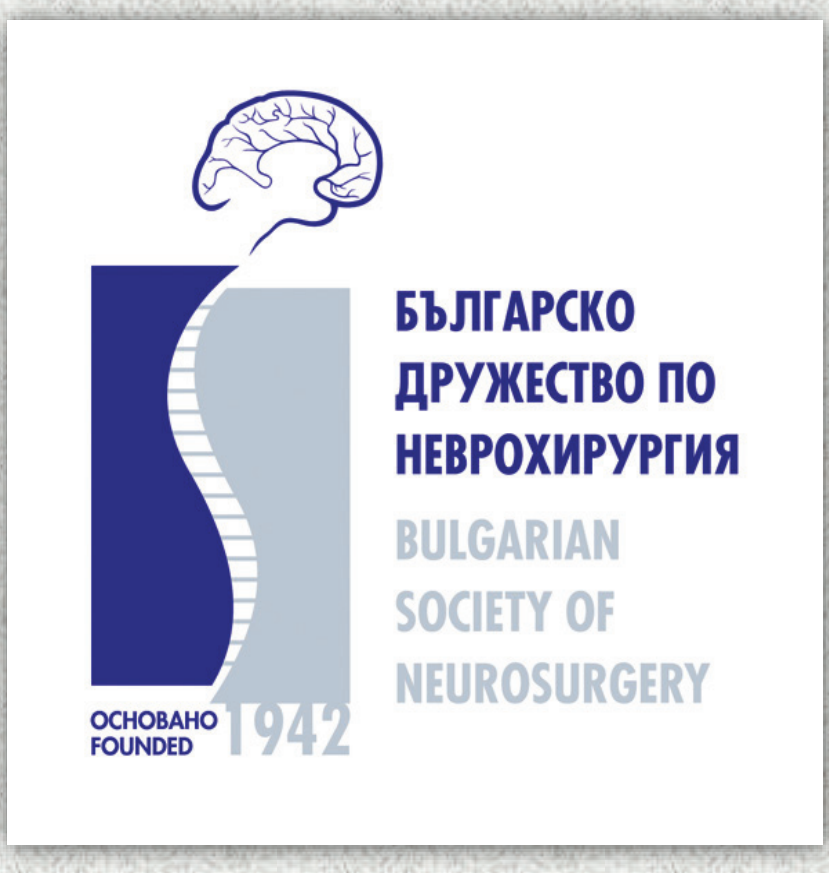

БЪЛГАРСКА НЕВРОХИРУРГИЯ

Година 2011, Том 16, Брой 1-2

Доклади от 7-ми Черноморски неврохирургичен конгрес
Доклади от 20-ти Национален конгрес по неврохирургия
16-19.11.2011, Правец, България

• • •

BULGARIAN NEUROSURGERY

Year 2011, Volume 16, Issue 1-2

Proceedings of the 7-th Black Sea Neurosurgical Congress
Proceedings of the 20-th National Congress of Neurosurgery
16-19.11.2011, Pravets, Bulgaria

Bulg Neurosurg, 2011, 16(1-2) • ISSN: 1310-2206

БЪЛГАРСКО
ДРУЖЕСТВО ПО
НЕВРОХИРУРГИЯ

BULGARIAN
SOCIETY OF
NEUROSURGERY

БЪЛГАРСКА НЕВРОХИРУРГИЯ

ГОДИНА 2011, ТОМ 16, БРОЙ 1-2

Доклади от 7-ми Черноморски неврохирургичен конгрес
Доклади от 20-ти Национален конгрес по неврохирургия
17-20.11.2011, Правец, България

• • •

BULGARIAN NEUROSURGERY

YEAR 2011, VOLUME 16, ISSUE 1-2

Proceedings of the 7-th Black Sea Neurosurgical Congress
Proceedings of the 20-th National Congress of Neurosurgery
17-20.11.2011, Pravets, Bulgaria

SPONSORS

VALENTIA
LEONIS
GROUP

VALENTIA LEONIS LTD
146 B, Vitosha Blvd.
1st fl., Office 16, 1463 Sofia
Tel. +359 2 4703676
www.valentialeonis.com

stryker®
distributed in Bulgaria by
V and D Services Ltd.
Ventures Development Innovations

110B, Simeonovsko shosse Blvd, floor 1, suit 4
1700 Sofia, Bulgaria
Cell: +359889513599, Fax: +35929515264
E-mail: office.vnd@gmail.com

БЪЛГАРСКО ДРУЖЕСТВО ПО НЕВРОХИРУГИЯ

ИЗПЪЛНИТЕЛЕН КОМИТЕТ 2010-2015

Председател
Проф. д-р М. Маринов, д.м.н.

Предишен председател
Проф. д-р В. Бусарски, д.м.н.

Първи заместник председател
Доц. д-р В. Каракостов, д.м.

Заместник председатели
Доц. д-р Н. Габровски, д.м.
Доц. д-р Т. Ефтимов, д.м.
Доц. д-р Св. Калевски, д.м.
Д-р Н. Недев

Главен секретар
Доц. д-р А. Бусарски, д.м.

Технически секретар
Д-р Кр. Минкин, д.м.

Касиер
Д-р А. Хаджиянев

Членове
Проф. д-р А. Къркеселян, д.м.н.
Проф. д-р С. Унджиян, д.м.
Проф. д-р К. Романски, д.м.н.
Проф. д-р Ст. Габровски, д.м.н.
Проф. д-р П. Вълканов, д.м.
Доц. д-р Г. Кючуков, д.м.
Доц. д-р Хр. Желязков, д.м.
Доц. д-р Я. Енчев, д.м.

Контролна комисия
Доц. д-р Р. Попов, д.м.
Доц. д-р Г. Поптодоров, д.м.
Доц. д-р Хр. Цеков, д.м.
Д-р Хр. Рангелов
Д-р Хр. Христов, д.м.

Адрес
УМБАЛ „Св. Иван Рилски“ ЕАД
Клиника по неврохирургия
Бул. Акад. Иван Гешов 15
1431 София, България
Тел. +359 2 852 7039, +359 888 634 577
Е-мейл: ns_bg@hotmail.com
Уеб-сайт: http://neurosurgery.bg

BULGARIAN SOCIETY OF NEUROSURGERY

EXECUTIVE COMMITTEE 2010-2015

Chairman
Prof. M. Marinov, MD, PhD, DSc

Previous Chairmen
Prof. V. Bussarsky, MD, PhD, DSc

First Deputy Chairman
Assoc. Prof. V. Karakostov, MD, PhD

Deputy Chairmans
Assoc. Prof. N. Gabrovsky, MD, PhD
Assoc. Prof. T. Eftimov, MD, PhD
Assoc. Prof. Sv. Kalevski, MD, PhD
N. Nedev, MD

General Secretary
Assoc. Prof. A. Bussarsky, MD, PhD

Technical Secretary
Kr. Minkin, MD, PhD

Treasurer
A. Hadjiyanev, MD

Members
Prof. A. Karkesselyan, MD, PhD, DSc
Prof. S. Undjian, MD, PhD
Prof. K. Romansky, MD, PhD, DSc
Prof. St. Gabrovsky, MD, PhD, DSc
Prof. P. Valkanov, MD, PhD
Assoc. Prof. Kyuchukov, MD, PhD
Assoc. Prof. Hr. Zhelyazkov, MD, PhD
Assoc. Prof. Y. Enchev, MD, PhD

Supervisory Committee
Assoc. Prof. R. Popov, MD, PhD
Assoc. Prof. G. Poptodorov, MD, PhD
Assoc. Prof. Chr. Tsekov, MD, PhD
Chr. Ranguelov, MD
Hr. Hristov, MD, PhD

Address
Sv. Ivan Rilsky University Hospital
Clinic of Neurosurgery
15 Acad. Ivan Geshov Blvd
1431 Sofia, Bulgaria
Tel. +359 2 852 7039, +359 888 634 577
E-mail: ns_bg@hotmail.com
Web-site: http://neurosurgery.bg

TABLE OF CONTENTS

Proceedings of the 7th Black Sea Neurosurgical Congress 17-20 November 2011 Pravets, Bulgaria

ORAL PRESENTATIONS

POSTER PRESENTATIONS

Proceedings of the 20th National Congress of Neurosurgery 17-20 November 2011 Pravets, Bulgaria

ORAL PRESENTATIONS

POSTER PRESENTATIONS

SPEECH

Prof. Dr. Marin Marinov, President of BNS

Appointment ceremony of honorary members and guests of the Bulgarian Neurosurgical Society

Dear Honorary guests and Highly esteemed members of the international neurosurgical community,
Dear Presidents, Vice- and Ex-Presidents of WFNS, EANS, Regional and National societies,
Dear Colleagues and Friends,

I take pride in the fact that the BNS is hosting this year such a representative international neurosurgical forum. I realize that most of you are coming to my country for the first time in life. For some of you this is probably the last European country that has been left unvisited with professional purpose. This meeting gives us the right occasion to obliterate from our memory this undeserved omission! Indeed, it is a great honor to welcome in Bulgaria all you who responded to our invitation and paid respect to the 7th Black Sea Neurosurgical Congress!

By virtue of its bylaws The BSN passed on its annual meeting 2011 a resolution to confer the title *"Honorary Member"* on internationally renowned, top-ranking neurosurgeons, who have attained world-wide fame and acknowledgment during many decades of relentless work, commitment and service in favor of sick people and the mission of neurosurgery.

For generations of Bulgarian neurosurgeons these great personalities and our new elected honorary members served as an example for professional excellence and exceptional achievements and contributions to the international field of Neurosurgical education, science and practice. In addition, our nominees have rendered great services on high-standing positions at world, continental, regional and national NS and other scientific organizations, as well as for political and public merits and social welfare in their countries.

On behalf of the BSN I have the enormous privilege and honor to present with a certificate and **medal for honorary membership** our distinguished European teachers, given in alphabetical order of countries:

1. From Belgium: Professor Jacque Brotchi
2. From France: Professor Marc Sindou
3. From Germany: Professor Madjid Samii and Professor Rudolph Fahlbusch
4. The 5th one awarded is from a country, with which we share the Black Sea coastline and the great European River Danube as a common border – namely Romania: Professor Alexandru-Vlad Ciurea
5. With the 6th nominee the BNS extends its recognition to the Near East, a region that is geographically close to the Black Sea region, awarding Professor Ibrahim Sbeih. Throughout the years Bulgarian Neurosurgery has had traditionally good relationships with Jordan – young Jordanian neurosurgeons were residents in Bulgaria and Bulgarian Neurosurgeons have visited Jordanian neurosurgical departments on an exchange basis.

Prof. Dr. Jacque Brotchi

Past-President of the World Federation of the Neurosurgical Societies

Emeritus Professor and Honorary Chairman, Department of Neurosurgery, Erasmus Hospital, Free University of Brussels (ULB), Belgium

Member of the Belgium Senate

Baron and Grand Officer of the Belgian Crown, Knight of Belgian, French and Danish Royal Courts

•

Prof. Dr. Marc Sindou

Professor and Chairman (retired) of the Department of Neurosurgery, Hôpital Neurologique P. Wertheimer Groupement Hospitalier Est, Lyon, France

Founding-member of the International Association for the Study of Pain (IASP)

Past-President of the World Society for Stereotactic and Functional Neurosurgery (WSSFN)

President de la Societe Neuro-Chirurgie de Langue Francaise (SNCLF)

•

Prof. Dr. Madjid Samii

Honorary President of the World Federation of the Neurosurgical Societies

Founder and President of the International Neurosurgical Institute (INI) Hannover at Otto-von-Guericke University, Germany

President of the China INI, Beijing

Chairman (retired) of Neurosurgical Department, Medical School Hannover and Nordstadt Hospital Hannover

•

Prof. Dr. Rudolph Fahlbusch

Director of the Center for Endocrine Neurosurgery and Intraoperative MRI at the International Neurosurgical Institute (INI), Hannover, Germany

Professor and Chairman (retired) of the Department of Neurosurgery at the University Clinic of Erlangen-Nuremberg, Germany

•

Prof. Dr. Alexandru-Vlad Ciurea

Carol Davila University School of Medicine & The National Center for Excellency in Neurosurgery, Bucharest, Romania

Chairman 1st Neurosurgical Clinic, "Bagdasar-Arseni", Bucharest, Romania

Honorary President of the Romanian Society of Neurosurgery (RSN)

Vice-President of the WFNS (World Federation of Neurosurgical Societies

Chairman WFNS Nominating Committee

Vice-President AMR (Romanian Medical Association)

•

Prof. Dr. Ibrahim Sbeih

WFNS – Second Vice President at Large

Consultant Neurosurgeon, Ibn Alhaytham Hospital

Past visiting Professor of Neurosurgery - Jordan University of Science & Technology

Past President of the Jordanian Neurosciences Society

Past President of the Pan Arab Neurosurgical Society

Member of WFNS Committees for Skull Base Surgery, Oncology, Education, International Initiative and Fund Raising

We have this evening another special and honorary guests:

Emeritus Professor George P. Foroglou

American Hellenic Educational Progressive Association (AHEPA) University Hospital,
Aristotle University of Thessaloniki, Greece

Father of the internationally renowned Thessaloniki Neurosurgical School

Past President of the Hellenic Neurosurgical Society

President Macedonian-Thrace Branch of the Hellenic Cancer Society

I remember my last meeting with him as a lecturer at the remote 1992 National Congress of The BNS in the ski resort Borovets in Rila Mountain near Sofia.

Presidents of National NS Societies:

1. Armenia
2. Georgia
3. Greece
4. Moldova
5. Romania
6. Russia
7. Turkey
8. Ukraine
9. Bulgaria

I propose a toast to all of you and your families!

