MADJID SAMII
SOCIETY OF INTERNATIONAL NEUROSURGEONS

4th MASSIN INTERIM MEETING

Prague May 2023

CZECH NEUROSURGICAL SOCIETY
ČESKÁ NEUROCHIRURGICKÁ SPOLEČNOST

ABSTRACTS

4th MASSIN Interim Meeting

May 25 – 27, 2023 | Prague, Czech Republic

4th MASSIN Interim Meeting
ABSTRACTS

May 25–27, 2023

Prague, Czech Republic

Contents

Session 3: Vestibular schwannoma panel – Module 1

Quality of life in patients after vestibular schwannoma surgery

Jan Lazák[1], Aleš Vlasák[2], Jan Betka[1], Eduard Zvěřina[1], Zdeněk Fík[1]

[1] Department of Otorhinolaryngology and Head and Neck Surgery, 1st Faculty of Medicine, Charles University, University Hospital Motol, Prague, Czech Republic
[2] Department of Neurosurgery, 2nd Faculty of Medicine, Charles University, University Hospital Motol, Prague, Czech Republic

Aim: To evaluate the most important factors of quality of life in patients after vestibular schwannoma surgery.

Materials and methods: Patients with unilateral sporadic occurrence of vestibular schwannoma who underwent surgery via suboccipital-retrosigmoid approach were included in the prospective study (2018–2021). Patients after previous Leksell gamma knife irradiation (or other methods of stereotactic radiosurgery) were excluded. Quality of life was assessed using 10 validated questionnaires that were distributed preoperatively, 3 months and 1 year after the surgery.

Results: A total of 76 patients were included in the study, complete data were analysed in 43 of them (response rate 57 %). Grade III and IV represented up to 70 % of all tumors. Patients with larger tumors had a significantly higher risk of postoperative facial nerve paresis, liquorrhea and lower probability of hearing preservation. Patients with smaller tumors and those, who suffered from headaches before surgery had more frequent and severe headaches after surgery. Postoperative headaches were associated with higher incidence of anxiety and tinnitus. More frequent anxiety was also identified in patients with preoperative serviceable hearing who became deaf after surgery. Nevertheless, tinnitus and hearing impairment appeared to have less impact on overall quality of life compared to headaches and facial nerve function.

Conclusion: According to our results, tumor size, postoperative function of the facial nerve and occurrence of postoperative headaches had the greatest influence on the overall postoperative quality of life in patients after vestibular schwannoma surgery.

Keywords: Quality of Life, Vestibular Schwannoma, Questionnaire, Surgery

Multi-modality monitoring of auditory function in cerebellopontine angle surgery

Cordula Matthies[1], Robert Nickl[1], Andreas Schmidt[1], Christian Stetter[1], Rudolf Hagen[2], Matthias Scheich[2], Ralf-Ingo Ernestus[1], Maria Breun[1]

[1]*Department of Neurosurgery, Würzburg University Hospital, Bavaria, Germany*
[2]*Department of Otorhinolaryngology, Würzburg University Hospital, Bavaria, Germany*

Introduction: Auditory brainstem responses (ABR) depend on a far-field technique and bear the limitations of small potential amplitudes, great variability in morphology and delayed delivery. This study was designed to evaluate the application of additional near-field techniques.

Methods: Patients with a very high interest in hearing conserving surgery were offered to undergo multimodality monitoring. Conventional ABR needle electrodes and additional near-field ball electrodes were placed for an extra-tympanic electrocochleography (ECochG) or at the eighth nerve entry zone (D-ABR). Evaluation was based on Gardner-Robertson GR Classification and a scoring system (Class 1: normal ABR, 2: latency delay, 3: wave III loss, 4: only wave I or V present, 5: no waves) and correlated with auditory function by.

Results: Hearing preservation was achieved in 45 of 107 vestibular schwannoma patients (42%), with GR Class I in 10, GR II in 16, GR III in 16 and GR IV in 3 patients. Besides conventional ABR either 69 additional ECochG or 46 D-ABR were recorded. Preoperative ABR, D-ABR and ECochG classes show a positive correlation with preoperative hearing classes. Postoperative ECochG was less reliable than ABR/D-ABR in predicting postoperative hearing quality: 23 patients with postoperative deafness had a preserved cochlea potential (Class 4) in ECochG. Analysis of ABR and ECochG classes identified a strong positive correlation ($P<0.01$, Kendall-Tau-b preop 0.835, postop 0.734) especially for classes 1 to 3, where wave V is still present ($P<0.01$ Kendall-Tau-b preop 0.741, postop 1.000). ECochG and D-ABR provide new information on the functional status within 5 to 10 seconds. Technical limits were related to the individual anatomy, such as narrow external auditory canals or extensive tumor formation.

Discussion and Conclusion: Both nearfield techniques deliver larger and faster responses of all components and are especially useful during direct dissection at the tumor-nerve-border and at the brainstem.

Keywords: vestibular schwannomas, auditory function, hearing preservation, auditory monitoring

Current concept of basic research in vestibular schwannoma

Michaela Tesařová[1,2], Lenka Peterková[1,2], Monika Šťastná[3], Michal Kolář[3], Lukáš Lacina[2], Karel Smetana[2], Radovan Hynek[4], Aleš Vlasák[5], Jan Betka[1], Zdeněk Fík[1]

[1]*Department of Otorhinolaryngology and Head and Neck Surgery, 1st Faculty of Medicine, Charles University and Motol University Hospital, Prague, Czech Republic*
[2]*Institute of Anatomy, 1st Faculty of Medicine, Charles University, Prague, Czech Republic*
[3]*Institute of Molecular Genetics, Czech Academy of Sciences, Prague, Czech Republic*
[4]*Institute of Biochemistry and Microbiology, University of Chemistry and Technology, Prague, Czech Republic*
[5]*Department of Neurosurgery, 2nd Faculty of Medicine, Charles University, Prague, Czech Republic*

Vestibular schwannoma is the most common benign neoplasm of the cerebellopontine angle. The first symptoms of vestibular schwannoma include hearing loss, tinnitus, and vestibular symptoms. In the event of further growth, cerebellar and brainstem symptoms, along with palsy of the adjacent cranial nerves, may be present. However, the clinical picture has unpredictable dynamics, and there are currently no reliable predictors of the tumor's behavior**.** The etiology of the hearing loss in patients with vestibular schwannoma is unclear. Given the presence of hearing loss in patients with non-growing tumors, a purely mechanistic approach is insufficient. A possible explanation for this may be that the function of the auditory system may be affected by the paracrine activity of the tumor. Also, initiation of the development and growth progression of vestibular schwannomas is not yet clearly understood. Biallelic loss of the *NF2* gene does not explain the occurrence in all patients; therefore, detection of gene expression abnormalities in cases of progressive growth is required. As in other areas of cancer research, the tumor microenvironment is coming to the forefront also in vestibular schwannomas. In the paradigm of the tumor microenvironment, the stroma of the tumor actively influences the tumor's behavior. However, research in the area of vestibular schwannomas is at an early stage. Thus, knowledge of the molecular mechanisms of tumorigenesis and approaching tumors as a complex tumor microenvironment with the active involvement of all its cellular and non-cellular components is crucial for understanding their behavior. Developing methods of molecular biology are helpful to elucidate the probable causes of tumorigenesis and open the way to improved diagnostics, the establishment of prognostic markers, and targeted antitumor therapy.

Keywords: vestibular schwannoma, tumor microenvironment, tumor growth, hearing loss

Long-term outcome of persistent postoperative headache after vestibular schwannoma surgery and its treatment strategy

Yoichi Uozumi[1], Yuichi Fujita[1], Yoji Yamaguchi[1], Tomoaki Nakai[2], Takashi Sasayama[1], Eiji Kohmura[1,3]

[1]Department of Neurosurgery, Kobe University Graduate School of Medicine, Kobe, Hyogo, Japan
[2]Department of Neurosurgery, Toyooka Hospital, Toyooka, Hyogo, Japan
[3]Department of Neurosurgery, Kinki Central Hospital, Itami, Hyogo, Japan

Objective: Postoperative headache (POH) is a disturbing complaint after resection of vestibular schwannoma (VS) through retrosigmoid approach. However, there are currently no treatment guidelines. We noted that persistent POH resembled the symptoms of primary headache and treated persistent POH with symptom-based approach that focuses on both the intensity and nature of the pain. The aim of this study was to evaluate the usefulness of this symptom-based opioid-free treatments for persistent POH after VS resection.

Methods: Of 137 patients whose sporadic VS was resected through the retrosigmoid approach, 74 had persistent POH beyond 3 postoperative months. Their symptoms were classified as tension-type headache (TTH), migraine, neuralgia, or other and were treated. We retrospectively analyzed the treatment outcomes during 2 postoperative years.

Results: Patients with persistent POH were significantly younger (P = 0.003) and had significantly smaller tumors (P = 0.001) and a greater extent of resection (P = 0.04) than those without POH. The most common simple symptom was TTH in 56 patients, followed by migraine in 6 and neuralgia in 5. All 7 patients with complex symptoms had a mixture of TTH and migraine. The complete disappearance of POH was achieved in 40 patients (54%) and a medication-free condition in 51 (69%). No patients had residual severe POH that could not be controlled with medication. Achievement of a medication-free outcome that included complete disappearance of the persistent POH was significantly more common in patients with preserved facial nerve function (P = 0.008) and those with simple symptoms (P < 0.001).

Conclusion: The symptom-based approach is appropriate for understanding and managing persistent POH after VS resection with excellent pain control. Preserved facial nerve function and simple symptoms are significant prognostic factors for a medication-free outcome.

