypoesthesia (n=6), headache (n=5) and double vision (n=3). All patients underwent gross (n=6) or near total (n=2) resection. Neuralgia, while not exacerbated, reappeared in 4 patients after surgery and was ameliorated with medication. Two patients sustained new trigeminal hypoesthesia, and preoperative abducens palsy either improved or resolved in all three cases. No orbital complications, cerebrospinal fluid leak or mortalities occurred. Two lesions had minor recurrence during a mean follow-up of 42.9 months. The first underwent radiosurgery 6 years postoperatively and the second is under close surveillance.

Conclusion:
Minimally invasive LOA stands as a plausible and aesthetically favorable surgical corridor for addressing TSs of the middle cranial fossa, even with extension into the posterior fossa. However, additional study is required as the approach may be limited for tumors with significant posterior or infratemporal fossa involvement.

The Mandibular Strut and Inferior Petrous Carotid Triangle as Key Anatomical Landmarks for Localizing the Parapharyngeal Internal Carotid Artery during the Endoscopic Endonasal Approach

Poster number 9

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
The parapharyngeal segment of the internal carotid artery (ICA) is the most concealed segment of the artery from an open approach. The endoscopic endonasal approach (EEA) affords more direct access from a ventral perspective, yet anatomical variability and the lack of consistent anatomical references may endanger the vessel's integrity.

Methods:
We aimed to define anatomical landmarks for the safe localization the parapharyngeal ICA (ppICA) relevant to the endoscopic endonasal approach (EEA). Four cadaveric heads (8 carotids) were dissected endonasally employing "the transpterygoid-transmandibular strut-transmedial jugular tubercle-inferior transpetrosal EEA". Extensive endoscopic laboratory investigation of the ICA course led to the development of a technique, which was subsequently demonstrated in a nasopharyngectomy and presented as a step-by-step guide.

Results:
Using a transpterygoid approach, the foramen lacerum was reached, the parasellar and paraclival ICA segments were exposed, and the lingual process removed. Drilling proceeded through the mandibular strut and adjacent petrous base along the inferolateral surface of the horizontal petrous ICA (hpICA) up to the vertical petrous ICA (vpICA). The medial jugular tubercle was drilled, and the eustachian tube disconnected and excised. Dissection was performed from superior to inferior using the vpICA to locate the carotid foramen and ppICA. The “inferior petrous carotid (IPC) triangle” was identified and delineated by the ventral hpICA, vpICA and the line connecting the carotid foramen to the lacerum cartilage.

Conclusion:
The importance of the IPC triangle lies in providing access for an anteroinferior petrosectomy, which is obstructed by the hpICA in an open approach, while its inferior apex marks the depth of the ppICA, enabling safer parapharyngeal space dissection. Both the mandibular strut and IPC triangle facilitate reliable craniocaudal localization of the ppICA during EEA.

Endoscopic Endonasal Neurosurgery Beyond the Sella - Single Center Experience with the Extended approach

Poster number 10

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
The endonasal endoscopic approach (EEA) was initially introduced as a means of accessing sellar region pathology. Over time, driven by the ever evolving technology, the EEA indications have been extending beyond the once held “standard” pathology and anatomy. Our aim is to review our experience with the extended EEA (eEEA).

Methods:
Surgical records database was screed for patients treated at the Clinical Hospital Center Zagreb, Departments of Neurosurgery and ENT between 2010 and 2024 for skull base pathology other than pituitary neuroendocrine tumors, using the eEEA. After identifying cases, individual patient data were extracted, including on: i) sociodemographic variables; ii) pathology (type of lesion, anatomical extension; iii) surgery (type of procedure, duration, intraoperative complications); iii) outcome (extent of resection, local postoperative status, global functional outcome and oncological control at latest follow-up for malignancy).

Results:
Over the screened period, the lesions operated via the eEEA included, among other, Rathke cysts, arachnoid cysts, echninococcus cyst, meningiomas, chordomas, chondrosarcomas, metastates, esthesioneruoblastomas, baseocellular carcinoma, and paranasal sinus malignancy. Compared to open surgical procedures for comparable pathology, the eEEA procedures took longer, although the average operative time shortened significantly over the observed period. The extent of resection was greater in the eEEA cases, as was long-term oncological control for the malignancies and global functional outcome. At the same time, complications were more frequent, mostly on the account of postoperative cerebrospinal fluid (CSF) leaks.

Conclusion:
The eEEA has proven to be at least as effective or superior for surgical treatment of skull base lesions accesible via the endonasal route and extending beyond the sellar space. The higher rates of CSF leaks are to be kept in mind when considering the approach.

Nationwide Trends and Outcomes of Transsphenoidal Pituitary Surgery in Brazil: A 15-Year Analysis from the Public Healthcare System

Poster number 11

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Transsphenoidal pituitary surgery is the standard approach for

sellar lesions worldwide. However, little is known about its epidemiology, outcomes, and economic burden in low- and middle-income countries. We aimed to analyze nationwide trends of transsphenoidal pituitary surgery in Brazil, using 15 years of data from the public healthcare system.

Methods:
We conducted a retrospective, population-based study including all patients who underwent transsphenoidal pituitary surgery between 2010 and 2024 in Brazil's Unified Health System (SUS), the public health system of Brazil. Data were extracted from the national hospital database, covering surgical volume, in-hospital mortality, length of stay, and costs. Regional variations and temporal trends were analyzed.

Results:
A total of 8,934 surgeries were performed nationwide over 15 years. The Southeast region was responsible for 65% of the surgeries. Surgical volume increased significantly in the Midwest. The median length of stay was 11.4 ± 1.2 days, with a progressive decline over time. The average SUS reimbursement was US$878 ± 97 per hospitalization, showing a

significant upward trend from 2010 to 2024, with similar values across regions. The overall in-hospital mortality rate was 1.4%.

Conclusion:
This first nationwide Latin American study of transsphenoidal pituitary surgery within a public system reveals marked regional disparities, with concentration in the Southeast and limited access in the North/Northeast. The procedure remains safe with stable low mortality, yet SUS reimbursement is markedly below international standards despite longer hospital stays.

Endoscopic Endonasal Clipping of Intracranial Aneurysms: A Systematic Review and Subgroup Analysis of Anterior and Posterior Circulation Outcomes

Poster number 12

Type of abstract:
abstract for poster presentation

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Presenting author:
Afonso Dutra-Melo

Topic:
Anterior/central skull base

Introduction:
The endoscopic endonasal approach (EEA) has been explored as an alternative route for intracranial aneurysm clipping, but its true role remains undefined. We performed a systematic review to evaluate outcomes, complications, and circulation-specific differences in patients treated with this technique.

Methods:
A PRISMA-compliant search of PubMed, Embase, and Cochrane through July 2025 identified 30 reports describing 50 patients with 59 aneurysms treated via EEA. Technical success was assessed per aneurysm, while complications and functional outcomes were analyzed per patient. Evidence certainty was rated with GRADE.

Results:
Among 59 aneurysms, 42 (71.2%) were anterior and 17 (28.8%) posterior circulation. Clipping was attempted in 56 cases, with complete occlusion in 54 (96.4%). Postoperative complications occurred in 15/50 patients (30.0%), most commonly cerebrospinal fluid (CSF) leak (12.0%), infection/meningitis (8.0%), and diabetes insipidus (8.0%). Ischemic stroke was confined to posterior aneurysms (28.6%). Functional outcomes were favorable overall, with 39/48 patients (81.3%) achieving full recovery. Anterior circulation cases showed higher rates of good recovery compared with posterior cases, which carried greater ischemic risk and disability.

Conclusion:
EEA clipping achieves high occlusion rates in carefully selected anterior circulation aneurysms, but posterior circulation lesions remain associated with higher complication rates and less favorable recovery. Current evidence, derived exclusively from case reports and small series, supports its role as a niche technique reserved for expert skull base–vascular teams.

The long-term impact of facial palsy on the quality of life of vestibular schwannoma patients

Poster number 13

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
To compare long-term quality of life (QoL) of vestibular schwannoma (VS) patients with and without facial palsy.

Methods:
This longitudinal cohort study was conducted at a tertiary referral centre for vestibular schwannoma. To assess QoL, VS patients completed the Penn Acoustic Quality of Life (PANQOL) questionnaire twice; at baseline and six years later. The results of patients with facial palsy were compared to those without. The effect of facial nerve function, sex and tumour size on PANQOL scores was assessed.

Results:
484 patients completed the PANQOL. At baseline, 94% of the patients had no or mild facial palsy, and a mean PANQOL score of 71 out of 100 points (± 18), while patients with moderate to severe palsy (6%) scored 61 points (± 19). After 6 years, the PANQOL total scores remained relatively stable (70 and 57, respectively). There is considerable inter-individual variation in both groups, but the difference in average PANQOL scores do not exceed the predefined minimal clinically important difference (MCID) of 12.5 points.

Conclusion:
VS patients with facial palsy on average have a lower QoL than those without, and time does not seem to mitigate the impact of facial palsy. The difference did not exceed the MCID, which may indicate a limited sensitivity of PANQOL for the impact of facial palsy on VS patients.

Positioning in Endoscopic Endonasal Skull Base Surgery (PosESS-Study): Semi-Sitting Versus Supine: a Prospective Randomized Controlled Trial

Poster number 14

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
Endoscopic endonasal pituitary surgery is standardly performed with the patient in supine position. In semi-sitting position, the intracranial pressure is lower due to decreased venous congestion, potentially reducing intraoperative bleeding. Aim of the study was to compare the supine and the semi-sitting position (head elevation of 30°) in endoscopic endonasal pituitary surgery.

Methods:
This study was a prospective randomized clinical trial. Inclusion criteria were as follow: adult patients with a presumed pituitary adenoma, who are suitable for endoscopic endonasal surgical resection. The primary outcome was intraoperative bleeding, assessed by the blood loss and the frequency of hemostatic maneuvers. Secondary outcomes included surgical ergonomics and the incidence of air embolism. A total of 56 patients were randomized (28 patients (50%) in the semi-sitting and 28 (50%) in the supine group). There were no differences in the baseline characteristics of both patients' groups.

Results:
The mean blood loss was 185ml (±130) in the semi-sitting vs. 277ml (±181) in the supine group (reduction of 33%) (p=0.033). The mean frequency of haemostatic maneuvers was 88 (±36) in the semi-sitting vs. 110 (±43) in the supine group (reduction of 20%) (p=0.049).

There were no significant differences in the incidence of air embolism in the semi-sitting (n=3/24, 15.8%) vs. in the supine group (n=0, 0%), air embolisms were all short-lasting and self-limiting and did not cause hemodynamical instability in the patient. There was no difference in the surgical ergonomic score.

Conclusion:
The semi-sitting position in endoscopic endonasal pituitary surgery is associated with reduced blood loss and fewer hemostatic maneuvers compared to the supine position, potentially improving the surgical workflow. Further studies are needed to determine whether these findings also apply to extended and transcavernous procedures.