I drink success to the meeting and wish to all of you enjoyable stay in my country!


URGICAL CONGRESS
S OF NEUROSURGERY
– 20th 2011
lex, Bulgaria

Proceedings of the 7th Black Sea Neurosurgical Congress

17-20 November 2011

Pravets, Bulgaria

ORAL PRESENTATIONS

BRAIN SURGERY TODAY

M. Samii

International Neuroscience Institute, Hannover, Germany

The rapid progress in neurosurgery in the last decades was due mainly to the expanding basic knowledge of the brain biology and the introduction of new technological devices. The future developments will certainly be related to the further advancements in each of these fields and their mutual influence.

The role of neuromonitoring, neuronavigation, and intraoperative neuroimaging will be growing. Modern brain tumor surgery implies maximal tumor resection and preservation of neurological functions. Recent studies on the substantial interindividual variations and the phenomenon of brain plasticity, have shown that traditional MR-based definition of the location of eloquent structures is unreliable. Preoperative brain mapping, including fMRI and fiber tracking, allows visualization of the spatial relationships between these structures and the tumor. These modalities provide information essential in planning and performing the surgery, as well as in predicting the outcome.

The treatment of cerebrovascular diseases has advanced dramatically due to the advancement in two close but separate fields- neuroradiology and microsurgery. Currently, the complication rate of the two treatment modalities demonstrates no significant difference. Treatment of cerebral aneurysms worldwide depends on the level of microsurgery and endovascular experience, as well as on the economic and technical environment. On the other hand, management of some complex cases, e.g. giant aneurysms or AVMs in which conventional therapy with a single modality frequently fails, requires interdisciplinary work.

The goal of modern brain surgery should be preservation and even restoration of neural functions and patients' quality of life. In the current presentation all these aspects will be highlighted.

NEW THERAPEUTHICAL APPROACH IN CRANIOPHARINGIOMAS CHILDREN VS ADULTS 157 CASES – GKS INCLUDED

A. V. Ciurea, MD, PhD, MSc[1],
M. Gorgan, MD, PhD[1], A. Tascu, MD[1],
A. Iliescu, MD[1], V. Rotarascu, MD[2],
A. Giovani, MD[1], F. Brehar, MD[1],
N. A. Gheorghita, MD[3], F. Stoica, MD[4]

[1]1st Clinic of Neurosurgery, "Bagdasar-Arseni" Clinical Hospital, Bucharest, Romania
[2]Psychology Department, "Carol Davila" Medical School, Bucharest, Romania,
[3]ICU Department, "Bagdasar-Arseni" Clinical Hospital, Bucharest, Romania
[4]GK Department, "Bagdasar-Arseni" Clinical Hospital, Bucharest, Romania

Objectives: Craniopharyngiomas (CPH) are benign slow-growing intra-cranial calcified tumors, preponderant in children. CPH expand in the pituitary stalk axis, from the sphenoid body to the third ventricle. MRI improves the anatomical location, the tumor diagnosis and the operative strategy. Microsurgery represents the main treatment option in spite of major difficulties. The goal of this study is to analyze the outcome of a series of 122 CPH cases of pediatric population and 35 CPH in adults, treated surgically.

Methods: Authors performed a retrospective analysis of 122 consecutive children (0-16 year old) and 35 adults with CPH diagnosed and operated at the "Bagdasar-Arseni" Clinical Hospital, Bucharest, during a period of 19 years (1990 – 2008).

In this cohort of children, males were slowly preponderant (64 boys and 58 girls), affecting predominantly the age group 7-10 years old (49 cases - 40.2%). Clinical features consisted in visual impairment (85 cases - 69.6%), endocrine dysfunction (99 cases - 81.3%) and increased ICP syndrome (82 cases - 67%). Visual and endocrine symptoms prevailed. Headache, was frequently encountered - 106 cases (86.6%). Hydrocephalus was present preoperatively in 31 cases (25.4%) and was dealt with VP shunt before definitive tumor therapy in 15 cases (12.3%). The essential neuroimaging findings is actually MRI. No DSA investigation was carried out routinely.

In adults (preponderantly 31-40 y.o., 21 cases) main clinical picture was characterized by headache

31 cases (88.5%), visual impairment 28 cases (80%), and endocrine dysfunction 15 cases (42.8%). None of them received radiotherapy and/or stereotactic radiosurgery, before surgical approach. All the cases underwent thorough endocrinological and neurosurgical investigations, pre- and postoperatively.

Pathology: The adamantinous type was preponderant in children (111 cases - 91.1%). All the cases were followed up during a period going from 6 months to 15 years.

In our series, in children, the most frequent location of CPH was the suprasellar retrochiasmatic region (89 cases - 73.2%). Pathologically, mixed forms (cystic forms with calcifications) are prevalent: 65 cases (53.6%). A personal craniopharyngiomas grading scale was presented.

In children, surgical approach was adapted to the tumor location: bilateral subfrontal (42 cases - 34.4%), unilateral frontal (26 cases - 21.4%), and pterional (24 cases - 21.4%), followed by midline interhemispheric (21 cases - 16.9%), transcallosal (3 cases–2.7%) and combined (6 cases - 5.3%). Actually, the fronto-lateral and pterional approach were preponderant surgical strategy both in children and adults. In adults, surgical approach was: subfrontal (20 cases-57.1%, subfrontal bilateral 12 cases, 34,3%, unilateral frontal 8 cases, 22,8%), interhemispheric (2 cases - 6.3%), pterional (11 cases - 31.2%), transcallosal 0 cases, transsphenoidal 2 cases (6.3%), combined approaches 0 cases.

Results: In children: the total removal of the CPH was the goal of the surgery, but this was achieved in only 65 cases (54.4%). Actually we advocate for partial removal of CPH because of the risk of functional impairment or possible operative mortality. In 11 cases (8.9%) we performed near-total resection, in 41 cases (33.9%) partial resection, and 5 cases (4.1%) were biopsies. We performed biopsy with cyst evacuation only on giant, extremely compressive forms, in which the tumor collapse was accompanied by cardiac bradycardia. Hydrocephalus was present in 32 cases (26.2%). No intraoperative death occurred. In the first month, there were 6 deaths (4.9 %), due to hypothalamic injury, in each case total removal having been attempted.

The real recurrences occurred in 22 cases from 65 cases of total removal (33.3%); tumor regrowth was noticed in 44 cases (77.2%) from a total of 57 cases with remnant tumor (near-total, partial and biopsies).

In adults series the total removal was achieved in 24 cases (68.5%), near total removal in 4 cases (11.4%), partial in 7 cases (20 %), and no biopsy.

No perioperative death in 35 cases CPH, operated in adults. Recurrences and regrowth occurred in 4 cases (11.4%).

Gamma Knife Surgery (GKS) was performed in 7 cases in children and 7 cases in adults, all with recurrences, but the results remain disputable because the tumoral chist pression asked a surgical approach.

Neuropsychological assessments revealed no altered IQ at individual level. The Intracranial Hypertension (ICP) and the tumor localization determine attention deficits. The extension of the tumor determines the mental deficit and the apathy. The recurrent tumors determine psychological dysfunction: attention, memory and the orientation deficits. The depression is dependent by age old of the patients and the QOL is dependent by the tumor localization. Psychosocial reinsertion is affected by memory dysfunction, medium moodiness and the forceless Ego.

Conclusions: Surgical treatment remains the main option, but the important number of complications, regrowths and recurrences prove the necessity of a multidisciplinary approach: microsurgery, radiosurgery and endocrinological treatment. Total or partial removal depends on age, the tumoral volume and hypothalamic adherences. Actually the authors advocate for partial removal with adjuvant therapies. The quality of life is a very important factor in CPH surgery outcome. The adamantinomas type was very important in recurrences and regrowths of CPH. Also, the authors present a CPH scale which facilitates the perfect location, surgical approach and outcome in this kind of tumor.

Keywords: Craniopharyngioma (CPH), MRI, children, adamantinoma, CPH Scale, recurrences, regrowth, Gamma Knife Surgery (GKS).

SURGICAL TREATMENT OF TRIGEMINAL NEURALGIA

I. Otarashvili, G. Ingorokva, G. Magalashvili, E. Maghalashvili

High-technology Medical Center, University Clinic, Tbilisi, Georgia

Introduction: Trigeminal neuralgia is the pathology which characterized by paroxysmal homolateral facial pain. Patients often describe this pain as "the most severe pain that human can suffer". It is considered proved, that a principal cause of trigeminal neuralgia is vascular compression of a trigeminal nerve directly near brainstem. The basic pathogenetic method of trigeminal neuralgia treatment is vascular decompression of trigeminal root, which allows to eliminate the cause of disease and to reach full recovery.

Research objective. A substantiation of indications for vascular decompression and estimations of its efficiency at TN.

Material and Methods: 44 patients with trigeminal neuralgia were operated in high technology medical center university clinic in the period from 2008 till 2011. Among which women rate was 27(61%) patients, men 17 (39%). Mean age was 51 years. Right sided pain syndrome was in 31 patients, left sided - 13. MRI data with signs of neurovascular conflict was observed in 91% of cases. Diagnosis of TN was definite when the patient had 4 of 5 criteria that were proposes by International Pain Society in 1994.

Results: Regression of pain syndrome in the nearest postoperative period was achieved in all patients. Recurrence of pain syndrome within one year after surgery had two patients. Two patients underwent additional surgery - readjustment of the displaced pad. There was no mortality in our study, and the overall complication rate in the late postoperative period was less than 1,5%.

Conclusion: Vascular decompression of the trigeminal nerve is the most effective pathognomonic method of treatment of the trigeminal neuralgia.

Keywords: Neuralgia, trigeminal nerve, vascular decompression.

PAIN PREDICTORS AND DEVELOPMENT OPTIONS AT TRAUMA OF NERVES OF EXTREMITIES

V. I. Tsymbalyuk, S. N. Nelepin, A. N. Nikiforova, N. A. Sapon, G. E. Chitaeva

Institute of Neurosurgery named after acad. A. P. Romodanov of NAMS of Ukraine, Kiev, Ukraine

Aims and Object of the Research: 1. To identify options of pain development at trauma of nerves of extremities. 2. To identify predictors of neuropathic pain at traumatic neuropathy.

Methods Used: 165 patients with traumatic injury of nerves of extremities were inspected: 55 with neuropathic pain syndrome (PS), 55 with nerve injury, accompanied by pain that differed from neuropathic PS, 55 without pain.

Results: We selected 55 persons with pain that appeared after influence on damaged nerve region (neuroma, compression zone). Pain intensity in most cases reached higher marks on Pain VAS and had significant negative influence on patients.

These features let us distinguish this PS as contact or properly neurogenic with following peculiarities. Neurogenic pain develops after pathological influence on nervous system without segmental and suprasegmental structures sensitization forming. After pathogenic factor removing PS was eliminated. Neuropathic pain develops after pathological influence on nervous system with segmental and suprasegmental structures sensitization forming. After pathogenic factor removing PS transformed, but didn't reduce completely. To remove neuropathic PS the essential influence on segmental and suprasegmental structures (neuromodulation, pharmacotherapy) is needed.

On posttraumatic neuropathic PS development influenced significantly: time, passed after injury to surgery, patient's sex and age. Combined or isolated, open or closed trauma, topography of damaged nerves and previous treatment had no significant influence on neuropathic PS development.

Conclusions: 1. According to obtained data we propose to differentiate neurogenic and neuropathic PS. 2. Neurogenic and neuropathic PS need different treatment tactics. 3. In aged persons, women, cases of postponed surgery additional pharmacotherapy in pre- and postoperative periods is needed for prevention of neuropathic PS development.

FOCAL CORTICAL DYSPLASIAS AND DRUG-RESISTANT EPILEPSIES – PRESURGICAL AND SURGICAL STRATEGIES

K. Minkin[1], P. Dimova[2], E. Naydenov[1], A. Bussarsky[1], K. Gabrovsky[1], M. Penkov[3], S. Nachev[4], M. Marinov[1], V. Bojinova[2], V. Bussarsky[1]

[1]Department of Neurosurgery, University Hospital "Saint Ivan Rilski", Sofia, Bulgaria
[2]Department of Pediatric Neurology, University Hospital "Saint Naum", Sofia, Bulgaria
[3]Department of Radiology, University Hospital "Saint Ivan Rilski", Sofia, Bulgaria
[4]Department of Neuropathology, University Hospital "Saint Ivan Rilski", Sofia, Bulgaria

Introduction: The focal cortical dysplasias (FCD) are a main cause of drug-resistant epilepsies. The definition of the epileptogenic zone in patients with drug-resistant epilepsy due to FCD remains an area of discussion and different presurgical methods are used: magnetic resonance imaging (MRI), video-electro-encephalography, positron emission tomography, single photon emission computed tomography, MRI-spectroscopy, etc. Our limited resources during the first 5 years of the epilepsy surgery program of University Hospital "Saint Ivan Rislki", Sofia have defined a simplistic presurgical approach to this problem - video-EEG and MRI 1.5 T. The aim of this study was to investigate the success rate of epilepsy surgery for FCD using MRI and video-EEG as the only preoperative tools to define the epileptogenic zone.
Material and Methods: Eight patients with drug-resistant epilepsy and focal cortical dysplasias were operated on during a 5 year period from January 2006 to December 2010. The mean age at surgery was 10 years (4-17 years) and the mean epilepsy onset was 5 years (9 months - 16 years). The presurgical work-up have included preoperative MRI and seizures registration with video-EEG in all patients. All patients have MRI-positive cortical dysplasia affecting the temporal (2 patients), frontal (5) or both temporal and frontal lobes (1).
Results: Complete seizure control (Engel class I) was achieved in 5 patients, significant improvement (Engel class II) was observed in 2 patients and one patient has mild improvement (Engel lass III). All 5 patients with complete seizure control have total FCD resection and all 3 patients with partial resection has suboptimal seizure control. No complications were observed in this series.
Conclusions: Patients with drug-resistant epilepsy and MRI-positive cortical dysplasia corresponding on the seizure semiology and video-EEG recordings seem to have a favorable prognostic after total FCD resection. The need of numerous non-invasive and invasive preoperative methods in this cases remains controversial.

