

SELECTED ABSTRACTS

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MICROSURGERY OF VENTRICULAR LESIONS: AN EXPERIENCE WITH 309 PATIENTS

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INTRODUCTION: Microsurgical experience with the management of lateral and anterior third ventricular tumors is presented. The surgical approach to the lesions at posterior third ventricle and suprasellar tumors like craniopharyngioma is not included here.

MATERIAL AND METHOD: Three hundred nine ventricular lesions, 214 anterior third ventricular and 95 lateral ventricular, were operated by the first author from 1987 till 2014 June. These were mostly primary intraventricular lesions. 90% of the third ventricle lesions were benign as was most of the lateral ventricular lesions. Colloid cyst (153 cases) was the commonest 3rd ventricular lesion and neurocytoma (25 Cases) the commonest lateral ventricular tumor.

RESULTS: While the majority of the third ventricular tumors were operated by the transcallosal route, the transcortical was the preferred route for the lateral ventricular tumor. Following transcallosal transventricular entry there were four options of entering the third ventricle, the transforaminal, interforniceal, subchoroidal and subforniceal suprachoroidal. Our preferred route is the transforaminal followed by subforniceal suprachoroidal; the later was first time developed and reported in the literature by the author in 1994. The approaches to the lateral ventricle are more varied and was dependent on the location of the lesion in the ventricle: lateral temporo parietal, middle temporal gyrus, anterior temporal lobectomy, occipital incision, superior parietal, middle frontal gyrus, and transcallosal.

CHANGING TRENDS IN THE MANAGEMENT OF PETROCLIVAL MENINGIOMA

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The initial enthusiasm of achieving eradication of a seemingly ‘inoperable’ meningioma by novel skull base approaches led many neurosurgeons to employ radical surgery.

The accompanying high morbidity was accepted as inevitable. Over the years, however, many started questioning this philosophy and the last decade saw the pendulum swing to the other extreme with the popularity of endoscopic surgery and radiosurgery.

Thus, minimally invasive neurosurgery became the fashion. However, it is important to remember “the pearl” that inadequate treatment through a less invasive approach is maximally invasive. Realization has now dawned that endoscopic surgery and radiosurgery cannot replace microsurgery for meningioma. A judicious use of various microsurgical techniques, including skull base approaches, with appropriate adjuncts like neuroendoscope and image guidance is the best way forward in dealing various meningioma. Measures preventing neurovascular damage during surgery, adequate closure to prevent CSF leaks, the bugbear of skull base surgery, and quick remedial measures to treat CSF leaks will go a long way to achieve acceptable results. Radical but safe excision in skull base tumors followed by adjunct radiosurgery, if necessary, will result in long-term control. Examples of meningioma at various sites managed will be

demonstrated on video. Our philosophy is that of Optimally Invasive Neurosurgery, individualizing the approach to suit the given patient with a goal to achieve maximal result with minimal damage to the patient. Neuroendoscope, image guidance and radiosurgery are all utilized as pillars on the foundation of microsurgery! We will try to answer some of the following decision dilemmas in this lecture:

- (1) to treat or not,
- (2) microsurgery or radiosurgery,
- (3) which surgical approach and
- (4) total or subtotal excision

**“RADIATING” MULTIPLE SUBPIAL
TRANSECTION FOR REFRACTORY
EPILEPSY REDUCES RATE OF
COMPLICATIONS**

Christian Raftopoulos

BACKGROUND: Multiple subpial transection (MST) is a potential surgical treatment for patients with epileptogenic foci located in cortical areas with higher functions.

As neurosurgical teams have become more experienced with MST, the original technique has adapted.

OBJECTIVE: To report our 6-year experience with a modified MST technique.

METHODS: The population included 62 consecutive patients with medically refractory epilepsy treated by MST, with a follow-up period ranging from 2 to 9 years. MST was performed on gyri under neuronavigation and guided by intraoperative electrocorticography.

We performed radiating MST from a single cortical entry point. The MST technique was

described according to the number of transections performed and the Brodmann areas (BAs) involved. Any MST-related complications were registered and followed up. Clinical outcome was described in terms of seizure suppression or reduction according to the Engel modified classification.

RESULTS: Twelve patients underwent MST alone (MSTa), and 50 had MST with another procedure. The main MST sites were BA 4 (61%) and 3, 1, 2 (58%); in 22% of cases, MST was performed in BA 44, 22, 39, and 40. Permanent neurological deficits were observed in 4 (6.4%) patients; 2 minor deficits were MST related (3.2%). A reduction in the seizure rate of at least 50% was seen in 79% of patients (MSTa group, 75%), and 42% became seizure free (MSTa group, 33%).

CONCLUSION: This study demonstrates the efficacy and low morbidity of radiating

MST performed under neuronavigation and intraoperative electrocorticography.

PRESERVATION OF FUNCTION IN ACOUSTIC NEUROMA SURGERY

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INTRODUCTION: An attempt is made to present the management protocol in Acoustic Neuroma (AN) patients and outline the steps

for preservation of cranial nerve function during acoustic neuroma surgery.

MATERIAL & METHOD: A detailed analysis of 1454 cases of cerebellopontine angle lesions operated by the first author between 1987 and 2014 June yielded 913 cases of AN. Microsurgery was the primary option in 634 and Gammaknife Radiosurgery was done in 296, of which 66 were previously operated by the author. A detailed analysis of microsurgically managed patients in two different periods (100 consecutive patients each before 1993 and 2008) were compared to see the changing trend and document current results. In the initial experience (1990s), the emphasis in microsurgery was preserving life, total excision of tumor and preservation of function in that order. In the 21st century, the emphasis in microsurgery has been all about functional preservation. In 100 consecutive cases of VS (excluding neurofibromatosis-2) that were treated microsurgically between 2005-08, there were four small tumors (<2 cm), 14 medium – sized tumors (2-3 cm) and 82 large tumors (≥ 3 cm).

The total excision rates was 83%. The facial nerve anatomical preservation rate was 96% and function was Grade III House-Brackmann (HB) or better in 87%. Both the total excision rate and facial function of Grade II HB or better were 100% in cases with tumor size less than three cm. Functional hearing preservation was achieved in ten cases. There was no operative mortality. The risk of injury to cranial nerves 7th and 8th can be: (i) just medial to IAM, (ii) at the brain stem and (iii) inside IAM. The causes of injury just medial to IAM is because of mechanical injury while

dissecting because of well-known maximal adherence between tumor and the nerve and the sharp angle the nerves make between the IAM and cisternal component. At the brainstem, the risk of injury is because of venous injury and subsequent loss of anatomical definition. Inside the IAM, the main causes of injury to VII and VIII are vascular jeopardy, thermal injury by drilling or coagulation and injury to labyrinth causing deafness. Recognizing the risk factors is the first step towards prevention of injury to 7th and 8th cranial nerves.

MICROSURGERY OF GIANT INTRACRANIAL ANEURYSMS

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INTRODUCTION: Giant intracranial aneurysms (GIA) are treacherous lesions with significant risks in management. In spite of the great advances in endovascular therapy the results of EVT in giant aneurysms has been suboptimal. A retrospective analysis of our strategy and results with microsurgery of GIA in the 21st century is presented.

MATERIAL AND METHOD: The author has operated on 123 GIA microsurgically till June 2013, 99 since 2000 and the material of

this presentation. Age ranged from 2 to 73 years and the female to male ratio was 2:1. 80% were in the anterior circulation and 20% in the posterior circulation. Intra operative neuroprotection measures included mild hypothermia, propofol induced burst suppression and hypertensive anesthesia during temporary arterial occlusion. Peroperative parent artery/bypass patency was checked by Microvascular Doppler, catheter angiography / ICG dye angiography.

Postoperative check angiogram was routinely performed.

RESULTS: Exclusion of the aneurysm from the circulation by direct repair (clipping, aneurysmorrhaphy, excision & suture) was done in 60. Flow diversion and ECIC bypass was done in 29, high flow bypass in 27 and STMC in 2. Trapping was done in 10. Temporary ECIC protective bypass was done in 3. Hypothermic cardiac arrest was used in 3 cases of giant basilar artery aneurysm with femoro-femoral bypass for direct repair. Dedicated skull base approach and lumbar drainage helped in avoiding brain retraction. Postoperative outcome was good in 79%, poor in 16% and 5 patients died.

CONCLUSIONS: Judicious surgical strategy and appropriate technology can result in good outcome in more than 80% of cases of GIA. Majority of the GIA can be treated microsurgically, the preferred modality today.

FOURTH VENTRICLE TUMORS

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INTRODUCTION: Fourth ventricle tumors are rare and challenging lesions with nonspecific clinical manifestations, with a native CT scan usually irrelevant in the early stages and with common rapid neurological deterioration due to brainstem compression or hydrocephalus.

The purpose of this study is to present our surgical experience in the management of fourth ventricle lesions.

MATERIAL METHODS: We retrospectively evaluated the epidemiological aspects, indications, approaches, the histopathological findings, clinical outcomes and other specific characteristics of 102 patients diagnosed with fourth ventricle tumor that were operated in our service in a 15 year period between January 1999 and December 2013, representing 51% of all intraventricular operated tumors and 2,8% of 3609 operated intracranial tumors by the main author in this period.

RESULTS: The gender distribution in this study was 45% females and 55% males. Over 50% of the tumors were found in the 4-18 years aged group population. Regarding the pathological findings there was a high variety with the predominance of medulloblastomas (35%), followed by ependymomas (28%), pilocytic astrocytomas (17%), other tumors

being more rare. While medulloblastomas represented 50% of fourth ventricle tumors in pediatric patients, for the adult population in our experience ependymomas represent 41%, astrocytoma 18% and medulloblastomas 7%. All the cases were operated in the sitting position with no significant air-embolism complications related to the position. There was a slight predominance in favor of transvermian approach, compared with telovellar approach. Complete removal was achieved in large majority of the cases, except the exophytic from the brain stem. The main complication was pneumocephalus, but only in 3% of cases was noted a tension pneumocephalus.

Another complications were persistent hydrocephalus (requiring definitive VPS) and CSF leakage, but only 1% developed meningitis. Cerebellar mutism, PRES were uncommon in our experience, and the mortality was 2% in our experience, higher than in supratentorial procedures.

CONCLUSIONS: The surgical results are directly correlated with the surgical expertise, the proper selection of the cases and of the approach. Sitting position is, in our opinion, the proper position for posterior fossa surgery. Cerebellar mutism is more related to retraction forces that can be encountered in both of the main approaches for fourth ventricle tumors: transvermian or telovellar approach. Despite of their frightening aura, majority of fourth ventricle tumors can be totally removed, offering the cure in benign lesions.

The amount of tumor removal is directly correlated with survival in malignant tumors.

KEY WORDS: intraventricular tumors, telovelar approach, transvermian approach, hydrocephalus, sitting position.

SURGICAL MANAGEMENT AND OUTCOME OF MCA BIFURCATION ANEURYSMS

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INTRODUCTION: A shift in paradigm in the treatment of MCA bifurcation aneurysms was encountered in recent years since the pipeline embolisation device became available. The objective is to evaluate the role of surgical clipping for the MCA bifurcation aneurysms in this changing era.

PATIENT AND METHODS: This study analyzes the 5 years results on MCA bifurcation aneurysms in 4th neurosurgical department with a mean follow up of 28 months, dedicated especially to surgical treatment

RESULTS/RESULT: Between January 2009 and December 2013, 59 MCA bifurcation artery aneurysms were treated by surgical clipping and 2 by endovascular embolisation in our department.