Neurosurgical Outcomes of a Developing Endoscopic Skull Base Program: Six-Year Experience from Mostar

Poster number 15

Type of abstract:
abstract for poster presentation

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Presenting author:
Josip Lesko

Topic:
Anterior/central skull base

Introduction:
The introduction of endoscopic endonasal surgery at University Clinical Hospital Mostar was a landmark in regional neurosurgical practice. The first procedures in 2019 required a unique multidisciplinary effort uniting endocrinologists, anesthesiologists, otorhinolaryngologists, and neurosurgeons. We report neurosurgical outcomes of the first 100 patients, reflecting the learning curve and consolidation of the program.

Methods:
A retrospective review was performed of 100 consecutive patients operated between 2019–2025. Indications included pituitary adenomas, meningiomas (tuberculum sellae, olfactory groove), clival chordomas, craniopharyngiomas, and pediatric lesions. Data included extent of resection (EOR), visual outcomes, hormonal remission, perioperative complications, and hospital stay.

Results:
- Pituitary adenomas constituted the majority (70%), followed by meningiomas (12%), chordomas (8%), craniopharyngiomas (6%), and pediatric cases (4%).

- Gross total resection (GTR) was achieved in 74% overall, with higher rates in pituitary adenomas (82%) compared to non-pituitary tumors (62%).

- Visual improvement occurred in 78% of patients with preoperative deficits.

- Hormonal remission was achieved in 64% of functioning adenomas.

- Transient diabetes insipidus occurred in 11% of cases, permanent DI in 3%, meningitis in 2%.

- No perioperative mortality was recorded.

- Operative times and complication rates improved significantly after the first 30 cases, underscoring the learning curve.

Conclusion:
From a neurosurgical perspective, six years of experience confirm that advanced endoscopic skull base surgery can be safely and effectively implemented in a smaller regional center. Clinical outcomes and complication rates are comparable to those of high-volume institutions, validating the multidisciplinary model and highlighting the importance of surgical experience in achieving optimal results.

Surgical management of pituitary tumours: a 15-year single-centre experience from Zagreb

Poster number 16

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
To summarise the surgical management and evolving outcomes of pituitary tumours treated at a single academic centre from 2011 to 2025.

Methods:
A retrospective review of all patients referred via the Department of Endocrinology, University Hospital Centre Zagreb, for operative treatment of pituitary tumours was performed. Cases were classified by diagnosis and year. Published institutional data on residual tumour rates and postoperative cerebrospinal fluid (CSF) leak were used to contextualise trends.

Results:
Over 15 years, 771 pituitary operations were recorded. Non-functioning adenomas were the most common indication (109 operations), followed by growth-hormone-secreting adenomas causing acromegaly (101), Cushing's disease (77), craniopharyngiomas (28) and macroadenomas (27). Annual volume increased from 32 surgeries in 2012 to 66 in 2024. Earlier institutional results showed complete resection in 36.2 % of cases operated between 2005 and 2011; residual tumour remained more frequently in functional adenomas. Subsequent adoption of endoscopic skull-base reconstruction has reduced postoperative CSF leak to 2.4 %. Further analyses will examine demographic factors, surgical approach and long-term endocrinological remission.

Conclusion:
The University Hospital Centre Zegreb pituitary surgery programme has evolved into a high-volume, multidisciplinary service, with a rising caseload and predominance of non-functioning adenomas. Preliminary evidence suggests improved outcomes over time, with lower complication rates and enhanced skull-base reconstruction. A full analysis will clarify predictors of surgical success and inform future practice.

Management of Ruptured Paraophthalmic Internal Carotid Artery Aneurysm with Extension into the Sphenoid Sinus: A Case Report

Poster number 17

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Epistaxis can rarely present as the first manifestation of ruptured internal carotid artery aneurysms extending into the paranasal sinuses. These cases represent a diagnostic and therapeutic challenge requiring a multidisciplinary approach.

Methods:
We report a case of a 63-year-old female with arterial hypertension, on anticoagulant therapy (warfarin), admitted with severe epistaxis. MSCT angiography revealed a large aneurysmal expansion of the paraophthalmic segment of the left internal carotid artery descending into the sphenoid sinus. Digital subtraction angiography confirmed the diagnosis, and coil embolization was performed.

Results:
Follow-up imaging at 6 weeks revealed extrusion of coils into the sphenoid sinus, without any symptoms. 5 months later, the patient developed a foreign body inflammatory reaction in the sinus, which was surgically and medicaly treated. 1 year later, epistaxis originating from the same localisation occurred again, and was treated by coil embolisation and endoscopic approach which included muscle packing of the sinus.

Conclusion:

Ruptured ICA aneurysms extending into the sphenoid sinus are rare but high-risk vascular malformations. Muscle packing remains the gold standard salvage technique in selected cases where coil embolisation proves unsuccessful. Prompt diagnosis, multidisciplinary decision-making, and combined endovascular and endoscopic treatment can provide durable outcomes.

Treatment Outcome in Patients with Large Craniopharyngiomas:

A Single-Centre Cohort Study

Poster number 18

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
Craniopharyngioma is a rare tumor accounting for 1.2–4.6% of all intracranial tumors. Patients may present with endocrine abnormalities and/or progressive visual dysfunction. Surgery is the primary treatment but may lead to severe morbidity. The optimal strategy to achieve tumor control while preserving visual and endocrine function remains a point of discussion.

Methods:
Objective: This study evaluates progression-free survival (PFS), overall survival (OS), and treatment-associated complications in patients treated for primary CP. Secondary outcome measures included ophthalmologic and endocrinologic outcomes.

Methods: Records of eighteen adult patients with a primary, histologically confirmed CP diagnosis were reviewed at Maastricht University Medical Center (MUMC). Descriptive statistics were used to summarize patient characteristics, treatment details, and outcomes. PFS and OS curves were generated using the Kaplan-Meier method. Treatment-related complications were graded according to the Common Terminology Criteria for Adverse

Events (CTCAE) v6.0 guidelines.

Results:
Median PFS and OS were 1.5 years (range: 0.1–11.7) and 7.9 years (range: 0.4-24.9), respectively. Six patients received postoperative RT due to tumor progression or inoperable tumor remnant. Two patients developed postoperative hypothalamic complications and died. Fifteen patients experienced (transient) visual deterioration, either post-operative (7), radiotherapy (4), or reoperation (4). Visual acuity in patients improved (11), worsened (5), or remained stable (2) and visual field deficits were improved (6), worsened (7), or stable (5) at last follow-up. Endocrinologic outcomes included panhypopituitarism (9), partial hypopituitarism (5), central diabetes insipidus (8), and no pituitary deficiency (2).

Conclusion:
Overall, an 89% survival rate was achieved in this cohort, while 50% of patients experienced tumor recurrence. Preexisting ophthalmological dysfunction stabilized or improved in the majority of patients after treatment. Still, surgery and radiotherapy are associated with high complication rates.

Mastering Endoscopic Endonasal Surgery for Non-Functioning Pituitary Neuroendocrine Tumors (PitNETs) During Residency: A Prospective Single-Center Study

Poster number 19

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
The endoscopic endonasal approach (EEA) is a is a well-established technique for the treatment of PitNETs. Its technical complexity requires a structured learning curve. This study prospectively evaluated surgical outcomes and operative times in residents at different training levels to assess the influence of experience and tumor complexity.

Methods:
We prospectively collected data from patients undergoing EEA for non-functioning macroadenomas between January 2023 and July 2025. Four residents in their fourth (PGY-4) and fifth (PGY-5) training years performed surgeries under senior supervision. Patients with prior EEA or functioning tumors were excluded. Primary outcome was operative time, including nasal, sphenoidal, sellar, and closure phases. Secondary outcomes included extent of resection, complications, and hospitalization. Cases with intraoperative cerebrospinal fluid (CSF) leak were excluded from time analysis but analyzed separately. Statistical analysis included Student's t-test, chi-square, and multivariate regression with significance set at $p < 0.05$.

Results:
Of 133 eligible patients, 120 were included (60 PGY-4, 60 PGY-5). Gross total resection (GTR) was achieved in 87% of cases, with no significant difference between PGY-4 and PGY-5 (85% vs. 88%). Tumor complexity significantly reduced GTR (94% Knosp 1–2 vs. 77% Knosp 3–4, $p=0.045$). Mean operative time decreased with training level (126.6 vs. 100.1 minutes, $p<0.001$). PGY level influenced all surgical phases ($p>0.001$), whereas Knosp grade prolonged only the sellar phase ($p=0.008$). No significant differences regarding complication rates and length of hospitalization between groups.

Conclusion:
Endoscopic endonasal surgery can be safely mastered during residency. Experience significantly reduces operative time across all phases, while tumor complexity primarily impacts the sellar step. A structured, supervised, stepwise training approach supported by neuronavigation optimizes the learning curve and ensures favorable surgical and clinical outcomes.

Influence of Surgical Corridor on Postoperative Brain Edema in Anterior Midline Skull Base Meningiomas (AMSBMs)

Poster number 20

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Anterior midline skull base meningiomas (AMSBMs) are surgically demanding lesions. This study evaluates the impact of different surgical approaches on surgical outcome and postoperative brain edema, using FLAIR MRI volumes as a marker of parenchymal alteration.

Methods:
This single-center retrospective study analyzed 48 patients with olfactory groove, planum sphenoidale, or tuberculum sellae meningiomas treated from 2015 to 2023. Approaches included transcranial (n=38) and extended endoscopic endonasal (EEEA, n=10). Extent of resection, complications, and FLAIR MRI volumes were assessed at 3 months and 1 year. Multivariate analysis was performed to determine independent predictors of postoperative edema.

Results:
No differences in extent of resection were observed between surgical approaches. At 3 months, preoperative tumor volume >10 cm^3 predicted significantly higher postoperative FLAIR volumes ($p<0.05$). At 1 year, surgical approach was the strongest determinant: EEEA resulted in significantly lower residual FLAIR volumes than transcranial approaches ($p=0.041$). Among transcranial techniques, anterior approaches, especially the transfrontal-sinus corridor, were associated with significantly reduced FLAIR volumes ($p=0.026$ and $p=0.012$). No associations were found with histology, WHO grade, or adjuvant therapies.

Conclusion:
Early postoperative edema is primarily volume-dependent, while long-term FLAIR outcomes are determined by surgical approach. Endoscopic and minimally invasive anterior transcranial corridors significantly reduce residual brain alterations, underscoring the need to integrate tumor size and surgical pathway in preoperative planning for optimal outcomes.

C1–C2 Transorbital Fixation: Cadaveric Study and Technical Nuances

Poster number 21

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
Anterior C1–C2 fixation has been described through both endonasal and transoral corridors, though limitations -primarily related to the achievable trajectory- still persist. The aim of this study is to assess the feasibility of anterior C1-C2 transarticular fixation via the combined medial TONES and endoscopic endonasal approach (MT/EEA).

Methods:
Four cadaveric heads were dissected. Neuronavigation identified entry points and trajectory. Medial orbital wall resection below the frontoethmoidal suture was performed via a conjunctival precaruncular or a superior eyelid incision. EEA entailed bilateral anterior ethmoidectomies. The nasopharyngeal mucosa, pharyngobasilar fascia, longus capitis and

rectus capitis anterior muscles were excised. Each MT accessed the contralateral C1–C2 joint. In one specimen, the screw tunnel was created from posteriorly, and screws were placed using the MT/EEA to confirm the adequacy of the corridor. Three types of screw entry and trajectory were performed purely via the MT/EEA employing a reverse, modified stand-alone Magerl technique.