This presentation has been published by Fujita Y. et al. in World Neurosurgery 2022.

Keywords: vestibular schwannoma, postoperative headache, retrosigmoid approach, treatment strategy

Intracanalicular vestibular schwannoma

Eduard Zvěřina, Jan Betka, Zdeněk Fík, Jan Lazák, Zdeněk Čada

Department of Otorhinolaryngology and Head and Neck Surgery, 1st Faculty of Medicine, Charles University, University Hospital Motol, Prague, Czech Republic

Objective: *Vestibular schwannoma* (VS) is defined as *intracanalicular (IC)* when it is limited to the internal auditory canal. Treatment options include microsurgery, stereotactic radiosurgery such as Leksell gamma knife (LGN) and observation (wait and scan).

Background: The aim of the work was to evaluate the obtained data, compare them with the literature and to propose an optimal treatment procedure.

Methods: Retrospective analysis of a group of more than 1,000 patients treated at our department in the years 1998–2022. Endoscopically assisted microsurgery, 3D exoscope and perioperative monitoring of hearing and facial nerve (NVII) function were used. Several patiens were only observed.

Results: There were 20% of patients with intracanalicular schwannoma in our group. In the case of patients with preserved hearing, the subocipital retrosigmoid approach (RS) was chosen. Only a small number of tumors were operated by the translabyrinthine (TLB) approach (primarily patients with deafness or useless hearing). Postoperative magnetic resonance imaging showed no residue or recurrence of IC VS. In all cases of IC VS it was possible to preserve or restore good NVII function. Useful hearing was preserved in 13 %. In several cases, there was an improvement from useless to useful hearing. Postoperative otoneurological examination in most cases showed good vestibular compensation. All patients returned to normal life. Most elderly patients, often with useless hearing, were only observed.

Conclusion: Treatment of IC VS must always be individual. In young patients, IC VS should be removed before a growing tumor destroys hearing. LGN leads to a gradual deterioration of hearing. It also attributes the results of the natural behavior of non-growing IC VS. In our opinion, LGN is not indicated in the treatment of IC VS. TLB approach always leads to hearing destruction. Therefore, for IC VS we prefer the RS approach.

Keywords: Vestibular schwannoma, Intracanalicular vestibular schwannoma, Leksell gamma knife, Stereotactic radiosurgery, Rerosigmoid approach

Session 4: Vestibular schwannoma panel – Module 2

Hearing preservation in vestibular schwannoma surgery

Zdeněk Fík[1], Aleš Vlasák[2], Jan Lazák[1], Vladimír Koucký[1], Veronika Svobodová[1], Zuzana Balatková[1], Eduard Zvěřina[1], Jan Betka[1]

[1]Department of Otorhinolaryngology and Head and Neck Surgery, First Faculty of Medicine, Charles University and Motol University Hospital, Prague, Czech Republic
[2]Department of Neurosurgery, Second Faculty of Medicine, Charles University and Motol University Hospital, Prague, Czech Republic

However, hearing loss is one of the main concerns in vestibular schwannoma surgery, its preservation remains a surgical challenge for decades. It is also questionable what the real impact of unilateral hearing loss on quality of life is. From this perspective, it is possible to explain the popularity of transpetrosal, deafening approaches.

Nowadays, hearing deterioration among all kinds of strategies (observation, stereoradiation, surgery) seems to be the same from the long-term point of view. Therefore, surgery can be considered to have the largest capacity for melioration in such results.

As the surgical technique for hearing preservation was described by Jannetta in the 1980s, at this time, we can focus mainly on technological development, such as different types of neuromonitoration or pharmacological neuroprotection.

Additionally, proper looking for the best candidates can improve hearing preservation results. However, obeying the hearing preservation rule (size of the tumour + hearing status) is not a guarantee of success. The involvement of other parameters, such as MRI findings, objective audiological results, and history of hearing deterioration, does not appear to be less important.

The long-term results of hearing preservation after surgery should be taken into account together with other factors, e.g. tinnitus, vestibular symptoms, and patients expectations.

Finally, in patients with unilateral hearing loss after surgery, several approaches to hearing restoration are available, including conservative and operative tools. From this perspective, the preservation of the cochlear nerve is determinative for the strategy chosen.

Keywords: vestibular schwannoma, hearing preservation, retrosigmoid craniotomy

Retrosigmoid approach

Jan Klener

Department of Neurosurgery, Na Homolce Hospital, Prague, Czech Republic

The retrosigmoid approach is one of the most widely used surgical approaches in brain neurosurgery. It is a relatively simple and safe approach, offering excellent exposure of the middle, upper and lower part of the pons, the adjacent part of the cerebellum, the brainstem and the posterior surface of the pyramid.

There are a large number of variants of the approach, which differ in the operative position, the technique of craniotomy, durotomy and the subsequent closure of the durotomy and craniotomy.

Extension of the retrosigmoid approach. i.e. drilling of the internal meatus, suprameatal extension, transtentorial extension, etc. the far lateral (posterolateral) approach will allow access to other intracranial regions, specifically the fundus meatus, the cavum Meckeli, part of the middle cranial fossa, and the craniocervical junction area.

The communication will illustrate the technique of retrosigmoid craniotomy as it is performed at our hospital, i.e. in the supine position, with osteoplastic craniotomy, T-shaped durotomy and the introduction of permanent suction. This variant makes it possible to operate in practically all cases with a gravitation-assisted non-retraction technique, which is very gentle on the cerebellar tissue. Cranioplasty is performed by replanting the own bone plate, in some cases supplemented by the application of an Osteoconductive bone graft substitute. Possible complications related to the approach are discussed.

The retrosigmoid approach is a versatile approach providing safe exposure of a wide range of pathologies in the posterior cranial fossa.

Options of vestibular rehabilitation in vestibular schwannoma patients

Vladimír Koucký, Markéta Bonaventurová, Veronika Bandúrová, Jan Betka, Zdeněk Fík, Zuzana Balatková

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

Resection of vestibular schwannoma causes acute peripheral vestibular lesion. The seriousness of clinical manifestation and subjective symptoms depend on many factors including residual vestibular function before the surgery. In most of the patients we can observe spontaneous adaptation to the vestibular asymmetry and restoring of the ability to keep balance thanks to the mechanisms of central compensation of the vestibular lesion. Nevertheless, there is a variety of final functional states in patient population. Factors that affect course of the compensation of the vestibular lesion are age, general physical health, cognitive abilities, vision or presence of psychological and anxiety disorders. The important role of the vestibular rehabilitation is to support and evolve the process of central compensation in every patient. In the lecture we discuss currently used methods of vestibular rehabilitation and techniques that may improve the final outcome of the patients such as use of virtual reality and gentamicine prehabituation.

Removal of large vestibular schwannomas (VS) by retrosigmoid approach: results of a cumulative series and criticism of “planned” partial resection followed by SRS

M. Sames, L. Mastronardi, C. G. Scavo, G. Stati, P. Vachata, T. Radovnicky, J. Cee

J. E. Purkinje University and Masaryk Hospital, Neurosurgery, Usti nad Labem, Czech Republic
San Filippo Neri Hospital, Neurosurgery, Roma, Italy

Objective: Evaluate safety and efficacy of removing Samii's grade IV vestibular schwannomas

(VS) by retrosigmoid approach (RSA) in a series of patients operated on from 2008 to 2017.

On the basis of literary research compare the long-term results after the “planned” partial resection followed by Stereotactic Radiosurgery (SRS).

Methods: Large VS (mean diameter 39,8 mm ± 6 mm) were excised from 57 consecutive patients by RSA. The strategic goal of the operation was radical resection. Surgical excision consisted of debulking of extrameatal portion, followed by removal of intrameatal part. Last pieces of VS were removed by blunt or sharp dissection. In cases of strong tumor adherence to surrounding structures, a millimetric film remnant of tumor capsule was left, thus yielding a near-total or subtotal resection.

Results: Postoperative mortality was zero. Total or near total (>95 %) removal was possible in

41 cases (72 %). FN was anatomically preserved in 94,7 % and 84,2 % of cases had good FN function (House-Brackmann grade I-II) at 6-month follow-up. VP shunt for hydrocephalus was necessary in 5 cases (8,8 %).

Discussion: The mean follow-up was 41,8 months, 3 cases showed recurrence or progression of residuals (5 %); and one had NF2.

We compare a different philosophy “planned” partial surgery followed by SRS, which has appeared in the literature since 2003. However, the longest published median follow-up is only 5 years. Residual volume greater than 6 cm^3 before radiosurgery had a tumor regrow of 37,7 %.

Conclusions: In this series of large VS retrosigmoid approach allowed zero mortality, high rate of functional FN preservation (84,2 % HB I-II) and low recurrence rate 5 %.

The longest published follow-up after planned partial surgery followed by SRS is surprisingly quite short (median 5 years) and shows a regrow in up to 37.7 %.

There is still a reason to seek a safe radical or near total tumor removal.

Perioperative facial nerve management in vestibular schwannoma surgery

Aleš Vlasák[1], Zdeněk Fík[2], Jan Betka[2], Eduard Zvěřina[2], Vladimír Koucký[2], Jan Lazák[2], Vladimír Beneš[1]

[1]Department of Neurosurgery, Second Faculty of Medicine, Charles University in Prague and University Hospital Motol, Prague, Czech Republic
[2]Department of Otorhinolaryngology and Head and Neck Surgery, First Faculty of Medicine, Charles University in Prague and University Hospital Motol, Prague, Czech Republic

Preservation of facial nerve function represents one of the most important goals of vestibular schwannoma surgery. Facial nerve palsy has deep impact on patient's quality of life. Postoperative facial nerve function became one of the crucial evaluation parameters of treatment success. In the lecture, we are going to present our surgical results and discuss techniques that we believe lead to better outcomes. We are not only talking about the anatomical preservation of nerve continuity. Its factors have already been sufficiently clarified – age, tumor size, cystic features of tumors, stimulation thresholds and learning curve of the team. In the lecture, we will focus primarily on techniques leading, in our opinion, to better function of preserved nerves.