THE PAROXYSMAL ACTIVITY IN CHILDREN WITH CEREBELLAR TUMORS

A. I. Litovcenco, V. N. Lacusta

Institute of Physiology and Sanocreatology, Academy of Sciences of the Republic of Moldova

The aim of the research - to study features of clinical manifestations and EEG indicators of paroxysmal brain activity in children with tumors of the cerebellum.
Was studied 36 children with tumors of the cerebellum (25 children with lesions of the hemispheres of the cerebellum and 11 children with lesions of the vermis) at the age of 5 to 14 years.
The paroxysmal activity was detected in 9 children, representing 25% of the total number of patients (2 children with the localization of the tumor in the vermis and 7 children with lesions of the cerebellar hemispheres: 4 cases with localization in the left hemisphere, and 3 - in the right). Thus, the frequency of manifestations of paroxysmal activity was significantly higher ($p<0.01$) for hemispheric tumor localization.
Analysis of paroxysmal activity index (Ip,%) revealed the following: Ip with the affectation of the hemispheres of the cerebellum was equal to 8,7±1,33%, with lesions of the cerebellar vermis - 2,29±2,11%, the duration of paroxysmal activity in children with lesions hemispheres of the cerebellum was significantly longer ($p<0.03$) compared with lesions of the vermis.
In the analysis of the intensity of paroxysmal activity (Io,%) identified the following features: Io at the tumor in the cerebellar hemisphere was 76,3±4,7%, with the affectation of the vermis - 52,5±8,6%, that is, the intensity of the paroxysmal activity was above ($p<0.05$) in children with lesions of the hemispheres of the cerebellum.
In all the cases, febrile convulsions were not accused in anamnesis.
Conclusions: 1) Changing the level of paroxysmal activity in tumor localization in different structures

of the cerebellum is associated with activation/ depression, proconvulsive/anticonvulsant brain systems. 2) In each case, the localization and tumor volume may create a individual mosaic of relationships between anticonvulsant and pro-convulsive activity.

COMPLEX INVESTIGATION OF ANGIOGENESIS IN GLIOBLASTOMA MULTIFORME STEM CELLS

I. S. Florian[1,2], O. Soritau[3], C. Tomuleasa[1], D. Cernea[3], A. Cocis[2], C. Abrudan[1,3]

[1]University of Medicine and Pharmacy "Iuliu Hatieganu", Cluj-Napoca, Romania
[2]Cluj County Emergency Hospital, Department of Neurosurgery, Romania
[3]"Prof. Dr. Ion Chiricuta" Oncology Institute, Cluj Napoca, Romania

Objective: Angiogenesis is an important prognostic factor associated with tumor growth and progression. Starting from personal clinical observations in some cases of re-intervention for recurrence in patients treated with temozolomide (TMZ), regarding to the development of particular aspects of angiogenesis, specific tumor angiogenic characteristics were investigated, to identify the most suitable prognostic factor in generating multimodal therapy protocols.
Material and Methods: Fresh tumor biopsies were processed for obtaining established cell lines and for development of a three dimensional (3D) functional angiogenesis assay in fibrin-gel matrix supplemented with serum-free growth medium, in presence of TMZ and anti-angiogenic or pro-angiogenic factors (bevacizumab, sunitinib, VEGF, EGF and PDGF). Chemosensitivity for TMZ of isolated tumor cells was determined by MTT test. Genes implicated in angiogenesis were evaluated at mRNA level by real-time PCR in tumor tissue and peri-tumoral tissue as control: VEGF, PDGF, TNF-α, ICAMs, CTGF, EPCR. Microvascular density (MVD) was also determined using a protocol adapted after Weidner's method.
Results: In 14 established cell lines, tumor cells tested by MTT assay shown sensitivity for TMZ in 60% of cases. Spontaneous angiogenesis was observed in most of the tumor explants tested and the development and spreading of capillary structures were enhanced in presence of TMZ in 11 from 19 cases (57.8%). MVD values varied between 22-130, with a median value of 83.6. Enhanced angiogenic potential in 3D model was correlated in 4 cases with higher MDV results (MDV>90) (21%) and in 5 cases with an increased expression of pro-angiogenic genes (26%). Higher levels of VEGF and PDGF mRNA were observed in 47% of tumors.
Conclusions: A great individual variability was observed in tumor cells sensitivity to TMZ and in angiogenic potential of GM, suggesting that these processes are controlled by multiple factors, mainly by the presence of growth factors such as VEGF and PDGF, but in correlation with other variable local factors from the vascular niche. TMZ enhanced angiogenesis in some tumors, probably by selection of cancer stem cells. A complex evaluation of each tumor can indicate the best choice of further therapy.

MANAGEMENT OF LOW GRADE GLIOMAS: STATE OF THE ART

N. Foroglou, P. Selviaridis, I. Patsalas

AHEPA University Hospital, Aristotle University of Thessaloniki, Greece

Low grade gliomas (LGG) are a heterogeneous group of tumors that tend to occur primarily in young adults and children. They are indolent, progressive, and often undergo malignant transformation. A small subgroup are cured by surgery only but this is a credit mainly to the nature of the tumors with distinct boundary. More problematic are the largest group of fibrillary diffuse astrocytomas, oligodendrogliomas and mixed gliomas. The prognosis of these tumors is primarily affected by age and pathologic type. Many questions remain in the management of LGGs, including the role of surgical resection (degree of resection, techniques for function preservation), the optimal timing of radiation and the role of chemotherapy (salvage after radiotherapy, primary treatment after surgery, concurrent with radiotherapy). Further complicating management decisions are concerns about toxicity with any intervention because LGG patients can often lead a relatively normal existence for years with no intervention. In this paper the current state of the art in the management of LGG is analyzed based on recent literature published, and the impact on survival of different new therapeutic tools is discussed.

SURGICAL PLANNING FOR BRAIN TUMOR RESECTION WITH MULTIMODAL NEURONAVIGATION: REVIEW OF 250 CASES

V. D. Rozumenko, K. M. Gerasenko, V. N. Kluchka, M. N. Shevelyov, A. V. Rozumenko

Romodanov Institute of Neurosurgery, Kiev, Ukraine

Aim and Object of the Research: The aim of research is to refine the value and efficiency of surgical planning and multimodal image-guidance in defining the functional limits for brain tumor resection.

Methods Used: Total of 250 patients underwent preoperative CT, MRI, MRA, fMRI, DTI-FT, and SPECT studies. The multimodal neuroimaging data were incorporated into neuronavigation system (StealthStation TREON Plus, Medtronic, USA). The superposition of neuroimaging data allowed obtaining overplayed images with precise anatomical and functional information. The preoperative planning was performed with a 3D volumetric reconstruction and subsequent segmentation of the cerebral hemispheres, cortical veins, tumor, adjacent eloquent cortical areas, and subcortical tracts. The bounds of safe surgical approach and tumor resection limits were circumscribed in the generated 3D model.

Results: A gross total or nearly gross total tumor resection was achieved in 137 (54.8%) cases, subtotal resection was in 94 (37,6%), and partial in 19 (7,6%). Tumors were classified as gliomas in 189 (75,6%) patients (WHO Grade II in 43 cases; WHO Grade III in 70 cases; WHO Grade IV in 76 cases), meningiomas in 31 (12,4%) patients, and metastasis were in 30 (12,0%) patients. Mean KPS scores improved after surgery from 68,6 to 87,3. The technique of multimodal surgical planning reveals the relationship between tumor and surrounding eloquent structures. On the stage of surgical planning all subsequent surgical procedures might be simulated in 3D space for the selection of optimal approach to the tumor and evaluating the feasible extent of cytoreduction. Using of multimodal neuronavigation provides assistance in intraoperative intracranial orientation and helps to avoid destruction of critical structures during intervention.

Conclusions: The advances in brain mapping techniques, surgical planning, and neuronavigation for surgical procedures allow to maximize the resection of tumor tissue and to avoid postoperative neurological disorders.

GLIOMAS GRADE II – INTRAOPERATIVE MAPPING AND MONITORING TECHNIQUES FOR OPTIMAL EXTENT OF RESECTION

K. Minkin[1], K. Gabrovsky[1], R. Tanova[1], E. Naydenov[1], A. Bussarsky[1], M. Penkov[2], S. Nachev[3], M. Marinov[1], V. Bussarsky[1]

[1]Department of Neurosurgery, University Hospital "Saint Ivan Rilski", Sofia, Bulgaria
[2]Department of Radiology, University Hospital "Saint Ivan Rilski", Sofia, Bulgaria
[3]Department of Neuropathology, University Hospital "Saint Ivan Rilski", Sofia, Bulgaria

Background: The extensive resection of gliomas grade II (GGII) represents a powerful positive prognostic factor regarding progression free survival and overall survival rates. GGII are frequently in contact or involve eloquent brain areas. The focus of this presentation is on the benefits from intraoperative mapping and monitoring techniques.

Material and Methods: Our study included 27 patients with GGII operated on using asleep-awake-asleep technique from January 2009 to August 2011. Mapping techniques have included direct electrical stimulation, phase reversal somatosensory potentials and corticotopography. Monitoring methods have consisted in motor evoked potentials, somatosensory evoked potentials and continuous conversation with the patient.

Results: The mean extent of resection of this series of patients with GGII was 85% and the mean residual volume - 5 ml. Transient postoperative paresis and speech difficulties were observed in 7 patients (26%). There were no permanent neurological deficits regarding motor and language functions. However, mild to moderate cognitive deficits concerning memory, praxis and execution were found pre-operatively and postoperatively in most of the patients.

Conclusions: Intraoperative mapping and monitoring techniques allow more aggressive GGII resection minimizing the risks of postoperative deficits. The extension of intraoperative tests during the awake phase could reduce some cognitive postoperative impairment.

INTEGRATION OF FMRI AND DTI INTO AN INTRAOPERATIVE 3-DIMENSIONAL ULTRASOUND-BASED NEURONAVIGATIONAL SYSTEM – TECHNICAL NOTE

P. Selviaridis[1], N. Foroglou[1], A. Chatzisotiriou[2], E. Tsatsali[3], D. Paraskevopoulos[1], I. Patsalas[1], K. Polyzoidis[1]

[1]Department of Neurosurgery, AHEPA University Hospital, Aristotle University of Thessaloniki, Greece
[2]Department of Neurosurgery, Agios Loukas Clinic, Thessaloniki, Greece
[3]MRI Department, Asklepios Diagnostic Centre, Thessaloniki, Greece

Aim and Object of the Research: In this study we present our technique of incorporating the fMRI and DTI images into an ultrasound-based neuronavigation system. The aim of this technique is to achieve the maximal and safest resection of lesions in eloquent areas.
Methods Used: A 3D Gradient Echo T1 sequence was initially performed in a 1.5T scanner. Functional MRI was obtained by using different motor- and language paradigms in order to activate and identify the primary motor cortex, the main language cortices, as well as the visual cortex. Post-processing of fMRI images was performed with the SPM software (Wellcome Department of Imaging Neuroscience, UCL). The DTI comprised a spin-echo EPI sequence utilizing 6 spatially independent gradient directions (Syngo DTI, Siemens). Images were fused and imported into the ultrasound-based neuronavigation system Sonowand. Registration was done with a fiducial-based point technique. After a tailored craniotomy, 3D data set from the ultrasound were reconstructed into a regular 3D volume and co-registered with the structural and functional data. Serial ultrasound scan was used to ensure the maximum possible resection.
Results: By using this technique, we operated on 11 patients harboring brain tumours in eloquent areas. There were 4 glioblastomas, 2 metastases, 1 oligodendroglioma and 4 astrocytomas. The implementation was feasible in all of them. In all cases the corticotomy and the access to the tumor was performed by avoiding the eloquent cortex and the major tracts. We achieved 7 gross total resections and 3 subtotal resections. Neurological deterioration was observed in 2 patients (1 permanent, 1 temporary).
Conclusions: Fusion of fMRI and DTI with intraoperative 3D ultrasound provided optimal access and safe resections to eloquent areas. The technical difficulties arise from the multiple sources of errors. Despite the helpfulness of repeated 3D-ultrasound images, brain shift remains a challenging problem.

FUNCTIONAL NEURONAVIGATION, INTRAOPERATIVE MRI AND ULTRASOUND IN LOW GRADE GLIOMAS

V. Gerganov, A. Samii, M. Samii, R. Fahlbusch

International Neuroscience Institute, Hannover, Germany

Mounting evidence in the literature highlight the predictive value of extent of resection in low grade gliomas (LGG) in terms of overall survival benefit, progression-free survival and reducing transformation rates. The quest to radicalism, however, should be tempered by the potential for functional loss following a radical resection. The preoperative and intra-operative visualization of eloquent cortical and subcortical structures is a prerequisite for their preservation. Neuronavigation is the platform for integration of data from various imaging modalities and for their intraoperative use. Intraoperative imaging technologies allow for immediate control of the extent of resection and update of the functional and anatomical dataset.
Material and Methods: We evaluated the general and functional outcome of LGG resection in an operating room, equipped with high-field MRI and MRI-compatible integrated functional navigation system (the INI-Brain Suite). A special focus was laid on the radicality of tumor removal and on neurological outcome.
Results: From the 594 patients operated since 2007 323 had gliomas. Seventy-one of them had LGG. Complete tumor removal could be achieved in 32/71 (42%) of the patients. Actual benefit from the intraoperative MR imaging had 38% of them, in whom complete removal was achieved only after MR demonstration of tumor residual that was not suspected by the surgeon. 9/10 tumor remnants could be demonstrated with the ultrasound. After surgery unchanged neurologically were 93%, temporary worsening was observed in 5,6% and permanent deficit had 1,4% of all patients.
Conclusion: Functional navigation guidance in an intraoperative MRI setting allows for achieving of high rate of radical LGG resection with minimal

neurological morbidity and obviates the need of awake or repeated surgeries.