Results:
The first entry point (EP) was the midpoint of the anterior C1arch craniocaudally, medial to a vertical line at the medial edge of the condyle-C1joint on the coronal plane. Fixation transgressed the C1-C2facets and C2isthmus. The 2ndEP was on the upper half of the C1arch craniocaudally, within two vertical lines bordering the medial half of the craniocervical joint up to C1 on the coronal plane. Fixation passed the C1-C2joint and C2isthmus but abutted the vertebral artery. The 3rdEP was at the midpoint of the C1arch craniocaudally and same as before on the coronal plane. Fixation traversed the C1-C2joint; not the isthmus.

Conclusion:
The combined MT/EEA can be effectively utilized for the placement of C1-C2 transarticular screws, obviating the need for angled instruments. Future clinical applications may include managing surgical instability following EEA for craniocervical junction pathology. Nevertheless, a high-riding vertebral artery and a narrow C2 isthmus pose significant challenges to this technique.

Skull base complications of paediatric otogenic and sinogenic infections in 129 patients.

Poster number 22

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
This study aims to characterise the clinical presentation, microbiology, treatment and outcome of complicated otogenic and sinogenic infections in children treated at two university hospitals in The Netherlands. Complications such as meningitis, skull base osteomyelitis (SBO), abscess formation and cerebral venous sinus thrombosis (CVST) are reported and analysed.

Methods:
This retrospective multicentre cohort includes children under 18 years treated at Maastricht UMC+ or Radboudumc between 2014 and 2024 for complicated otogenic or sinogenic infections. Clinical, radiological, microbiological, treatment and follow-up details were analysed using descriptive analysis and non-parametric tests (significance at $p \leq 0.05$).

Results:
A total of 129 children were included (median age 9 years; 60% male). Otogenic infections were more associated with cranial nerve palsy and CVST, while sinogenic infections showed higher rates of abscess formation. A notable increase in complicated infections and a rise in Streptococcus pyogenes was observed following COVID-19. All patients received antibiotics, with a median of 52 days for otogenic infections and 41 days for sinogenic infections ($p<0.001$). At follow-up 75% achieved good recovery (Glasgow Outcome Scale 5), one patient (0.8%) died.

Conclusion:
Complicated otogenic and sinogenic infections in children remain rare but require multidisciplinary management and prolonged antibiotic treatment. This experience-based study reflects institutional best practices resulting a favorable outcome. The post-pandemic rise in incidence highlights the need of clinical awareness.

Pituitary hyperplasia is a rare cause of optic chiasm compression. We report a case of a young woman presenting with progressive headaches and visual field deficits. MRI showed pituitary hyperplasia and surgical management was decided.

Poster number 23

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Pituitary hyperplasia (PH) is an underdiagnosed entity. While physiological PH is well documented, idiopathic cases with visual symptoms remain rare. We report a case with progressive visual field loss due to PH, in whom early surgical decompression was decided preemptively, given her desire for pregnancy and a unique anatomical predisposition to chiasmal compression.

Methods:
A 25-year-old woman presented with a 6-month history of headaches and progressive bilateral superior visual field loss.

MRI revealed a symmetrically enlarged pituitary gland (9 × 9.1 × 8 mm), with no focal lesion but with a convex superior border and subtle chiasmal compression. The optic chiasm was displaced by the gland due to a flattened sella and upward orientation of the planum sphenoidale. Notably, 3D recons-truction allowed us to calculate an acute canalicular optic nerve–chiasm angle of 165°, possibly contri-buting to early compression.

Results:
Given the confirmed visual symptoms, reproductive plans, and anticipated physiological gland growth, endoscopic endonasal transsphenoidal decompression was performed. A limited anterior re-section was made to visualize the diaphragma sellae. Histology confirmed diffuse pituitary hyperpla-sia. Postoperatively, visual acuity and fields improved, without any

pituitary insufficiency. MRI showed resolution of chiasmal edema, despite stable gland size—highlighting the mechanical benefit of decompression with limited antehypophysectomy.

Conclusion:
This case provides several clinically relevant insights:

Anatomical vulnerability can predispose to symptomatic PH.

The optic nerve–chiasm angle may be a novel marker of early visual compromise.

Physiological pituitary growth in pregnancy is a known risk. Our proactive approach was guided by this consideration.

Anticoagulation for cavernous sinus thrombosis: A systematic review and individual patient data meta-analysis

Poster number 24: This poster presentation has been withdrawn due to institutional constraints

Presenting author:
Chatdanai Akarapas

A case of Accessory nerve schwannoma mimicking hypoglossal schwannoma

Poster number 25

Type of abstract:
abstract for poster presentation

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Topic:
Anterior/central skull base

Introduction:
Jugular foramen schwannoma is rare. Among them, accessory nerve schwannoma is very rare. We experienced a case in which a patient was diagnosed with hypoglossal schwannoma preoperatively, but was later diagnosed with accessory nerve schwannoma based on intraoperative findings, and we report this case.

Methods:
Illustrative Case: A 62-year-old female. She was diagnosed with dysarthria and right-sided tongue deviation and atrophy, and a head MRI revealed a 17mm tumorous lesion on the dorsal side of the right internal carotid artery that appeared to extend into the right hypoglossal canal (HC). A hypoglossal schwannoma was suspected and surgical treatment was proposed, but the patient requested observation. Three years later, she developed dysphagia, hoarseness, and atrophy of the right trapezius muscle. MRI showed the tumor had grown to 30 mm and surgery was planned via transcondylar approach to open the HC and resect the tumor.

Results:
Intraoperative findings confirmed an extracranial tumor at the C1 level. Upon opening the HC, no lesions were found within the HC that were continuous with the tumor identified at the C1 level, and the tumor was found to be continuous with the JF. When the intradural examination was performed, the hypoglossal nerve was normal, and a tumorized accessory nerve was found, leading to a diagnosis of accessory nerve schwannoma. The tumor was completely removed, and the tongue deviation improved postoperatively.

Conclusion:

Retrospectively reviewing CT findings, The HC's enlargement was observed only on the extracranial side and was fused with the JF. It can be difficult to differentiate between JF schwannoma and hypoglossal schwannoma based on initial symptoms, so it is important to consider the differential diagnosis based on detailed imaging findings.

Should the orbital periosteum be widely opened during orbital tumor surgery?

Poster number 26

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
Yoshihiro Natori

Topic:
Anterior/central skull base

Introduction:
In orbital tumor surgery, the periosteum of the orbit is opened. We conducted an anatomical study to determine whether a wide opening or a minimal opening is preferable.

Methods:
A cadaver head was used, into which colored silicone had been injected via the carotid artery and vein. The orbital region was sectioned in the coronal plane. The area immediately behind the eyeball was immersed in acetone solution for 15 minutes to dissolve the adipose tissue, after which the condition was observed.

Results:
The extraocular muscles are enclosed by connective tissue containing adipose tissue, but the space within the muscle cone was recognized as essentially a single compartment.

Therefore, when the lesion has breached the connective tissue membrane surrounding the extraocular muscles and is in contact with the orbital periosteum, the fundamental approach is to make a minimal incision at an appropriate location. However, for lesions confined within the muscle cone, reliable disruption of the connective tissue membrane surrounding the extraocular muscles is essential to reach the muscle cone. This necessitates a relatively extensive orbital periosteal incision.

Conclusion:
Based on the size and location of the lesion, the necessity for decompression should be considered. If indicated, extensive exposure of the orbital periosteum is necessary.

NUT cell carcinoma masquerading in the central skull base: A rare case in the sphenoid sinus.

Poster number 27

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
Prempreet Kaur Manjit Singh

Topic:
Anterior/central skull base

Introduction:
Nuclear protein in testes (NUT) cell carcinoma is a rare and aggressive malignancy with poor prognosis often arising from the midline structure in the head and neck region.

Methods:
We report a case of a 73-year-old man with sphenoid NUT cell carcinoma who presented with a one-week history of severe headache, nausea, vomiting and right eye pain. Contrast enhanced computed tomography of paranasal sinus showed opacity and erosion of the floor of the right sphenoid sinus. In addition, magnetic resonance imaging of the paranasal sinuses, brain, and orbits demonstrated irregular and enhancing soft tissue at the roof of nasopharynx with extension to the right sphenoid sinus, right cavernous sinus and right carotid canal. Presuming fungal sinusitis, we proceeded with an endoscopic sinus surgery aiming to debride.

Results:
However, intraoperative findings revealed unhealthy mucosa and bony defect in the floor and posterior wall of the right sphenoid sinus, with whitish debris. There were no fungal ball or purulent discharge seen. The histopathological report revealed NUT carcinoma of the sphenoid sinus. Due to the local and distant spread of the disease, the patient was referred for oncological management.

Conclusion:
We wish to highlight the rare occurrence of NUT cell carcinoma at sphenoid, and the fact that it was disguising as a fungal invasion.

Reconstruction of Recurrent Orbital Squamous Cell Carcinoma Using a Free Rectus Abdominis Flap and Patient-Specific PEEK Implant: A Case Report

Poster number 28

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Squamous cell carcinoma (SCC) of the orbit is a rare, aggressive malignancy, usually caused by invasion from adjacent cutaneous or sinonasal tumors. Its proximity to vital neurovascular structures and risk of perineural spread complicates treatment. A multimodal approach with surgery, radiotherapy and reconstruction is essential for disease control and functional recovery.

Methods:
A 56-year-old female patient with recurrent SCC of the right orbit was evaluated. Previous treatments included chemoradiotherapy (2020) and CyberKnife stereotactic radiotherapy (16 Gy, 2022). In December 2023, she underwent resection of recurrent SCC involving the right orbit and parapharyngeal space. Follow-up MRI in June 2025 revealed a new recurrence. In July 2025, bifrontal craniotomy with osteoplasty and tumor resection was performed. In August 2025, reconstruction of the orbital defect was carried out using a free flap and a patient-specific PEEK implant.

Results:
A bicoronal incision with facial degloving was performed. The previously osteosynthesized frontal bone and orbital titanium mesh were removed along with fibrotic tissue. The superior orbital rim and nasal root were reconstructed using a custom PEEK implant fixed with titanium plates and screws. A free rectus abdominis flap was anastomosed to the right lingual artery and internal jugular vein, using a cephalic vein graft for pedicle length. Reconstruction included re-osteosynthesis of frontal bone and placement of three titanium

meshes. The flap successfully covered the orbital defect, PEEK implant, and adjacent bone. Postoperative course was uneventful and the patient was discharged for outpatient care.

Conclusion:
This case demonstrates that recurrent orbital SCC requires radical resection combined with microsurgical reconstruction and custom implants. Careful multidisciplinary planning enables oncological control, functional restoration, and improved social reintegration, while close follow-up is essential due to the risk of recurrence.