Keywords: facial nerve, vestibular schwannoma, functional outcome

Session 5: Brachial plexus

Nerve transfers for axillary nerve repair in brachial plexus injury: results of 206 adult patients

Pavel Haninec, Libor Mencl

3rd Faculty of Medicine, Charles University Prague

Restoration of axillary nerve function is one of the main priorities of brachial plexus surgery. Neurotization, the transfer of a functional but less important donor nerve to a nonfunctional, more important recipient nerve, has recently become a leading treatment option. A variety of donor nerves have been used to reinnervate the axillary nerve with various degrees of success. The aim of this study was to compare the effectiveness of our commonly used donors in brachial plexus injury.

A group of 206 patients with various types of brachial plexus injury was analyzed. All patients underwent axillary nerve reconstruction performed by the senior author (P.H.) and had a minimum follow-up period of 24 months. The thoracodorsal nerve was used as a donor in 69 patients, the triceps branch of the radial nerve in 25 patients, lower subscapular nerve in 19 patients, long thoracic nerve in 38 patients, intercostal nerves in 27 patients and fascicle transfer from the ulnar or median nerve in 23 patients. The median age was 31 years, and the median time between trauma and surgery was 6 months.

Successful deltoid recovery was defined with muscle strength MRC grade above 3, electromyographic signs of reinnervation and by muscle mass increase. The overall success rate was 75,5% but varied greatly between different types of brachial plexus injury and corresponded to available donors. The donor with the highest success rate was triceps branch of the radial nerve (80%), followed by subscapular nerve (78,9%), fascicle transfer from the ulnar or median nerve (73%) and thoracodorsal nerve (71%). Much lower success rate had long thoracic nerve (36%) and intercostal nerves (22%), which were used in complete brachial plexus injury.

Surgical treatment of obstetrical brachial plexus palsy

Pavel Haninec, Libor Mencl

3rd Faculty of Medicine, Charles University, Prague

Obstetrical brachial plexus palsy displays a stable incidence of approximately 1 per 1,000 live births. Most children show good spontaneous recovery, but in 20% to 30% an important residual motor impairment remains.

Between 2000 and 2022, total of 61 patients with obstetrical brachial plexus injury underwent nerve surgery in Department of Neurosurgery, 3rd Faculty of Medicine, Charles University, Prague. The aim of our study was to evaluate the results achieved using various surgical techniques in patients with partial and total obstetrical brachial plexus palsy.

The overall success rate in upper plexus birth injury was 80% in shoulder abduction, 65% in external rotation and 88% in elbow flexion with median follow-ups of 47 months. Success rate in complete paralysis was 70% in finger and wrist flexion, 69% in shoulder abduction, and elbow flexion in 72%, the median follow up was 53 months.

Improved function can be obtained in infants with obstetrical brachial plexus injury with early surgical reconstruction. It is possible to achieve functional reinnervation by reconstruction of entire brachial plexus from remaining roots with restoration of hand function.

Reconstructive neurosurgery – not only for nerve injury

Thomas Kretschmer

Dir. Department of Neurosurgery & Neurorestoration, Neurosurgical Intensive Care, Head Neurooncology Center (DKG), Skull Base Center (GSB), Klinikum Klagenfurt, Austria

Reconstructive nerve surgery aims at regaining lost function. The field develops at fast pace and is influenced by different specialities. To achieve the obtainable it is frequently necessary to embed the patients in a comprehensive interdisciplinary treatment concept.

The field underwent an amazing development within the last 20 years. Besides the reconstruction of lesioned nerves the principle of nerve transfer is used in ever more variants: functional nerves or fascicles thereof are being used as axon donors, and rerouted to nerves that have been severely damaged. The donor nerve and its correlated cortical area serve as “emitting device” for per se other than the original functions – this is possible because of brain plasticity. In this sense a growing number of nerve transfers are now being used to make up for lost function. It became evident that the nerve transfer principle is not limited to a use for peripheral nerve injury. There is robust data that nerve transfers have its place in restoring function for people with spinal cord injury. On the horizon appear applications for stroke and brain lesions. The knowledge about “new” and reliable transfer combinations increases fast.

Apart from these “rewiring” techniques there are multiple other options, surgeries, and devices to improve function in such cases if pain and spasticity is treated. Many of those are not new in the neurosurgical armamentarium, however are not frequently enough considered.

The presentation gives a focused overview over this fascinating field and its current and future capabilities.

Minor surgeries with major complications within the peripheral nerve and brachial plexus surgery – there can be the only one solution

Lukas Rasulić[1,2], Aleksa Mićić[1,2], Stefan Radojević[1,2], Jovan Grujić[1,2], Andrija Savić[1,2], Filip VItošević[3], Siniša Matić[2], Milan Lepić[4]

[1]*Faculty of Medicine, University of Belgrade, Belgrade, Serbia*
[2]*Clinic for Neurosurgery, University Clinical Centre of Serbia, Belgrade, Serbia*
[3]*Neuroradiology department, Center for Radiology and MRI, University Clinical Center of Serbia, Belgrade, Serbia*
[4]*Clinic for Neurosurgery, Military Medical Academy, Belgrade, Serbia*

Different preoperative, intraoperative and postoperative complications can occur during the course of surgical treatment; however, according to some data, at least half of them could be prevented. Considering that peripheral nerve surgery is largely elective, and complications resulting in peripheral nerve lesions may seriously alter patient's quality of life, its complications are of great medical, socio-medical and legal importance. Intraoperative complications during peripheral nerve surgery are extremely rare, apart from general complications, while iatrogenic peripheral nerve injuries remain as the most significant group of complications. The aim of this study was to analyze and describe most common complications associated with peripheral nerve surgery. A retrospective selected cases analysis with literature review was performed, which included series of patients treated due to peripheral nerve lesion at Clinic for Neurosurgery, University Clinical Centre of Serbia. Results show that complications occurring during peripheral nerve surgery are very rare, while the direct intraoperative complications are extremely rare. Most of the "surgery-related" complications were in fact "surgeon-related" and should never occur in experienced subspecialist of peripheral nerve treatment. Some specific complications are associated with peripheral nerve tumor surgery, and may occur due to following "fist, no harm" principle, or are associated with independent factors of tumor biology, such as in malignant peripheral nerve sheet tumor. Direct injuries to the nerves during surgeries without targeting peripheral nerve pathology mostly occur when the nerves are not visualized due to a relatively small size or when the nerves are mistaken for vessels. The risk concerns those regions in which the peripheral nerves lie superficial and are exposed during surgery. The procedures carrying the highest risk of iatrogenic intraoperative peripheral nerve injuries are usually performed by specialist other than neurosurgeons, including osteosynthesis, lymph node biopsy, varicose vein surgery, and inguinal hernia repair.

Keywords: peripheral nerve surgery, complications, iatrogenic nerve injuries

Session 6: Vascular neurosurgery and skull base

Revascularization for Moyamoya Disease: Results in Personal series of 110 surgical cases

Shinichi Numazawa[1], Sadayoshi Watanabe[1],Yasunobu Itoh[1], Kentaro Mori[1], Jun Sakai[1], Hirotaka Yoshida[1], Ryo Kitagawa[1], Isao Akatsu[1], Tomoko Otomo[1] Isao Yamada[1] Kouta Yamakawa[1], Awfa Aktham[1], Kazuo Watanabe[2]

[1]*Neurosurgery, Tokyo general hospital, Japan*
[2]*Neurosurgery, Southern Tohoku General Hospital, Japan*

Introduction: We have treated 82 patients with moyamoya disease over a 32-year period from 1991 to 2022, and have experienced 110 surgeries, so this report focuses on surgeries.

Patients: The age ranged from 2 to 77 years, with a mean age of 38.5 years, 29 males and 53 females. 12 patients were younger than 16 years, 2–12 years, with a mean age of 6.8 years, 2 males and 10 females. 70 adult cases were 17–77 years, with a mean age of 47.7 years, 29 males and 41 females. The number of patients with TIA/infarction was 62, 8 with hemorrhage, and 12 with headache, involuntary movements, and brain examination with MRI, MRA. 66 patients were followed up for 1–27 years. Surgery: For children, direct anastomosis and vascularized galea transplantation to the frontal lobe were performed on the diseased side, followed by similar surgery on the contralateral side approximately 3 months later. For adult cases, a similar operation was performed on the sick side, and if necessary, based on the evaluation of cerebral blood flow, the contralateral side was operated on. For adult patients, there was a time when only direct anastomosis was performed, but due to decreased blood flow in the frontal lobe, a vascularized galea transplantation was added to the procedure. In pediatric cases, bilateral and occipital lobe surgeries were added in 9 cases and in 3 cases, respectively. In adults, 60 patients underwent surgery on the sick side only once, 17 patients underwent surgery on the contralateral side twice, and 6 patients underwent surgery on the third side three times. The ADLs of the patients who were followed up were 1 in 51 cases, 2 in 8 cases, 3 in 4 cases, 4 in 3 cases, and 5 in 1 case. Postoperative complications included postoperative TIA in 3 cases, hyper perfusion in 1 case, postoperative infection in 4 cases (3 cases were experienced in the same year, so some cause was assumed), and STA non-opening in 4 cases.