The incidence was twice in women than in men, 35% of the aneurysms were ruptured; the postoperative mortality was 10%: 1 death out of 39 in the SAH group and 7 out of 20 in the hematoma group, 4 patients died before surgery. 63,7% of the aneurysms were located

on the right side. The average dimensions were 3,99 neck and 7.68 for dome with increased dimensions in the hematoma group. In the SAH group 4 patients developed new neurological deficits postoperative. Most of the patients who died presented in WFNS 5. Most of the patients in the SAH group presenting in

WFNS 3 grade recovered the neurological deficit postoperative. The postop Rankin scale averaged to 1 in the SAH group.

CONCLUSIONS: Surgical clipping remains the only curative treatment especially in acute cases of ruptured aneurysms or in cases where the broad neck prevents embolisation or where the aneurysm is thrombosed and acts by mass effect.

KEY WORDS: MCA bifurcation; clipping; hematoma

POSTERIOR FOSSA MENINGIOMAS – AN OVERVIEW

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INTRODUCTION: Posterior fossa meningiomas have a frightening aura mostly because of the high vascularization and intimate relation with numerous neurovascular structures in a quite small space. From a surgical point of view the most difficult locations are clival meningiomas, those

situated medial to the acoustic meatus and the tentorial notch.

AIM: The purpose of this retrospective study is to present our strategies in the management of these difficult tumors and to delineate the technique's advantages and aid in achieving an improved extent of tumor resection and enhancing the patient's outcome.

MATERIALS AND METHODS: From a total of 765 locations of intracranial meningiomas operated by the main author between 2001 – June 2014, 118 were located in the posterior fossa. All patients were evaluated by MRI and CT scans before surgery, and tumor location, size and relation to neighbouring anatomical structures were determined. We discussed the tumor's characteristics that could influence treatment decision and the choice of the most reliable approach.

RESULTS: 118 posterior fossa meningiomas represent 15% of all new cases of intracranial meningiomas operated by the main author. The specific locations were: Cerebello pontine angle: 40 cases; Tentorial - 23 cases; Tentorial notch: 3 cases; Petro-clival: 20 cases; Foramen magnum: 13 cases; Convexity: 19 cases. All cases were operated in semi-sitting position. Simpson's grade I resection was not a goal, but grade II was achieved in most of the cases. The most frequent complication related to semi-sitting position was pneumocephalus. Local postoperative complications were pseudo-meningocele, hematomas (5%) and CSF fistulas (4%). Postoperative mortality was 2%.

CONCLUSIONS: Despite their scary appearance, most of the posterior fossa

meningiomas can be safely resected without major complications. Avoiding is a matter of adherence to the general principles of meningioma surgery: Early devascularization, preservation of arachnoidal layer, internal debulking, circumferential dissection and preservation of all normal vasculature and nervous structures. All these objectives could be achieved with microsurgical techniques in semi-sitting position.

KEY WORDS: posterior fossa, meningiomas, semi-sitting, tentorial notch, retrosigmoid approach, gross total removal.

POSTERIOR FOSSA CAVERNOUS MALFORMATIONS – CLINICAL CHARACTERISTICS, MANAGEMENT AND PROGNOSTIC FACTORS

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INTRODUCTION: Cavernous malformations represent clusters of abnormal, dilated sinusoidal channels with a single layer of endothelium.

MATERIAL AND METHODS: Between July 2004 and July 2014, 38 patients were diagnosed with posterior fossa cavernous malformations and treated in our neurosurgical department from "Bagdasar – Arseni" Emergency Clinical Hospital, Bucharest, Romania. There were 25 women (65.8%) and 13 men (34.2%) with age between

28 and 69 years old. The mean age at admission was 49.8 years.

RESULTS: There were 38 patients with 48 posterior fossa cavernous malformations (CM), 7 patients had multiple cavernous malformations (18.4%), 3 patients with both supra and infratentorial lesions and 4 with cavernous malformations located exclusively in the posterior fossa. 3 patients (7.9%) had associated developmental venous anomalies. From 48 posterior fossa cavernous malformations, 22 were located in the cerebellar hemispheres, 3 in vermis, 10 in pons, 6 in midbrain, 1 in medulla and 6 in cerebellar peduncles. The most common signs and symptoms at presentation were headache 35 patients (92.1%), cerebellar symptoms (ataxia, dysarthria, vertigo) 25 patients (65.7%), motor weakness 10 patients (26.3%), paresthesia 8 patients (21%), and cranial nerve dysfunction 15 patients (39.5%). 37 cavernomas were approached microsurgically. Removal of the lesion was attempted in all patients. Some degree of transient neurological deterioration was detected in 10 patients (27%). A significant permanent neurological deterioration from surgery was detected in 6 patients (16,2%): two patients had third nerve palsy following resection of a midbrain cavernoma, one experienced unilateral hearing loss after surgical resection of a pontine cavernoma, two patients retained minor sensitive symptoms, and one patients had postoperative pulmonary thromboembolism and died. Overall, preoperative symptoms improved in a large number of patients: cerebellar symptoms improved in 20 patients (52,6%), motor

weakness in 5 patients (13.2%), paresthesia in 1 patient (2,6%), cranial nerve palsy in 3 patients (7.9%), and headache in 33 patients (86.8%). The histopathological examination confirmed the diagnosis of cavernous malformations in all 37 operated patients, one patients refused the surgical treatment. From 48 posterior fossa cavernous malformations, 36 had at least one hemorrhagic episode prior to hospital admission.

CONCLUSIONS: Cavernous malformations are more frequent present in the younger population. Individualized surgical strategies ensure decreased postoperative hemorrhage rates and favorable long-term outcomes.

KEY WORDS: cavernous malformations, posterior fossa

THE PREFERENCE FOR TRANSCALLOSAL OR TRANSCORTICAL APPROACH IN SURGERY OF LATERAL VENTRICLE TUMORS

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INTRODUCTION: Tumors of the lateral ventricle are rare and could originate in the ventricular wall or arising and expanding within the lateral ventricle from the surrounding neural structures.

Based on a 10 years retrospective study, we analyze postoperative results and factors that

affected the preference for transcallosal or transcortical approach.

PATIENT AND METHODS: We performed a retrospective study, lasted between January 2004 - June 2014, that comprised 29 consecutive patients who underwent operation for lateral ventricle tumors.

The main clinical symptoms and signs were associated with the localization and size of the tumors. The transcortical approach was used in 18 patients and the transcallosal approach was used in 11 patients.

RESULTS/RESULT: Total tumor resection was achieved in 21 patients (72.5%). In cases with subtotal resection, transcortical approach was used in 6 cases (20.5%) and transcallosal approach in 2 cases (7.5%). Most frequent histological tumor's type was glioblastoma, choroid plexus papilloma, ependymoma and meningioma. One patient died because of postoperative intraventricular hemorrhage. Additional neurological deficits were seen in 4 patients and postoperative seizure occurred in five patients. Two patients with preoperative hydrocephalus required ventriculo-peritoneal shunting after tumor's resection.

Two patients developed postoperative epidural hematoma and one required reoperation.

The mean duration of postoperative evaluation was 26,45 months (range 4-96).

CONCLUSIONS: The nature, size, location and vascularization of intraventricular tumors are the most important elements influencing the choice of surgical approach. Surgeons must evaluate all

these factors and prefer the short and safe way to remove the tumor.

KEY WORDS: lateral ventricle tumors, transcallosal approach, transcortical approach.

**DISCUSSING POST-OP COMPLICATIONS:
CEREBELLAR MUTISM AND
POSTOPERATIVE VISUAL LOSS AFTER
POSTERIOR FOSSA SURGERY, A CASE
REPORT**

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Cerebellar mutism has been associated with injury to midline cerebellar structures secondary to degenerative disease, tumors, hemorrhage, or surgery. This syndrome typically arises 48 hours after the initiating event and resolves approximately 7 to 8 weeks later. Another rare post-op complication that can appear after posterior fossa surgery is the postoperative visual loss syndrome which has a very low incidence (~1/60 000-1/125 000 cases) and usually occurs after long prone patient positioned surgery. We present the case of a 10 year old child that presented to our hospital with signs of ICP due to a large 4th ventricle ependymoma. After endoscopic third ventriculostomy and surgery he developed cerebellar mutism and post-op visual loss syndrome. The possible etiology of this complications along with an in depth look

about the pathophysiology of such post-op complications is discussed.

**SURGERY OF PETROCLIVAL
MENINGIOMAS. RECENT SURGICAL
RESULTS AND OUTCOMES**

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INTRODUCTION: Petroclival meningiomas represent only 10% of all meningiomas located in the posterior fossa, but are some of the most formidable challenges in skull base surgery. We described our recent experience (2000-2014) regarding the surgery of these tumors.

PATIENT AND METHODS: We retrospectively analyzed surgical results and outcome in 11 cases of petroclival meningiomas. Most common symptoms in our series were headache and gait disturbance, while cranial nerves palsies represented the most common presenting signs.

There were 8 females and 3 males, and the mean age was 52 years. Surgical approaches chosen for petroclival meningiomas in our series were retrosigmoid (9 patients) and subtemporal transtentorial (2 patients).

RESULTS/RESULT: We achieved total tumor resection in 5 cases (45%) and subtotal resection in 6 cases (55%). Overall outcome (total/subtotal resection) was good in 6 cases, fair in 3 cases and poor in one case. One postoperative death occurred due to

hemorrhagic midbrain infarction (9%). Complications were usually related to cranial nerve deficits: loss of hearing (2 patients), paresis of trochlear nerve (1 patient), trigeminal nerve (3 patients) and facial nerve (1 patient). In 4 patients these cranial nerves deficits were transient. In one case, a patient developed postoperative hydrocephalus and needed shunt placement.

CONCLUSIONS: Despite the fact that complications can be disastrous, we considered that an appropriate approach, combined with microsurgical techniques and a better understanding of the anatomy, greatly decrease the incidence and severity of complications and make feasible a total tumor resection.

KEY WORDS: petroclival meningiomas, surgery, retrosigmoid approach, subtemporal transtentorial approach.

**DECOMPRESSIVE CRANIECTOMY IN
SEVERE BRAIN INJURY GUIDED BY
INTRACRANIAL PRESSURE
MONITORING. N. OBLU EMERGENCY
HOSPITAL EXPERIENCE**

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Severe brain injury is a devastating entity for the patient. It often leads to neurological and anatomical troubles with severe and permanent deficiency that affects the patient's quality of life on long term or can even cause

death. Intracranial pressure monitoring seems to be an indispensable stage in management of severe traumatic brain injured patients. Our days this technique completes trauma protocol in our center. We compared two groups of patients with severe traumatic brain injury who received a decompressive craniectomy: in the first group the surgical decision was made on clinical signs and imaging, in the second group of patients decompressive craniectomy was performed after invasive monitoring of intracranial pressure. The first group studied includes a total of 77 patients. In this group, mortality was very high, namely 75%. In the last two years in 20 patients with severe brain injury we monitored intracranial pressure with Camino systems.

In this group the overall mortality was 45%. Among the 20 patients monitored in 8 patients we had performed a decompressive craniectomy. In this second group of 8 patients we found a mortality of 62%. (lower than those in the first group). The main complication was bronchopneumonia occurred in both groups studied. In conclusion, monitoring of intracranial pressure seems to be indispensable in the management of severe brain injuries as guides for an aggressive treatment including the decompressive craniectomy.

MILD HEAD INJURY: EPIDEMIOLOGY, MANAGEMENT, OUTCOME, COSTS

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INTRODUCTION: Mild traumatic brain

injuries represent 80% of the total traumatic brain injuries. Their management is conducted as recommended by EBIC (European Brain Injury Consortium) or WFNS (World Federation of Neurosurgical Societies). The aim of the study is to analyze the management of patients with mild traumatic brain injuries who present at the Emergency Department (ED), of the admitted ones, the paraclinical investigations used and the cerebral lesions which these identify.

PATIENT AND METHODS: During a 3 months period, 533 patients with mild traumatic brain injuries presented at the ED. We have followed these patients regarding the demographic data, the causes that led to the mild traumatic brain injuries and the paraclinical investigations used.