RECONSTRUCTIVE SURGERY FOR CAROTID STENOTIC LESIONS

D. Usachev, V. Lukshin, A. Shmigelsky,
A. Belyaev, A. Sosnin, A. Ahmedov

Aim: To study surgical risk factors of carotid endarterectomy and ways of their prevention.
Methods: 689 carotid reconstruction were performed in 480 patients with symptoms of chronic cerebral ischemia, aged from 5 to 89 years. Diagnostic algorithm included clinical, neurosonological (duplex scanning, blood flow measurement, TCD, auto-regulatory tests), EEG, radiological methods (cerebral angiography, MRI, Spiral CT with perfusion and angiography modes) before and after surgery. For more objective clinical examination we used NIH Stroke Scale.
During carotid reconstructions we used multimodality neuromonitoring techniques (TCD, EEG and cerebral oximetry) and neurological testing (by regional anesthesia).
Results: All patients were distributed among 4 groups: with somatic, ischemic, hyperperfusion risk factors, and patients with bicarotid staged CEAs. Risk factors and complication rates in each group were studied with and without prevention methods. According to revealed risk factors different prevention methods were used: loco-regional anesthesia, brain protection methods, selection of more adequate reconstruction variant (eversion or linear CEA). Loco-regional anesthesia was used in 21 cases. Results of multimodal neuromonitoring and direct neurological assessment were compared. The rate of specific complications was 3,8%, mortality – 0,3%.
Conclusions: Surgical treatment of patients with stenotic carotid lesions is efficient and lead to reliable hemodynamic and neurological improvement. Surgical risk stratification and use of risk prevention methods lead to decrease of specific complication rate of carotid reconstructions. Loco-regional anesthesia is preferred method for "high risk" patients.
Keywords: Carotid stenosis, deformation, kinking, reconstructive surgery, carotid endarterectomy.

INTRACRANIAL HEMORRHAGE, ANEURYSM OCCLUSION, DIFFUSE ANGIOSPASM – AS A CAUSE OF FATAL OUTCOMES – WAYS FOR RESOLVING THIS PROBLEM.

D. Gunia MD, G. Ingorokva, MD, PhD,
E. Ekvtimishvili, MD

High-technology Medical Center, University Clinic, Tbilisi, Georgia

Background: The low level of intrasurgery complications in patients with aneurysms, who are operated by endovascular method – doesn't activate any apprehension at present time. It is established that the main case, which set to fatal outcomes and patient incapacity is an angiospasm. It is diagnosed in about 30-70% patients between 3 and 14 day after diseases manifestation. In spite of progress in surgical instruments and endovascular methods assigned for balloon angioplasty and different pharmacological vasodilators using, actually we often face the challenge when we don't get a success.
Material and Methods: From the 2008 till now 192 patients with aneurismal hemorrhage were hospitalized in our clinic in term between 1–10 days after aneurysm rapture. For occlusion aneurysm we used coils GDC "Boston Scientific" and surgical instruments from another firms: "Cordis", "Balt". In 163 (85%) patients the angiospasm was diagnosed, in 29 (15%) from them it was absent initially. For angiospasm prophylactic treatment we applied the balloon angioplasty and selective or superselective pharmacological infusion. In the most of cases the endovascular treatment was performed urgently, the single contraindication to surgery was the terminal patient condition.
Results: 128 (67 %) - made a full recovery, 32 (17 %) patients had a moderate neurological deficit, 17 (8 %) – were with severe incapacity, 15 (8 %) patients – with fatal outcome.8 (54%) from them died due to angiospasm after aneurysmal hemorrhage.
Summary: Endovascular treatment of patients with aneurysmal hemorrhage complicated by vasospasm, though on the difficulty or sometimes insolvability of this problem, is the most effective way of prophylactic and treatment.

SPONTANEOUS CEREBRAL VENOUS SINOUS THROMBOSIS. OUR EXPERIENCE IN THE LAST THREE YEARS

A. Panteli, A. Zisakis, E. Samaras,
A. M. Zampethanis, O. Karypidou,
G. Markogiannakis, T. Petrosyan, S. Lyra,
K. Bakopoulos, E. Archontakis,
F. Hatzigeorgiou, V. Varsos

Department of Neurosurgery. Red Cross Hospital. Athens, Greece

Introduction: Cerebral venous sinous thrombosis is a rare neuropathological condition, which appears with a prevalence of 3-4 cases in one million population per year.
Aim: This study aims to present our experience and to compare it with recent literature review.
Material and Methods: Four cases of cerebral venous sinous thrombosis treated in our department the last three years. In these four cases, 3 were females and 1 was male. All of the cases presented with headaches. In addition, two out of four had dysphasia and one had disorders of vision. All cases underwent computed tomography (CT), magnetic resonance (MRI) and magnetic resonance angiography (MRA).
Results: All the patients' imaging on admission showed an intraparenchymal haematoma, on CT, which was confirmed by MRI. The MRA revealed cerebral venous sinous thrombosis. The patients underwent anticoagulant treatment with low molecular weight heparin and further medication for the intraparenchymal haematoma. The patients were followed up by MRI-MRA in (1), (3) and (6) months. The follow up of the patients showed an important improvement of the clinical and neurological condition as well as improvement of the neuroimaging.
Conclusion: Cerebral venous sinous thrombosis is a very rare and peculiar neuropathological condition. Thus, it is a challenge for the neurosurgeon to diagnose and manage these cases, as soon as possible.

SUPRAORBITAL KEY-HOLE APPROACH FOR SACULAR ANEURYSMS OF ANTERIOR CEREBRAL CIRCULATION

G. Zapuhlih, V. Andronachi

Department of Neurosurgery, Institute of Neurology and Neurosurgery, Chişinau, Republic of Moldova

Background: The fundamental tendency to be as minimally invasive as possible and to achieve a maximum of efficacy in the treatment of patients has existed since the beginning of surgery. In treating intracranial aneurysms the most widely used approach is pterional or frontotemporal approach described by Yasargil. The increasing knowledge of microsurgical anatomy, improved preoperative diagnostic technique, and well-adapted microsurgical instruments have led to the development of minimally invasive approches. The supraorbital keyhole approach via an eyebrow incision is one of these minimally invasive procedures. Since it was first described by Perneczky it has raised debates on its advantages and disadvantages. The autors present their experience in using the supraorbital keyhole approach in treating intracranial aneurysms.
Methods: A prospective review of all patients who underwent operations for aneurysm clipping in Institute of Neurology and Neurosurgery between January 2000 and December 2010.
Results: In our institution, we have been using the supraorbital keyhole approach for more than 10 years. During a 10-year period (between January 2000 and Dec 2010) there were 254 patients suffering from supratentorial aneurysms. In this report, we will describe the results of supraorbital keyhole craniotomy through an eyebrow skin incision in 53 patiens with 54 aneurysms that were successfully clipped. In 5 cases premature intraoperative rupture of the aneurysms occurred, but these events were managed successfully. Despite the small size of the craniotomy the approach allows enough room for intracranial manipulation with maximal protection of the brain and other intracranial structures. Four patients died after complications of cerebral vasospasm. Two patients had a significant long-term deficit but remained independent. There were no craniotomy-related complications in the present series.
Conclusion: The supraorbital keyhole approach offers equal surgical possibilities with less intraoperative accidental rupture and less approach-related morbidity as conventional approaches in the

treatment of supratentorial aneurysms. The supraorbital keyhole approach together with the advent of the modern neuroanaesthesia, CSF drainage, and microsurgical techniques is a safe approach for the treatment of supratentorial aneurysms.

Keywords: Supraorbital keyhole approach, aneurysm surgery, surgical technique, minimally invasive neurosurgery.

ENDOVASCULAR TREATMENT OF INTRACRANIAL AVM

E. Ekvtimishvili, MD, D. Gunia, MD,
G. Ingorokva, MD, PhD

High-technology Medical Center, University Clinic, Tbilisi, Georgia

Background: Endovascular treatment of AVM using Hystoacryl

Material and Methods: AVMs appear in 0.14 % of population and 64% from all cases are diagnosed till 40 age. Correlation between aneurysm is 1:5,3, mean age 33 y.

From the 2008 till now 28 patients with intracranial AVMs were hospitalized in our clinic, from them 11 (40%) patient with seazures, 16 (57%) with haemorrage, 1 patient (3%) – pseudotumorous type. Grading of AVMs (Martin-Spezler) G1 – 1 patient, G2 – 9, G3 – 7, G4 – 9, G5 – 2: In every case we used Hystoacryl.

Results: Every patient underwent control DSA after 6 and 12 month. Total occlusion were found in 8 patient, subtotal occlusion in 12 patient, 79-51% occlusion in 4 patient, <50% in 3 patient, couldn't perform occlusion in 1 patient, 2 (1.8 %) patients – with fatal outcome

Summary: Endovascular treatment of intracranial AVMs is effective and safe method which can be performed as single choise of treatment as well in combination with surgery and radiosurgery.

ENDOVASCULAR TREATMENT OF CAROTID-CAVERNOUS AND DURAL ARTERIOVENOUS FISTULAE

M. Lilov[1], T. Eftimov[2], I. Todorov[2],
I. Hadzhiangelov[2], I. Stoev[2], N. Neichev[3],
D. Zidarova[3]

[1]*Department of Image Diagnostics, Military Medical Academy – Sofia, Bulgaria*
[2]*Department of Neurosurgery, Military Medical Academy – Sofia, Bulgaria*
[3]*Department of Anesthesiology and Critical Care, Military Medical Academy – Sofia, Bulgaria*

Aim: To present the etiology, classification and up-to-date options for endovascular treatment of the carotid-cavernous and dural arteriovenous fistulae and to analyze in this respect the outcome of patients, treated in MMA-Sofia.

Material and Methods: A retrospective analysis of selected cases from the clinical practice was provided, along with a short literature review, so as to illustrate the current state of the diagnosis and the endovascular treatment of the intracranial aretriovenous fistulae.

Results: Both the endovascular coil-embolisation of the fistulae and the parent artery reconstruction using flow-diverter devices (SILK, BALT Int.) resulted in occlusion of the arteriovenous communication with no procedure-related complications.

Conclusions: The CT and the MRI provide valuable initial information, but they are not always sufficient about the diagnosis and the type of the carotid-cavernous and the dural arteriovenous fistulae. The Digital Subtraction Angiography (DSA) is a "golden standard" for diagnostics and subsequent endovascular treatment of these diseases. Because of its minimal invasiveness and low complication rates, the endovascular interventions are becoming a method of choice for the management of the intracranial arteriovenous fistulae.

Keywords: Intracranial arteriovenous fistula, carotid-cavernous fistula, endovascular treatment.

ENDOVASCULAR TREATMENT OF INTRACRANIAL MICROARTERIOVENOUS MALFORMATIONS

Andreou, I. Ioannidis, N. Nasis, S. Lafazanos

Diagnostic & Therapeutic Center of Athens HYGEIA Athens, Greece

Object: Microarteriovenous malformations (micro-AVMs) are an uncommon subgroup of brain AVMs

defined by a nidus measuring < 1 cm in diameter. The clinical features, angiographic characteristics, and outcomes in patients' micro-AVMs who had been treated endovascularly after presenting with hemorrhage were reviewed to identify common features affecting prognosis.

Methods: Between 1997 and 2010, 28 patients (12 females and 13 males) with 29 micro-AVMs were treated. Twenty-seven patients presented with intracerebral hematoma and 1 with subarachnoid hemorrhage only. All patients underwent CT on admission, diagnostic cerebral angiography, and 1 session of endovascular treatment during the acute phase.

Results: Procedure-related complications occurred in 3 patients, which caused temporary hemiparesis in 1 and no clinical sequelae in 2 patients. Complete nidus obliteration was achieved at the end of the embolization in 26 of 28 lesions. Two recurrences were evident on follow-up angiography 6 months postembolization, resulting in a complete obliteration rate of 96,5 % (26 of 28 lesions) after a single treatment. Late angiography was performed in 18 patients, and no further recurrences were identified.

Conclusions: Immediate complete obliteration of a micro-AVM with a high permanent cure and low morbidity rates was accomplished using endovascular treatment. Early embolization after bleeding should be considered as an alternative to resection.

SPATIAL RELATIONS OF INTRACRANIAL ANEURISMS TO THE ARTERIAL VESSEL AS DETERMINING FACTOR FOR RUPTURE POTENTIAL IN PATIENTS WITH MULTIPLE INTRACRANIAL ANEURYSMS (PRELIMINARY STUDY)

V. Georgieva, E. Krastev, M. Milev, Malinov

Department of Neurosurgery,
UMHATEM "N. I. Pirogov", Sofia, Bulgaria

The authors present their observations on a surgical series of 68 patients with multiple intracranial aneurysms with a total number of 173 aneurysms. Given the growing number of incidentally discovered unruptured aneurysms it is suggested that algorythms should be developed for the evaluation of their rupture potential. In the present investigation a retrospective analysis of the clinical history and the imaging studies (CT, DSA, CT angiography) of the patients was performed. Certain factors, reflecting the relations of the aneurysmal sac to the feeding artery, were found to be of predictive value for aneurysmal rupture. The hemodynamic phenomena inside the aneurysmal sac and in the adjacent vessel were discussed. The analysis of the described spatial relations of the structures could be of benefit in the process of selection of therapeutic options.