Conclusion: There was a bias in the number of cases due to the presence or absence of a pediatric department at each hospital, and the age of the patients varied by age group, the results of treatment seemed to be comparatively good by using direct anastomosis and the vascularized galea Transplantation is used.

Anatomical Surgery of the Jugular Foramen lesions

Kentaro Watanabe, Yuichi Murayama

Jikei Medical University School of Medicine, Department of Neurosurgery, Tokyo, Japan

Objective: The anatomy around the jugular foramen is complex, and at the same time, the glossopharyngeal, vagus, and accessory nerves are very vulnerable, requiring a thorough understanding of the anatomy around the foramen and sensitive surgery.

Jugular foramen lesions include schwannomas, glomus tumors, bone-derived tumors, and vascular disease; each tumor requires a different approach to treatment. Especially for extracranial tumors, the Mastoid's route must be used, and the relationship to facial nerve must be considered.

Methods: Surgical strategies considering the direction of tumor extension, tumor type and characteristics were discussed along with clinical case experiences of perfusion routes of the sigmoid sinus, IPS, jugular bulb, and anterior and posterior condylar veins.

Twenty-one tumors around the foramen magnum and Foramen Jugulare were experienced during the 3-year period from January 2019 to December 2022. (12 pyramidal myelomas, 6 schwannomas, 1 hemangioblastoma, 1 Glomus tumor, two dAVF and 2 bone tumors.

Results: Surgery for schwannomas was performed with preservation of the tumor capsule, and residual symptoms of permanent nerve dropout The surgery for schwannoma was performed with preservation of the tumor capsule. In one case, dysphagia and hoarseness appeared after gamma knife surgery for the residual tumor. In one case of meningioma, temporary abducens nerve palsy occurred. Other postoperative complications of meningioma included intraoperative venous perfusion failure in two cases. Intraoperative venous irrigation failure occurred intraoperatively, but was avoided by securing the venous channel. In another case, a tumor localized in the jugular bulb caused venous sinus stenosis, resulting in intracranial hypertension symptoms. We report a case in which the tumor was removed by a minimal transcondylar approach and the symptoms improved after surgical removal of the tumor in the vein.

Surgical planning for removal of tumors around the jugular foramen requires consideration of surgical approach, neurological function, and venous perfusion.

Keywords: Jugular Foramen, Schwannoma, Glomus tumor, Transcondylar approach

Session 7: Skull base tumors

Malignant Transformation of Intracranial Epidermoid Cyst to Squamous Cell Carcinoma, Case Report and Literature Review

Mohammad Farajirad, Elnaz Farajirad, Saman mahazeb Torabi

Department of neurosurgery, Mashad University of medical sciences, Mashad, Iran

Intracranial Epidermoid cysts (ECs) are rare, benign tumor of central nervous system that appears from maintain ectodermal implants. Malignant transformation of an EC to squamous-cell carcinoma (SCC) is rarely reported. Intracranial squamous cell carcinoma has known as a poor prognosis condition that optimal modalities remain uncertain. We present the case of 43-years old male complained 3 months severe headache and right eye hemianopia. Primary evaluation depicted right homogenous brain mass which was successfully totally removed. Pathological assessment found epidermoid cyst without any sign of malignancy. Six months later, patient was referred with episodes of intermittent headache and right eye blindness. After initial imaging, new tumor was growth in same site of frontal epidermoid cyst. Second surgery was performed and pathological report discloses to be a malignant SCC. SCC transformation was confirmed by two expert neuro- pathologists. The exact underlying mechanism causing malignant transformation is not definitely known and it seems SCC may have been transformed due to chronic inflammatory respond to epidermoid cyst. Literature reviews demonstrate that, although, optimal total resection in addition adjuvant radiotherapy is the recommended management o

Keywords: Brain Neoplasms, Epidermoid Cyst, Malignant Transformation, Squamous Cell Carcinoma

Endoscopic endonasal surgery for pterygopalatine fossa tumors – juvenile angiofibroma

Jan Plzak, Zuzana Balatkova

Department of Otorhinolaryngology and Head and Neck Surgery, 1st Faculty of Medicine, Charles University and University Hospital Motol, Prague, Czech Republic

Juvenile angiofibroma (JA) is a benign, highly vascularized tumor associated to adolescent. JA displays a slow and locally expansive growth starting at the basisphenoid and the sphenopalatine foramen, spreading from the nasal cavity to the nasopharynx, paranasal sinuses. Dumbbell shape extension into the pterygopalatine fossa and then the infratemporal fossa, the cavernous sinus or intracranial may occur. Diagnosis is based on typical symptomatology and CT/MRI finding. The treatment of choice is surgery after preoperative embolization. The use of an endoscopic approach to excise small juvenile angiofibromas is supported by excellent results. Extended juvenile nasopharyngeal angiofibromas are still a surgical challenge; however, there is increased experienced-based evidence that endoscopic resection of large or an extended tumour is feasible in expert hands.

Pterygopalatine fossa (PPF) surgery will be discussed. It is very difficult to access the PPF, which is traditionally approached via an open method, such as lateral rhinotomy, midfacial degloving, facial translocation, transantral maxillectomy, and the Fisch C and D procedures. Although these procedures provide good exposure of the PPF, they are often complicated by unacceptable facial scaring and deformity, as well as dysfunction of the facial and infraorbital nerves. Endoscopic sinus surgery is now a standard procedure for phlogistic sinonasal disease and, more recently, has been adopted as a basic approach for the treatment of benign sinonasal tumors, such as juvenile nasopharyngeal angiofibroma.

Keywords: pterygopalatine fossa, juvenile angiofibroma

Parasellar meningiomas – tips and tricks

Miroslav Vaverka, David Krahulík, Ondřej Kalita, Matěj Halaj

Neurosurgical clinic, University Hospital FNOL, Olomouc, Czech Republic

Introduction: Parasellar meningiomas summarized heterogenic group of tumors, with specific aspects of technical solutions for each type. Common problems of all is safe radicality with maintainig function of neurovascular structures, cosmetic effects, watertight closure of dura and behavior eventual rest of tumor prediction in follow -up period. Histological examination of specimen and also in currently much more genetics plays important role particularly for indication of complementary gamaknife treatment (RS).

Method: Authors present some case reports, typical for individual group of meningiomas with their specify and pitfalls.

Results: In more than 100 surgeries authors demonstrated their experience.

Meningiomas could completely resected in most cases. Pterional craniotomy with extradural unroofing of the optic canal is crucial for many reasons in most complex cases:

1. blood supply is attacked in beginning of procedure simultaneously with detachment tumor from skull bases.
2. anterior clinoidectomy adds more surgical space and better angle for manipulation
3. optic nerve in normal area in large tumor facilitates locating
4. in regrows, the optic nerve has room to be displaced, without compromising vision.
5. if RS is indicated optic nerve is free of disease and residual tumor can safely receive the radiation dose.
6. Histological and molecular-genetics examination brings important information for long term control, in meningiomas more than 10 yrs.

However, functional preservation of III, IV and VI. cranial nerves is main limiting factor for radical surgery.

Discussion: Overview of current trends is done, especially role of endoscopic methods and new knowledges in the field of molecular genetics is discussed.

Conclusion: Parasellar meningiomas are interesting chapter of neurosurgery with a long history, this topic focused interest many big neurosurgeon, but still are there the space how to increase safe radicality and durability of tumor resection.

Keywords: meningioma, parasellar, approaches, radicality

Session 8: Posterior fossa, brain stem and vascular

Perfusion Imaging Guided Microsurgical Revascularization in Acute Stroke

Jiri Dostal, Jan Mracek, Vladimir Priban

Department of Neurosurgery, University Hospital and Faculty of Medicine in Pilsen, Charles University, Czech Republic

The standard of treatment of acute ischemic stroke due to a large vessel occlusion is intravenous thrombolysis and mechanical thrombectomy. In the case of their failure, the prognosis of the patient is very unfavorable. Open surgical revascularization by either direct microsurgical embolectomy, extra-intracranial bypass or both can offer a significant benefit for these patients. The amount of salvageable tissue can be evaluated by perfusion imaging. In case of favorable perfusion imaging finding, time factor is not the sole predictor of the outcome, as has been proved by several recent randomized controlled trials. Some of the patients can greatly benefit from an early surgical revascularization. The authors present options of screening of patients with persisting large vessel occlusion after failure of the standard treatment, including case reports from their institution. The aim is to actively find patients suitable for the surgery and to be able to treat them as soon as possible.

Keywords: large vessel occlusion, stroke, thrombectomy, extra-intracranial bypass, revascularization

Peritumoral brain edema in the skull base meningiomas

Barbora Musilová, Marek Grubhoffer, Martina Štoková and Jiří Fiedler

Neurosurgical Department, Hospital České Budějovice, Czech Republic

Background: Despite the novel technologies in operative technique, the refreshment of WHO grading system and the expansion of the molecular biology, there are still several questions regarding skull base meningiomas. It is not clear, whether peritumoral brain edema (PTBE) can influence the outcome of the treatment. Exactly mechanism of PTBE formation has not been clearly elucidated. Aim of this retrospective cohort study is to evaluate the influence of PTBE in meningiomas of the skull base.

Methods: We retrospectively reviewed patients operated between 2012 and 2022. The following data was statistically analysed – location of the meningioma according to Yasargil classification, presence of the PTBE, its grade and postoperative complications. The grade of PTBE was classified in this fashion – grade I (size < 1 cm), grade II (1–3 cm) and grade III (> 3 cm) on T2-weighted MRI images. The observed complications were hematoma, CSF leak, hydrocephalus, neurological deficits (newly occurred or worsen previous) and cardiopulmonary.