Regarding the admitted patients, we have taken into consideration risk factors, neurological symptoms, the need to repeat a paraclinical investigation, their management and outcome.

RESULTS/RESULT: Out of the 533 patients who presented at the ED, 248 (65%) were adults and 158 (29.64%) were third age patients. The remaining 27 (5%) were aged between 0-18 years old. Male patients (359; 67%) were more frequently affected than female patients (174; 32.6%). The top three causes were aggressions (57%), car accidents (27%) and same level falls (6.3%). The patients were investigated by skull X-rays (47.8%) and head computed tomography (CT) scans (52.35%). Out of the total number of patients, 198 were admitted; these had the following risk factors: age > 65 years old (31%), alcohol use (18.6%), seizures (7.57%) and the

following clinical symptoms: headaches (71%), vomiting (9.6%), dizziness (36.8%), loss of consciousness (31.8%). Out of the admitted patients, only 12 presented cerebral lesions: hemorrhagic brain contusions (n=5), small subdural blood collections (n=3), traumatic subarachnoid hemorrhages (n=2), acute subdural hematoma (n=1) and intraventricular hemorrhage (n=1). The patient with acute subdural hematoma was operated on and had a favorable outcome.

The patient with intraventricular hemorrhage, who was 90 years old and presented with coagulopathy, has deceased. All the other patients were discharged after a mean hospitalization period of 3 days.

CONCLUSIONS: Out of the patients with mild traumatic brain injuries, only a small number present cerebral lesions. For their diagnosis, expensive paraclinical investigations are used in both the ED and the neurosurgical department. Careful monitoring of the evolution of the neurological status and performing a head CT scan only in case of neurological deterioration would save resources that could be targeted for the therapeutic stage.

KEY WORDS: mild head injury, head CT scan.

RECCURENCE OF CHRONIC SUBDURAL HEMATOMAS: THE IMPORTANCE OF THE SURGICAL TECHNIQUE

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INTRODUCTION: In this study we are trying to establish a correlation between the

surgical technique used for the treatment of chronic subdural hematomas and the risk of recurrence.

PATIENT AND METHODS: Between 01.04.2008 and 30.06.2014, 138 patients were operated on and followed-up for chronic subdural hematomas. Among them, 18 patients (13%) had one or several recurrences. Factors related to the patients (gender, age, location of the hematoma) are analysed as possible predictors of recurrence.

RESULTS/RESULT: Several surgical techniques were used in the treatment of chronic subdural hematomas.

Each of them is analysed to find possibly connections with the recurrence risk of the size of the approach, the reposition of the bone flap, the suture of the dura and other aspects

CONCLUSIONS: There are obvious, statistically significant, correlations between the risk of recurrence and some elements of the used surgical technique.

KEY WORDS: chronic subdural hematomas, recurrence, surgery.

TRAUMATIC INJURIES OF THE SPINE IN PAEDIATRIC POPULATION

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INTRODUCTION: Traumatic pediatric spine injuries represents a subject poorly debated in the literature.

The authors aim is to realize an extended study addressing this theme.

PATIENT AND METHODS: Authors present a retrospective study including 434 pediatric patients admitted with traumatic spine injuries in the First and Second Neurosurgical Clinics in "Bagdasar-Arseni" Clinical Hospital, from 2003 to 2013 (11 years). The diagnosis was established throughout clinical examination and radio-imagistic investigations. The study group was divided in 4 age-related categories (0-3y, 4-7y, 8-14y and 15-18y) taking into consideration specific age related risk factors. Out of the 434 admitted patients, 172 had no proven osseous or disc lesions, 149 had spinal fractures with or without spinal cord involvement, 51 had spinal luxations and 24 had other spinal pathologies.

Neurological diagnosis was establish using Frankel Classification grading system. Also the etiology and the localization of the spinal level where included in the study. 68,5% of the patients were treated conservative, while 31,5% needed surgery.

RESULTS/RESULT: Based on the information noted in the medical records, a distinct injury profile, explained by anatomical and biomechanical features, differentiates the young patient with an immature spine from the older adolescent with a more mature, adult like spine.

CONCLUSIONS: Traumatic spine injuries in pediatric patients have a low incidence, mainly due to a more flexible spine. Anatomical particularities in children spine allows a better applicability of conservative treatment. The prognosis depends on the

severity of spinal cord injuries, with neuro-functional recovery noticeably increased in pediatric population compared to adult population.

KEY WORDS: spine trauma, children, outcome.

BRACHIAL PLEXUS SURGERY - LONG AND A HARD TASK

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Surgery of the brachial plexus is demanding field of surgery. In recent years, development of microsurgery - improvements in optics, electrodiagnostic, equipment, magnetic resonance imaging, surgical instruments, and new suture material evolved surgery of brachial plexus.

The most common condition in this section of neurosurgical expertise that requires surgical treatment is brachial plexus injury. In 90% of cases cause of brachial plexus injury is vehicular accident. This said, it is obvious that this type of injury usually occurs in previously healthy and relatively young population. The fact that untreated brachial plexus injury may cause permanent disability of these previously healthy young people, demands development of even better treatment plans and new surgical techniques.

Timing of the surgical treatment is of the

outmost importance. Most experts in this field of surgery recommend conservative treatment for patients who have showed spontaneous recovery within the first few week after the trauma. Surgical treatment is indicated for patients who have an associated vascular lesion and for sharp wounds, in which a nerve lesion can be expected, exploration and repair of the divided neural elements should be undertaken as soon as the patient's condition permits. The patient with a root avulsion injury should undergo surgery within the first few months after the injury. A closed injury without evidence of root avulsion should be treated by surgery, if there is no sign of recovery within 6 months. In cases of brachial plexus traction injuries only possibility is neurotization (nerve transfer).

If indicated, surgical treatment consists of neurolysis, nerve grafting, nerve transfer and combination of these procedures. Goal of the treatment is achieving good shoulder and elbow control, than elbow, wrist and finger extension, and finally sensibility of the hand and the forearm.

Combined use of donor nerves in reinervation of the musculocutaneous or axillary nerves results with high rate and better quality of recovery when compared to the other modalities of nerve transfer. The use of intraplexal and contralateral plexal neurotization along with a better understanding of central-peripheral function integration may provide improved results and purposeful hand function for our patients in the future.

The other, much rarer pathology are tumors of brachial plexus. They pose a great

challenge to the neurosurgeon. Radical to complete excision of the tumor with preservation of neurological function of the involved nerve is an ideal surgical treatment option with brachial plexus tumor surgery.

KEY WORDS: nerve transfer, nerve transplantation, peripheral nerve surgery, brachial plexus tumors.

SURGERY OF THE PERIPHERAL NERVES IN CHILDREN

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Modern surgical treatment of peripheral nerves begins with introduction of operative microscope in 1964 (Curtze). Pathology of peripheral nerves is a complex field of neurosurgery, and includes injuries, tumors and compressive neuropathies.

NERVE INJURIES: In neonatal period the most frequent type of injury is obstetric brachial plexus injury.

After this period and until 3rd year of age child is prone to falls and cuts, while still insecure on his feet. From age 3 to 8, frequent type of injury are secondary peripheral nerve injuries after fracture (compression of radial nerve after humerus fracture, ulnar and median nerve after supracondylar fracture, and injuries of the knee that affect peroneal nerve). From age 9 to 15 the most frequent

mechanisms are motorcycle accidents, cuts, missile injuries and stab wounds.

Indications for operative treatment are open injuries with undoubtable nerve injury and neurological deficit, closed injuries that show no sign of recovery even three months after injury, and pain that is resistant to therapy.

Good preoperative evaluation and multidisciplinary approach is an imperative.

In our Clinic, many different procedures are done: neurolysis, direct suture, nerve transplantation, nerve transfer. Treatment of choice is different for every patient and it is individually selected. After surgery, of utmost importance for neurological recovery is physical rehabilitation.

In children, greater regeneration ability contributes to better treatment results (especially in children less than 10 years old). Poorer results are when mixed nerves are involved, traction injuries and higher lesions. Best results are accomplished when defect is less than 5cm. Also, better recovery is noticed in early surgical treatment, however delay no longer than 6 months doesn't affect outcome significantly.

OBSTETRIC BRACHIAL PLEXUS INJURY: Specific type of peripheral nerve injury in children is obstetric brachial plexus injury.

Risk factors are: shoulder dystocia, macrosomia (over 4kg), small stature/cephalopelvic disproportion, breech presentation). The generally accepted mechanism of this injury is traction to the neck during delivery, where the neck on the side of the anterior shoulder is stretched and this

stretch causes a "strain" on the brachial plexus on that side, causing a varying degree of injury.

Initial treatment consists of detailed clinical examination, including a check for associated injuries. Electrophysiological diagnostic is recommended at 4 weeks initially to confirm the diagnosis and get a baseline reading. Repeat examinations are carried out every 4–6 weeks until 3 months.

Surgery should be performed when there are no clinical signs of recovery three months after surgery; partial lesions of brachial plexus are usually treated conservatively.

In majority of cases, 70-80% of children spontaneous recovery is expected. Early recovery, during first two weeks is good prognostic sign. If treated surgically after 9 months of injury outcome is significantly poorer.

After surgery, physical rehabilitation is conducted. Functional usage of injured arm and child feeding itself are the most important recovery criteria.

PERIPHERAL NERVE TUMORS IN CHILDREN: Tumors of peripheral nerves are rare lesions, and even rarer in children. However, around 14% of all soft-tissue tumors in children arise from peripheral nerve system.

They are even more frequent in phakomatoses.

Symptoms and signs of peripheral nerve tumors are caused by direct nerve invasion, involvement of surrounding tissues, or mass effect. The duration and progression of symptoms or signs is important as most benign tumors have a longer duration and a slow rate of progression, while malignant tumors tend to progress rapidly in size,

amount of pain, and neurologic deficit. A careful family history is important in the assessment of an underlying neurogenetic disorder, such as neurofibromatosis.

Peripheral primitive neuroectodermal tumors (pPNETs) account for 4-17% of all pediatric soft tissue tumors and often exhibit aggressive clinical behavior. In several large series, the rates of metastases range from 20-31%, with long-term survival rates (< 25%). Obtaining a complete resection of tumor with negative margins is paramount in surgically treating primitive neuroectodermal tumors.

KEY WORDS: pediatric peripheral nerve surgery, peripheral nerves, pediatric peripheral nerve tumors.

**MINIMAL INVASIVE SPINE SURGERY
WITH ROBOTIC INTRAOPERATIVE 2/3D
FLUOROSCOPY AND COMPUTER
ASSISTED NAVIGATION**

Christian Raftopoulos (Belgium)

Many surgical treatments for chronic low back pain that is refractory to medical treatments focus on spine stabilization. One of the main surgical procedures consists of placing an interbody cage with bone grafts associated with pedicle screws.

This technique can be performed using different approaches: a large open posterior approach, tubular approaches (minimal open) or percutaneously (minimally invasive percutaneous or MIP).

One of the main difficulties is to precisely locate the screws into the pedicle avoiding especially infero-medial pedicle breaches. This

difficulty is even greater when working percutaneously.

This lecture focuses on percutaneously placed pedicle screws (PPS), reports the use of a robotic multi-axis 2D/3D fluoroscopy and neuronavigation to enhance the accuracy of pedicle screw placement and reviews other strategies and results reported in the literature.

**WRONG SITE SURGERY IN THE REALM
OF NEUROSURGERY**

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Recently there is a surge in patient safety awareness, nevertheless preventable harm to neurosurgical patients remains problematic. Wrong site surgery with its subtypes permanently exists in the realm of neurosurgery, however it is often underreported or underestimated due to the associated legal claims. Wrong-patient, wrong-side, wrong-level and wrong-procedure surgeries could be catastrophic to patients, healthcare professionals and institutions. These sentinel events are generally preventable according to the literature. Different approaches are developed in an attempt to solve this problem. One of the most promising tool is the neurosurgical safety checklist. It represents low-cost, time-saving, cost-effective and easy to apply and to modify solution.