SURGICAL MANAGEMENT OF CRANIOPHARYNGEOMAS

M. Samii

International Neuroscience Institute, Hannover, Germany

Craniopharyngiomas are locally aggressive tumors constituting about 2.5-4% of all brain tumors. Complete tumor removal is the optimal management but may be difficult to achieve without high morbidity rates. Surgery of giant or extensive craniopharyngiomas, defined as tumors larger than 4 cm with extension into multiple compartments other than the chiasmatic cistern, is reported to be associated with higher mortality and postoperative morbidity rates, decreased extent of resection and higher rates of tumor recurrence.

From the 65 patients with craniopharyngiomas, operated at the International Neurosecience Institute in Hannover, 21 had such giant or extensive craniopharyngioma. All were operated via the frontolateral approach. We evaluated retrospectively the outcome of their surgical resection. The main outcome measures were possibility of radical resection, neurological, endocrinological and ophthalmological outcome and morbidity rates.

The resection was confirmed using intaoperative MRI in 13 patients and early postoperative MRI in the remaining cases. Gross total resection was achieved in all but one patient with intense adhesion of the tumor tissue to the anterior cerebral arteries. With the frontolateral approach, all parts of the tumor were accessible. Eight patients reported improved visual status and one patient showed worsening in the visual condition after surgery (bitemporal hemianopsia). One patient had short-term memory loss that improved during the hospital stay, 2 patients had transient psychoorganic syndrome and one had transient abducence nerve palsy.

The frontolateral approach is a simple technique that allows safe and radical removal even of extensive craniopharyngeomas, extending in multiple cisterns.

NEUROSURGICAL MANAGMENT OF CRANIOPHARYNGIOMAS: ENDOCRINOLOGICAL RESULTS

R. Fahlbusch

Director Center of Endocrine Neurosurgery, International Neuroscience Institute (INI), Germany

Introduction: The optimal treatment strategy in craniopharyngiomas is still under debate: conservative symptomatic treatment versus extendet surgery. However, today complete tumor resection with acceptable morbidity can be obtained in 80–90% of the patients. This experience is based on a personal learning curve over the last 3 decades.

Patients and Methods: The author's operative series at Erlangen University in all craniopharyngiomas is related to 311 patients. We compare in this presentation a series of primary operations in 73 patients between 1997 and 2005 with a former series between 1983 and 1996 with 168 patients (1), 30% were children. All underwent carful endocrinological dynamic testing perioperatively, presenting before surgery pituitary insufficiency – minimum in one axis – in 77% of the cases, and ophthalmological deficits in 70%.

Open surgery was only performed if no hypothalalmic damage was present, otherwise symptomatic surgery was indicated. Transsphenoidal surgery was indicated in up to 40%, among the different transcranial approaches the frontolateral one is meanwhile dominating.

In the last 10 years neuronavigation and intraoperative MRI control improved the surgical outcome too.

Results: In the last series 8 out of 73 patients underwent merely stereotactic cyst puncture. Following transsphenoidal surgery in intra- and suprasellar (subdiafragmatic type) tumors a total removal could be obtained in 88,5%, in the larger supra- and retrosellar tumors in 88% and in intra- and suprasellar tumors (supradiafragmatic type) in 75%, following bitrontal translaminar and frontolateral approaches. There was no perioperative mortality, the rate of pure surgical complications was 11%. In the literature mortality rates are higher and resection rates lower. Meticulous control of water/electrolyte balance (cave hyponatremia!) in the early postoperative phase is mandatory.

In general endocrinological deficits increased postoperatively, improvements, such as in pituitary adenomas, are exceptional. As a result of increasing higher rate of total removal and lower recurrence rate (10-15%) the deficits increased mildly in the later series. They were lower after t'sphenoidal than after t'cranial surgery, although the pituitary stalk as origin of the tumor could be preserved in part in general. T'SPHENOIDAL: preop/postop DIAB.INSIP. 18-45%, ADREN. 38-58%, THYROID. 35-42%, GONADAL 57-57%. T'CRANIAL: 10-70%, ADR 20-78%, THYR 32-58%, GON 53-65%. GH deficiency was present in 90% of the cases. Careful follow-up with endocrinological and MRI examinations in nearly all patients demonstrated true recurrences in 10-15% within 10 years. In about 20% radiotherapy was necessary over the years to prevent further growth of residual tumors and of inoperabel true recurrences.

Conclusion: Open surgery with the goal of total tumor removal remains the treatment of choice in most patients, since the results of primary radiotherapy are worse in comparison. Previous stereotactic cyst aspiration can be indicated in special cases and might be necessary to improve the patient's condition before major surgery.

Consequent and regular endocrinological controls and adequate hormonal replacement are essential for quality of life.

Literature:

(1) R. Fahlbusch, J. Honegger, W. Paulus, W. Huk, M. Buchfelder Surgical treatment of craniopharyngiomas, experiences with 168 patients. J Neurosurg, 1999, 90:237-50.

J. Honegger, M. Buchfelder, R. Fahlbusch. Surgical treatment of craniopharyngiomas: endocrinological results. J Neurosurg, 1999, 90:251-57.

B. Hofmann, A. Höllig, C. Strauss, R. Buslei, M. Buchfelder, R. Fahlbusch. Results after treatment of craniopharygiomas: further experiences with 73 patients since 1997. J Neurosurgery, 2011, 115, No. 4.

ENDOSCOPIC ENDONASAL TRANSSPHENOIDAL SURGERY – EXPERIENCE WITH 2000 PATIENTS

P. Kalinin, D. Fomichev, M. Kutin, B. Kadashev, A. Shkarubo, S. Alekseev

Background: We started endoscopy after 30 years of classical transsphenoidal surgery with Girsh-like approach and more than 5000 cases.

Material and Methods: For the last 7 years we gained a great experience in treating over 2000 patients by endoscopic endonasal transsphenoidal approach. The majority of patients had pituitary

adenomas (PA) (85%). The other tumours were represented by craniopharyngiomas, chordomas, meningiomas, angiofibromas, cancers, arachnoid cysts etc.

Results: Use of endoscopic technique permitted us to considerably broaden indications for transsphenoidal surgery. In particular, this approach allowed removal of PA of a small-size sella, PA with secondary nodes as well as PA with a narrow neck between their superior and basal parts, and giant (>60mm) tumours (see examples below).

Conclusion: Introduction of endoscopic technologies into daily practice permitted to remove tumors which earlier could be hardly accessed by a transcranial approach: suprasellar craniopharyngiomas, meningiomas of planum sphenoidale and olfactory fossa, gliomas, tumours invading cavernous sinus and spreading into clivus. A modified method was used for a multilayer hermetic closure of major postoperative skull base defects and prevention of postoperative CSF leakage.

FRONTOLATERAL APPROACH TO SUPRASELLAR MENINGEOMAS: TECHNIQUE AND RESULTS

R. Fahlbusch, V. Gerganov

International Neuroscience Institute, Hannover, Germany

Among a variety of historically develop approaches with suprasellar meningeomas – the bifrontal, the unilateral subfrontal, the frontotemporal (pterional approach), even the endoscopic transsphenoidal approach, we favour meanwhile the frontolateral to suprasellar meningeomas, (2, 4).

Surgical Technique: The tumor matrix is coagulated and the contralateral optic nerve visualized. In large meningeomas an internal debulking is required. Tumor resection is continued and the optic chiasm, the contralateral optic nerve in carotid artery are identified. With sufficient internal decompression the tumor can be safely dissected from surrounding structures. The dissection should be performed in the arachnoid plane, thus leaving a protective layer of arachnoid over the optic nerve and chiasm, the anterior communicating artery complex and the pituitary stalk. Special attentions need to be paid to the arterial supply to the optic nerves and chiasm. Their inferior surface is supplied by two or three arteries which arise from the medial wall of the internal carotid artery. The pitiutary stalk is generally unilateraly and posteriorly displaced and may be explored behind a layer of arachnoid, it is never encased by the tumor. Opening of the optic canal was required in the majority of cases for futher tumor removal or exploration. The matrix is coagulated and the basal dura resected. In case of hyperostosis or bony tumor involvement, they have to be removed with a diamond drill. In case of extensive drilling and opening of this way this area is then covered with a pericranial flap with the fascia of the temporal muscle or with a galeal-periosteal flap, and sealed with fibrin glue.

In a series of 47 patients operated from 1983-2002 at the University of Erlangen- Nürnberg (1) and an additional series operated on between 2002-2006 (2) we could document complete resection in 98/100%, visual improvement in 80/85%, visual deterioration in 20-15%. There was no mortality rate and recurrences ocurred into 1,5, respectively 6,3%. These results could hardly be obtained in surgical series before 2000, but also not in larger series published since 2002, when other authors used different approaches. We recommend that for documentation of ophthalmological results the outcome scale of the German Ophthalmological Society should be used (3).

Literature:

(1) R. Fahlbusch, W. Schott. Pterional surgery of meningiomas of the tuberculum sellae and planum spenoidale: surgical results with special consideration of ophthalmological and endocrinological outcomes. J Neurosurg, 2002, 96:235-43.

(2) R. Fahlbusch, V. Gerganov. Suprasellar meningeomas. *Editors:* N. Pamir, P. Black, R. Fahlbusch, pp. 387-94. Meningiomas: A Comprehensive Text, Saunders Elsevier 2010.

(3) Deutsche Ophthalmologische Gesellschaft: Empfehlungen zur Beurteilung der Minderung der Erwerbsfähigkeit durch Schäden des Sehvermögens. Klin Mbl Augenheilk, 1982, 180:242-45.

(4) M. Nakamura, R. Roser, M. Stuck, P. Vorkapic, M. Samii. Tuberculum sellae meningiomas: clinical outcome considering different surgical approaches. Neurosurg, 2006; 59(5):1019-28.

INTRACRANIAL APPROACHES FOR LARGE SUPRASELLAR TUMORS – BACK TO THE CLASSICS

S. Florian, MD, PhD[1,2], B. Pintea, MD[1,2], Z. Andrasoni[2]

[1]*University of Medicine and Pharmacy, "Iuliu Hatieganu" Cluj-Napoca, Romania*
[2]*Cluj County Emergency Hospital, Department of Neurosurgery, Cluj-Napoca, Romania*

Background: The principles in the surgical management of sellar and suprasellar tumors are to relieve mass effect, normalize pituitary hyper-secretion, preserve or restore normal pituitary function, prevent tumor recurrence and to provide tissue for pathological and scientific study. Selection of the approach is based on the size, configuration and location of the tumor.
Objective: This review consists in a case series of patients with suprasellar tumors operated by transcranial approach in 1st Neurosurgical Department of County Emergency Hospital Cluj-Napoca between 01.01.2000-31.12.2010. This study targets to add some arguments in favor of classical intracranial approach which could be the treatment of choice for many of these tumors.
Patients and Methods: We present a retrospective study of a single centre single surgeon on 228 consecutive cases with large suprasellar tumors admitted and operated in our department between 01.01.2000–31.12.2010.
Results: All cases selected for this study had extrasellar extension, demonstrated on the pre-operative neuroimagistic studies. Like other reports on suprasellar tumors, the most common type of tumor in our study was pituitary adenoma, 118 of cases (52%), followed by tuberculum sellae and planum sphenoidale meningioma, 68 of cases (30%) and craniopharyngioma, 28 of cases (12%). Other tumors encountered in this region was low grade glioma, 7 of cases, immature teratoma 2 cases, 3 cases of germ -cell tumor and 2 cases of metastasis. The peak incidence was in the 5th decade. Sex ratio was 1, 28. The most common ophthalmic presentation was blurred vision, in 90% of cases. Headache, the second most common presentation was presented in 68% of cases. The mean duration of symptoms was 12, 7 months.
All our cases underwent surgery by transcranial approach, unilateral fronto-temporal in 152 of cases (67%), unilateral subfrontal in 47 of cases (21%), bifrontopterional in 12 cases (5, 5%), and bifrontal in 9 cases (4%), interhemispheric transcallosal in 5 cases (1, 5%) and frontoorbitozigomatic in 3 cases (1%).
Surgical related complications were transient visual alteration in 3 cases, local infection in 4 cases, intracerebral hematoma in 3 cases, arterial vasospasm in 2 cases, transient diabetes insipidus in the large majority of pituitary adenomas and cranio-pharingiomas. Only 4 cases of pituitary adenomas and 2 of craniopharingiomas recurred after subtotal resection, requiring re-intervention. Gross total resection of the tumor was achieved in 83% of cases. Mortality rate was 1, 5%.
Concussions: The classical fronto-temporal approach is enough for complete removal of large tumors in this region. There is no need for larger opening for multidirectional approach because that means multiple ways for brain injury. The key points are proper positioning, proper opening, brain relaxation and surgical experience.