Results: Overall 96 patients were included in our study. PTBE has occurred in 58 patients (60,4%), 38 patients (39,6%) was PTBE-free. Regarding the grade of PTBE – grade I (29,3%), grade II (31%) and grade III (39,7%). Postoperative complications have occurred in 39 patients (40,7%) of which 32 patients with PTBE (82%). 57 patients (59,3%) possessed the postoperative course without any complications – 26 patients (45,6%) from them had associated PTBE. In the group of patients with the postoperative hematoma there was captured the positive correlation. With an increasing in the grade of PTBE increase as well the number of patients with hematoma.

Conclusion: In retrospective evaluation of a single center cohort we have confirmed potential association between the occurrence of PTBE and its influence on complicated postoperative course.

Keywords: skull base meningioma, PTBE, VEGF, surgical morbidity

Skull base meningiomas – functional outcome after surgical resection

Gopal Raman Sharma

Department of Neurosciences, Nepal Mediciti, Lalitpur, Kathmandu, Nepal

20–30% of intracranial meningiomas are located in skull base areas. Surgical removal of these skull base meningiomas are often difficult due to narrow and deep corridors and mostly they are surrounded by vital neurovascular structures, however, due to advancement of modern neurosurgical equipment these tumors can be safely removed with minimum morbidity.

Aim of this study is to analyze data and bring out the functional outcome after surgical resection of these skull base meningiomas.

This is a retrospective study of 88 skull base meningiomas cases (out of 266 intracranial meningiomas) operated at our institute between January 2007 and April 2022. Intraoperative neurophysiological monitors and CUSA were used along with operating microscope. Followed up period ranged from 1 to 12 years.

There were 32 males and 56 females and age ranged from 8 to 80 years.

Raised ICP (68%), cranial nerve palsies (75%) and seizures (47%) were main clinical presentation. Location of meningiomas were olfactory groove (24), sphenoidal (26), sellar/suprasellar (11), Cavernous sinus (2), cp angle (16), petroclival (6) and foramen magnum (3).

63 patients had Simpson's grade II and 25 had grade III excision. Histologically all meningiomas were benign except one.

46% suffered postoperative complications mainly new onset of cranial nerve palsies (13), pseudomeningocele (5), cavity hematomas (5) and hydrocephalus (3).

Outcome was assessed in term of MRS, more than 90% had MRS < 2 and 10% had MRS > 3. Two patients died.

Recurrence rate was 2%.

Standard treatment of skull base meningiomas should be surgical excision with preservation of neurovascular structures. More than 90% of patients may achieve good functional outcome with mortality less than 2% Meningioma.

Keywords: Meningioma, Skull base, Surgical outcome

Brain stem cavernomas. Radical removal functional microsurgery

Eduard Zverina, Pavel Haninec

Department of Neurosurgery, Third Faculty of Medicine, Charles University in Prague, University Hospital Královské Vinohrady, Prague, Czech Republic

Introduction. Brainstem cavenomas (BSC) require radical surgery because of fatal outcome due to re-bleeding. Surgery inside the brain stem (BS) is a most challenging problem. Hence the usual course is to remove only those cavernomas (C) solely close to the BS pial surface. The aim of this study was to minimize the risk of surgical injury to the adjacent neural and vascular structures.

Methods. For this purpose, all BSC they were pre-, intra-, and postoperatively examined by all available methods for the anatomical and functional localization of BSC. The blood supply to the BS requires a sparing approach. Operative planning is done in two phases. Preoperatively we tried to find the best approach to the BS. During the operation to find the safest approach inside of BS. Microsurgery must be accompanied by special intraoperative monitoring. This combined approach with microsurgery has been termed functional microsurgery.

Results. More than 40 patients were monitored since 1991, follow-up 1–31y. All C were removed by radical microsurgery. There was no operative mortality and temporary new morbidity was found due to the surgery.

Conclusion. Microsurgery of BSC must be accompanied by special intraoperative monitoring. This combined approach has been termed functional microsurgery. Not only BSC located near the pial surface but also deep seated ones can be successfully removed. In spite of distorted anatomy, BS nuclei, pathways and vascular supply, especially venous, should be spared. Treatment by stereoradiosurgery does not seem to be justified.

Keywords: Cavernomas, Brain stem, Brain stem cavernomas, Functional microsurgery

Session 9: New technologies

KEYNOTE LECTURE

Digitization in Neurosurgery – why would we care?

Steffen K. Rosahl

Department of Neurosurgery, Helios Klinikum Erfurt, Germany

Digitization has become a buzzword in daily news and even the WHO has introduced guidelines for research on this topic. Still, it is hard to keep track on current advances in neurosurgry. We have reviewed the most recent literature with the goal to extract some of the most promising applications for the near future.

Even though e-Health, robotics, remote care, telemedicine, and automated documentation systems will also be relevant, digital assessment of patient reported outcome measures (PROM), machine learning and artificial intelligence in diagnostics and augmented reality in surgical training and OR stand out among the digital advances in neurosurgery today.

1. Digital PROMs in spinal surgery have recently become more applicable with the publication of normatized values (Z-scores). Patients can record data like pain-free walking distance on smartphones themselves and share them with surgeons and caregivers for therapy stratification. Automated remote monitoring of the patient's moving range is also possible as long as data security is given.
2. AI in convolutional networks is capable of delivering a histological diagnosis of intracranial tumors in magnetic resonance images and differentiate them from treatment related lesions by their radiomic signatures.
3. Deep learning models can automatically and accurately segment gliomas in multimodal MR sequences. By transfer learning, the same models can be applied to other intracranial tumors like meningiomas or vestibular schwannomas. Volumetric follow-up will be facilitated by these methods.
4. Surgical training can be improved and sped up by augmented reality (AR) systems which also allow for recording of objective variables to asses individual learning results.
5. Augmented reality will overcome current standard image-guidance in the OR by holografically projecting 3D images acquired by magnetic resonance and computed tomography onto the operating field (virtual operating field). A head mounted display (HMD) will replace infra-red camera-based image-guidances systems.

Keywords: digitization, artificial intelligence, augmented reality, PROM, Radiomics

Experiences of 4K3D exoscope: Can it replace the microscope?

Eiji Kohmura[1,2], Yoichi Uozumi[2], Hidehito Kimura[2], Takashi Sasayama[2]

[1]*Department of Neurosurgery, Kinki Central Hospital, Itami, Japan*
[2]*Department of Neurosurgery, Kobe University Graduate School of Medicine, Kobe, Japan*

Modern neurosurgery has developed since introduction of microscope. Surgeon is fixed, however, to the microscope and often forced into an unreasonable posture. Monitor-surgery such as endoscopic surgery enables heads-up posture while operating. We had a chance in 2018 to test a high-resolution (4K) 3D exoscope (ORBEYE, Olympus, Japan). Our clinical experiences were so good that we officially introduced it last year. Pros and cons of it will be presented in this paper. We could quickly adapt to the monitor surgery due to high-resolution 3D image even at the first usage. Depth of focus is greater than surgeon's eye with microscope. Comparing to microscope, it has not only ergonomic advantage but also educational one. Entire surgical team can share surgical field owing to its big screen 4K 3D imaging, which facilitates teamwork, smooth surgical procedure and surgical training. Color resolution especially red color was initially not perfect but improved recently. Positioning of the exoscope, monitor and assistant should be considered before surgery. It is not possible to link directly to navigation system. Virtual reality displaying such as projecting tumor contour into surgical field is therefore not possible. Recording and editing of 4K3D movie is limited as it requires great capacity. Routine recording has to be done as normal HD movie. In conclusion, it can replace microscope in most of the neurosurgical operations although there are some restrictions.

Keywords: Exoscope, 3D, 4K

Frameless and Fiducial-Less Deep Brain Stimulation

David Krahulik[1], Filip Blazek[1], Martin Nevrly[2], Pavel Otruba[2], Lumir Hrabalek[1], Petr Kanovsky[2]

[1]Department of Neurosurgery, University Hospital Olomouc, 77900 Olomouc, Czech Republic
[2]Department of Neurology, University Hospital Olomouc, 77900 Olomouc, Czech Republic

Deep brain stimulation (DBS) is a beneficial procedure for treating idiopathic Parkinson's disease (PD), essential tremor, and dystonia. The authors describe their set of imaging modalities used for a frameless and fiducial-less method of DBS. CT and MRI scans are obtained preoperatively, and STN parcellation is done based on diffusion tractography. During the surgery, an intraoperative conebeam computed tomography scan is obtained and merged with the preoperatively-acquired images to place electrodes using a frameless and fiducial-less system. Accuracy is evaluated prospectively. The described sequence of imaging methods shows excellent accuracy compared to the framebased techniques.

Keywords: Parkinson's disease, deep brain stimulation, Nexframe, O-arm

Unilateral Biportal Endoscopic lumbar discectomy: Experience in the first 10 cases

Alhareth Ma'aya, Jin Hwa Eum

Neurosurgery Department, Spine Center, Ain Alkhaleej Hospital, Alain, UAE

Background: Various modalities of treatment from standard discectomy, microdiscectomy, percutaneous discectomy, transforaminal endoscopic discectomy, and biportal endoscopic discectomy have been in use for lumbar intervertebral disc prolapse. The access to spine is kept to a minimum without stripping paraspinal muscles minimizing muscle damage by posterior interlaminar or extraforaminal endoscopic approach. The aim of this paper was to evaluate technical problems, complications, and overall initial results of biportal endoscopic discectomy.