The multicentric critical analysis of the long-term experience with such checklists will be fateful for their future.

MICROSURGERY OF POSTERIOR CRANIAL FOSSA MENINGIOMAS

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INTRODUCTION: The authors of this study presents a retrospective study based on 48 case series of posterior fossa meningiomas operated in the fourth department of neurosurgery of “Bagdasar-Arseni” Clinic Emergency Hospital between June 2009 and June 2014.

MATERIAL AND METHODS: Data was collected and analyzed from electronic data base and hospital registry. There were 17 man and 31 women with a median age of 54.8 years old. All patients underwent open tumor resection. 12 patients benefited from a ventriculoperitoneal shunt, 4 in an acute phase.

RESULTS: Tumor size was between 3-5 cm in 29 cases, and over 5 cm in 19 cases.

2 of this category of patients supported 2 and respectively 3 stages of resection. According to Simpson Scale, grade I resection was achieved in 20,8%, grade II in 34.6 %, grade III in 35.4 %, and grade IV in 9.2%. The most frequent location was cerebellar convexity (37.5%) followed by pontocerebellar

angle (27.1%) and petroclival area (24.1%). Most frequent pathological samples showed transitional meningioma (33.9%) followed by meningothelial (25.2%) and fibrous type (22.5%). They were 6 cases with atypical and anaplastic meningiomas (12,5%). In 94.6 % of cases the postoperative neurological status remained the same or improved. 3 cases (5.6%) presented neurological deterioration, 2 reversed on the follow-up period, and 1 remained permanent. One case with a giant hemifossa tumor deceased by complications related to brain stem decompression. They were 2 CSF postoperative fistulas, one postoperative wound infection, one postoperative cerebellar hematomas, and 3 patients presented decompensations of previous illnesses (heart and lung). They were recorded 4 tumor re-growth in malignant meningiomas, and 2 in the non-malignant group. All cases benefited of treatment: 4 cases- gamma-knife and 2 cases-open surgery. Mean general follow up period was 34 months.

CONCLUSION: General results of the treatment of posterior fossa meningioma are very good in our clinic, due to homogenous neurosurgical attitude, experienced teams and adequate perioperative treatment. The rate of total resection is significant decreased by lesions over 5 cm diameter and lesions located in petroclival area.

**THE INTERHEMISPHERIC
TRANSCALLOSAL APPROACH FOR
VENTRICULAR TUMORS. PERSONAL
CONSIDERATIONS**

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The optimal approach for lateral and third ventricular mass lesions depends on many considerations, among which: location, size, aim of surgery, neurosurgeon’s experience and preferences. Maximal safe resection is generally the goal together with a minimally invasive surgical corridor.

In this presentation we review our last series of 34 supratentorial ventricular tumors operated on during a 5 years period (9 glioblastomas, 8 low grade gliomas, 6 colloid cysts, 3 metastasis, 2 meningiomas, 2 neurocytomas, 1 cavernoma, 1 subependymoma, 1 choroid plexus tumor, 1 pineocytoma). 21 of these were approached through an interhemispheric transcallosal route. We present videos with our techniques for nervous tissue (i.e. fornix) and vessel preservation (collateral of the sagittal sinus, pericallosal and callosomarginal arteries, thalamostriate veins, posterior choroidal arteries) tumor dissection, intra and extracapsular debulking, and removal together with pre/post op imaging.

**DIFFUSION TENSOR IMAGING:
IMPLICATIONS FOR TARGET VOLUME
DELINEATION IN HIGH GRADE GLIOMA
RADIOTHERAPY AND FOLLOW UP**

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AIMS: Radiotherapy treatment planning for high-grade gliomas (HGG) is hampered by the inability to visualize peritumoral white matter infiltration and to individualize radiotherapy target volumes. Diffusion tensor imaging (DTI) is able to show white-matter abnormalities resulting from tumor infiltration not visualized by conventional imaging methods as CT and MRI. The gross tumor volume (GTV) and the subclinical disease volume considered as the clinical target volume (CTV) should include the macroscopic and the peritumoral white-matter infiltration.

METHODS: In ten patients with biopsy-proven HGG who were referred and treated by high dose radiotherapy at our center were retrospectively analysed regarding the information obtained by DTI tractography. Using a Siemens MR facility a DTI tractography was obtained before and after high dose radiotherapy. The follow up DTI were performed in 4 patients.

RESULTS: a comparison of the GTV and CTV delineation based only on the conventional methods used for imaging of high grade gliomas for external beam radiotherapy and the additional information

obtained on white matter peritumoral infiltration provided by the DTI tractography was performed. Postradiotherapy changes in tract configuration were analysed.

CONCLUSION: DTI tractography can be used to individualise radiotherapy target volumes. Changes in the shape of the radiotherapy used target volumes make the individualization of treatment possible.

AGRESSIVE OR CONSERVATIVE MANAGEMENT IN EXTRADURAL HEMATOMAS IN CHILDREN 0-3 YO – A CHALLENGING NEUROSURGICAL CHOICE

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INTRODUCTION: Epidural hematomas (EDH) in children appear as a consequence of head trauma. Although emergency surgical intervention was the classical neurosurgical treatment for EDH, lately there has been observed a tendency to replace operation by conservative management, whenever the neurological status and imaging appearance allows it. The aim of this article is to present our experience in treating EDH in children 0-3 years old and to establish a management protocol for EDH in infants, by evaluating the clinical and neuroimaging status, of both surgically and conservatively treated patients,

from hospital admission to discharge.

PATIENT AND METHODS: Retrospective study that includes 52 patients diagnosed with an extradural hematoma, admitted in the First Neurosurgical Clinic, Clinical Hospital ‘Bagdasar-Arseni’ in Bucharest, from January 2004 to December 2013. The patients were identified by diagnosis from the clinic’s database; clinical and imaging data was extracted from the patient’s individual records and crosschecked with the operating protocols. Cerebral CT scan was the preferred imaging investigation for diagnosis.

RESULTS/RESULT: our study includes 52 patients (26 boys and 26 girls), with a mean age of 14.5 months (range 6 weeks – 3 years old). 25 patients were surgically treated, while the other 27 received symptomatic medication and were monitored clinically and by imaging exams. The most frequent clinical manifestations were intracranial hypertension (21 patients) and psychomotor agitation (19 patients). The traumatic mechanisms were: accidental falling (38 patients), blunt head trauma (3 patients), road accident (2 patients), unspecified (8 patients) other causes (1 patient). Based on the Glasgow Coma Scale classification of TBI, 39 patients suffered a mild TBI, 7 a moderate TBI and 6 patients suffered a severe TBI. Most of the patients had a good recovery; there was a total of two deaths. The most common location for the EDHs was parietal (20 patients) and temporal-parietal (11 patients).

CONCLUSIONS: Both surgical treatment and conservative management of EDH have a good clinical outcome. Clinical and neuroimaging evaluation at admission and

dynamic imaging surveillance plays an imperative role in deciding the appropriate therapeutic attitude for each patient.

KEY WORDS: extradural hematoma, children, head trauma.

COMPLEX SURGERY IN CERVICAL SPINE TRAUMA

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This paper aims to present the surgical protocol of the traumatic spine injuries, of the injuries belonging to the occipital cervical junction area as well of those in subaxial and transition cervical dorsal area.

The advantages and disadvantages, indications and contraindications, tips and tricks of the different types of approach are comparatively presented, by showing several cases from the personal database of the author.

KEY WORDS: odontoid surgery, anterior fusion, posterior – transarticular fusion, combined approaches.

THORACIC SPINE TYPE C INJURIES ACCORDING TO AO CLASSIFICATION: INJURY PROFILE, MANAGEMENT AND OUTCOME

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INTRODUCTION: In the last years we observed an increased number of patient with multiple lesions after high energy accidents.

Type C injuries of the thoracic spine are the most severe lesions, with the worse prognosis.

PATIENT AND METHODS: This study analyses the injury profile, management and outcome of all patients with thoracic spine, from T1 to T10, type C injuries treated in the Spinal Surgery Department of "Bagdasar-Arseni" Emergency Hospital, in the last 5 years.

RESULTS/RESULT: There were 26 patients admitted, mostly male = 77%, mean age 33.8 years. All of them were victims of high energy accidents. All the 26 patients presented had spine injury associated with multiple lesions (head, thoracic, abdominal and limbs). We have chosen a posterior approach in all cases, with laminectomy or hemilaminectomy, permitting us to resolve all the major objectives of the surgery with the advantage of lower blood loss and a smaller operating time. The purpose of surgery was to achieve decompression of the spinal cord and the stability of the thoracic spine. We treated surgically 19 patients and conservative 4 patients.

CONCLUSIONS: Thoracic spine type C fractures remain a challenge for the spinal surgeon. These lesions require a multidisciplinary team approach for the treatment of the associated lesions. The main goal of the surgery is to achieve stability of the fractured segments.

The timing for surgery is indicated mainly by the associated respiratory problems.

KEY WORDS: thoracic spine, type C injuries.

PERCUTANEOUS TRANSPEDICULAR STABILIZATION IN THORACO-LUMBAR FRACTURES PATIENTS

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INTRODUCTION: We present our preliminary results of using percutaneous transpedicular stabilization in thoraco-lumbar fractures patients.

PATIENT AND METHODS: Four patients with spinal fractures in thoraco-lumbar region, were operated on using stabilizing procedures in our institution during the period of time since February 2013 till August 2014.

RESULTS/RESULT: In all 4 cases we obtained good stabilization using monoaxial screws, and no mobility limitations

CONCLUSIONS: Percutaneous 4 screws fixation time in thoraco-lumbar region is faster and the intraoperative bleeding is less in comparison with open surgery, with average operative time of 45-60 minutes, and bloodshed of about 200 ml, instead 135 minutes and 1 liter.

KEY WORDS: Percutaneous, transpedicular, thoraco-lumbar fractures

IMMUNOHISTOCHEMICAL EXPRESSION OF GFAP-Δ AND NESTIN IN CEREBRAL ASTROCYTOMAS CORRELATES WITH TUMOR INVASIVENESS

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INTRODUCTION: GFAP- δ , the delta isoform of glial fibrillary acid protein (GFAP), is particularly expressed in the subventricular zone (SVZ) of the brain. GFAP- δ positive cells in the SVZ co-express the neural stem cells (NSCs) marker nestin. According to the theory of glioma oncogenesis transformation of a cell population with stem features which resides in the SVZ could be the origin of astrocytomas. The working hypothesis of this paper is that cerebral astrocytomas retain the molecular signature of precursor cells and express the GFAP- δ and nestin.

MATERIAL AND METHODS: We investigated the immunostaining of GFAP- δ and nestin in cerebral astrocytomas and evaluated the correlation between the positive cell ratio of these markers and the neuroimaging features associated with tumor invasion in forty-four cases of grade II, III and IV cerebral astrocytomas (World Health Organization's classification). Tissue samples were obtained by stereotactic biopsies in all cases. GFAP- δ and nestin immunostaining were graded in a semi-quantitative manner taking into account the ratio of positive cells. According to the neuroimaging criteria, tumors were categorized in highly-invasive and low-invasive.

RESULTS: There were thirty-seven high-grade astrocytomas (thirty-five glioblastomas and two anaplastic astrocytomas) and seven low-grade (diffuse) astrocytomas included in

this study. Most of the low-grade and high-grade astrocytomas express GFAP- δ and nestin.

There is a statistically significant correlation between the neuroimaging invasiveness of cerebral astrocytomas and GFAP- δ immunostaining grade ($\rho=0,484$, $N=44$, $p=0,001$) and nestin immunostaining grade ($\rho=0,362$, $N=44$, $p=0,012$).