LAMINA TERMINALIS APPROACH FOR THIRD VENTRICULAR LESIONS

I. Sbeih

Second Vice President (at large) WFNS. Consultant Neurosurgeon
Professor of Neurosurgery - Jordan University of Science & Technology

It is a well known fact that tumors in the region of the third ventricle are the most difficult to expose and remove. We should realize that true third ventricular lesions arise from within the walls and confines of the third ventricle. Extension of tumor from adjacent areas of 3rd ventricle should be excluded from this category; extension of a thalamic glioma into the third ventricle. Our series of third ventricular lesions includes 161 patients, who were operated upon via various approaches in the period between Jan 1990–Jan 2010, which includes 58 craniopharyngiomas, 52 colloid cysts, 14 gliomas, 7 optic nerve gliomas, 6 ependymomas, 5 rathke cysts, 5 germinomas, 4 histocytosis–X, 4 hamartomas, 3 choroid plexus papillomas, 2 epidermoid tumors, 1 histocytic sarcoma. We are presenting 102 patients with third ventricular lesions that were approached via lamina terminalis in the period 1990–2009 and this includes 55 craniopharyngiomas and 47 patients with other third ventricular lesions.
Lamina terminalis approach via frontobasal route is described. We use this approach extensively for excision of third ventricular lesions that are mainly within third ventricle, in both adults and pediatric

population. The technique is described in details and video clips of the procedure will be shown. Basically, lamina terminalis is accessed by many approaches: pteryonal, lateral subfrontal, etc., but we prefer to approach it via transbasal interhemispheric approach. We will give a close look at craniopharyngioma cases where Lamina terminalis approach was used in 55 cases. 31 patients had mixed solid and cystic lesion, 18 patients had solid and 6 patients had cystic lesions. 32 patients had size of tumors more than 4 cm in diameter.

Gross total resection was achieved in 43 out of 55 patients (76%) with recurrence in 6 cases (15%). There was one mortality in this group. Subtotal resection was achieved in 12 patients (22%) with recurrence in 10 patients (83%). We also encountered one mortality in this group who died of status epileptics 20 days following his surgery. Endocrinological worsening and obesity were among the main morbidity issues but both usually improve within 2-3 years from surgery. We also encountered worsening of vision in two patients and confusional state in 5 patients, among other complications. This approach has the advantages of allowing: radical excision of the lesion, neurovascular structures preservation, exposure of retroseller area, preservation of pituitary stalk and most importantly decreasing the misery associated with recurrence and its management, among other advantages. The factors that favor recurrence are large size of tumor, brain invasion, high Ki-67 index, adamantinoma histological type and incomplete surgical excision. We believe that incomplete resection is a virtual guarantee of recurrence. However this view should be taken on the background of risks of hypothalamic damage and other complication if total excision is pursued no matter what.

WHY SURGERY SHOULD BE PREFERRED IN THE TREATMENT OF SECRETING PITUITARY TUMORS

R. Fahlbusch

International Neuroscience Institute Hannover, Germany

There is no doubt that till today pituitary tumours causing life threatening situations have to be operated on acutely: large tumours with obstructive hydrocephalus, rarely with threatening amaurosis and with apoplexy, in a delayed urgency management.

Other indications based on ophthalmological and endocrinological symptoms lead to elective surgery in general.

Pituitary insufficiency, although improvable by decompressive tumour ablation, will always be treated medically. There was always evidence and hope that antibodies, acting on molecular level, will control “substances” stained, respectively secreted in/by pituitary adenoma cells.

Independent from the progress of antiproliferative medical treatment of hormonally active pituitary adenomas there are still indications for surgery:

In up to a quarter of prolactinomas surgery is indicated in the rare case of intolerance of medication, in non-responders, in mainly cystic tumours and if it is the female patient’s wish, harbouring a microadenoma preventing pregnancy.

In acromegaly more than half of the patients can be “normalized” by surgery.

In many countries all over the world the cheaper and quicker way to achieve a successful treatment of hormonally active pituitary adenomas, Cushing’s disease, non-functioning adenomas but also craniopharyngiomas and other more rare pituitary tumours are still the domain of surgery.

Selective adenomectomy with elimination of the hormonal excess and preservation of pituitary functions has been improved globally by the introduction of new surgical tools such as endoscopy, navigation and intraoperative MRI, but also by systematic individual training of younger neurosurgeons in highly specialized centers for pituitary surgery.

Since surgical limitations still exist in recurrent, rapidly growing adenomas which are mainly invasively developed, support is highly expected from additional medical treatment.

NEUROSURGICAL MANAGEMENT OF ACROMEGALY

R. Fahlbusch

International Neuroscience Institute Hannover, Germany

The aim of this study was to illustrate the present role of transsphenoidal surgery as primary therapy in GH-secreting adenomas, but also to compare the results concerning control of desease with previous series using older criteria of cure. We report on a consecutive series of 688 acromegalic patients treated over a time period of 19 years. During the authors time at Erlangen University. Biochemical

cure was defined as normalization of basal GH level, suppression of GH-levels to below 1ng/ml during an oral glucose load and normalization of IGF-1 levels. Of the 506 patients undergoing primary transsphenoidal surgery, a total of 57,3% postoperatively fulfilled the criteria used. The rate of biochemical cure correlated with the magnitude of the initial GH levels the tumor size and invasion. The overall complication rate was below 2%. Mortality in this series was 0,1% (1 of 688). During a follow-up period of 10,7 years only two recurrences (0,4%) occurred. However, in the patients treated by transcranial surgery and by repeat surgery the cure rate was found to be relatively low (5,2 and 21,3% respectively). These data suggest that surgery remains with very few exceptions the primary treatment of acromegaly for (i) a high cure rate, (ii) low morbidity, (iii) low recurrence rate and (iv) immediate decline of GH. Based on current criteria of cure, recurrences are uncommon. However, cure by surgery alone is improbable in patients harbouring extended, invasive tumors with high secretory activity, in whom further adjuvant treatment is mandatory.

Further progress was obtained in the last 100 patients: the overall cure rate improved from 57,3 to 66%, in microadenomas from 75 to 90%. Recently even some patient with invaded cavernous sinus could be “normalized”. How far besides experience the introduction of endoscopy, navigation and intraoperative MRI were influencial shall be discussed.

Literature:

P. Nomikos, M. Buchfelder, R. Fahlbusch. The outcome of sugery in 668 patients with acromegaly using current criteria of biochemical “cure”. Eur J Endocrin, 2005, 152:1-10.

PRIMARY CABERGOLINE TREATMENT OF LARGE AND GIANT PROLACTINOMAS

L. Astafieva, B. Kadashev

N. N. Burdenko Neurosurgical Institute, Moscow, Russia

Objective: Prospective study of cabergoline treatment effect in newly diagnosed patients with large and giant invasive prolactinomas.

Patients and Methods: The study group included 62 patients with large prolactinomas (tumors more 3,6 cm) and 29 patients with giant prolactinomas (tumors more than 6 cm); among them 17 are mainly cystic tumors. The treatment period was 3-48 month (median 12).

Serum prolactin level before treatment ranged between 12990 and 2210000 mU/l (median 198000; normal 30-545 mU/l). 60 men and 31 women aged 16-67 years (median 37) were treated with cabergoline of dose from 0.5 mg to 3,5 mg/week (mean 1,5 mg). 74 (81%) patients before treatment had visual impairment. 15 (16%) patients had epileptic syndrome.

Results: Tumors decreased in size in 78% patients. Decrease of prolactin occurred in all patients; however prolactin level was normalized only in 49% of cases during treatment. 58 (78%) patients had improved visual symptoms; other patients have shown no visual impairment. In 6 (6,6 %) patients cerebrospinal fluid (CSF) leakage occurred within 3-6 weeks after initiation of treatment. In 3 patients endoscopic endonasal surgery to repair the fistula was performed. In other patients the CSF leakage ceased with diuretic therapy and with temporarily decreases of cabergoline dosage. 4 (4,4%) patients had enlargement of the tumor due to intratumoral hemorrhage (3 cases) and growth of cabergoline-resistant tumor (1 case).

Conclusion: Cabergoline should be the first-line therapy for large and giant invasive prolactinomas. Use of cabergoline results in effective reduction of prolactin, improvement of visual defects and provides tumor shrinkage (including cystic prolactinomas). Patients with large and giant prolactinomas are at risk of CSF leakage (6,6%), enlargement of the tumor (4%) during primary treatment with cabergoline.

SCREENING FOR AIP MUTATIONS IN YOUNG PATIENTS WITH SPORADIC AND FAMILIAL PITUITARY MACROADENOMAS

M. Yaneva[1], A. Elenkova[1], A. Daly[2], M. Tichomirowa[2], V. Bours[2], G. Kirilov[1], I. Atanasova[1], R. Ivanova[1], M. Marinov[3], A. Beckers[2], S. Zacharieva[1]

[1]*Clinical Center of Endocrinology, Medical University, Sofia*
[2]*Department of Endocrinology, CHU de Liège, University of Liège, Belgium*
[3]*Clinic of Neurosurgery, St. I. Rilsky University Hospital, Medical University, Sofia*

The pathophysiological mechanisms of triggering the process of tumorigenesis in patients with

pituitary adenomas remain not clearly elucidated. A rising number of studies demonstrate the role of mutations in the AIP (aryl hydrocarbon receptor interacting protein) gene as predisposing factor for the development of pituitary adenoma in familial adenomas or less often in sporadic tumors.

Aim and Object of the Research: The aim of our study was to assess the prevalence of AIP mutations in young patients with pituitary macroadenomas and in patients with familial pituitary adenomas.

Methods Used: A total of 50 subjects – 46 patients (24 women, 22 men) and 4 relatives of a patient, carrier of AIP mutation, underwent genetic analysis. The mean age of diagnosis of the disease was 23,46. 20 patients had prolactinoma, 18 – somatotropinoma, 3 – somatolactotropinoma and 5 patients were with pituitary incidentaloma.

Results: The prevalence of AIP mutations in studied patients was 8,7 % (4/46). In the group of apparently sporadic pituitary adenomas the prevalence was estimated at 9,52 % (4/42). The following mutations were described: pArg56Cys ex2; p.Glu82fs ex2; p.Arg16His ex1; F269F. Four patients had familial isolated pituitary adenomas (FIPA) of heterogeneous type. All studied patients from FIPA families were negative for AIP mutations (0% prevalence of AIP mutation).

Conclusions: The present study demonstrates the relatively low prevalence of AIP mutations in young patients with sporadic macroadenomas and familial pituitary adenomas.

DATA BASE FOR SYSTEMATIC REGISTRATION OF PATIENTS WITH PITUITARY AND ADRENAL TUMORS

D. Tcharaktchiev[1], H. Dimitrov[2], S. Zacharieva[1], M. Marinov[1], S. Vandeva[1], V. Vasilev[1], M. Yaneva[1], A. Elenkova[1], E. Natchev[1], G. Kirilov[1], I. Atanasova[1], R. Ivanova[1]

[1]*Clinical Centre of Endocrinology and Gerontology, Medical University, Sofia*
[2]*Macrosoft Ltd.*

Aim and Object of the Research: The principal aim of the Data base for systematic registration of patients with pituitary and adrenal tumors is to give a possibility for analysis, control and evaluation of clinical status, laboratory results and therapeutic outcomes, and in this way to give a possibility to ameliorate the quality of care provided to these patients.

Methods Used: The methods include: modeling of register data base and processes using Unified Modeling Language; set up of Data base management systems (DBMS) using Structured Query Language; application of systems for generating and analysis of archetypes; combined use of unified terminologies – ICD 10, ICD 9 CM and ATC classification, Diagnosis-related groups (DRGs); mapping of clinical, surgical, laboratory, histological, image studies with genetic analyses and tests, in compliance with Directive 95/46/EC.

Results: The variables for control of patients' status were determined. A standardized system for registration of all necessary demographic, medico-administrative, clinical, and laboratory (incl. genetic) data, as well as imaging and therapy data for patients with endocrine tumors was build. The requirements for set up of comprehensive system for registration of important number of variables (882) were realized.

Conclusions: The set up and the exploitation of the system demonstrated the possibility of functioning of complex data bases for research purposes in University clinical centers. The use of the European standard for Electronic Health Record Communication EN/ISO EN13606 during the building of data base makes possible to assess the clinical significance of registered symptoms in the context of their examination.

DYSREGULATED GROWTH FACTORS AND CYTOKINES IN PITUITARY ADENOMAS?

I. Atanasova, R. Ivanova, A. Elenkova, E. Nachev, M. Yaneva, S. Vandeva, M. Marinov, S. Zacharieva

There is an intensive study on the pathogenesis of pituitary tumors concerning growth factors, receptors, cytokines, signal transduction and cell cycle regulation with a great dial of controversy.

The **aim** of our work was to estimate the predictive value of some markers of malignant potential in pituitary tumors.

Material and Methods: 50 patients with pituitary tumors (36 somatotropinomas, 7 prolactinomas, 5 corticotropinomas and 2 nonsecreting; mean age 43.16+/-11.4 /17-73 y, 19 males and 31 females), matched by sex and age with 42 controls (mean age 41.88+/- 10.96,19 males and 23 females). All patients underwent neurosurgery. Epidermal growth factor receptor (EGFR), IL-6, fibroblast growth factor (FGF19), transforming growth factor beta

(TGFß) in sera of patients and controls were done by ELISA. P53 and MIB1i were done by immunohistochemistry in all patients.
The **results** were analyzed by age, sex, type of tumor, hormonal secretion, tumor size, invasion, expansion, remission and surgical intervention. Results: EGFR was significantly higher in pituitary tumors at the expense of acromegaly compared with healthy persons /p=0.0001/ and in p53 negative subjects /p=0.016/. There was no significant correlation with invasion, expansion, recurrence and tumor size. IL-6 was significantly higher in nonrecurrent, non invasive and p53 negative tumors and negatively correlated with tumor size (r=-0.36). There were no correlations of FGF19 and TGFß with the tumor characteristics and the other studied parameters.
Conclusion: Recently there is an exciting data still under research that IL-6 underlies the slow proliferation rate and benign nature of pituitary tumors which is supported by our results. EGFR is elevated in acromegaly but further analyses are required for its potential as a marker of tumor aggression.

TRANSSPHENOIDAL PITUITARY SURGERY: MICROSCOPIC OR FULLY ENDOSCOPIC?