Materials and Methods: First 10 consecutive cases operated by biportal endoscopic discectomy between February 2022 – October 2022 are reported. All patients with single nerve root lesions including sequestrated or migrated and selected central disc at L3-L4, L4-5 and L5-S1 were included. All cases are operated under direct supervision and assistance of Dr. Jin Hwa Eum. All patients had preoperative MRI and 2 patients had postoperative MRI to check the adequacy of decompression. Postoperatively, all patients were mobilized as soon as the pain subsided and discharged within 24–48 h post surgery. Patients were followed up at 1, 3, 6, and 12 weeks.

Results: The mean follow up was 4 months (range 1 month – 10 months). Open conversion was not required in any patient. Minor dural punctures occurred in 2 case and no root damage happened. The average surgical time was 155 min (range 90–220 min). Average blood loss was less than 10 ml. Technical difficulties encountered were image orientation, peroperative dissection and bleeding problems, and reaching wrong levels suggestive of a definitive learning curve. Overall 80% of patients had good-to-excellent results, with two patients having recurrence of whom non was reoperated. two patient had root irritation symptoms to L5 root that had paresthesia in L5 region even on 3 months of follow-up.

Conclusion: Biportal endoscopic discectomy is minimally invasive procedure for discectomy with early encouraging results. Once definite learning curve was over and expertise is acquired, the results of this procedure are acceptable safe and effective.

Keywords: unilateral biportal endoscopic surgery

Three-dimensional Custom-made Porous Polyethylene Cranioplasty in High-risk Terrain – Mono-institutional Study

Jan Mracek[1], Miroslav Seidl[1], Petr Kasik[1] Jiri Dostal[1], Radek Tupy[2], Vladimir Priban[1]

[1]Department of Neurosurgery, Faculty of Medicine in Pilsen, Charles University, University Hospital Pilsen, Pilsen, Czech Republic
[2]Department of Imaging Methods, Faculty of Medicine in Pilsen, Charles University, University Hospital Pilsen, Pilsen, Czech Republic

Background: Cranioplasty is accompanied by a high incidence of complications. A common complication is surgical site infection with an incidence of 1.4–24.4%. The optimal material for cranioplasty in terms of the incidence of infection remains unclear. Porous polyethylene is a modern material associated with a low risk of infection, but has not yet been included in meta-analyses. The aim of our study was to verify the assumed low incidence of surgical site infection after porous polyethylene cranioplasty in a high-risk terrain.

Methods: We prospectively evaluated the group of 21 patients in the period 2014–2022, who underwent secondary three-dimensional (3D) custom-made cranioplasty from porous polyethylene in a high-risk terrain. The risk terrain was defined through risk factors: previous infection with the need for removal of an autologous bone flap or implant, bone flap resorption, repeated revision surgeries, open frontal sinus. The incidence of surgical site infection and exposure of the implant were assessed. The objectives were evaluated using physical examination and computed tomography.

Results: Twenty-one operations were performed in 21 patients. In 16 cases, cranioplasty was performed after decompressive craniectomy and in five cases after craniotomy of limited size. Seven patients had one risk factor and 14 patients had a combination of two risk factors. The mean follow-up was 48 months (12–96). Neither infection nor implant exposure was detected in any patient in our group.

Conclusions: We have confirmed the minimal risk of infection or implant exposure after 3D custom-made cranioplasty with porous polyethylene even in risky terrain. Further clinical studies with better evidence could confirm our conclusions.

This study was supported by the grant of Ministry of Health of the Czech Republic – Conceptual Development of Research Organization (Faculty Hospital in Pilsen – FNPl, 00669801)

Keywords: cranioplasty, porous polyethylene, high-risk terrain, infection

Changing vibes – the ethical challenges of electronic brain implants

Steffen K. Rosahl

Department of Neurosurgery, Helios Klinikum Erfurt, Germany

While the idea to physically control the mind to arrive at a “psychociviliced society”, conceived by José Delgado in the 1960s and supported by his famous animal experiments with a “stimoceiver” seemed to have been a rather dark but long-gone chapter of neuroscientific history.

However, with Elon Musks company Neuralink and its recent improvements of neuro-electronic interfaces some of these conceptual thoughts have resurfaced. Another company recently succeeded in developing an electrode that is flushed into the brains vessel through a catheter, thus avoiding a craniotomy for placement. The recent achievements in implanting electrodes at less risk made people dreaming of streaming music directly into the brain and playing video games “by thought alone” while others talk about creating “super soldiers” with suppressed perception of pain or enhanced attentional focus and superhuman senses.

While we implant electrodes in the brain to help patients overcome disorders like Parkinsons, obsessive-compulsive disease or epilepsy in the first place, we are also rocking the foundations of human psyche, human minds and the human society as a whole.

It may be helpful to have a mind matrix that lets you decide for yourself if those implants should be allowed to change our minds and “vibes” or if mankind may be better off if neural enhancement is proscribed. We have created such an “ethic matrix” based on Belmont criteria (beneficence, non-maleficence, autonomy, justice) and adapted it to assess the consequences electronic implants in the human brain.

Keywords: ethics, neuroelectronic implants, Neuralink, psyche

Session 10: Skull base tumors, vascular and varia

INVITED LECTURE

Craniopharyngioma – a neurosurgical challenge

Alexandru Vlad Ciurea[1,2,3], Bogdan Gabriel Bratu[4], Andrei Adrian Popa[5], Corneliu Toader[6,7], Habil Horia Ples[8,9]

[1]Professor of Neurosurgery and Emeritus Professor, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[2]Honnorary Member of the Romanian Academy, Medical Science Section, Romania
[3]Chief of the Neurosurgery Department and Scientific Director, Sanador Medical Center, Bucharest, Romania;
[4]Medical Student in 4th year at "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[5]Medical Student in 5th year at at "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[6]Associate Professor of Neurosurgery, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[7]Vascular Neurosurgery Department, National Institute of Neurology and Neurovascular Diseases, Bucharest, Romania
[8]Associate Professor Habil of Neurosurgery, "Victor Babeș" University of Medicine and Pharmacy, Timișoara, Romania
[9]Chief of the Neurosurgery Department, Emergency County Hospital Timisoara, Romania

Craniopharyngioma (CPH) represents a congenital benign intracranial tumor with disembryogenic origin (1.2–4% of all intracranial tumors), arising from sellar and suprasellar areas, with important multiple extensions, even into the third ventricle. In children, craniopharyngiomas represent 6–10% of all intracranial tumors.

CPH has multiple difficulties in choosing the proper operatory treatment and management of the complications. Due to the anatomical localization and multiple extensions, it represents a major challenge for the neurosurgeon.

From this point of view, the multiple studies conducted by Prof. Madjid Samii were very important in determining the best neurosurgical treatment, with minimal complications and safe gross tumor resection.

Modern Neurosurgery developed due to the important contributions of Professor Madjid Samii in CPH classification and especially in surgical approaches, which are more complex and extremely efficient.

The first classification of CPH by Samii and Bini (1991) has led to multiple successive classifications. The degree of vertical extension was classified from Grade I to Grade V by Samii and Tatagiba (1995 and 1997). Regarding horizontal extension, CPH can grow laterally into the subtemporal area, anteriorly into the subfrontal space and prechiasmatic cistern, and posteriorly into the cerebellopontine angle, interpeduncular and prepontine cisterns, and foramen magnum.

The tumor receives blood supply from many major arteries, including the posterior communicating artery (lateral tumoral part), intracavernous meningo-hypophyseal arteries (intrasellar tumoral part) and anterior communicating artery and proximal anterior cerebral artery (anterior tumoral part). Prof. Madjid Samii emphasized conservation of the principle nearby vascular and nervous structures, especially oculomotor nerves.

From all the different multiple neurosurgical approaches, bifrontal craniotomy was the preferred surgical treatment for decades and nowadays the fronto-lateral craniotomy showed to be the most efficient approach. This approach was used in extensive CPH, and the last studies from the literature demonstrates exceptional results in fronto-lateral craniotomy, with total tumor resection.

Keywords: craniopharyngioma, Madjid Samii, fronto-lateral craniotomy, skull base

INVITED LECTURE

Important steps in Romanian society of neurosurgery development

Alexandru Vlad Ciurea[1,2,3], Andrei Adrian Popa[4], Bogdan Gabriel Bratu[5], Vicentiu Mircea Saceleanu[6,7], Habil Horia Ples[8,9]

[1]Professor of Neurosurgery and Emeritus Professor, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[2]Honnorary Member of the Romanian Academy, Medical Science Section, Romania
[3]Chief of the Neurosurgery Department and Scientific Director, Sanador Medical Center, Bucharest, Romania
[4]Medical Student in 5th year at "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[5]Medical Student in 4th year at "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[6]Associate Professor of Neurosurgery, "Lucian Blaga" University of Medicine, Sibiu, Romania
[7]Chief of the Neurosurgery Department, Sibiu County Emergency Hospital, Sibiu, Romania
[8]Associate Professor Habil of Neurosurgery, "Victor Babeș" University of Medicine and Pharmacy, Timișoara, Romania
[9]Chief of the Neurosurgery Department, Emergency County Hospital Timisoara, Romania