CONCLUSIONS: Our results show that GFAP- δ and nestin positive cell ratio in biopsy samples of cerebral astrocytomas correlates with tumour invasiveness assessed by preoperative neuroimaging investigations. Therefore, we suggest that GFAP- δ and nestin could have potential clinical implications as markers associated with tumor invasiveness in cerebral astrocytomas.

KEY WORDS: cerebral astrocytomas, GFAP- δ , nestin, immunostaining.

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PRESERVATION OF PASSING-THROUGH VESSELS DURING BRAIN TUMOR RESEMOVAL

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Cranial base meningiomas and high grade gliomas are the most frequent tumors that can incorporate brain vessels into the tumor mass. Sometimes tumors lobes just cover the vessels

with or without vessel wall infiltration, other times the vessel trunk (i.e. carotid artery, pericallosal artery, sylvian artery, rolandic artery or important venous trunks) cross the tumor mass giving vascular supply for the tumor or collaterals traversing the tumor with brain destination to more or less important areas. For the big trunks preop images, neuronavigation and intraop echodopler can give indications about the position but not about the cleavage plane between the vessel wall and the tumor tissue. For perforators and other small branches careful dissection can provide identification and preservation. For big vessels reconstruction is sometimes possible with suture or tangential clips. At the end the balance between the decision to maximize the tumor resection continuing dissection or to live bigger or smaller part of the tumor for avoiding vessels potential damage remains a challenge in all this cases.

We present videos from our surgeries to document our attitude concerning this topic.

OUR EXPERIENCE IN A SERIES OF 277 BRAIN AVMS, MICROSURGICAL TREATMENT AND OUTCOME

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INTRODUCTION: Brain arteriovenous malformations (AVMs) are congenital tangle

of dysplastic vessels.

METHOD: We reviewed medical records of patients with brain AVMs operated from 1999 to June 2014, in Clinic of Neurosurgery, Emergency Clinical Hospital Bagdasar-Arseni.

RESULTS: 277 patients with brain AVMs underwent surgery. Mean age was 29.82 years. Forty five patients (16.25%) had grade I Spetzler-Martin AVMs, 100 patients (36.10%) grade II, 81 patients (29.24) grade III, 39 patients (14.08%) grade IV and 12 patients (4.33%) grade V. In 250 patients (90.25%) AVMs were supratentorial and in 27 cases (9.75%) were infratentorial. 195 patients had ruptured AVMs, 86 presented seizures and 111 cases had motor deficits. We performed total resection of AVMs in 228 cases (82.31%). Following surgery modified Rankin Score improved in 202 patients (73%), remained unchanged in 41 (15%) and deteriorated in 34 patients (12%) (Wilcoxon test $p=0.000$, $Z=-9.248$). Short term morbidity rate was 37%. Long term follow-up revealed favorable outcome in 241 patients (86.7%). Mortality was 6.1%.

CONCLUSIONS: Microsurgery is the treatment of choice in AVMs. In the majority of cases the outcome was favorable. Surgical results were good, with low morbidity and mortality. Patients with poor results belonged to the group admitted with severe altered state of consciousness, massive hematomas and acute brainstem dysfunction.

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“Excellence in scientific interdisciplinary research, doctoral and postdoctoral, in the economic, social and medical fields - EXCELIS”, coordinator The Bucharest University of Economic Studies.

PHOSPHORYLATED NEUROFILAMENT SUBUNIT NF-H IN CSF IS BIOMARKER IN ACUTE TRAUMATIC SPINAL CORD INJURIES

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INTRODUCTION: The objective of this study was to measure the phosphorylated neurofilament subunit NF-H (pNF-H) in cerebro-spinal fluid of patients with spinal cord injury and to determine the correlation between the pNF-H levels and the severity of the injury.

PATIENT AND METHODS: The study included 15 subjects with acute traumatic spinal cord injury: eight patients with complete spinal cord injury (SCI) and seven patients with incomplete SCI. All patients were classified according to the American Spinal Injury Association impairment scale (ASIA) and all patients underwent surgery during the first 24 hours (decompression, stabilization). We measured daily the heavy phosphorylated neurofilament subunit (pNF-H) concentration by sandwich ELISA test in CSF

in all patients and we correlated the values of pNF-H with the clinical evolution.

RESULTS/RESULT: For all patients with SCI pNF-H was detectable in CSF samples and the values were different in the cases of complete SCI toward the cases of incomplete SCI and the cerebro-spinal pNF-H level was more elevated in cases of complete SCI. The level of CSF pNF-H was of ten till hundred times higher in complete SCI than the level of CSF pNF-H in cases with incomplete SCI, where the level of this biomarker was close to normal. The patients with a favorable neurological evolution after treatment had a specific pattern of daily values of NFP-H: a sudden increase up to a maximum value then a progressive decrease until normal. The maximum values were different in each case, from 10 times up to 170 times higher than the normal.

CONCLUSIONS: The phosphorylated form of the high-molecular-weight neurofilament subunit NF-H (pNF-H) in cerebro-spinal fluid can be a specific biomarker for spinal cord injury and it can distinguish the severity of SCI. pNF-H is a predictive biomarker because of its values pattern can show the reducing or stopping of the secondary lesion and the favorable result.

KEY WORDS: biomarker, cerebro-spinal fluid, phosphorylated neurofilament subunit NF-H, spinal cord injury

**SPINAL INTRAMEDULLARY
CAVERNOMAS. PERSONAL EXPERIENCE
REFERRING TO SIX CASES**

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INTRODUCTION: Despite cavernous malformations of the CNS are pathologically similar, intramedullary cavernous malformations are very rare lesions, increasingly recognized after introduction of magnetic resonance image, generating gradual neurological decline, with severe deficits or acute loss of spinal function.

PATIENT AND METHODS: We present our experience with 2 cervical and 4 thoracic spinal intramedullary cavernoma from 2010 to 2014 searching history, onset of clinical manifestation, neurological status, radiological findings, operation, and clinical outcome.

RESULTS/RESULT: Among 6 patients male were 2 cases; female 4 cases; mean age was 42 years (range 25-72 years); mean duration of symptoms were 1,5 years (range 5 days and 2 years) with slowly progressive neurological decline. In two cases there was acute onset of neurological compromise. In all cases diagnosis was made on MRI and lesions were possible to be radically excised and gently extracted from the hemosiderin-stained bed inside of the spinal cord via a laminectomy and midline myelotomy with microsurgical techniques. The surgical outcome on a mean duration of follow up of 12 months were: for 5 cases - the patients neurological conditions

remarkably improved 1 month later, for 1 case no improvement were remarked.

CONCLUSIONS: Spinal intramedullary cavernoma should be early recognized by MRI, can be positioned in a precarious position and generate significant neurologic deficits than cranial cavernomas. For symptomatic intramedullary cavernous malformations extended to the dorsal surface of the spinal cord, total resection with microsurgical techniques can offer good or excellent outcome, restoring neurological status and to stop chronic deterioration and acute rebleeding. To asymptomatic patients with deeper lesions which entail a higher operative risk, but also a surgically manageable cause of myelopathy a closed observation is mandatory.

KEY WORDS: intramedullary cavernous malformation, microsurgical resection.

**FIRST RESULTS OF CYBERKNIFE
RADIOSURGERY OF MENINGIOMAS
COMPARED TO INTERNATIONAL
WORKGROUPS**

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INTRODUCTION: Outcome-report about Cyberknife-Radiosurgery experience of intracranial meningiomas (IM) from Hamburg, Germany in comparison to published datas.

PATIENT AND METHODS: 28 patients (2011–2014) with IM were treated with robotic cyberknife radiosurgery (CK-SRS) in our centre. Resection before SRS was performed in 5/28 (21%) cases.

CK-SRS as primary option in 22/28 (78%), recurrent disease in 5/28 (22%). One patient was treated after incomplete resection. Target volumes varied from 20–130ccm.

Patients were treated in 1-5 fractions, depending on size and location. 30% of lesions were meningiomas at high risk (HRM) areas closed to optical nerves, pathways or brainstem were treated in five fractions. MRI follow-up was at 3/ 6/ 12/ 18 and 24 month after treatment.

RESULTS/RESULT: Follow-up extended from 6 to 40 months (median 24 months). Only minor SRS-toxicities was observed: mortality: 0%, morbidity: 3% (grade 1: headache 3%, no grade 2 ≥ side effects). No patients underwent salvage resection after CK-SRS. No recurrence until today. No side effect on HRM. Results will be comparable to literature.

Non-Robotic systems have equal local control but significant higher morbidity (2–9% vs. 0.5–1% CK).

CONCLUSIONS: High precision, high tumor coverage and the steep dose gradients make CK-SRS efficient and safe. Even for larger and more complex volumes near organs at risk Cyberknife offers a noninvasive SRS-treatment option. All patients showed excellent clinical outcome in terms of high local control, minor side effects and good quality of life.

KEY WORDS: Radiosurgery, Meningiomas, Cyberknife

INTRAMEDULLARY TUMORS: CLINICAL FEATURES AND OUTCOMES - 5 YEARS EXPERIENCE

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INTRODUCTION: Intramedullary tumors rare lesions. This study discusses the clinical features at presentation, the outcomes, giving a few hints on technical nuances and complications.

PATIENT AND METHODS: This is a retrospective review of the data of 41 patients with intramedullary tumors admitted for treatment in the IVth Neurosurgical Department of Bagdasar Arseni University Hospital between January 2009 and December 2013. Only 36 patients were evaluated with preoperative and postoperative magnetic resonance imaging (MRI) and underwent microsurgery. The diagnosis of certainty was made on pathological criteria. ASIA score and Modified McCormick classification was applied to assess neurological function before and after surgery.

RESULTS/RESULT: There were 17 males and 19 females with a mean age of 46.8 years. Twelve tumors were located in the cervical

cord, 19 in the thoracic cord, and 5 in the conus medullaris.

Gross total resection (GTR) of the tumor was achieved in 29 cases, and subtotal resection (STR) was achieved in 7 cases. The histopathology proved 25 tumors to be ependimomas, 6 hemangioblastomas, 5 astrocytomas. Patients presented with nonspecific symptoms and the mean duration of symptoms was 37.4 months. During a mean follow-up period of 62.4 months, no recurrence or regrowth of the residual tumors was observed in the 7 cases of subtotal resection on MRI. 92% of patients experienced an improvement in the McCormick grade and ASIA score and 8 % of patients maintained their preoperative status.

CONCLUSIONS: Excepting high grade astrocytomas, Intramedullary tumors are benign lesions with a tendency to grow and to develop neurological deficit. The accurate diagnosis depends on pathology. For symptomatic patients, early surgery should be performed before neurological deficits deteriorate. When GTR cannot be achieved, STR of the tumor for decompression is advised as in the current series no regrowth or recurrence was observed after STR. Postoperative radiotherapy is not recommended for these benign tumors. With few exceptions tumor resection is associated with a good outcome.

KEY WORDS: Intramedullary tumors, ependimoma, astrocytoma.

**FRONTOTEMPORAL VERSUS
BIFRONTAL APPROACH FOR ANTERIOR
CRANIAL FOSSA MENINGIOMAS**

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INTRODUCTION: Meningiomas of anterior cranial fossa are represented by olfactory groove, tuberculum sellae, planum sphenoidale, anterior clinoid process and orbital roof meningiomas.

PATIENT AND METHODS: We reviewed medical records of patients that underwent surgery for anterior fossa meningiomas from 2009 to 2014, in the Fourth Department of Neurosurgery, Emergency Clinical Hospital Bagdasar-Arseni.