N. Rainov, V. Heidecke

Department of Neurosurgery, Klinikum Augsburg, D-86156 Augsburg, Germany

Objective: The most frequently used surgical approach to pituitary lesions is the transseptal transsphenoidal microscopic approach. The endonasal transsphenoidal fully endoscopic approach is however rapidly gaining popularity. We present our results with both techniques in comparison.
Methods: The outcome of 30 patients with all types of pituitary adenomas operated by the biportal transsphenoidal endoscopic approach was compared with the outcome of 30 patients who underwent surgery by the sublabial transseptal transsphenoidal microsurgical approach. All patients have been operated by the same experienced surgeons, who changed their standard surgical technique for pituitary adenoma from microsurgical to fully endoscopic.
Results: Compared to the standard microsurgical technique group, patients who underwent fully endoscopic pituitary surgery had a similar mean length of procedure and less nasal pain and discomfort. The incidence of intraoperative CSF leaks was significantly higher in the endoscopic group, however the number of patients who required surgical revision of a CSF fistula was not significantly different in both groups. The recurrence-free intervals in both groups are similar so far, however postoperative MRI scans demonstrate significantly more cases with radical tumor removal in the endoscopic surgery group.
Conclusions: Fully endoscopic pituitary surgery does not last longer and does not have more surgery-related complications than microscopic surgery. It results however in fewer nasal complications than microsurgery. The fully endoscopic view is incomparably more wide-angled compared with the microscopic view. It allows 360° intrasellar inspection with removal of residual tumor in areas not visible during microsurgery. In addition, endoscopy obviates the need for intraoperative fluoroscopic control of retractor and instrument positioning, since it works by direct visualization of anatomical landmarks. In our hands, the fully endoscopic endonasal transsphenoidal surgery has produced at least comparable if not better results than microsurgery for pituitary adenoma. We have prospectively adopted the fully endoscopic approach for all pituitary adenoma cases and would recommend this technique not just as an adjunct, but as a full replacement of pituitary microsurgery.

SURGICAL TREATMENT OF PITUITARY MACROADENOMAS BY TRANSNASAL AND SUPRAORBITAL APPROACHES

G. Zapuhlih

Department of Neurosurgery,
Institute of Neurology and Neurosurgery,
Chisinau, Republic of Moldova

Background: Pituitary adenomas are the most common tumors of the sellar region. They arise from epithelial pituitary cells and account for 10-15% of all intracranial tumors. Tumors exceeding 10 mm are defined as macroadenomas. Current surgical approach used for this lesion is transsphenoidal, but in some cases the tumor tissue is hard fibrotic by consistency and is difficult to remove by this method.
Objectives: We present our experience with surgical treatment of pituitary macroadenomas with transnazal combined with supraorbital approach.

Methods: We performed a retrospective review of a prospective database of patients treated surgically for pituitary macroadenoma in Department of Neurosurgery of Institute of Neurology and Neurosurgery.

Results: In a period of 5 years between 2005 and 2009, 67 patients were treated with pituitary macroadenoma and was performed 89 operations (age range, 28–67 years; mean age, 37.6 years), including 31 females (average follow-up,6.2 months). Rate male/female was 1,2:1. In all cases the diagnosis was confirmed by cerebral MRI with or without contrast and in 11 patients tumor invaded one or both cavernous sinuses. All patients was operated by transsphenoidal approach and the overall rate of surgical success was 68%, demonstrated by postoperative imaging and symptom resolution at follow-up. In 22 (32%) cases the gross-total resection was not possible due to hard fibrotic tissue of the adenoma. All this patients have been operated by suprarbital approach one month after first surgery to prevent CFS leaks. During the first surgical treatment, there were 12 intra- or postoperative complications, 8 intraoperative CSF leaks. The supraorbital surgery group had 3 intra- or postoperative complications. No CFS leaks was detected. Of the patients who had pre- and postoperative imaging studies, all the patients treated transcaranian had gross-total resection, and 17 (80%) of 22 patients reported complete symptom resolution at follow-up.

Conclusions: Transsphenoidal surgery is effective approach to remove pituitary adenoma, but due to different hard fibrotic consistency, the tumor have to be combined by transcranian one. Supraorbital approach allowed us to remove totally the tumor, confirmed by postoperative MRI. Second operation improve outcomes at follow-up. One month waiting for second surgery allow us prevent CFS leaks after operation.

INVASIVE PITUITARY ADENOMAS (PERSONAL EXPERIENCE)

I. Sbeih

Second Vice President (at large) WFNS. Consultant Neurosurgeon
Professor of Neurosurgery - Jordan University of Science & Technology

Pituitary adenomas are the third most common intracranial tumor after meningiomas and gliomas. Some adenomas are typical but others may be invasive, aggressive, premetastatic or carcinomatous. Invasive adenomas can infiltrate bone, dura, nasal sinuses, cranial nerves and venous sinuses. The goal of surgery in the invasive nonsecretory adenomas is gross total resection, followed by radiotherapy, radiosurgery or conservative follow up. In the inasive seretory group, surgery is followed by medical treatment, radiotherapy or radiosurgery.

We are presenting our experience with giant invasive pituitary adenoma in the period between 1985–2008. 56 patients were encountered: 33 males and 23 females. Age of patients ranged from 16-68 years with mean age of 36.7 years. Main presentation was visual failure and endocrinolgical manifestations.

36 patients were non secreting adenomas, 16 prolactin secreting, 2 ACTH and 2 GH secreting. 50 patients needed transcranial and 8 patients needed trannasal surgical excision. Indication of surgery in non-functioning adenoma was neurosurgical deterioration. In the secretory group indication was deterioration of neurological condition in spite of medical treatment. Transcranial surgery was needed where invasive adenoma extended to posterior, middle or anterior fossa. One preferred surgical approach by us is transbasal subfrontal, among other approaches. The aim of surgery was gross total resection whenever possible. Postoperative adjuvant therapy was needed for all patients: radiotherapy in 54 patients, Gamma radiosurgery in 12 patients and drug therapy in 12 patients. The dose in Gamma Knife varying between 14-22 gray. Follow up in our patients ranged from 20-54 months with mean follow up period of 58.2 months. Mortality in this series occurred in 2 patients: one patient died of meningitis after major CSF leak and one died of pulmonary embolism. No carcinomatous change was seen in any of our patients.

We believe that surgical cure is not possible for all invasive secretory and nonsecretory adenomas. Invasiveness is an issue decided by radiological, histological, and operative findings. Most invasive adenomas are giant ones.

PERCUTANEOUS SPINAL INTERVENTIONS IN PATIENTS WITH COMPRESSIVE VERTEBRAL BODY FRACTURES

P. Bošnjaković, S. Ristić, M. Mrvić

Institute of radiology Clinical center Niš, Serbia

Aim: To evaluate the possibilities of percutaneous treatment of compressive vertebral fractures (CVF) and to present the results of the own series.

Patients and Methods: In the period between June 2002 and December 2010, 146 patients with painful CVF were treated by percutaneous vertebroplasty (PVP). There were 108 female and 38 male patients with average 57.3 years of age. The predisposing factor for VBF was osteoporosis in 66, metastatic disease in 42, multiple myeloma in 26 and aggresive haemangioma in 12 patients. The intensity of pain was established using anlogue visual scale (VAS) ranging from 0 to 10. Average VAS score in our patient cohort was 7.8.

After proper preinterventional evaluation (un-efficient other therapies, imaging studies, laboratory analysis) the interventions were performed on outpatient basis. One gram of Ceftriaxon was given i.v. neuro-leptanalgesia was used as well as deep infiltration of the puncture sites with local anesthetic. Vertebral body was punctured under fluoroscopic control using mono or bipedicular approach (or alternative ones). Prepared PMMA was injected through the needle.

After the intervention the patients were kept for an hour at angiography suite and discharged from hospital. Controls were performed after 24 hours, 1, 6 and 12 months.

Results: All the procedures were technically successful. Forty eight patients were completely pain free after the procedure, significant pain reduction was achieved in 80 of them while in 18 there were no changes. Worsening of the symptoms was not recorded. At 1 and 6 months, average VAS scale dropped from 7.8 to 2.3.

There were no clinically manifest complications. Soft tissue leak was detected in 8% of the patients, epidural in 16%, venous in 8.9% and discal in 9.8% - all without any clinical manifestation.

Conclusion: PVP was established as safe and efficient procedure in the treatment of painful VBF with proper patient's selection. The indications for other types of intervention (kyphoplasty, stent supported kyphoplasty) should be very carefully considered.

COMBINATION OF INTERBODY FUSION AND DISC ARTHROPLASTY IN PATIENTS WITH MULTILEVEL DEGENERATIVE DISEASE OF THE CERVICAL SPINE

D. Ferdinandov, A. Bussarsky, L. Tatarchev, A. William, K. Ninov, N. Stoyanchev, N. Mirchev, V. Karakostov, M. Marinov, V. Bussarsky

Department of Neurosurgery, Medical University – Sofia, Sofia, Bulgaria
Clinic of Neurosurgery, Sv. Ivan Rilski University Hospital, Sofia, Bulgaria

Anterior cervical discectomy and fusion is considered to be reliable surgical procedure to treat cervical degenerative disc disease. On the other hand cervical disc arthroplasty is shown to be safe and at least as effective as arthrodesis in many trials but not without limitations.

Our aim was to determine the safety and efficacy of a single-stage procedure combining anterior cervical discectomy and fusion and disc arthroplasty in patients with symptomatic, multilevel degenerative disease of the cervical spine.

We report results on 20 patients surgically treated in the Clinic of Neurosurgery of Sv. Ivan Rilski University Hospital between February 2008 and July 2011. Only patients with symptomatic multilevel degeneration disease of the cervical spine, with predominant anterior myeloradicular compression and absence of severe alterations of sagittal alignment, have been subjected to the hybrid technique.

A total of 22 disc prostheses and 23 cages were implanted in two- and three-level procedures. One patient sustained surgical revision due to postoperative deterioration because of a persisting soft disc compression. Remaining patients have not complained of persisting or recurring symptoms. Device dislocations or other procedure related complications were not observed.

Up to date only few studies which include small group of patients address this hybrid conception of the management of cervical multilevel disc degeneration disease. Although larger series with longer follow-up are needed we find the proposed strategy of combing of arthroplasty and arthrodesis in a single surgical procedure safe, reliable and effective.

CERVICAL DISC ARTHROPLASTY IN PATIENTS WITH SPONDYLODISCOGENIC MYELOPATHY

D. Ferdinandov, G. Kounin, A. Hadjiyanev, K. Gabroski, R. Avramov, D. Slavkov, D. Genova, C. Ranguelov, A. Bussarsky,V. Karakostov, M. Marinov, V. Bussarsky

Department of Neurosurgery, Medical University – Sofia, Sofia, Bulgaria
Clinic of Neurosurgery, Sv. Ivan Rilski University Hospital, Sofia, Bulgaria

The safety and efficacy of cervical disc arthroplasty in patients with intractable to non-surgical treatment radiculopathy is shown in many studies. Although there have been case reports describing arthroplasty for the treatment of patients with myelopathy, there is a concern that motion preservation may lead to repeating spinal cord microtrauma and negatively affect the clinical results.

Our aim was to determine the safety and efficacy of cervical disc arthroplasty in patients with spondylodiscogenic myelopathy.

We report 10 patients presented with symptoms of cervical myelopathy. Surgical procedures were performed in the Clinic of Neurosurgery of Sv. Ivan Rilski University Hospital between February 2008 and July 2011. A total of 15 disc prostheses were implanted. The severity of myelopathy was assessed using Nurick classification system and Benzel's modified Japanese Orthopedic Association scale. All patients had improvement in their postoperative neurological status comparable to patients underwent interbody fusion. Complications were not observed.

We conclude that the cervical disc arthroplasty in selected patients is safe and effective as the current standard of care for the treatment of cervical myelopathy. Disc replacement after adequate anterior decompression also gives immediate stability at the level. In addition patients could have a benefit from segmental motion preservation and the rate of long-term complications of fusion surgery could be reduced.

QUALITY ASSURANCE OF MEDICAL CARE FOR PATIENTS WITH TRAUMATIC BRAIN INJURY IN UKRAINE

A. Huk

State Institution Institute of Neurosurgery named after A.P.Romodanov of the National Academy of Medical Science of Ukraine

Around 100,000 people sustain isolated TBI in Ukraine annually, including 11,5-13,5 thousand children aged under 15.

Objective: To identify ways to enhance the quality of medical care provided to patients with acute traumatic brain injury in Ukraine.

Material and Methods: Medical care delivery to 356 acute TBI patients in neurosurgical departments of Ukraine was accessed using a specially designed expert chart. A patient's pathway, timeliness and completeness of medical care were determined for patients with TBI of various severity at a pre-hospital and hospital stages in different type of hospitals, as well as compliance with medical care protocols adopted in Ukraine in 2006.

Results: The quality of medical care provided to TBI patients can be objectively assessed if unified assessment methods are available, including medical care quality indicators based on Donabedian's Triad Model: structure (resources) – process – outcome. To assess each of these three components appropriate protocols should be in place. Implementation of unified clinical protocols for TBI patients allowed reducing mortality by 29% (from 4,5% to 3,2%) over the last five years.

Conclusions: Quality assurance of medical care to acute TBI patients is possible if adequate resources are available, health providers are professionally competent and trained, state-of-the-art technologies are employed, and strict compliance with medical care protocols in line with the evidence-based medicine approach is ensured. A focused impact on the quality and effectiveness of medical care requires the implementation of key indicators, which would allow monitoring the quality of care and identifying problems in medical care delivery.