The development of Romanian Society of Neurosurgery (RSN) was in accordance with the continuous ascending activity of Prof. Madjid Samii. The initial connection was made by Prof. Dr. Alexandru Constantinovici (1929–2018) since the pre-democratic (1989) period in Romania. With the liberation of Eastern European countries, the possibility of movement and training of neurosurgeons has increased in an exponential way. Prof. Constantinovici was the one who motivated the Romanian neurosurgeons to participate in the bi-annual neurosurgery courses of Prof. Madjid Samii. This idea continued in the later period, as I personally supported a continuous connection with the Klinikum Hannover Nordstadt, UNI Klinik and INI Klinik Hannover. All these connections have led to the improvement of the level of neurosurgical activity in Romania: clinical, surgical and scientific. In this paper are presented all the stages of neurosurgical development in Romania, with the main neurosurgical personalities (Bucharest – Prof. Constantin Arseni, Prof. Alexandru Constantinovici; Iasi – Prof. Nicolae Oblu, Prof. Rusu etc.). Also, it will be presented aspects of neurosurgery in the main university centers in the country and finally, the current state of the RSN. Madjid Samii's contribution is directly outlined by:

- Permanent participations in the congresses / conferences of the RSN
- The scientific and hands-on neurosurgical training performed by Prof. Madjid Samii with the Romanian neurosurgeons in Hannover University Centers
- Direct and material support of the neurosurgery in Bucharest (Bagdasar-Arseni Hospital, Neurosurgical Clinic) through a substantial donation in neurosurgical equipment and instrumentation performed by AWD-Stiftung Kinderhilfe Hannover in 1996 with annual activity report
- Neurosurgical team from INI Klinik Hannover to the University Center of Iasi, Neurosurgery Clinic – exchange of experience in 2018 (teaching and training)
- Many neurosurgeons from all university centers in Romania are annually trained in INI Center

Keywords: Madjid Samii, Alexandru Constantinovici, Romanian Neurosurgery, Hannover, INI Klinik Hannover

Effects of reoperation timing on survival among recurrent Glioblastoma patients: a retrospective multicentric study

Ondrej Kalita[1], Tomas Kazda[2], Stefan Reguli[3], Radim Jancalek[4], Pavel Fadrus[5], Marek Slachta[1], Petr Pospisil[2], Lukas Krska[3], Jana Vrbkova[6], Lumir Hrabalek[1], Martin Smrcka[5], Radim Lipina[3]

[1]Department of Neurosurgery, Faculty of Medicine and Dentistry, Palacky University in Olomouc, University Hospital, Olomouc, Czechia
[2]Department of Radiation Oncology, Faculty of Medicine, Masaryk University, Masaryk Memorial Cancer Institute, Brno, Czechia
[3]Department of Neurosurgery, Faculty of Medicine, University of Ostrava, University Hospital Ostrava, Czechia
[4]Department of Neurosurgery, Faculty of Medicine, Masaryk University, St. Anne's University Hospital in Brno, Czechia
[5]Department of Neurosurgery, Faculty of Medicine, Masaryk University, University Hospital Brno, Czechia
[6]Institute of Molecular and Translate Medicine, Faculty of Medicine and Dentistry, Palacky University in Olomouc, Czechia

Background: Glioblastoma inevitably recurs but no standard regimen has been established for treating recurrent disease. Several reports claim that redo surgery can improve survival, but the effects of reoperation timing on survival have rarely been investigated.

Methods: We therefore evaluated the relationship between reoperation timing and survival in recurrent GBM.

Results: A univariate Cox regression analysis of post-surgical survival (PSS) revealed a statistically significant effect of reoperation on PSS from a threshold of 16 months after the first surgery. Cox regression models stratified the Karnofsky score with age adjustment confirmed a statistically significant improvement in PSS for time to progression (TTP) thresholds of 22 and 24 months. The patient groups exhibiting first recurrence at 22 and 24 months had better survival rates than those exhibiting earlier recurrence. For the 22-month group, the HR was 0.5 with a 95% CI of (0.27,0.96) and a p-value of 0.036. For the 24-month group, the HR was 0.5 with a 95% CI of (0.25,0.96) and a p-value of 0.039.

Conclusion: Patients with the longest survival were also the best candidates for the repeated surgery. A later recurrence of Glioblastoma was associated with higher survival rates after reoperation.

Keywords: Glioblastoma, Reoperation timing, Treatment strategy

Biphasic surgery in Bilingual patient with glioblastoma in Wernicke's area

Michal Orlicky[1], Ondrej Kalina[2], Vladimir Kaťuch[1]

[1]Department of Neurosurgery and Medical faculty, University of P. J. Safarik, Košice, Slovakia
[2]Department of Health Psychology, Faculty of Arts, University of P. J. Safarik, Košice, Slovakia

Aim: To show unusual preoperative strategy in indication of awake surgery for tumour in eloquent – Wernicke's area.

Background: 50 y/o female, with active use of Hungarian mother language, and active use of second - Slovak language presented with bilingual sensory speech disorder and MRI correlating huge solid/cystic tumour in the left FT region. Antiedematic aggressive therapy did not improved language skills thus not allowed direct awake surgery with speech skills monitoring to be used.

Method: With the idea of maximal possible treatment for the patient we decided for endoscopically guided biopsy of solid part of the tumour with evacuation of cystic part. Hours afterwards, full improvement of speech skills in both languages and glioblastoma gr. IV histology indicated 2nd phase awake surgery with (a) both language skills control, (b)known DTI position of arcuate fascicle, cortico-spinal tract and optic radiation, (c)gliolan guided.

Results: First phase surgery – decompression of the eloquent area and histological verification of the tumour enabled 2nd phase surgery with awake monitoring of speech skills and MRI and gliolan positive gross total resection, with no speech skills deficit.

Conclusion: Each patient requires specific approach and surgical strategy to reach maximal possible treatment.

Keywords: awake surgeries, wernicke's area

Comparative analysis of single versus dual anti-epileptic drugs for controlling intra-operative and early postoperative seizure in glioma patients undergoing an awake craniotomy

Ahmad Pour-Rashidi[1], Sara Pazandi[1], Reza Shariat Moharari[2], Aidin Shakeri[1], Mohamad Shirani[1], Abbas Amirjamshidi[1]

[1]Department of Neurosurgery, Sina Hospital, Tehran University of Medical Sciences, Tehran, Iran
[2]Department of Anesthesiology, Sina Hospital, Tehran University of Medical Sciences, Tehran, Iran

Background: Awake craniotomy (AC) is widely suggested as a procedure for maximal safe resection of lesions at eloquent brain regions**.** However, the risk of intraoperative or postoperative seizure following AC is one of the remarkable consequences. We aimed to compare the effect of single versus dual anti-epileptic drugs for controlling intraoperative and early postoperative seizure in glioma patients undergoing awake craniotomy.

Method: This study was conducted by evaluating medical records of patients of the neurosurgery department of Sina hospital who underwent awake craniotomy from August 2019 to February 2023. Fifty-five patients were enrolled in this study. Patients were divided into two groups based on whether they received monotherapy or dual therapy according to group practice. The age range was between 19 to 69 years patients with a recent diagnosis of brain glioma (2016 WHO classification II, III, and IV) who had no history of previous surgery and no history of chemoradiation. The standard anesthesia technique for asleep-awake-asleep craniotomy was used in our institute. Statistical analysis was performed using JAMOVI (Version 2.3).

Result: The mean range of age in groups S (single) and D (dual) was 42.1 and 42.2 respectively (P=0.980). There were 23 females and 32 males (P=0.944). There were 15 patients and 13 patients presented with pre-operative seizure in groups S and D respectively. The duration of preoperative seizure was not significantly different between the two groups. Eight patients in group S and three patients in group D had intraoperative seizures (P=0.137). The length of hospital stay (P=0.606) and the length of ICU stay (P=0.141) were not significantly different.

Conclusion: Although there were no statistically significant relations between the two groups, we found a lower rate of intraoperative and early postoperative seizure, and shorter length of ICU and hospital stay in group D compared to group S.

Keywords: Neuro-Oncology, Awake Craniotomy, Glioma Surgery

Our first experiences with endoscopic-assisted suturectomy with subsequent therapy with cranial remodeling orthosis as a treatment of craniosynostosis

Petr Vacek

Department of Neurosurgery, Faculty of Medicine in Pilsen, Charles University in Prague, University Hospital Pilsen, Czech Republic

Introduction: The surgical treatment of craniosynostosis has been gradually developing since 1890. The endoscopic-assisted suturectomy of the affected sutures, followed by varying lengths of therapy with cranial remodeling orthosis, is already widely accepted.

Methods: We retrospectively evaluated the cohort of the first 11 children (2019–2021) with craniosynostosis treated by endoscopic-assisted technique followed by a cranial remodeling orthosis application. There were four children with sagittal synostosis, two with bilateral and one with unilateral coronal synostosis, two with metopic synostosis, and two with unilateral frontosphenoidal suture synostosis. We performed the scan for the orthosis within a week after the surgery, so the therapy with the orthosis started within two weeks after the surgery at the latest.

Results: The average age of the child at the time of the surgery was 5,7 months (4,0–8,5), weight was 7,3 kg (5,9–8,5), the average operative time was 92 minutes (50–140), two children (18%) received a blood transfusion during the procedure. The average length of hospital stay was 4,1 days (3–6), and the duration of wearing the orthosis was 8,7 months (7–11). We didn't convert any procedure to an open approach and did not notice complications in any child during hospitalization. All children tolerated wearing the orthosis well. The cosmetic correction of the shape of the head was evaluated as satisfactory by both the parents and the neurosurgeon after the end of orthosis therapy in all children.

Conclusion: Endoscopic-assisted suturectomy followed by cranial remodeling orthosis therapy is becoming a standard method of treating craniosynostosis. Proper indication and timing of performance are essential.