Considerations Regarding Pituitary Adenomas

Poster number 29

Type of abstract:
abstract for poster presentation

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Presenting author:
Dan Iovanescu

Topic:
Anterior/central skull base

Introduction:
The approach to pituitary adenomas can be influenced by particular forms of pneumatization and configuration of the sphenoid sinus, by various types and degrees of septal deviation, or by possible concomitant neighboring pathologies. The adoption and promotion of endoscopic techniques, along with collaboration between the rhinologist and the neurosurgeon, represents the best option.

Methods:
The experience accumulated through complex team-based management of such cases—initiated in Târgu Mureș in 1993 and reaching over 170 cases—was later combined with the use of endoscopic approaches, the first such surgery being performed in 2008.

Transseptal-sphenoidal approaches, also exceeding 170 cases, enabled the application of these procedures at the Emergency Clinical Hospital in Timișoara as well, based on the experience gained.

Results:
We consider that the median nasal approach offers a safe reconstruction of the surgical field, providing a sufficiently wide access path without traumatizing the ethmoidal labyrinth—especially when hyperpneumatized.

It also allows for the intraoperative use of both microscopic and endoscopic techniques, depending on the specific needs of each case.

The learning curve was completed with a minimal rate of complications, not exceeding 2%.

Conclusion:
Medicine in general, and the orbito-rhino-neurological field in particular, require the continuous adaptation of medical care to the undeniable technical advances in equipment designed for the sphenoidal area.

A multidisciplinary team composed of a neurosurgeon and an ENT specialist may be the key to therapeutic success.

Description of preoperative characteristics and postoperative complications after endoscopic uninostril pituitary surgery in young, middle-aged and elderly patients

Poster number 30

Type of abstract:
abstract for poster presentation

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Presenting author:
Levente Stankovics

Topic:
Anterior/central skull base

Introduction:
The endonasal endoscopic transsphenoidal surgery (EETS) is the most widely used approach to remove pituitary adenomas, one of the most frequent primary tumors of the central nervous system. Our societies across the western world are aging, therefore to assess the effect of aging on preoperative chracteristics and postoperative morbidity after EETS is of utmost importance.

Methods:
We conducted a retrospective, cross sectional descriptive analysis of 155 consecutive patients admitted to the Department of Neurosurgery, University of Pécs for pituitary adenoma resection between June 2016 and July 2023. Only uninostril approaches were included. Patients were stratified into young (<55 years), middle-aged (55-65 years), and elderly (>65 years) age groups. Data regarding tumor size (micro- or macroadenoma) and histology were also recorded. The frequency of pre- and postoperative complications was

assessed across age groups, including apoplexy, visual field deficits and vision loss, cranial nerve palsy, anterior pituitary hormone changes, diabetes insipidus, liquorrhoea, reoperation, and intrahospital mortality.

Results:
The cohort included 77 young, 31 middle-aged and 47 elderly patients, macroadenomas predominated in all groups. Preoperative visual deficits ranged between 39-44,7%, with postoperative improvement rates of 78-90%. Apoplexy was most prevalent among the young (18,2%). Average preoperative cranial nerve palsy rates were 5,8% with low frequency of new postoperative deficits (<3%). Endocrine derangements were most common in the young both pre- and postoperatively (26 and 33,8%, respectively). Postoperative diabetes insipidus was predominant in young patients (24,7%). Liquorrhoea and reoperation rates were significantly higher in the young (16,9 and 7,9%, respectively).

Conclusion:
Higher frequency of postoperative liquorrhoea and reoperation in the young age group may be attributed to the fact that total resection is more often pursued in this population.

Sinonasal Adenocarcinoma with Extensive Cranial Invasion managed with Bifrontal Craniotomy and Tailored Skull Base Reconstruction: A Case Report

Poster number 31

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
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Topic:
Anterior/central skull base

Introduction:
Sinonasal carcinomas are rare tumors accounting for about 3% of all head and neck malignancies. They are divided into squamous cell carcinomas and adenocarcinomas, which originate either from respiratory epithelium or the underlying seromucinous glands (salivary type). Epithelial type adenocarcinomas are divided into intestinal (strongly associated with exposure to wood dust) and non-intestinal type.

Methods:
We report the case of a 62-year-old male, who presented with progressive memory and behaviour disorders for the past three months, with rapid deterioration over the last ten days. His past medical history included arterial hypertension and dyslipidemia and he had been working as a carpenter for over 40 years. The MRI scan revealed a large extra-axial mass, with heterogeneous post contrast enhancement, occupying the left anterior cranial fossa. The lesion invaded the ethmoid bone and extended to the left frontal sinus and the left nasal cavity. The patient was referred to the our department for further management.

Results:
A bifrontal craniotomy with cranialization of the frontal sinuses was performed. The extradural part of the tumour was completely resected creating a large bony defect. The intradural part of the tumor was detached from the frontal lobe in a microsurgical manner. The skull base reconstruction was achieved in a multilayered fashion using synthetic bone grafts, fat, fasia lata, a vascularised pericranial flap and fibrin sealant. Noticeable, the two synthetic bone grafts were adjusted to the correct size, placed one next to the other and fixed bilaterally to the surrounding healthy anterior cranial fossa in order to reconstruct the

bony defect.

Conclusion:
Aggressive resection is the cornerstone of treatment for these tumors. The main challenge in this approach is the high risk of CSF leak due to the large bony defect formed after tumor removal. This case highlights the importance of a tailored reconsctruction strategy based on tumor`s extent and location.

Endoscopic Endonasal Approaches for the Management of Skull Base Lesions: A Case Series

Poster number 32

Type of abstract:
abstract for poster presentation

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Presenting author:
Bakhtiyar Pashaev

Topic:
Anterior/central skull base

Introduction:
This study evaluates the efficacy, surgical outcomes, and complications of the endoscopic endonasal approach (EEA) for resecting diverse benign and malignant skull base pathologies.

Methods:
A retrospective analysis was performed on 113 consecutive patients undergoing EEA for skull base lesions between 2010 and 2025. Analyzed parameters included histopathology, extent of resection, complications, and clinical outcomes.

The cohort included 46 males and 67 females, with a median age of 52.3 years (range 7–76). Pathologies comprised meningiomas (n=29), chordomas (n=19), chondrosarcomas (n=6), metastases (n=6), SNUC (n=6), SNAC (n=3), neuroendocrine carcinoma (n=4), esthesioneuroblastoma (n=2), plasmacytoma (n=2), and other rare entities (n=36). Approaches were tailored to lesion location (anterior, middle, or posterior cranial fossa). Most cases required extended approaches with multilayer reconstruction.

Results:
Resection extent was gross total (GTR) in 51 cases, subtotal in 31, partial in 23, and biopsy in 8. Postoperative improvement included vision (n=11) and resolution of CN III (n=5) and CN VI (n=8) palsies. Complications: CSF leak (n=12, 10.6%), meningitis (n=5, 4.4%), vascular injury (n=3, 2.7%), new CN VI deficit (n=4, 3.5%), visual deterioration (n=2, 1.8%), brain injury (n=3,

2.6%), significant blood loss (n=7, 5.5%), DVT (n=6, 5.3%), and diabetes insipidus (n=4, 3.5%). Perioperative mortality was 1.8%

Conclusion:
EEA is a versatile and effective technique for managing skull base pathologies. Surgical strategy—from curative resection to diagnostic biopsy—should be guided by tumor biology, location, and extent. EEA constitutes definitive treatment for selected lesions or a key component of multimodal therapy.

Isolated herpes zoster of vagal nerve: a masquerade for zoster oticus

Poster number 33

Type of abstract:
abstract for poster presentation

Authors:
Chew Wen Chao Daniel,

Toh Yi Jie Ezekiel,

Teo Wei Yang Neville

Presenting author:
Daniel Chew

Topic:
Basic science

Introduction:
Herpes zoster most commonly involves the trigeminal, facial, or vestibulocochlear cranial nerves. Vagal nerve involvement is rare and has not been reported outside of polyneuropathy or its sine herpete form. Here we add a rare case of isolated vagal nerve zoster presenting with both motor and mucocutaneous symptoms.

Methods:
A 40-year-old female with no previous comorbidity initially presented with 3 days duration of left otalgia, sore throat and hoarseness. Initial examination was consistent with early otitis externa and perichondritis, and nasoendoscopy was unremarkable. She was started on oral and topical antibiotics, but reported symptomatic progression and had become aphonic 2 days later. Nasoendoscopy repeated showed left supraglottic ulceration with a left vocal cord palsy. There were new, deep erosions of her pinna conchal bowl. Swabs taken subsequently returned positive for varicella-zoster virus (VZV) and concomitant staphylococcus caprae / corynebacterium jeikeium infection.

Results:
She was treated with culture-directed antibiotics and oral Acyclovir with symptomatic improvement. Her mucocutaneous lesions resolved within 2 weeks. However, there was still persistent left vocal cord palsy after 2 months. She declined injection laryngoplasty and opted to monitor for further improvement.

Conclusion:

Not all vesicular rash around the ear is zoster oticus. Although rare, it is important to distinguish vagal nerve zoster due to its additional laryngeal ramifications. Prompt recognition can help to guide essential investigations, facilitate early treatment and reassure the distressed patient.

Efficacy and Safety of Microvascular Decompression versus Gamma Knife Surgery in Patients with Trigeminal Neuralgia: an updated meta-analysis

Poster number 34

Type of abstract:
abstract for poster presentation

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Presenting author:
Afonso Dutra-Melo

Topic:
Imaging & interventional radiotherapy

Introduction:
Trigeminal neuralgia is a debilitating condition often requiring surgical intervention when medical therapy fails. Microvascular decompression (MVD) and Gamma Knife surgery (GKS) are the main treatment options, but their relative efficacy and safety remain debated. This meta-analysis aimed to compare outcomes between MVD and GKS in patients with trigeminal neuralgia.

Methods:
We systematically searched PubMed, Embase, and Cochrane without temporal restrictions, in July 2025, for randomized controlled trials and observational studies that had as an intervention MVD versus GKS in patients with trigeminal neuralgia that reported any outcomes of interest as (1) complete pain relief,(2) recurrence of pain; (3) numbness; (4) BNI score I; (5) BNI score IV, V; (6) Overall complications. Statistical analyses were performed using R software. Heterogeneity was assessed with I^2 statistics.

Results:
Eight studies (n=9,343; 84.5% GKS) were included. MVD provided higher complete pain relief (RR 2.18, 95% CI 1.27–3.75) and BNI I rates (RR 1.89, 95% CI 1.24–2.87), while reducing severe/persistent pain (BNI IV/V: RR 0.65, 95% CI 0.52–0.81) and recurrence (RR 0.32, 95% CI

0.14–0.74). Safety analysis showed greater overall complications with MVD (RR 3.37, 95% CI 1.39–8.15) but reduced postoperative numbness compared with GKS (RR 0.50, 95% CI 0.34–0.75).

Conclusion:
Both procedures demonstrated efficacy in the management of trigeminal neuralgia, with MVD providing superior pain relief outcomes, but at the expense of a higher risk of complications. In contrast, GKS was associated with higher occurrence of postoperative numbness and carried a smaller risk of perioperative and long-term complications.