RESULTS/RESULT: There were 59 patients operated in our department. Mean age was 55.58 years, sex ratio M/F was 27/32. According to grade of resection 46 patients (77.97%) had Simpson grade II, 6 patients (10.17%) Simpson grade III, 6 patients (10.17%) Simpson grade IV and 1 patient (1.69%) Simpson grade V. We performed frontotemporal approach in 41 cases (69.49%), bifrontal approach in 13 patients (22.03%) and frontal unilateral approach in 5 cases (8.47%). We compared mRS (modified Rankin Score) before and following surgery, using Wilcoxon test, and we found that 46 patients improved, 10 patients remained with the same score and only 3 patients got worse ($Z=-5.352$, $p=.000$).

We found no difference between frontotemporal and bifrontal approaches regarding degree of tumor resection, using Mann-Whitney test ($U=235$, $p=.394$), but frontotemporal approach had fewer complications. Morbidity was 13.55% and mortality 1.69%. Tumor rest/recurrence was found in 11 patients (18.64%), and 5 underwent second surgery and 6 stereotactic radiosurgery.

CONCLUSIONS: Anterior fossa meningioma can be operated with favorable outcome. Frontotemporal approach offers the same chance of complete tumor resection as bifrontal approach, but with lower surgical risks. Choosing the appropriate approach must be individualized.

Preserving optic nerves, optic chiasm, oculomotor nerves and, if possible, olfactory nerves is mandatory.

KEY WORDS frontotemporal approach, bifrontal approach, anterior cranial fossa.

**GELASTIC SEIZURES IN A PATIENT
WITH RIGHT PARACENTRAL TUMOUR**

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INTRODUCTION: Gelastic seizure (GS) also known as "gelastic epilepsy" is a rare type of seizure associated with several different conditions such as tumors - hypothalamic hamartomas, tuberous sclerosis, hemangiomas, post infectious foci, cortical temporal dysplasia We report one case of this rare condition generated by a right gyrus cinguli gr.II astrocytoma.

PATIENT AND METHODS: Clinical presentation: A 27 years, old male, right handed, was admitted for a 2 years history of very frequent gelastic seizures accompanied sometimes by simple motor partial seizures in both arms, more often being involved his left arm, without impairment of his consciousness state. His neurological examination was normal. Diagnosis was made on native CT scan: minimal hypodense frontal right paramedian lesion, cerebral MRI showed a small right, parenchymal, homogeneous lesion (16/22/15mm), well delimited, involving gyrus cinguli, without perilesional edema and mass effect, hyperintense both on T1 and T2 MR sequences, non-enhancing after Gadolinium. The cerebral lesion was also documented on EEG and video-EEG recordings.

RESULTS/RESULT: Using an interhemispheric microsurgical approach, above the corpus callosum and the right pericallosal artery, at the level of gyrus cinguli, a yellow-gray, infiltrative tumour, having a moderate vascularisation had been identified and totally removed.

The anatomo-pathological analysis revealed a grade II astrocytoma. The patient recovered very well, without deficits, no gelastic seizures or epileptic manifestations; three months after operation he is still free of seizures.

CONCLUSIONS: A case of gelastic seizures accompanied by simple motor partial seizures in both arms, without impairment of his consciousness state induced by a grade II right gyrus cinguli astrocytoma is described and documented by radiological and electrophysiological studies. Using

microsurgical resection, the tumor was totally removed, the patient clinical condition improved. Without an affective connotation as in temporal or hypothalamus topography, gelastic seizures are not pathognomonic for hypothalamic hamartomas and in the case of frontal localization of the lesion they can be associated with motor involvement of the limbs as in our case.

KEY WORDS: gelastic seizures (GS), cerebral astrocytoma.

CHOLINE IN SPINAL CORD PREDICTS FUNCTIONAL OUTCOME IN CERVICAL SPONDYLOTIC MYELOPATHY

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INTRODUCTION: CSM is the most common spinal cord dysfunction in patients over the age of 50.

Although neuroimaging has undergone spectacular development in recent years, no group of predictors has proven reliable enough for an accurate prediction of long-term functional outcome and/or individual gain following surgery in these patients. Magnetic resonance spectroscopy (1H-MRS) assesses metabolites associated with various neural events involved in spinal cord pathology (e.g., N-acetylaspartate - NAA, reflective of neuronal integrity; Choline - Cho - marker of inflammation; lactate - Lac, a marker of anaerobic metabolism). Since neurological

recovery appears to be influenced by residual spared function, we proposed that the 1H-MRS measurements of radiologically normal-appearing (or spared) spinal cord (C2 level) can provide valuable prognostic information of recovery after decompressive surgery.

METHODS: Patients underwent clinical (functional) evaluations - modified Japanese Orthopedic Association Scale (mJOA), 9-Hole Peg Test (9-HPT) and Walking Test (WT) / time and # steps - one day prior to surgery (Time1) and 6 months (Time2) postsurgery.

Also, at Time 1 all patients underwent MRI and MRS. High resolution thin-sliced sagittal T2-image (TR=1500ms, TE=125ms, FOV=200mm, voxel size=0.6 x 0.6 x 0.6) has been acquired to reconstruct the spinal anatomy. A volume of interest (VOI) with dimension of about 10 x 10 x 30 mm³ has been placed along the main axis of the cord at C2 level. For MRS acquisition we used a point-resolved spectroscopy sequence (PRESS, TE=30ms, TR=1500ms, averages=200, flip angle 90, spectral width=1000 Hz) with chemical shift selective water suppression. Three metabolites were quantified: NAA - Functional recovery has been defined as the change (Δ) between Sessions II and I for 9-HPT and WT scores (i.e., $\Delta 9\text{-HPT} = 9\text{-HPT}_{\text{SessionII}} - 9\text{-HPT}_{\text{SessionI}}$) and the recovery rate [$RR = (mJOA_{\text{SessionII}} - mJOA_{\text{SessionI}}) \times 100 / (18 - mJOA_{\text{SessionI}})$] for mJOA. Spearman correlation coefficient was used to determine the correlations between metabolites and functional recovery. At the moment, 10 patients have been enrolled in the study and four already accomplished the full (6 months) time course of study.

RESULTS: Our preliminary results suggest that high Cho correlates negatively with RR and positively with $\Delta 9\text{-HPT}$. A similar trend has been found between NAA and functional tests, but without statistical significance. Walking test did not correlate in any way with metabolic alterations. Also, the Lac peaks were difficult to be detected and poorly correlated with functional recovery. However, the whole group of patients needs to finalize the study in order to draw statistical conclusions.

CONCLUSIONS: High Cho suggests remote increased membrane turnover due to inflammation/gliosis.

Inflammatory response in normally appearing cervical spinal cord was related to functional recovery. Thus, 1H-MRS might be a sensitive method to quantify relevant metabolite changes in CSM, and consequently increase our knowledge of the factors leading from these changes to neurological deficits. Such objective data would help clinicians to set realistic therapeutic goals, by selection of individualized rehabilitation strategies based on the prediction of functional potential. In addition, they can also be helpful as an individual prognostic indication to relatives and patients.

Aknowledgments: This study was supported by EuroSpine – The Spine Society of Europe.

Neuroendocrine carcinoma of the brain invading the frontal sinus. A microsurgical resection.

**THE ROLE OF DIFFUSION TENSOR
IMAGING IN THE EVALUATION OF THE
CERVICAL SPINAL CORD TRAUMA**

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Cervical spine trauma with the involvement of spinal cord represents a major cause of devastating neurologic morbidity amongst the young population. The management of this condition is undermined by a poor level of evidence regarding the possible evolution and long-term outcome. Numerous efforts have been made in the last decades to find the clinical and imaging indicators for the neurological and overall prognostic of these complex patients. However, little can be predicted today and the information that reaches the patient and his family rely mostly on experience and clinical flair.

We wanted to analyze the quantifiable measures comprised within the diffusion tensor MRI images and to see how well they correlate with the clinical status. We looked at the data from 15 patients with cervical spinal cord trauma, subaxial, and measured diffusion anisotropy, anisotropy diffusion coefficient, and fiber length and studied their grade of correlation with the neurological performance (measured on SLIC scale).

The results showed a strong correlation between clinical and imaging data, suggesting

that measures of the diffusion tensor imaging are a good indicator of the level of neurological damage. We present the results and discuss the biological and clinical implications.

**TOPICAL VANCOMYCINE AND
BACTERIAL CULTURE FROM
INTERVERTEBRAL HERNIATED DISC
PREVENT POSTOPERATIVE
OSTEODISCITIS**

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INTRODUCTION: Osteodiscitis represents a serious complication of lumbar disc herniation operations.

The treatment of osteodiscitis is controversial and expensive to society. It extends over a period of several months from diagnosis. Reducing postoperative osteodiscitis by using simple measures may limit patient's suffering and reduce costs. The purpose of this study is to evaluate the early diagnosis of bacterial infections of the intervertebral disc by isolating germs located in the herniated disc fragment and topical Vancomycine powder application, along with the conventional antiinfective therapy. The purpose of this study is to evaluate the early diagnosis of bacterial infections of the intervertebral disc by isolating germs located in the herniated disc fragment and topical

Vancomycine powder application, along with the conventional antiinfective therapy.

PATIENT AND METHODS: Medical files of patients who were operated on for lumbar disc herniations during 01.01.2013 -

30.06.2014 were reviewed. The diagnosis of lumbar disc herniation was established based on the clinical evaluation, confirmed by MRI results. The surgical intervention was performed by mini-open approach: fenestration and foraminotomy completed with removal of the herniated disc fragment and disc remnants from the intervertebral space. A group of 162 patients (group A) received conventional therapy for prevention of post-operative infections with 2 doses of cephalosporin. In the second group of 137 patients (group B), after the removal of the herniated disc fragments, 1g of Vancomycine powder was topically applied and the disc fragments were bacteriologically analyzed. They received the conventional treatment of preventing post-operative infections with cephalosprin - 2 doses.

RESULTS/RESULT: The two groups of patients were similar in terms of demographic characteristics: age, sex, operative level. Out of the 162 patients of group A, one patient developed postoperative osteodiscitis and was treated for 3 months with antibiotics. Regarding patients in group B, in four cases *Staphylococcus* was isolated from the disc fragments.

Postoperative treatment for these patients with prolonged antibiotic therapy over the standard period avoided the developement of the clinical picture of osteodiscitis.

CONCLUSIONS: Postoperative osteodiscitis requires prolonged antibiotherapy. By using simple measures, like topical Vancomycine powder application and early isolation of germs from the herniated intervertebral disc, followed by the immediate

establishment of appropriate antibiotic treatment, this serious complication is avoided.

KEY WORDS: herniated disc, osteodiscitis, Vancomycine, microbiological examination.

VAGUS NERVE STIMULATION (WHAT IS IT, HOW DOES IT WORK, HOW TO IMPLANT, RESULTS)

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INTRODUCTION: Refractory epilepsy represents a severe clinic entity which affects an important number of patients. One of the surgical techniques employed in the management of refractory epilepsy is vagal neurostimulation (VNS). The authors present here the first series of patients with refractory epilepsy operated and implanted with vagal neurostimulators in Romania, and described in detail the surgical technique and the preliminary results.

MATERIAL AND METHODS: Our study included 50 patients diagnosed with refractory epilepsy, investigated, selected and implanted with vagal neurostimulators between October 2012 and August 2014 in Neurosurgery Clinic, "Bagdasar-Arseni" Emergency Hospital. We have implanted in all patients the latest model of vagal neurostimulator (model 103) using a left latero-cervical surgical approach.

RESULTS: There were 13 children and 37 adults in this series. The gender distribution was: 23 females and 27 males. The medium age

was 24,8 years. The average period of hospitalization was 3,5 days. The medium follow-up period was 14 months. There was no death in this series and no intraoperative incidence. One patient presented dysphagia postoperatively which completely remitted after two months.

CONCLUSIONS: VNS represents now a safe, quick and efficient surgical procedure with a minimum period of hospitalization and a short recovery period.

KEY WORDS: refractory epilepsy, vagal neurostimulation.