Keywords: craniosynostosis, endoscopic-assisted suturectomy, cranial remodeling orthosis

Session 11: Spine

Analysis of the optimal level of thoracoscopic sympathectomy in patients with primary hyperhidrosis

Oleksii Eroshkin[1,2]

[1]*Department of Neurosurgery, Central Hospital of the Ministry of Internal Affairs of Ukraine, Kyiv, Ukraine*
[2]*Medical Center "MedClinic", Kyiv, Ukraine*

Background: For this day for surgical treatment of hyperhidrosis there are still no sustainable statements regarding the determination of the levels for interruption the sympathetic trunk for different localizations of hyperhidrosis, also there are various surgical methods of treatment.

Methods: In the study included 68 patients from 16 to 62 years old with primary hyperhidrosis, 23 male and 45 female. 65 (95.5%) patients were of working age, which emphasizes the medical and social significance of the problem. All patients underwent surgical treatment using the method of bilateral single-port thoracoscopic sympathectomy. In the first group (n=20) patients with palmar hyperhidrosis the sympathetic trunk interruption was performed at the R3 (R-rib) level, in the second group (n=48) patients with palmar, axillary, plantar hyperhidrosis – at the level R3-R4.

Results: The severity of primary hyperhidrosis in 68 patients was from 2 to 4 scores by Hyperhidrosis Disease Severity Scale. According to the results of the questionnaire DLQI (The Dermatology Quality of Life Index) an improvement in the assessment of the quality of life after bilateral single-port thoracoscopic sympathectomy was obtained in both groups of patients. In I group DLQI was before surgery – 20.6 (95% CI 17-25.2) and after surgery – 1.5 (95% CI 1 -2,3). In the II group DLQI before surgery – 23.2 (95% CI 21.8-26.2) and after surgery was 2 (95% CI 1-3) ($p<0.001$).

Conclusions: To achieve results in palmar-plantar and axillary hyperhidrosis it is necessary to interrupt the sympathetic trunk at the both level R3 and R4, while bilateral thoracoscopic sympathectomy at the level of R3 may be sufficient to improve the quality of life in patients with palmar hyperhidrosis. This data may reduce the risk of compensatory hyperhidrosis after VATS surgery.

Keywords: primary hyperhidrosis, bilateral uniportal thoracic sympathectomy, level of interruption of the sympathetic trunk, results after VATS surgery, compensatory hyperhidrosis

Endoscopic extreme transforaminal lumbar interbody fusion with large spacer (OLIF cage): A technical note and preliminary report

Jin Hwa Eum, Alhareth Ma'aya

Neurosurgery Department, Spine Center, Ain Alkhaleej Hospital, Alain, UAE

Introduction: The report describes a novel endoscopic fusion technique performed with unilateral biportal endoscopy (UBE) that is known as extreme transforaminal lumbar interbody fusion (eXTLIF) and is performed with a large spacer.

Methods: We performed modified far lateral endoscopic TLIF using a biportal endoscopic approach. Unilateral total facetectomy and laminotomy was performed for decompression and exposure of the exiting and transverse nerve root. We made additional third portal laterally for large spacer (OLIF cage) insertion, after which percutaneous pedicle screw fixation was done. We investigated several clinical and radiological parameters.

Results: Endoscopic extreme transforaminal lumbar interbody fusion was performed in 12 patients who were followed for more than 3 months after surgery. Lumbar lordosis, segmental lordosis, and disc height significantly increased postoperatively($p<0.05$). Preoperative radicular leg pain and the Oswestry Disability Index significantly improved after surgery($p<0.05$).

Discussion: Despite a short follow up period, endoscopic extreme TLIF showed satisfactory clinical radiologic results. However there are some limitations of the procedure such as dural injury and technical difficulty.

Conclusion: We successfully performed endoscopic extreme TLIF using large spacer (OLIF cage). Our technique was usually suitable for the L4-5 and L5-S1 levels. Endoscopic extreme TLIF maybe an alternative treatment method for lumbar degenerative disease.

Keywords: unilateral biportal endoscopic surgery, eXTLIF

Spinal meningiomas: An overview and our experience

V. Přibáň, D. Bludovský, S. Žídek, M. Choc, I. Holečková, R. Koleják

Department of Neurosurgery, University Hospital Pilsen, Czech Republic

Introduction: Spinal meningiomas are the most frequent intradural tumors. Their character is benign with good prognosis overall. The most common affected region is the thoracic spine and the majority of patients are females. Authors present a group of patients which underwent surgical treatment in years 2000–2021.

Methodology: 87 patients were operated in Pilsen in 21 years, 68 females (78%) and 19 males (22%) with average age of 65 years. Localisation: C spine 11 patients; C-Th junction 8; Th spine 65 (78%), LS region 3. Clinical presentation: paraparesis 56, Brown-Sequard syndrome 22, radiculopathy 4, cauda equina syndrome 1, posterior cord syndrome 1, asymptomatic 3 (graphic recurrence on MRI). Microsurgical extirpation with ultrasound aspirator was used in all cases, controlled by electrophysiological monitoring in most cases. Laminectomy was performed as the preferred approach. Nurick scale was used to evaluate clinical outcome.

Results: Nurick score pre-op. Was 3,15 on average, which improved to 1,84 post-op. Following risk factors associated with worse outcome were demonstrated: male gender (odds ratio 1,7 statistically non-significant), paraparesis pre-op (odds ratio 2, non-significant), age of 65 years or above (odds ratio 9, statistically significant), bad Nurick score pre-op (key risk factor, odds ratio 45, statistically significant)

Conclusion: Surgical treatment of spinal meningiomas is one of more pleasant sides in neurosurgery. The key to a good outcome is a timely diagnostics in patient with preserved ability to walk.

Keywords: spinal meningioma, surgery, outcome

Treating Chronic Subdural Hematoma in Elderly Patients with Endovascular Liquid Embolization of Middle Meningeal Artery Distal Branches

Bruno Splavski[1], Vladimir Kalousek [2], Domagoj Gajski[1, 2], Kresimir Rotim[1, 2]

[1]*University of Applied Health Sciences, Zagreb, Croatia*
[2]*Sestre milosrdnice University Hospital Center, Zagreb, Croatia*

Introduction: Elderly patients suffering from chronic subdural hematoma often undergo surgical treatment with an ambivalent success, which is influenced by assorted medical conditions/comorbidities, including coagulopathies requesting extended use of antiplatelets/anticoagulants. Repeated microbleeding from the hematoma outer membrane is accountable for its further growth and relapse. Because such a membrane is supplied by distal branches of the meningeal artery, their endovascular embolization may bring hematoma piecemeal resolution and replace surgery in selected patients.

Methods: Preliminary results of an institutional case report of the patient in whom endovascular liquid embolization of middle meningeal artery distal branches successfully resolved chronic subdural hematoma were presented. The method's technical details and outcomes were discussed.

Results: A 75-year-old male suffered a moderate brain injury in a traffic accident as a cyclist, resulting in a chronic subdural hematoma, which was treated with super-selective endovascular liquid embolization of distal superior branch of the middle meningeal artery using a non-adhesive embolic agent (2 mL Squid). At a 6-month follow-up, he was fully recovered and neurologically intact, with no signs of hematoma recurrence observed.

Conclusion: Endovascular liquid embolization of middle meningeal artery distal branches should be performed in selected elderly patients for the resolution of chronic subdural hematoma as a non-surgical supplementary method. It is an effective and safe interventional technique with low recurrence, morbidity, and mortality.

Keywords: Chronic subdural hematoma, Middle meningeal artery, Liquid endovascular embolization, Elderly patients

Poster

Aspergillosis of the spinal canal of the lumbosacral spine

Mitalip Mamytov[1], Akylbek Akmataliev[2]

[1]*Kyrgyz State Medical Academy named after I. K. Akhunbaev Department of Neurosurgery for Undergraduate and Postgraduate Education Bishkek, Kyrgyz Republic*
[2]*National Hospital under the Ministry of Health of the Kyrgyz Republic Bishkek, Kyrgyz Republic*

Aspergillosis is an infectious disease caused by various types of molds of the genus Aspergillus, accompanied by toxic and allergic reactions.

The incidence of invasive aspergillosis varies from 12 to 34 cases per million population per year. With the advent of MRI and CT investigations, the previously rare forms of invasive aspergillosis, such as central nervous system lesions.

Aspergillosis of the central nervous system is associated with a very high mortality rate (80 – 99%). Due to poor penetration of some medicinal products through the blood-brain barrier and vascular occlusion by the angioinvasive Aspergillus spp., in many cases the CNS Aspergillosis is detected only after death. Usually, the CNS damage occurs as a result of hematogenous dissemination from the primary locus. The cites of infection in are detected using CT, MRI.

The article describes a clinical case of Aspergillosis of the spinal canal of the lumbosacral spine, which is of interest not only as a rarity, but also because of its localization and pseudotumorous course of the disease. The diagnosis was made using magnetic resonance imaging of the lumbosacral spine and histological examination.

The idea about this pathology in general practitioners has not arisen when this disease occurred, because invasive aspergillosis of the spinal canal is rare.

MRI manifestations of bone aspergillosis are similar to bone infarction, with vertebral lesions being not rare in this pathology unlike other bones – tibia, ribs, sternum, pelvic bones, large joints. And although bone lesions are almost always considered secondary in relation to pulmonary aspergillosis, in our case the disease manifested precisely as a lesion of the spine.

The manifestations of fungal spondylitis, including Aspergillus spondylitis, which are found by imaging methods, are similar to those of Tuberculosis.

Keywords: aspergillosis, spinal canal, antifungal therapy