Radiologic markers for cranial nerve dysfunction in patients with an occipital condyle fracture: petrous- and sphenoid bone fractures

Poster number 35

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
Madelon Thevis

Topic:
Imaging & interventional radiotherapy

Introduction:
One third of the OCF cases has one or multiple cranial nerve dysfunctions (CNDs). Despite this high number, it is underdiagnosed and predictive radiological factors for CND in OCF cases are unknown. This study aims to identify such radiological predictors, with a focus on fractures involving clivus and skull base.

Methods:
A retrospective observational study was conducted at a Dutch Level I trauma

centre. Using CT-cue and an earlier patient database, 119 surviving patients with OCFs were included. Clinical and radiological data were extracted from electronic patient files. Presence and type of CND was collected per case, and all CT-scans were reviewed by a neuroradiologist for e.g. fracture classification and involvement of relevant anatomical structures. Associations were analysed using SPSS.

Results:

Of the 119 patients with an OCF, 40 (34%) presented with CND. Fractures involving the sphenoid-, petrous bone and clivus were significantly associated with various forms of CND. Sphenoid fractures were strong predictors for lower CND (cranial nerves IX–XII), with significant associations for CN IX (p=0,006), CN XI (p=0,006), and CN XII (p=0,008). Petrous bone and clivus fractures were significantly associated with hearing loss (p<0,001 for both). Neurological sequelae was significantly more common in patients with sphenoid (p=0,004) and petrous bone fractures (p<0,001), but were not associated with ICU admission.

Conclusion:
This is the first study that identifies specific radiological predictors of CND in

OCF patients. Fractures involving the sphenoid, petrous bone, and clivus – especially in combination – should raise clinical suspicion for cranial nerve injury. These radiological findings should stimulate doctors to test the cranial nerves and initiate multidisciplinary management of trauma patients with those fractures.

Hypofractionated Gamma Knife Stereotactic Radiosurgery for Optic Chiasm Metastases with Preservation of Chiasm Integrity

Poster number 36

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Imaging & interventional radiotherapy

Introduction:
Stereotactic radiosurgery is an effective treatment for brain metastases but poses significant risk when lesions are near the optic chiasm. Hypofractionated Gamma Knife radiosurgery (hfGKRS) allows for safer dose delivery by dividing radiation into smaller daily fractions enabling optic nerve recovery while maintaining therapeutic efficacy.

Methods:
Two patients with pulmonary carcinoma metastases near the optic chiasm were treated with hfGKRS.

Case 1: A 44-year-old male underwent resection and postoperative radiation. Nine months later, seven new lesions appeared, one near the optic chiasm (volume (V) = 0.023 cm^3). Treatment included 4.5 Gy in 5 fractions (isodose line (IDL) = 65%, total dose (TD) = 22.5 Gy) for the chiasmatic lesion and 25 Gy (IDL = 65–70%) for the others.

Case 2: A 66-year-old male underwent two resections without postoperative radiation; subsequent regrowth near the chiasm was treated with 6 Gy in 5 fractions (IDL = 50%, TD = 30 Gy).

Results:
Both patients tolerated hfGKRS well, without visual deterioration or neurological complications. Follow-up MRI demonstrated complete control of the treated chiasmatic lesions and no evidence of new metastatic growth. In both cases, visual acuity and fields remained intact. The hypofractionated regimen provided sufficient recovery between doses, limiting optic nerve stress while maintaining high tumoricidal effect. Radiological and clinical

evaluations at follow-up indicated durable local control and stable neurological status.

Conclusion:
hfGKRS offers a safe and effective strategy for managing metastases adjacent to the optic chiasm. Fractionated dosing enables optic pathway preservation without compromising oncologic efficacy. This approach expands therapeutic options for complex optic region metastases while maintaining patient vision, function, and quality of life.

Surgical corridors to Dorello's Canal: Quantitative and qualitative exposure from ventral, anterolateral, and posterolateral perspectives.

Poster number 37

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Lateral skull base

Introduction:
The intraoperative localization of the sixth cranial nerve (CN VI) has been a surgical challenge due to its intricate course and proximity to critical structures. Particularly, its interdural segment -traversing Dorello's canal (DC)- is closely related to the petroclival region, making it susceptible to injury during transpetrosal and transclival approaches.

Methods:
This study seeks to provide anatomical insights into DC and CNVI, with emphasis on their surgical relevance. Fifteen cadaveric sides were dissected to perform the following three approaches (5 sides each): 1) Combined endoscopic endonasal/contralateral transmaxillary approach (EEA/CTMA); 2) Kawase approach and subsequently extended Kawase approach entailing transposition of cranial nerve five (CNV); 3) Retrosigmoid suprameatal approach (RISA). Morphometric and qualitative data were obtained. The mean lengths of the cisternal and interdural segments of CNVI were 19 mm (range:14-25) and 8.6mm (range:6-13), respectively.

Results:
EEA/CTMA accesses the entire DC and cisternal CNVI. The sphenoidal petrosal process marked the transition of the interdural CNVI to its cavernous segment. The standard Kawase provided access to 71.6% of cisternal CNVI, while DC remained inaccessible. The extended Kawase exposed 100% of the cisternal CNVI and 51.6% of the proximal DC, though visibility of the petrous apex and distal DC was obstructed by CNV. The inferior petrosal sinus (IPS) served as reliable landmark, ensuring CNVI integrity when drilling and arachnoidal dissection remained superior to its cours lateral to CNV. RISA enabled 100% exposure of cisternal CNVI and 89.6% of DC.

Conclusion:
When approaching DC through ventral, anterolateral, or posterolateral corridors, the IPS is the most consistent anatomical landmark, as it generally courses parallel and immediately lateral to the canal. Precise anatomical understanding of DC in relation to different skull base approaches is crucial for minimizing morbidity and tailoring the approach to the pathology.

Bridging Research and Practice: Towards Clinical Implementation of AI-based Vestibular Schwannoma Segmentation

Poster number 38

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Lateral skull base

Introduction:
Automated segmentation of vestibular schwannomas on contrast-enhanced T1- and T2-weighted MRI can facilitate consistent and efficient tumor measurements. While previous studies validated accuracy, clinical integration remains challenging. We evaluated an in-house developed AI-model for vestibular schwannoma measurements in a simulated clinical environment and initiated a prospective study for real-world implementation.

Methods:
Our research-based AI-model was advanced into software compatible with clinical systems. A retrospective study was conducted on pseudonymized scans. 7 clinicians assessed the model's output in a simulated clinical workflow. Outcomes included accept/reject rate, reasons for rejection, verification time and structured user feedback. In addition, a

prospective study was initiated to evaluate clinical impact. Primary outcomes included quantitative measures such as time and cost savings and qualitative measures based on the Quadruple Aim and System Usability Scale (SUS).

Results:
In the retrospective setting, segmentations on 30 contrast-enhanced T1-weighted (T1ce) and 30 T2-weighted (T2) scans with varying tumor sizes were evaluated. The model achieved an accept rate ranging from 63%-93% (T1ce) and 40%-80% (T2), with mean verification times of 74 and 80 seconds per case, respectively. Given that manual measurements take 15–20 minutes per case, these verification times indicate substantial potential time savings for accepted segmentations. User feedback emphasized efficiency and high potential for clinical adoption, while suggesting improvements for specific tumor cases and visualization.

Conclusion:
Our AI-model demonstrated strong performance and efficiency benefits in a simulated clinical workflow. Positive user feedback supports its readiness for clinical application. The ongoing prospective study will provide critical evidence of real-world impact and represents a key step towards routine implementation in skull base practice.

A Combined Retro- and Presigmoid Perilabyrinthine Approach with Lateral Upper Cervical Dissection for Lesions Involving the Jugular Foramen and Upper Cervical Region: A Feasibility and Comparative Study

Poster number 39

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Lateral skull base

Introduction:
Jugular foramen tumors are complex skull base lesions that often require advanced skull base approaches due to their extra- and/or intradural extension. A thorough understanding of the surgical anatomy and the use of single or combined approaches are essential to determine the optimal surgical strategy and achieve maximal safe resection.

Methods:
Ten injected cadaveric specimens (20 sides) underwent a combined retro- and presigmoid infralabyrinthine approach. Each side then underwent an upper cervical dissection to expose the extracranial aspect of the jugular foramen. This was achieved by detachment of the sternocleidomastoid, posterior belly of the digastric, and levator scapulae, which allowed for full exposure of the internal jugular vein, extracranial internal carotid artery, and cranial nerves IX - XI along their extra- and intracranial course. To elucidate the inferior and superior limits of this approach, it was comparted to the a combined far-lateral transcondylar perilabyrinthine upper cervical approach—which were performed on the remaining 10 sides.

Results:
The presigmoid perilabyrinthine corridor combined with retrosigmoid and lateral upper cervical exposure allowed for full exposure of cranial nerves IX - XI along the extra- and intracranial aspects of the JF. Reflection of the rectus capitis lateralis muscle allowed for full exposure of parapharyngeal IJV. The retrosigmoid variant of this approach, in contrast to the far-lateral transcondylar variant, is limited to lesions that do not extend inferiorly beyond the lower cranial nerves or to the level of the foramen magnum, or to lesions extending

superiorly or superomedially beyond the lower cranial nerves, owing to the absence of jugular tubercle drilling.

Conclusion:
The combined retro- and presigmoid perilabyrinthine approach with lateral upper cervical dissection is useful for intra- and extracranial lesions of the jugular foramen that are confined intracranially to the level of the lower cranial nerves and that lack significant inferior or superior intradural extension.

Surgical Outcomes and Long-Term Quality of Life After Resection of Cerebellopontine Angle Epidermoid Cysts via Retrosigmoid Approach: A Multicenter Study

Poster number 40

Type of abstract:
abstract for poster presentation

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Topic:
Lateral skull base

Introduction:
Epidermoid cysts of the cerebellopontine angle (CPA) are rare benign tumors. Their slow growth may lead to disabling cranial nerve dysfunction. Surgery is the standard treatment, but radical removal is limited by adherence to critical structures, raising concerns about postoperative morbidity and long-term quality of life.

Methods:
This retrospective multicenter study included 40 consecutive patients undergoing microsurgical resection of CPA epidermoid cysts between 2013 and 2023. Only primary cases (no recurrences) with a minimum follow-up of 12 months were analyzed. Demographic, surgical, and clinical data were collected, including extent of resection, postoperative complications, recurrence, and reintervention. Quality of life was assessed using the University of Washington Head and Neck Cancer Quality of Life Questionnaire (UW-QOL) Outcomes were compared preoperatively, early postoperatively, and at last follow-up.

Results:
Mean follow-up was 68.3 months (12–144). Gross total resection was achieved in 70%, with 10% recurrence (one reoperation); mean progression-free survival was 61.2 months. Transient CN VII and VI palsy were common. Quality of life showed no immediate change (18.2 vs. 17.6, $p>0.05$) but improved at last follow-up (13.5, $p<0.001$). Pain improved postoperatively and at follow-up ($p<0.001$), while anxiety, mood, activity, and recreation improved at follow-up ($p<0.001$). Facial nerve palsy and trigeminal neuralgia correlated with worse quality of life ($p<0.001$).

Conclusion:
Surgically treated epidermoid cysts of the cerebellopontine angle show low recurrence rates and generally favorable long-term outcomes. Postoperative cranial nerve deficits are mostly transient. Quality of life improves significantly over time. Facial nerve palsy and trigeminal neuralgia are the main factors affecting the quality of life of these patients.