CEREBRAL VENOUS ETIOLOGY OF INTRACRANIAL HYPERTENSION

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INTRODUCTION: The aim of this study was to present the characteristics that differentiate between idiopathic intracranial hypertension and intracranial hypertension caused by intracranial vascular damage.

PATIENT AND METHODS: This study included twenty-one patients, 14 women and 7 men of 18 – 61 years old.

The main symptoms and the imaging findings diagnosed intracranial hypertension in the absence of an expansive intracranial process, hydrocephalus and intracranial infection.

RESULTS/RESULT: Cerebral angiography with venous phases showed whether there was cerebral vascular disease (cerebral venous thrombosis, venous sinus thrombosis or

stenosis). The pressure of the cerebro-spinal fluid was determined by repeated lumbar puncture with manometry after the exclusion of endocranial lesions by cerebral explorations. The analysis of the symptomatology correlated with the values of intracranial pressure, and the imaging findings revealed significant differences between these two types of intracranial hypertension.

CONCLUSIONS: Vascular intracranial hypertension has a known etiology, such as cerebral vascular illness, and a relatively rapid increase in intracranial pressure of approximately 21 cm H₂O. Intracranial hypertension caused by intracranial vascular damage is named vascular intracranial hypertension. The treatment of vascular intracranial hypertension is etiologic, pathogenic and symptomatic, but that of idiopathic intracranial hypertension is only symptomatic.

KEY WORDS: intracranial pressure, vascular intracranial hypertension, venous sinus stenosis, venous sinus thrombosis

THE ENDOVASCULAR, MINIMAL INVASIVE, CEREBRAL ANEURYSMS TREATMENT WITH VASCULAR REMODELING TECHNIQUES WITH STENTS AND BALLOONS

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INTRODUCTION: The large neck cerebral aneurysms can be treated endovascular way, helped by the remodeling techniques with balloons and stents.

PATIENT AND METHODS: 89 cerebral aneurysms at 83 patients treated endovascular, minimal invasive, with coils and remodeling techniques with 64 balloons and 36 stents. We used the balloons and stents to keep the coils inside the aneurysm sac.

RESULTS/RESULT: All the 89 aneurysm were coiled and the parent vessels remained patent. The recanalization rate of the aneurysm at 6 and 12 months follow up was 6%. 2 cases of stent occlusion because the patients did not take the double antiplatelet inhibition (with Plavix and Aspirin) after stent implantation.

CONCLUSIONS: Most of the cerebral aneurysm can be treated safe in this moment, minimal invasive, endovascular way, helped by remodeling techniques with stents and balloons.

KEY WORDS: cerebral, aneurysm, endovascular, stent, balloons.

**SECOND NEUROSURGICAL
MASTERCLASS CLUJ-
NAPOCA INTRODUCTION TO VASCULAR
NEUROSURGERY**

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INTRODUCTION: The second Neurosurgical Masterclass, “Introduction to

Vascular Neurosurgery” was held between 28th February and 1st March 2014 in Cluj-Napoca. It was organized by the Students’ Scientific Circle of Neurology and Neurosurgery under the auspices of the Neurosurgical Department of Cluj-Napoca. It was addressed to students and residents.

The previous edition of this event was the first known neurosurgical course dedicated to medical students, held in July 2013.

PATIENT AND METHODS: Our course was designed to offer first-hand guidance from experienced speakers. Before the course, participants received a textbook specially written for this occasion by students and residents under the guidance of the main author. The lectures were divided into three days.

RESULTS/RESULT: 281 medical students from 8 university centers from Romania and abroad participated in this course. Our speakers comprised of a professor of neurosurgery, an endovascular specialist, residents and students. The lecturers encompassing three generations meant that the auditorium could witness different stages of neurosurgical evolution, the importance of experience and mentorship. The first day was dedicated to the history of vascular neurosurgery. On the second, a review of relevant anatomy and neuroimaging were provided. On the last day we discussed intracranial vascular lesions and case presentations.

CONCLUSIONS: The goal of the course, to give participants a guide to the field of vascular neurosurgery, was accomplished. We managed to create a bridge not only between

the present and the future generation of neurosurgeons, but also between university centers. Considering the positive feedback provided by the participants these courses will continue.

KEY WORDS: vascular neurosurgery, course, students.

MULTIPLE CRANIAL TUMORS IN A 26-YEAR-OLD MALE WITH NEUROFIBROMATOSIS TYPE 2

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INTRODUCTION: Neurofibromatosis type 2 is an autosomal dominant inherited disorder predisposing to multiple benign tumors of the nervous system, such as meningiomas, ependymomas, vestibular schwannomas and other cranial nerve and peripheral schwannomas. Bilateral vestibular schwannomas are found in 90–95% of the cases and it is reported that 99% of them are benign. However, they remain an important cause of mortality due to their location.

PATIENT AND METHODS: In this paper we present a case report of a 26-year-old male admitted with ataxia, headache, nausea, emesis and bilateral sensorineural hypoacusis, intracranial hypertension syndrome and cerebellar syndrome. The patient also presented with significant congenital hypotrophy of the lower and upper limbs. The cerebral MRI scan revealed multiple cranial

tumors, schwannomas and meningiomas, located in both cerebellopontine angles, right lateral ventricle (temporal horn), right frontal lobe (paramedial), left frontal lobe (parasagittal). The overall aspect suggested the diagnosis of neurofibromatosis type 2. Over the course of one year, the patient underwent 3 different neurosurgical interventions, in order to improve the neurological symptomatology.

RESULTS/RESULT: The postoperative clinical evolution was favorable, without subsequent motor deficits.

The CT scan performed 6 months after the last neurosurgical intervention showed no tumoral recidivation and no changes in tumor size.

CONCLUSIONS: Due to the benign nature of the tumors associated with neurofibromatosis type 2, neurosurgical resection was used only as a cure for complications caused by tumor growth. The typical treatment strategy is „watch and wait then rescan”, meaning that close monitoring of the patient’s neurological status and periodic scanning are recommended.

KEY WORDS: meningioma, schwannoma, neurofibromatosis.

PROGNOSIS VALUE OF COMPUTER TOMOGRAPHY FOR PATIENTS WITH CEREBELLAR HEMORRHAGE IN GOOD NEUROLOGICAL STATUS GCS = 13-15

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INTRODUCTION: For patients with cerebellar hemorrhage in good neurological status (GCS=13-15) sometimes therapeutic management may be difficult. In many studies, different authors tried to find predictors for outcome and determine what the best choice is for these patients: surgery or medical treatment only.

PATIENT AND METHODS: We made a retrospective study of 66 patients with primary cerebellar hemorrhage, admitted in hospital in good neurological status (GCS=13-15). We have considered three CT factors suitable for predicting patient outcome: largest diameter of hemorrhage (measured on axial CT), shape of the fourth ventricle and aspect of the quadrigeminal cistern.

RESULTS/RESULT: All patients with cerebellar hemorrhage with maximum diameter less than 3cm and only 79% of those with diameter higher than 3cm had a good prognosis. Good prognosis has been related in all cases with normal shape of the fourth ventricle, in 88% of patients with partial compression of V4 and only in 56% of patients with complete obliteration. Good prognosis has been related in all cases with normal quadrigeminal cistern, in 84% of patients with partial obliteration and only in 63% of patients with complete obliteration.

CONCLUSIONS: 1. Patients in GCS=13-15 with cerebellar hemorrhage having maximum diameter less than 3 cm, normal shape of the fourth ventricle and quadrigeminal cistern can receive only medical

treatment 2. Patients with complete obliteration of the fourth ventricle or quadrigeminal cistern have better prognosis with early surgery

KEY WORDS: cerebellar hemorrhage CT prognosis.

NEUROENDOCRINE CARCINOMA OF THE BRAN INVADING THE FRONTAL SINUS. A MICROSURGICAL RESECTION

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Neuroendocrine tumors are rare, accounting for less than one percent of all malignant disorders. These tumors can only be accurately diagnosed when a pathologist examines a tissue sample using specialized stains that help clarify the cells' subtype. Urine also may be tested for elevated levels of specific products that are related to this type of cancer. Neuroendocrine carcinomas can originate in different locations including the gastrointestinal tract, lung, and brain. Some tumor cells produce hormones, while other cells cause no symptoms.

CASE REPORT: A 60 years old male presented in our hospital for loss of smell, headache and for the appearance of an epicranial tumor in the frontal region. The ENT doctor discovered a tumor inside his nose. IRM study discovered a tumor with ethmoidal origins that invaded the ethmoidal cells, the left frontal sinus, the duramater and with mass effect upon the cerebral parenchyma.

RESULTS: The tumor was resected via a frontal approach. It had infiltrated the ethmoidal cells, the frontal sinus and the duramater. We evacuated pus from the frontal sinus. Histopathological exam showed a neuroendocrine carcinoma. Post-op evolution was uneventful, the patient being kept for 10 days under.

KEY WORDS: Neuroendocrine carcinoma, microsurgical resection, pus in the frontal sinus.

**MULTIPLE BRAIN CAVERNOMAS:
MICROSURGICAL RESECTION OF TWO
LESIONS**

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BACKGROUND: Cavernomas of the brain are congenital lesions clinically divided into hereditary and sporadic forms. Multiple lesions are usually observed in the familial form, whereas the sporadic variant generally shows a single cavernoma. In this case we describe the case of a patient with two left side cavernomas, one pontomezencephalic and the other temporoinsular that were treated surgically.

CASE DESCRIPTION: A 43 years old male was admitted in our hospital for right hemiparesis, right cranial nerve IV paresis, headache and vomiting. The IRM study identified two lesions that were treated surgically. The pontomezencephalic lesion showed signs of bleeding.

RESULTS: both lesions were treated surgically, the temporoinsular one by opening

the sylvian valley and the brain stem one by a subtemporal approach. Post-op evolution was uneventful. The patient had no additional neurological deficits.

KEY WORDS: Hemangioma, Cavernous, Central nervous system, Hemorrhage, Familial cerebral cavernous malformation.

**POSTERIOR FOSSA CAVERNOUS
MALFORMATIONS: TREATMENT AND
SURGICAL OUTCOME – A 5 YEARS
EXPERIENCE**

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INTRODUCTION: Only 15% of cavernous malformations are located in the posterior fossa, yet this location is associated with important neurological deficits and even death if left untreated.

We review here the experience of our department with a series of 15 consecutive cases.

PATIENT AND METHODS: We reviewed the case files of 15 consecutive cases of brainstem and cerebellar cavernous malformations operated between January 2009 and December 2013. Special attention was paid to the accuracy of diagnosis as predicted by the MRI, to the operative protocol and to the follow up. The patients were followed on average for 26 months using Karnovsky performance score.

RESULTS/RESULT: We reviewed the case files of 15 consecutive cases of brainstem and cerebellar cavernous malformations operated between January 2009 and December 2013. Special attention was paid to the accuracy of

diagnosis as predicted by the MRI, to the operative protocol and to the follow up. The patients were followed on average for 26 months using Karnovsky performance score.

CONCLUSIONS: Total removal should be the standard treatment of posterior fossa cavernomas and where there is no danger of injuring the brainstem, the surrounding hemosiderin ring should be removed as well. "This paper was co-financed from the European Social Fund, through the Sectorial Operational Programme Human Resources Development 2007-2013, project number POSDRU/159/1.5/S/138907 "Excellence in scientific interdisciplinary research, doctoral and postdoctoral, in the economic, social and medical fields - EXCELIS", coordinator The Bucharest University of Economic Studies"

KEY WORDS: brainstem; cavernous malformation; surgery.

ANALYSIS OF 98 PATIENTS WITH APOPLEXY IN A PITUITARY ADENOMA: CLINICAL CHARACTERISTICS, MANAGEMENT AND PROGNOSTIC FACTORS

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INTRODUCTION: Pituitary apoplexy is a clinical syndrome characterized by abrupt and occasionally catastrophic occurrence of

hemorrhagic or ischemic infarction of a pituitary adenoma.