Comparative outcomes of exoscopic and microscopic vestibular schwannoma excision — a single-center experience

Poster number 41

Type of abstract:
abstract for poster presentation

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Presenting author:
Vlasak Ales

Topic:
Lateral skull base

Introduction:
Microsurgical resection of vestibular schwannomas using binocular operative microscopes has long been the gold standard. Recent technological advances have produced exoscopic systems that offer improved surgeon ergonomics during lengthy procedures, high-quality magnification, image enhancement via digital filters, advantageous access to deep-seated structures, and real-time image sharing.

Methods:
Our skull base team at Motol University Hospital acquired an exoscopic system in December 2020. Since January 2021 the device has been used routinely for all procedures. This study compares two corresponding four-year periods: 2017–2020 (microscope-assisted surgery) and 2021–2024 (exoscope-assisted surgery). During the microscope period 128 patients were treated (64F/64M), and during the exoscope period 156 patients were treated (91F/65M). The mean age in the microscope cohort was 48.8 years (range 14–71), and in the exoscope cohort 52.5 years (range 24–78).

Results:
Our institutional philosophy prioritizes gross-total resection while preserving facial nerve function. In the microscope cohort GTR was achieved in 92% of cases; NTR in 5 patients and STR once. In the exoscope cohort GTR was achieved in 80% of cases, NTR in 17%, and STR and PR each in one case. Final facial nerve function (House–Brackmann grading) in the microscope group was HB 1–2 in 69%, HB 3–4 in 25%, HB 5–6 in 3%. In the exoscope group

final function was HB 1–2 in 78%, HB 3–4 in 17%, HB 5–6 in 4%.

Conclusion:
Our experience demonstrates that exoscope-assisted vestibular schwannoma surgery provides not only improved ergonomics for the surgeon and the operative team but also comparable — and in some measures superior — clinical outcomes to conventional microscopic techniques. As with any novel technology, adoption of the exoscope entails a learning curve; however, this learning period has been short.

Skull Base Paraganglioma: diagnosis, treatment algorithm and update of recent cases

Poster number 42

Type of abstract:
abstract for poster presentation

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Presenting author:
Hans Thomeer

Topic:
Lateral skull base

Introduction:
The purpose of this presentation is to report on new cases of paragangliomas treated in the University ENT and Neurosurgery Department in Utrecht. Moreover to compare the existing evidence concerning the efficacy and safety of surgery, radiotherapy or wait-and-scan policy.

Methods:
From 2015 to 2025 data from patient charts were collected and reviewed.

Results:
Of 102 collected cases, 18 patients (Fisch type A or B) were treated with surgery, 6 patients with (Fisch B-C) wait-and-scan policy, 5 cases with stereotactic radiosurgery (Fisch Type C). No posttreatment severe complications (i.e. cranial nerve palsies, hearing loss, meningitis) were encountered during follow up but one patient who died from intracranial complications after radiation therapy.

Conclusion:
For selected patients with lateral skull base disorders, given the proximity to sensitive critical structures such as the brainstem, cranial nerves, and cochlea, the technology of Gamma knife Radiosurgery (GKRS) has emerged as a first-line treatment to achieve long-term tumor control. In some cases surgery remains a feasible option.

Clinical presentation of intralabyrinthine schwannomas. A single center study

Poster number 43

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
Lateral skull base

Introduction:
To describe presentation of intralabyrinthine schwannomas (ILSs)

Methods:
Retrospective single center study involving patients collected from outpatient clinic. Data collection included age, gender, nature and timing of presenting symptoms, hearing (according to the AAO-HNS grading system), results of vestibular tests (caloric tests and cervical vestibular evoked myogenic potentials (cVEMPs) and tumor localization. Presenting symptoms and laboratory test results were categorized according to the extension of the lesion in the cochlea (C), the vestibule (V) on one hand and according to unifocal (L1) or plurifocal (L2) extension in the labyrinth, on the other.

Results:
Twelve patients were collected from outpatient clinic setting between 2015 and 2025. The intracochlear lesions were more commonly (56%) encountered than the vestibular or mixed forms (44%). The mean delay of diagnosis was long (> 60 months). Hearing impairment was the most common symptom, only one of 9 patients retained useful hearing during follow up. Only during incapacitating symptoms (dizziness, menieriform complaints: in one patient) or patients preference, surgery is chosen. No postoperative complications were noted. No patient underwent radiotherapy.

Conclusion:
Our results demonstrate that ILSs, even very small and localized ones, might in some cases lead to heavily compromised labyrinth functioning and complaints necessitating surgical treatment. Most cases stay in wait-and-scan protocol during follow up.

Skull base hydatidosis mimicking a clival chordoma for 17 years: case report and review of diagnostic pitfalls

Poster number 44

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
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Topic:
Lateral skull base

Introduction:
Hydatidosis is a parasitic disease caused by Echinococcus larvae, most commonly affecting the liver and lungs. Skeletal involvement is rare (0.5–4%), and cranial disease is exceptionally uncommon. Skull base hydatidosis poses major diagnostic and therapeutic challenges, often mimicking primary clival tumors such as chordoma.

Methods:
A 72-year-old man with hypertension and chronic obstructive pulmonary disease was followed from 2007 to 2010 for a destructive clival lesion interpreted as a chordoma, then lost to follow-up. He re-presented in 2023 with progressive facial palsy, bilateral hearing loss, dysphagia, and gait imbalance. Imaging again suggested a destructive petroclival chordoma. In 2025, he underwent right retrosigmoid surgery: the cyst was punctured, partially aspirated, and the capsule removed en bloc without adhesions. Saline with steroids was used for irrigation. Histopathology unexpectedly revealed hydatid cyst, and albendazole was

initiated on postoperative day 3.

Results:
The postoperative course was uneventful, with recovery of swallowing and gait, although bilateral deafness, facial palsy, and ocular sequelae persisted. Cranioencephalic MRI confirmed subtotal removal with residual bony involvement. Whole-neuraxis MRI and thoraco-abdominopelvic CT revealed no systemic disease, except for a possible small cystic lesion at S2. At 18 months of follow-up, the patient remains clinically stable under suppressive albendazole therapy.

Conclusion:
Skull base hydatidosis is exceptionally rare and may closely mimic chordoma, leading to long-term misdiagnosis. This case underscores the importance of including hydatid disease in the differential diagnosis of cystic clival lesions, particularly in endemic regions, and illustrates the critical role of careful surgical technique combined with prolonged antiparasitic therapy.

Extensive tumors of the lateral skull base originating from the ear: clinical material from the Department of Otolaryngology and Laryngological Oncology, Poznan University of Medical Sciences

Poster number 45

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
Assistant Professor Jacek Banaszewski

Topic:
Lateral skull base

Introduction:
Skull base tumors are a heterogeneous group of neoplasms that develop in the lower part of the skull, in an area adjacent to the brain, cranial nerves, blood vessels, and facial structures. Due to the complex anatomy of this region, skull base tumors are difficult to diagnose and treat.

Methods:
Between 2021 and 2025, five patients with extensive malignant tumors of the lateral skull base originating from the external ear were operated on at the Department of Otolaryngology in Poznan, Poland. Diagnostic and therapeutic possibilities were analyzed depending on the regional advancement of the tumor

Results:
Preoperative temporal bone and neck CT scans and head MRI were the preferred imaging studies prior to deciding on the treatment method. Additionally, chest CT and abdominal ultrasound were used to exclude distant metastases. Surgical treatment involved wide access to the lateral skull base tumor via lateral or subtotal petrosectomy and parotidectomy. For closure of skin defects, the following were used: free flap from the forearm [RFFF] or anterolateral thigh [LTA] with microvascular anastomosis, local advancement flaps, or primary closure using Z-plasty

Conclusion:
The treatment of extensive malignant tumors of the lateral skull base requires comprehensive otolaryngological and radiological diagnostics. The choice of surgical treatment should be tailored to the extent of tumor invasion and anatomical involvement

Cranial nerve testing in patients with a skull base- and/or occipital condyle fracture

Poster number 46

Type of abstract:
abstract for poster presentation

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Topic:
Lateral skull base

Introduction:
Cranial nerve dysfunction (CND) occurs in one-third of patients with occipital condyle fractures (OCFs), often involving multiple cranial nerves (CNs) with a median of three affected CNs - wherof half has chronic sequelae.

Objective: to evaluate the frequency and completeness of current CN testing practices among healthcare professionals, focusing on differences between medical specialties.

Methods:
A structured, anonymous questionnaire was distributed among doctors of different specialties in a Dutch tertiary university hospital. The survey consisted of two parts: (1) four clinical scenarios involving skull base and occipital condyle fractures, with and without pre-diagnosed CND (CN VII), to analyse testing habits, and (2) questions on specific CN testing techniques, frequency of assessments, and potential barriers to conduct comprehensive CN evaluations. Responses were collected electronically via Google Forms and Castor EDC and analysed using SPSS IBM version 27. Descriptive statistics were applied to compare CN testing practices across different groups of doctors.

Results:
Results: CND testing in SBOCF cases is often incomplete. Eye movements and facial nerve function were the most frequently tested, whereas smell, hearing, and balance were least assessed. CN testing was less extensive in occipital condyle fractures compared to skull base fractures and in cases without pre-diagnosed CND. Barriers to CN testing included patient loss of consciousness (64%), prioritization of other pathology (47%), and perceived irrelevance (30%).

Conclusion:
Doctors should be aware of the necessity to do timely and complete CN testing in cases with an SBOCF, because this can lead to more effective management and potentially better long-term treatment outcomes.

Team Simulation Model for Internal Carotid Artery Injury in Endoscopic Endonasal Surgery

Poster number 47

Type of abstract:
abstract for poster presentation

Authors:
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Presenting author:
Carl H. Snyderman, MD, MBA

Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
Injury to the internal carotid artery (ICA) is a rare complication of endoscopic endonasal surgery (EES) of the skull base. Interprofessional education (IPE) programs with simulation components improve collaborative attitudes, role delineation, and patient outcomes in medical crises. However, interprofessional team simulation training for ICA injury in EES remains unexplored.

Methods:
We researched various healthcare team training models, including the core TeamSTEPPS principles, peer-reviewed team scoring modalities, and existing ICA injury simulation models to inform our curriculum. Interviews with OR personnel during EES cases helped develop a role-specific timeline of responsibilities during an ICA injury. Consensus on pre-operative preparations and intra-operative management protocols from a survey of experienced skull-base surgeons guided the creation of a technical scoring checklist. Observations from a cadaveric ICA injury exercise for surgeons, conducted at our institution's skull-base surgery workshop, also informed the inclusion of common errors committed under stress in our simulation scenarios.

Results:
1. Participants receive pre-course reading materials on vascular injury during EES and each team member's role in responding to ICA injury.

2. Participants engage in our team simulation model replicating ICA injury scenarios in a high-fidelity operating room. Independent reviewers score team performance using the

Mayo High Performance Teamwork Scale (MHPTS) and a technical ICA management protocol checklist, followed by a team debrief.

3. Participants complete our curriculum, encompassing interactive lectures featuring videos depicting both correct and incorrect handling of ICA injuries, with pauses to discuss TeamSTEPPS principles.

4. Participants engage in a second simulation with repeat scoring.

Conclusion:
ICA injury, a feared complication of EES, requires robust, hands-on training for the entire interprofessional team. Our designed curriculum, combining a collaborative didactic education with a high-fidelity interprofessional simulation, is expected to enhance team performance in ICA injury management during EES.

Feasibility of robot-guided laser osteotomy for anterior clinoidectomy and optic canal delineation in a preclinical cadaveric study - current evidence and future perspectives

Poster number 48

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
Anterior clinoidectomy and optic canal unroofing are specific neurosurgical techniques, and crucial for addressing complex pathologies of the central skull base. Current approaches using high-speed drills and manual piece-meal resection poses the risk of mechanical and thermal damage. Laser bone cutting demonstrates superior precision and improved bone healing compared to traditional mechanical methods.

Methods:
Preclinical cadaveric study investigating the feasibility of robot-guided cold ablation laser osteotomy for anterior clinoid excavation and optic canal delineation. Four fresh-frozen human skulls were used. Access to the target structures was achieved via pterional craniotomy and extradural preparation. A robot-guided Erbium-doped yttrium aluminium garnet laser (Er:YAG laser) was used for the excavation of the anterior clinoid process and optic canal delineation. Safety and accuracy were maintained by optical coherence tomography, a navigation system and a coaxial camera. The bone ablations were visually analyzed intraoperatively, postoperatively by CT scans, and microscopically after skull

maceration.

Results:
Four anterior clinoid processes were excavated and four optic canals were delineated with the Er:YAG laser. On average, 63% of the spongious bone of the anterior clinoid process was removed. The cutting edges of the excavation and the delineation were sharply defined and correspond to the planned trajectories of the preoperative planning. Cortical perforation was observed in two specimens. Restricted literature data emphasizes the need for further investigation into in-vivo laser osteotomies, especially for orbito-cranial surgery.

Conclusion:
This preclinical study demonstrates on the feasible of robot-guided Er:YAG laser removal of osseous tissue at the skull base following preoperative computer-assisted planning. This technique may provide significant advantages in skull base surgery with a high degree of cutting precision. Further research is needed to refine preoperative planning, workflow, and safety aspects.

Endoscopic Endonasal Approaches in Sellar Reconstruction: Preliminary Results of a Randomized Comparison of Fascia Lata versus Temporalis Muscle Fascia

Poster number 49

Type of abstract:
abstract for poster presentation

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Presenting author:
Marcel Marjanović Kavanagh

Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
Endoscopic endonasal approach (EEA) has become the preferred technique for pituitary and parasellar lesions. One of the main challenges remains cerebrospinal fluid (CSF) leakage, reported in up to 27% of cases. Autologous grafts, particularly fascia lata (FL) and temporalis fascia (TF), are widely used for dural repair, yet evidence from randomized controlled trials is scarce.

Methods:
We initiated a prospective randomized trial of 50 patients undergoing EEA for sellar pathology requiring dural reconstruction. Patients were randomized to FL (n=25) or TF (n=25) repair. Primary outcomes were postoperative CSF leak and meningitis. Secondary endpoints included operative time, length of hospitalization, donor site morbidity, and postoperative pain (VAS on day 1, day 3, and 1 month).

Results:
CSF leak occurred in 1/25 (4.0%) FL patients and 2/25 (8.0%) TF patients. Meningitis developed in 5/25 (20.0%) in the FL group versus 10/25 (40.0%) in the TF group. Mean

operative time was longer in TF (246.9 min) compared with FL (192.8 min). Hospital stay was 11.7 days in TF versus 9.0 days in FL. Postoperative pain scores were higher in TF on day 1 (VAS 3.8 vs 3.1) and day 3 (VAS 2.9 vs 2.2), but comparable at 1 month (VAS 0.3–0.4).

Conclusion:
Preliminary results suggest that both FL and TF provide effective reconstruction in EEA for sellar pathology, but TF was associated with longer operative time, prolonged hospitalization, higher early pain, and an increased risk of meningitis. Ongoing recruitment and follow-up will clarify whether these early trends persist in the full cohort.

A Novel AI Tool for Enhancing Skull Base Anatamosurgical Education through Interactive Spatial Navigation Exercises: A Feasibility and Validation Study

Poster number 50

Type of abstract:
abstract for poster presentation

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Presenting author:
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Topic:
New Technologies and Materials in Cranial base Surgery

Introduction:
The emergence of large language models (LLMs) introduces a novel, underexplored opportunity to extend individualized, structured neuroanatomical training. We evaluate the feasibility and utility of a custom programmed LLM for delivering guided, stepwise, navigation-based exercises and assessments to supplement surgical neuroanatomy instruction for individual students outside the classroom setting.

Methods:
We implemented a GPT-driven assessment platform, programmed with navigation-based querying principles, that allows users to navigate between anatomical points using contiguous structures of one or more tissue types. The model adheres to strict rules of contiguity and tissue-type constraints, designed to simulate 3D-spatial navigation. Navigation exercises are generated adaptively with escalating complexity. Feedback and optional hints are provided in a tutoring-like manner. The exercises and answers are derived from a supplied knowledge base, including from lectures utilized in our neuroanatomy training program. Usability, internal consistency, anatomical validity, response grading accuracy, and the perceived educational value of the model were assessed.

Results:
The Surgical Neuroanatomy Navigation Assessment Tool successfully generated anatomically valid, progressively complex questions across multiple cranial compartments and tissue types. Simulated use yielded >95% internal consistency and high anatomical accuracy in both query generation and answer validation across multiple sessions. The model reliably

enforced contiguity and tissue-specific constraints and appropriately flagged incorrect user responses. The platform's adaptive difficulty and immediate feedback features enabled user-directed learning. No major anatomical inaccuracies or invalid question paths were identified across >150 queries. Minor inconsistencies were limited to terminology specificity and were correctable by backend rules refinement.

Conclusion:
The integration of an interactive LLM-based tool as an adjunct to skull base anatomy learning is feasible and easily replicable. This tool enables high-fidelity, individualized practice of complex spatial navigation in skull base and neuroanatomy. Its low cost and adaptability make it a compelling adjunct to cadaveric and didactic instruction.

Predictors of Growth of Vestibular Schwannoma After Gamma Knife Treatment: A Systematic Review

Poster number 51

Type of abstract:
abstract for poster presentation

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Presenting author:
Daniel Alvarado

Topic:
Oncology

Introduction:
GKRS shows a high success rate in controlling growth of vestibular schwannoma, but a small number of tumors still grow after treatment. However, only a few studies have investigated the predictive factors of this growth.

Methods:
This paper has analyzed literature published between 2000 and 2024 from PubMed, EMBASE, and Cochrane databases. Potential determinants, including age, gender, tumor volume, radiation dose, tumor location, and imaging characteristics, have been reviewed.

Results:
A total of 1964 unilateral vestibular schwannoma cases treated with GKRS were analyzed. Mean marginal dose was 12.5 Gy, with follow-up ranging from 6 to 240 months. Radiological control was achieved in 92.9%. Age, gender, and dose showed no consistent prognostic significance, while smaller initial tumor size and lower baseline growth rates were associated with improved control in select studies. Tumor location and morphology yielded mixed findings, though cystic VSs showed favorable reduction. ADC values emerged as a potential predictive biomarker. Reported complications included pseudo-progression, highlighting the need for cautious interpretation of post-treatment imaging.

Conclusion:
We have found that initial tumor volume, pretreatment growth rate, and imaging ADC value potentially predict growth after GKRS. These findings provide a reference for further optimizing personalized treatment in vestibular schwannoma care.

MRI-based Prediction of Vestibular Schwannoma: A Systematic Review

Poster number 52

Type of abstract:
abstract for poster presentation

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Topic:
Oncology

Introduction:
Vestibular schwannoma (VS) is the most common cerebellopontine angle tumor in adults. Its natural history is highly variable, ranging from long-term stability to rapid growth. Reliable, noninvasive prediction of tumor behavior is crucial to support individualized management and avoid both overtreatment and delayed intervention.

Methods:
Following PRISMA guidelines, PubMed, EMBASE, and Cochrane databases were searched for studies published between January 2000 and January 2025. Eligible studies included cohort designs evaluating MRI-derived features such as texture metrics, signal-intensity ratios, perfusion parameters, and apparent diffusion coefficient (ADC) values as predictors of VS progression or treatment response. Study quality was assessed using the Newcastle–Ottawa Scale. Reported diagnostic performance (AUC, sensitivity, specificity, p-values) was extracted and summarized descriptively.

Results:
Ten cohort studies (7 retrospective, 3 prospective; total n = 525) were included. Texture-analysis metrics (e.g., kurtosis, gray-level co-occurrence matrix features) achieved AUCs of 0.75–0.93 for predicting volumetric or linear growth. Signal-intensity ratios on gadolinium-enhanced T1-weighted MRI (tumor/temporalis muscle) demonstrated 100% sensitivity and 93.8% specificity. Perfusion MRI parameters (K^trans, v_e, ASL, DSC-derived blood flow) differentiated growing from stable tumors with AUCs up to 0.85. Post–gamma knife changes in ADC values correlated with favorable treatment response, though baseline ADC showed limited predictive value for natural growth.

Conclusion:
MRI-based biomarkers, particularly texture metrics, signal-intensity ratios, and perfusion parameters, show promise for predicting VS growth and treatment response. However, methodological heterogeneity limits generalizability. Standardized imaging protocols and prospective validation studies are needed before clinical implementation.

Mapping the Neglected Topic in Head and Neck Paraganglioma Research: a PRISMA Scoping Review on Quality of Life

Poster number 53

Type of abstract:
abstract for poster presentation

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Topic:
Oncology

Introduction:
Paragangliomas in the head and neck (HNPGL) are rare slow growing neuro-endocrine tumors. The impact of various treatment strategies and tumor characteristics on health-related quality of life (HRQoL) remains unclear. This scoping review aims to map the available evidence and summarize the findings on how HNPGL affects patients' HRQoL.

Methods:
A comprehensive literature search was conducted in PubMed, Embase, and Cochrane. Articles were included when presenting a quantification of HRQoL or Patient Reported Outcome Measures in patients with HNPGL (n > 5). Studies focusing exclusively on paragangliomas outside the head and neck region were excluded. A scoping review using descriptive and inductive thematic analysis was performed and presented using the Prisma-ScR guidelines.

Results:
Fourteen studies were included presenting quantifiable HRQoL data in patients with HNPGL. The most used HRQoL measure were the Short Form-36 (n = 4, 29%) and EORTC Core Quality of Life 18 questionnaire (QLQ-C30) (n=3, 21%), followed by Short Form-12 (n=2, 14%). HNPGL negatively affects HRQoL across several domains, even in patients not requiring an intervention. Specific subgroups, including those with carotid body tumors, multiple tumors, or dysphonia, reported disproportionately lower HRQoL.

Conclusion:
Current sparse evidence on HRQoL in patients with HNPGL demonstrates significant impairment and identified various factors influencing this outcome. However, further research is necessary to specifically assess the effect of different therapeutic managements on HRQoL.