MATERIAL AND METHODS: Between January 2009 and December 2013, 98 patients were diagnosed with pituitary apoplexy and treated in our neurosurgical department from "Bagdasar – Arseni" Emergency Clinical Hospital, Bucharest, Romania.

Adequate follow-up was obtained for all patients of the study. There were 62 women (63.3%) and 36 men (36.7%) with age between 17 and 75 years old. The mean age at admission was 49.9 years.

RESULTS: There were 98 tumors with pituitary apoplexy, 14 tumors were microadenomas (14.3%) and 84 were macroadenomas (85.7%). In our study there were 64 non-functional adenoma (65.3%), 24 prolactinomas (24.5%), 7 somatotroph adenoma (7.1%) and 3 corticotroph adenomas (3.1%). In all cases urgent transnasal transsphenoidal approach was made and hormonal replacement when needed. The histopathological examination confirmed the diagnosis of pituitary apoplexy. In all cases ocular motility improved after surgical decompression, deficits in visual acuity and visual field deficits were partially resolved after surgery, with better results when surgery was done in the first week after diagnosis.

CONCLUSIONS: Pituitary apoplexy represents a true neurosurgical emergency for which rapid diagnosis and glucocorticoid replacement are the first important steps.

Urgent transsphenoidal decompression is recommended to save life, visual function and to have the chance to regain pituitary function.

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KEY WORDS: apoplexy, pituitary adenoma.

PLANUM SPHENOIDALE MENINGIOMA – CASE REPORT AND REVIEW OF THE LITERATURE

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BACKGROUND: Meningiomas of the central subfrontal region originate either from the olfactory groove, planum or jugum sphenoidale or suprasellar area, accounting for about 5% to 10% of all intracranial meningiomas in a review of the world literature.

They represent a subgroup of anterior skull base meningiomas, planum sphenoidale meningiomas being located more anterior and in proximity of the olfactory groove location.

OBJECTIVE: We are reporting a case of a planum sphenoidale meningioma successfully resected using a classical left pterional approach.

METHODS: A 64-year-old woman presented with symptoms of opto-chiasmatic syndrome, with progressive visual disturbance, headache and nerve compression from a planum sphenoidale meningioma. Preoperative magnetic resonance imaging showed a well-defined suprasellar solid mass with homogenous enhancement and a broad dural attachment to the planum sphenoidale. Surgical resection was performed using a left pterional approach. The intra- and postoperative courses were uneventful with a partial recovery. The opto-chiasmatic syndrome persisted but the postoperative computer tomography investigation showed total surgical removal with no residual tumor.

CONCLUSION: In order to obtain a better postoperative outcome, the planum sphenoidale meningiomas must be diagnosed early and the operative procedures are to be performed with utmost care and in time.

EGFR INACTIVATION IN COMBINATION WITH TEMOZOLAMIDE INDUCED SYNERGISTIC CYTOTOXICITY IN LOW PASSAGE GLIOBLASTOMA CELL LINE: IN VITRO STUDY

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The central nervous system (CNS) tumours are the most common solid tumours. Despite the successful introduction of multimodal therapy approaches (modern surgery, etc) and new cytostatics, the prognosis of many brain tumours, especially high-grade brain tumours remains grim. Drug failures in the clinic may be due to the fact that preclinical models do not represent the heterogeneity that is observed in human tumours.

Compared to established cell lines, low passage cell lines were reported to better preserve features of cancer. At low passage, cancer cell lines are a mixture of several cell populations and should better mimic the tumour heterogeneity in vivo. For this reason, they are supposed to have better value as tumor models.

In this study, we used a low passage primary brain tumour cell line derived from glioblastoma tumours, to analyze the effect of AG556 (a EGFR inhibitor) alone or in combination with Temozolomide (TMZ) (a common drug for brain cancer). Both AG556 (1, 5 and 10 μ M) and TMZ (1 and 5 μ M) treatment, induced significant cytotoxic effect on glioblastoma cells in a dose- and time-dependent manner. Dual treatment with AG556 and TMZ resulted in synergistic cytotoxicity at a frequency of 93%, when compared to single treatment.

THE EMERGING ROLE OF ALTERNATIVE THERAPY IN TARGETING BRAIN TUMOURS

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Recent studies have shown that more than 50% of cancer patients use plant compounds for alternative and complementary therapies. *Ligustrum vulgare* hydroalcoholic extract (LHAE) is used for prevention or treatment of several diseases including cancer.

The aim of this study was to investigate the effect of LHAE on the brain tumor cell viability. In the present study, we have analyzed the effect of LHAE alone and in combination with temozolomide (TMZ) or doxorubicin (DOXO) on four primary brain tumor cell lines in vitro.

We found that LHAE displayed inhibition property against brain tumor cell lines including: glioblastoma (GB1B, GB2B, GB8B) and astrocytoma (AC1B). Depending on drug concentration, period of treatment, LHAE induced 40–60% cytotoxicity in glioblastoma cells and 60–80% cytotoxicity in low-grade astrocytoma cells. At the higher concentration used in this study (100 μ L/mL), LHAE induced more pronounced cytotoxic effects than both DOXO and TMZ in all brain tumor cell lines analyzed. In general, cytotoxic drugs are proposed to act selectively by targeting cells that proliferate rapidly. In our study, we found that low proliferative astrocytoma cells were

more sensitive to single treatment compared to rapid proliferative glioblastoma cells. The treatment with LHAE failed to exhibit a real benefit when combining with a second agent TMZ or DOXO, except in the case of GB1B cell line where combinatorial treatment, resulted in synergistic response in 44% and additive response in 22% of the combinations. This study underlines the need for identification of new molecules able to kill brain tumor cells that would facilitate the development of better therapeutic approaches.

INDOOR ENVIRONMENTAL QUALITY STUDY IN AN EMERGENCY HOSPITAL FROM BUCHAREST

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INTRODUCTION: For the medical staff, the hospital is an ongoing environmental work space, while for the patients the hospital means a temporary space to be healed, before returning home. In this context, indoor microclimate conditions are perceived differently by the patients and the medical staff.

METHODS: Two types of questionnaires were used: for operating rooms and other areas, like wards and medical and non-medical offices. In parallel, measurements of IEQ most

important parameters were performed in the analyzed building.

RESULTS: The questions in this survey are mostly addressed to evaluate the indoor environmental quality and the implications on the medical activity. Regarding the air quality, it is perceived as low in some medical wards and relatively high in the operating zone. Measurements of air quality confirmed the results of the enquiry. Thermal comfort was found to be variable in function of the occupants' activity level. Measured values of the Predicted Mean Vote and of the Draft Risk were confronted with data collected from questionnaires.

CONCLUSIONS: As it can be observed, the survey results are partially in agreement with measurements of comfort. In both cases, we recorded disagreement between the various categories and the experienced comfort sensation. It follows the importance of finding new strategies for air distribution and ventilation in operating rooms: zonal ventilation and changing the conception of the perforated panels used laminar flow ceilings for instance.

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KEY WORDS: field survey, healthcare, indoor comfort.

OUR EXPERIENCE IN A SERIES OF 57 PATIENTS WITH COLLOID CYSTS OF THE THIRD VENTRICLE

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OBJECTIVE: A variety of surgical approaches have been described to access and remove colloid cysts. Endoscopic approaches are least invasive but are used especially in cases with

ventriculomegaly. Transcallosal interhemispheric and transcortical approaches are typically reserved for patients with symptomatic or large asymptomatic cysts without any significant hydrocephalus. For selected cases ventriculoperitoneal shunt is an option.

MATERIALS AND METHODS: We retrospectively analyzed the surgical outcome and complications of 57 patients with colloid cysts of the third ventricle operated at Bagdasar Arseni Emergency Hospital, Bucharest, between 2000 and 2014. A detailed pre- and post-operative neurological assessment was done in all patients. CT or IRM scan of the brain was done before and after surgery.

RESULTS: An analysis was performed for resection rates, morbidity and mortality based on treatment strategy. A total of 32 patients were included in the microsurgical group and 25 patients in the endoscopic group. The median maximal cyst diameter was 11.3 mm (range 5-37 mm) with no significant differences between the two groups. Total resection was achieved in 93.75% of the microsurgical group compared to 64% of endoscopic group ($p < 0.001$), but with higher

morbidity in the first group (18.75% compared to 12%). The median hospital stay was 5 days for endoscopic group and 8 days for microsurgical one. There were no deaths related to the surgery.

CONCLUSION: Microsurgical resection of colloid cysts is associated with a higher rate of complete resection but a higher morbidity rate than with endoscopic removal. With increasing experience, most of the complications are avoidable.

KEY WORDS: Colloid cyst; third ventricle; complications; microsurgery; endoscopy.

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REPERFUSION SYNDROME IN EARLY CHILDHOOD - CASE REPORT

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Reperfusion syndrome in children is a rare situation. We present the case of 6 month old child who had fallen from his mother arms. He presented for complete motor deficit 72 hours after the traumatic event. We have operated him and immediately he improved his motor

deficit and afterwards 6 - 12 hours postop he became again hemiplegic. We have performed angio CT scan which shows signs of reperfusion.

We follow up the infant and he had a good clinical outcome although he maintained sequels on the CT scan.

THE ROLE OF VIRTUAL ENDOSCOPY IN PLANNING ENDOSCOPIC TRANSSPHEOIDAL SURGERY FOR PITUITARY ADENOMAS

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OBJECTIVES: To realize and navigate the 3D model from CTs of patients and compare them to the intraoperative endoscopic images. **Design:** Prospective observational study

METHODS: The CTs of 15 patients proposed for endoscopic approach for pituitary adenoma were reconstructed using OsiriX (Pixmeo Sarl). Virtual endoscopy (VE) was performed prior surgery to assess the surgical corridor and particular anatomy. We evaluated the inferior and middle turbinate, sphenoid ostia (SO), choanal arch, sphenoidal recess, sphenoid septa, sellar fossa, paraclival carotid prominences. The intraoperative endoscopic images were compared to the virtual images.

RESULTS: The virtual images had a good resemblance with the actual surgical images, all the structures from the nasal cavity were

identified and had a perfect matching except the SO which was identified in 8 cases in VE vs. 12 intraoperative. All the structures from the sphenoid sinus were identified with perfect matching except the ipsilateral paracalvarial carotid (10 cases in VE vs. 5 intraoperative). The VE could not appreciate the state of the sellar floor in none of the cases.

CONCLUSIONS: The preoperative knowledge of the nasal and sphenoid anatomy may generate benefits during the performance of surgeries, anyhow detailed information concerning the integrity of structures could not be offered by this technique and it offers no additional information in cases where the sphenoid sinus is fully occupied by tumor or not aerated.

AWAKE CRANIOTOMY FOR ELOQUENT AREAS TUMORS – CASE REPORT

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Nowadays the role of brain tumors surgery is to maximize the tissue resection and to minimize the postoperative morbidity. Lesions located in eloquent area have a high risk for a neurological impairment. We present the case of a 31-year-old male admitted in our department with right-sided body hypoesthesia since one month associated with general seizures. MRI showed an infiltrative lesion located on the left temporoparietal region. Because the language area was

trapped in the tumor and due to imagistic difficulty in specifying the involvement of the motor area we managed surgically this patient using the technique of awake craniotomy. The outcome was favorable with no neurological deficit. The histology was low grade glioma. Because remnant infiltrative part of the tumor exists on postop images, chemo and radiotherapy was applied. The patient has a 2 years neurological free outcome until now and

not imagistic modifications. We present this case together with pre/postop images; follow up images, histology, anesthesia for awake craniotomy protocol and treatment protocol. This method allows intraoperative brain mapping with identification and protection of functional cortex and it provides a good alternative for intraoperative functional monitoring in lesion located in eloquent areas.