Endoscopic endonasal approach in the diagnosis and treatment of clival metastatic tumors

Poster number 54

Type of abstract:
abstract for poster presentation

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Topic:
Oncology

Introduction:
Clival tumors are rare. Chordomas are most common primary tumors arising in the clivus. Among the rest of clival lesions metastases emerge as important pathologies. The aim of the study was to review the surgical results in a series of patients with clival metastatic tumors operated with endoscopic endonasal approach.

Methods:
The study is a retrospective analysis of a series of 29 patients (8 women and 21 men) treated from the 2011 to 2020 by the endoscopic transsphenoidal surgeries for clival metastatic tumors. The mean age of the patients was 58.6 years (32-90 years), and the mean follow up period was 3.6 years (0-12 years).

Results:
The most common histopathological diagnoses were metastatic squamous cell carcinoma (20.7%), adenocarcinoma (17.2%), and non-small cell lung cancer (17.2%). Three patients had gross total resection (10.3%), 4 – subtotal resection (13.8%), and 22 – partial resection (75.9%), including 14 cases of tumor biopsy (n=14/22, 63.6%). One patient had a fat tissue graft as a reconstruction of the meningeal defect (3.4%). The only complications included one case of transient diabetes insipidus and one case of epistaxis. There were no deaths during the postoperative period.

Conclusion:
Endoscopic endonasal approach for clival metastatic tumors allows for a good extent of resection or diagnostic biopsy. The complication rate is low.

Analysis of Complications in the Treatment of Pituitary and Skull Base Tumors Using the Extended Endoscopic Endonasal Approach

Poster number 55

Type of abstract:
abstract for poster presentation

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Topic:
Oncology

Introduction:
The endoscopic endonasal approach is the most common method of treating parasellar tumors. It is safe and provides high resection effectiveness; however, it carries a risk of complications. The aim of this study was to analyze complications in patients operated on using the extended endoscopic endonasal approach for pituitary and skull base tumors.

Methods:
This is a retrospective analysis of complications in a series of 296 patients treated with the extended endoscopic endonasal approach at the National Research Institute of Oncology between 2010 and 2024. Complications were observed in 153 patients (51.7%). The mean patient age was 51 years, and the mean follow-up period was 7.4 years (range: 0–16 years).

Results:
The most common complications were transient diabetes insipidus, observed in 84 patients (28.4%), CSF leak in 29 patients (9.8%), and sinusitis in 20 patients (6.8%). Other complications included SIADH (n=15; 17.2%), cranial nerve palsies (n=8; 2.7%), epistaxis (n=7; 2.4%), and strokes (n=4; 1.4%). Four cases of major vessel hemorrhage (1.4%) were observed, including 2 internal carotid artery (ICA) ruptures (0.7%). One patient died in the immediate postoperative period. The highest complication rates were observed in patients with craniopharyngiomas (n=36/64; 56.3%) and tuberculum sellae meningiomas (n=33/66; 50.0%).

Conclusion:
Severe complications, including CSF leak, ICA injury, or fatal outcomes, are rare, confirming the safety of this treatment method. The most frequently observed complication in extended endoscopic endonasal resections is transient diabetes insipidus.

Do Systemic Immune-Inflammatory Indices Predict Prognosis in Chordoma? A Systematic Review and Meta-Analysis

Poster number 56

Type of abstract:
abstract for poster presentation

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Topic:
Oncology

Introduction:
Chordoma is a rare skull base and spinal malignancy with high recurrence and limited prognostic markers. Systemic immune-inflammatory indices (SII, PLR, NLR) are emerging biomarkers in oncology. We systematically reviewed evidence to evaluate their role as prognostic indicators of survival outcomes in chordoma patients.

Methods:
A systematic review and meta-analysis was conducted following PRISMA guidelines. Comprehensive searches of PubMed, Embase, and Cochrane were performed in July 2025 using the terms: chordoma AND (“systemic immune-inflammation index” OR SII OR index OR inflammation OR immune OR biomarker OR RDW OR “d-dimer”). Eligible studies evaluated

associations between SII, PLR, NLR and/or LMR and overall survival. Two independent reviewers performed selection, data extraction, and risk of bias assessment. Random-effects models calculated pooled hazard ratios (HR) with 95% confidence intervals. Heterogeneity was assessed using I^2 statistics. Analyses were performed with R software.

Results:
The search identified 2,621 records; 4 studies with 387 patients were included. Elevated SII suggested worse prognosis (HR 2.11; 95% CI: 0.52–8.59; p=0.093) with no heterogeneity (I^2=0%). PLR showed a nonsignificant link with poorer survival (HR 1.44; 95% CI: 0.89–2.33; p=0.134; I^2=88%). NLR also trended toward worse prognosis (HR 1.41; 95% CI: 0.90–2.20; p=0.131; I^2=77%). Although not statistically significant, all indices trended toward association with unfavorable survival, highlighting the need for larger standardized studies in chordoma.

Conclusion:
Systemic immune-inflammatory indices show promise as prognostic biomarkers in chordoma. SII demonstrated homogeneity but lacked significance, whereas PLR and NLR revealed heterogeneity across studies. Findings are limited by small sample sizes and methodological variability. Larger, multicenter prospective studies with standardized cut-offs are needed to validate prognostic utility.

A Nasopharyngeal Spindle Cell Lipoma Masquerading as Malignancy: A Rare Entity and Diagnostic Dilemma

Poster number 57

Type of abstract:
abstract for poster presentation

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Topic:
Oncology

Introduction:
Spindle cell lipoma (SCL) is a rare benign adipocytic neoplasm typically arising in the posterior neck and back of middle-aged men. Its occurrence in the nasopharynx is exceptionally rare. Owing to its resemblance to malignant entities such as liposarcoma and nasopharyngeal carcinoma, accurate diagnosis is critical to avoid overtreatment.

Methods:
We report a case of 61-year-old man presented with a two-month history of progressive left-sided hearing loss. Otoscopy demonstrated middle ear effusion, while flexible nasoendoscopy revealed a smooth submucosal mass obstructing the left Eustachian tube orifice. MRI showed a well-circumscribed, hyperintense lesion on T1- and T2-weighted sequences with complete signal suppression on fat-saturated imaging, suggestive of a lipomatous tumour.

Results:
The mass was completely excised via an endoscopic transnasal approach without complication. Histopathological evaluation revealed mature adipocytes interspersed with bland spindle cells within a collagenous stroma. No nuclear atypia, mitotic activity, or lipoblasts were identified. Immunohistochemistry demonstrated diffuse CD34 and S100 positivity, consistent with spindle cell lipoma. FISH analysis showed absence of MDM2 amplification, excluding atypical lipomatous tumour/well-differentiated liposarcoma. Following surgery, the patient's otitis media with effusion resolved, with restoration of

normal hearing. The patient has remained asymptomatic and disease-free over five years of follow-up.

Conclusion:
Nasopharyngeal spindle cell lipoma is an exceptionally rare benign neoplasm that closely mimic malignancy both clinically and radiologically. Awareness of this diagnostic entity, in conjunction with histopathological confirmation, underscores the value of accurate diagnosis in guiding conservative management and to avoid unnecessary oncological intervention.

Multimodal Management of Malignant Parapharyngeal Space Tumours: A Retrospective Case Analysis from University Hospital Dubrava

Poster number 58

Type of abstract:
abstract for poster presentation

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Topic:
Oncology

Introduction:
Malignant neoplasms of the parapharyngeal space account for less than 1% of all head and neck tumors. They most commonly originate from salivary glands, nerve sheath structures, or lymphoid tissue. Their rarity, histological heterogeneity, anatomical complexity, and non-specific clinical presentation make diagnosis and therapeutic management particularly challenging, often necessitating a multidisciplinary approach.

Methods:
A retrospective analysis was conducted on 23 patients with malignant tumors of the parapharyngeal space. Histopathological diagnoses included salivary gland tumors (carcinoma ex pleomorphic adenoma, adenocarcinoma), various carcinomas (squamous cell, ameloblastic, clear cell, and nasopharyngeal carcinoma), sarcomas (chondrosarcoma, myofibroblastic sarcoma, rhabdomyosarcoma, pleomorphic undifferentiated sarcoma, fibrosarcoma), as well as melanomas. Surgical management involved a variety of approaches, including open techniques (transoral–transmaxillary, transmandibular, and orbitozygomatic) and endoscopic approaches (transnasal–transmaxillary–transpterygoid). Additionally,

depending on the disease stage and histological subtype, a subset of patients received adjuvant radiotherapy and/or chemotherapy. Follow-up included regular clinical examinations and radiological assessments.

Results:
Nasopharyngeal carcinoma was the most frequently observed entity. In the majority of patients, complete surgical resection was achieved; more extensive lesions also required complex reconstructive procedures. Endoscopic approaches enabled minimally invasive resection in selected cases. Oncological outcomes will be presented in detail, including recurrence rates, disease-free survival, overall survival, as well as prognostic differences among histological subtypes. Furthermore, different surgical approaches were analyzed and compared, along with the impact of adjuvant therapy on overall survival.

Conclusion:
Management of malignant parapharyngeal tumours requires an individualised and multimodal approach. Optimal oncological outcomes and preservation of function and quality of life are best achieved through a combination of minimally invasive endoscopic techniques, conventional surgical procedures and adjuvant therapy.

Geometrical accuracy in Leksell Gamma Knife radiosurgery

Poster number 59

Type of abstract:
abstract for poster presentation

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Topic:
Radiotherapy

Introduction:
In Leksell Gamma Knife (LGK) radiosurgery, geometrical accuracy of the stereotactic procedure is of paramount importance. Therefore, a comprehensive quality assurance program is needed to verify the accuracy of radiosurgery. In this work, preliminary results of the in-house method for the end-to-end geometrical accuracy testing for LGK Icon are presented.

Methods:
An antrophomorfic head phantom in conjunction with dosimetry film, marked as a radiosurgery target, was used for a simulation of a radiosurgical procedure, including stereotactic frame fixation, imaging, treatment planning, positioning, and treatment. Using the CT images of the phantom, a treatment plan was generated with fiducial markers on film to define the target. The phantom with the film target was irradiated accordingly, and the dose distribution delivered to the film was analysed. The distance between the marked target on the film and the centre of the delivered dose distribution represented the overall geometrical error of the radiosurgical procedure.

Results:
The overall geometrical error of the radiosurgical procedure was calculated in two orthogonal planes (axial and coronal) to determine the geometrical error vector in space. The radiosurgical procedure was performed in two ways: with phantom position verification and correction using the on-board CBCT on LGK Icon, and without, by simply adjusting the phantom to the planned irradiation position without any position correction. Both methods

yielded an overall geometrical error of less than 1 mm, while the position verification and correction method provided even more accurate dose delivery, with an overall geometrical error of around 0.5 mm.

Conclusion:
Geometrical accuracy of LGK radiosurgery is susceptible to image and frame-related distortions, patient positioning and movement, and treatment planning errors. Our in-house method for independent end-to-end testing of radiosurgery geometrical accuracy is a valuable contribution to the quality assurance program, ensuring safe and efficient radiosurgery with the LGK Icon.