TRAUMATIC EPIDURAL HEMATOMA OF THE CLIVUS AS A RESULT OF OCCIPITAL CONDYLE FRACTURE AFTER A CAR ACCIDENT: CASE REPORT

R. Evangelos, S. Maria, P. Nikolaos, T. Spyridon, D. Georgios, R. Aristedis, M. Georgios, K. Epameinondas

Neurosurgical Department, General Hospital "Asclepieion" Voulas, Athens, Greece

Introduction: A 31-years old young man was transferred to the Emergency Department of our hospital after a car accident. His vitals were within normal range and there were no serious external injuries observed. The patient was complaining for severe headache and pain on the upper cervical spine on head move. Neurologic examination showed no compromise of cranial nerves or peripheral palsy. He was already on a hard neck collar (Miami-J type) so he was driven for further radiologic examinations.

Methods and Results: Initial assessment with x-rays of the skull and the cervical spine (c-spine) showed no obvious fracture of the bony structures. CT scan of the brain and the c-spine showed an occipital condyle fracture (OCF) classified as Type I (according to Anderson and Montesano classification) and a large epidural hematoma of the retroclival area extending from the tip of the odontoid to the level of the hypophysis. MRI examination revealed no serious ligamentous injury of the atlanto-occipital junction and identified the exact extent of the hematoma (45mm in vertical axis and 7,7mm maximal diameter in the middle of the clivus). There was no mass effect over the pons or the medulla.

Discussion: Traumatic epidural hematomas of the retroclival area are very rare in the adults, especially after occipital condule fracture. Our patient was treated conservatively with hard neck collar for 4 weeks and then with soft collar until the symptoms disappeared. Control MRI of the skull base after two months revealed a significant reduction of the collection in the retroclival area.

PETROCLIVAL MENINGIOMAS, PERSONAL EXPERIENCE

I. Sbeih

Second Vice President (at large) WFNS. Consultant Neurosurgeon.
Professor of Neurosurgery - Jordan University of Science & Technology

Introduction: Petroclival meningiomas are rare tumors constituting 5% of all intracranial meningioma. They arise from pia – archnoid around the junction of petrous apex and the clivus. They are difficult lesions to treat because of their location and neurovascular relationships.

Methods: I operated upon 61 cases of petroclival meningiomas in the period between 1990-2008. Seven patients were lost for follow up. We are presenting our experience with 54 cases that we operated upon and were followed up for a period ranging from 13-176 months (average of 61 months). There were 36 females with an average age of 48 years, and 18 males with an average age of 37 years. None of our patients had previous surgeries for their meningiomas.

Results: The main presenting manifestations were cranial nerve involvement and related deficits: ocuolomotor nerve in 8 patients, trochlear nerve in 4 patients, abducent nerve in 16 patients, trigeminal nerve in 10 patients, facial nerve involvement in 8 patients, vestibulocochlear nerve in 5 patients, and lower cranial nerves involvement in 4 patients. Other presentations included ataxia, hemiparesis, quadriparesis and features of raised intracranial pressure. Radiological diagnosis rested on the use of brain MRI, MRA, MRV and thin slice C-T scan of petrous bone and clivus. Bony invasion was seen in 4 patients. Surgical approaches utilized were retrosegmoid in 40 patients, petrosal approaches in 9 patients and combined approaches in 5 patients. We achieved gross total resection in 38 patients and subtotal resection in 16 patients.

Recurrence occurred in all 13 patients who had subtotal resection, and in 7 patients who had gross total resection. After a period of observation, Gamma radiosurgery was used in 11 patients, using 12-15 gray to the 50% isodose. Tumor control was achieved in 9 patients. Surgical results were: poor outcome in 4 patients, fair outcome in 10 patients and good outcome in 40 patients. Complications included new carinal nerve deficits in 15 patients (mostly abducent nereve). Other complications included ataxia, pyramidal weakness, CSF fistula and hydrocephalus. Mortality occurred in 2 patients.

Histological studies showed endotheliomatous meningioma in 39 patients, fibromatous meningioma in 6 patients and mixed type in 9 patients.

Conclusion: Petroclival meningiomas are formidable lesions to treat. Factors influencing surgical outcome include neurovascular relationship, bony invasion, multiple intracranial compartment involvement, among other factors. Every effort should be done to achieve gross radical excision. However this is not possible in some cases. For such residual tumors, Gamma radiosergurey should be used, after a period of observation.

MANAGEMENT OF PATIENTS WITH CRANIOFACIAL TUMORS IN UKRAINE

A. Huk[1], O. Palamar[2], M. Polishchuk[3]

[1]State institution Institute of otolaryngology named after O. S. Kolomiychenko of the National Academy of Medical Sciences of Ukraine"
[2]Neurosurgery center of the Kyiv oblast clinical hospital
[3]Neurosurgery department of the National medical academy of postgraduate education named after P. L. Shchupyk

Craniofacial tumors (CFT) are the skull base tumors that simultaneously spread in intra-extracranial directions affecting si tissues \no-paranasal sinuses, of the face, orbit, nasal pharynx and oral pharynx, upper and lower jaw bones, middle and outer ear structures on one side and invading the brain on the other side. The distinctive characteristic of CFTs is their rapid spread (in case of malignancies) onto the skull base along the mucous membrane, natural orifices, and along intensively vascularized tissues (falx).

Material and Methods: Between 2002 and 2010, 149 patients with CFTs were underwent surgery (121 with malignant tumors), with the following principle used – two single-stage approaches (cranial and facial), which required a single-stage gradual intervention by two teams of surgeons i.e. neurosurgical and otolaryngologic, and enabled radical surgery – frontal (74 operations) and lateral craniofacial resection (47).

Results: A 3-year survival rate was achieved in 63% of the patients, 5-year survival rate in 30% of the patients, postoperative lethality is absent, complications occurred in 18% of the patients.

Conclusions: The intracerebral spread of the tumor is an adverse predictor, unlike its epidural spread and coalescence with the dura mater; the ingrowth of the tumor into the periorbit decreases a 3-year survival rate among patients; the exenteration of the orbit does not affect the 3-year survival rate; a 5-year survival rate is higher in patients with a shorter medical history.

ATYPICAL BRAIN MENINGIOMAS. A 15 YEARS EXPERIENCE OF OUR DEPARTMENT

A. K. Zisakis, K. Panteli, O. Karypidou, A. Zampethanis, G. Markogiannakis, T. Petrosyan, K. Bakopoulos, S. Lyra, F. Hatzigeorgiou, V. Varsos

Department of Neurosurgery, Red Cross Hospital, Athens, Greece.

Introduction: Meningiomas are benign tumours and consist almost 25% of all primary brain tumours. They are most common in adults with an annual incidence 6 in 100.000 individuals. A sex ratio is females/males (3/2).

Atypical and anaplastic meningiomas represent a small subgroup with histologic and clinical features suggesting aggressive behavior.

Material and Methods: Over the past 15 years we operated on 37 mengiomas with atypias. Twenty (20) were males and seventeen (17) were females. Regarding the location 65% situated over the convexity, the falx and the parasagittal region, 31% on the skull base, 4% on the tentorium and none in the posterior fossa.

In regard to histology: atypical meningiomas (grade II) 18 in males and 15 in females, anaplastic meningiomas 2 in males and 2 in females. None of our cases were diagnosed initially as meningiomas treated by radiation. All our cases underwent total excision or almost total and all had radiation at the site excision.

Results: We had 7 recurrencies in which the patients died within 2 years. We lost 7 cases to follow up. The rest of them are followed in annual brain MRIs and are free of recurrencies.

Discussion: The total excision followed by radiotherapy gives the best surviving results. However, a very close follow up is needed since regardless to atypical or anaplastic histology tumours can reccur.

EVOLUTION OF SURGICAL TREATMENT FOR MALIGNANT GLIOMAS – A DECADE OF EXPERIENCE IN A SINGLE INSTITUTION

N. Gabrovsky, M. Laleva, G. Poptodorov, N. Velinov, St. Gabrovsky

Department of Neurosurgery, University Hospital Pirogov, Sofia, Bulgaria

Malignat gliomas are the most frequent primary CNS tumors. Despite the improvement of the surgical techniques and the development of new therapeutic approaches, the prognosis of the patients with malignant gliomas remains poor with an unavoidable progression of the disease and a fatal outcome. We analyze the experience acquired and the evolution of the surgical treatment for malignant gliomas in a single institution over a decade.

For the period 06.2001-06.2011, 475 patients with gliomas were treated in the department of Neurosurgery in Hospital "Pirogov". Clinical data was collected retrospectively in 290 cases and prospectively in the remaining 185.

During this period new surgical techniques and devices were periodically introduced.

For a decade the intraoperative ultrasound, the awake craniotomy, the intraoperative neurophysiological monitoring and the fluorescence-guided surgery using 5-aminolevulinic acid were introduced in the everyday practice of our department. The assessment of the quality of life and the continuous follow-up of the patients became a routine. A tumor bank with a web-based register was also established.

The influences of all this clinical, surgical and organizational factors on the outcome of the treatment of malignant gliomas were assessed.

RESECTION OF SINGLE BRAIN METASTASES – COMPARISON OF TWO TERTIARY REFERRAL CENTERS

N. Peev, M. Dherijha, N. Kitchen, S. K. Kalevski, D. G. Haritonov, C. Akhunbay-Fudge

Department of Neurosurgery, Varna Medical University, Bulgaria
St. Anna Multiprofile Hospital, Varna, Bulgaria
Victor Horsley Department of Neurosurgery, The National Hospital for Neurology and Neurosurgery, London, United Kingdom

Background: With the cancer survival improvement owing to earlier detection and improved therapies for primary tumors, brain metastases are now the most common of all brain tumors and the incidence is constantly growing, thus imposing treatment protocols optimization. Surgical resection is mainstay in the treatment of the single brain metastases. However local recurrence (LR) of a resected brain metastasis occurs in 40 – 50 % of the operated patients that do not receive postoperative whole-brain radiation therapy (WBRT). WBRT is reported to reduce the incidence of postoperative LR to about 10%.

Aim: With the present investigation authors aim to compare the results of resection of brain metastases in two tertiary referral centers functioning in different conditions – St. Anna Multiprofile Hospital, Varna, Bulgaria and The National Hospital for Neurology and Neurosurgery (NHNN), London, UK.

Methods: The patients operated for brain metastases in The National Hospital for Neurology and Neurosurgery (NHNN), London, UK for a period of eight years (2003–2010) were retrospectively investigated. The results from the two centers were compared with accent on the type of resection (Piecemeal/Enbloc).

Results: For the investigated period of eight years, the authors have selected 48 patients operated in St. Anna Multiprofile Hospital, Varna, Bulgaria for single brain metastasis and subsequently diagnosed local recurrence. Of these patients 29 (60%) had had piecemeal and 19 (40%) had had enblock resection of the brain metastasis. Of the selected 79 patients operated in The National Hospital for Neurology and Neurosurgery (NHNN), London, UK for single brain metastasis with subsequent LR only 9 (11%) have documented to have enblock resection.

Our investigation suggest that the way a metastatic brain tumor is resected – piecemeal or enblock resection can affect its future dissemination.

Conclusion: Allthough one of the mainstays of the treatment of brain metastases, resection itself could benot only positive but also negative predictive factor, contributing for further dissemination of the tumor, depending on the type of resection (Piecemeal/Enbloc).

QUALITY OF LIFE IN PATIENTS WITH GLIOMAS IN ELOQUENT BRAIN AREAS

V. D. Rozumenko, A. P. Khoroshun,
A. V. Rozumenko

Romodanov Institute of Neurosurgery, Kiev, Ukraine

Aim and Object of the Research: Motor disorders are a major factor that reduces the quality of life (QOL) in patients with brain tumors after surgical treatment.

Methods Used: A total of 42 patients (28 males, 14 females, mean age 40.3 years, range 21-70 years) who underwent resection of tumors located in eloquent area (motor area in 28 cases, sensory area in 14 cases) and had a motor impairment. Gliomas II WHO Grade were found in 8 (19,0%) patients, III WHO Grade – in 19 (45,2%) and glioblastomas – in 15 (35,8%) patients. The preoperative planning was based on integrated CT, MRI, fMRI, SPECT and computed EEG studies. Tumor microsurgery resection was carried out using the Medtronic StealthStation navigation system accompanied with intraoperative laser thermodestruction (808 nm, 18W). QOL was estimated with a Karnofsky performance scale (KPS). In the early postoperative period complete regression of motor disorders was achieved in 25 (59.5%) of 42 patients. Rehabilitation treatment in early postoperative period used in 17 (40.5%) patients and included physiotherapy techniques (electrostimulation, laser therapy), massage, medical gymnastic.

Results: As the results of researches after surgical removal of a tumor and a rehabilitation treatment have shown the percent of patients with KPS 70≥ has increased from 43,7% to 83,5%. Women had lower indicators of QOL than men. Patients with glioblastomas have the lowest index of QOL. Patients of young age (19-44 years) have shown higher indicator of QOL in comparison with patients of an average (45-59 years) and advanced age (60-74 years).

Conclusions: The complex treatment of brain gliomas, including surgical removal of a tumor and the differential recovery treatment enable stable increase of QOL of the operated patients. QOL is one of the basic indicators of efficiency of surgical treatment of tumors located in eloquent brain areas.

THE EXPERIENCE OF TREATING MALIGNANT BRAIN GLIOMAS

A. Y. Glavatskii, A. Hassan, I. P. Zinkevich,
G. V. Khmelnitskii

Treatment of malignant brain gliomas remains one of the most relevant and complex problems of modern neurooncology. The experience of treating these patients in unoperative cases where surgical intervention is not possible is of the undoubted interest. The application of chemoradiotherapy using modern cytostatics is promising.

Objective of the Paper: To determine the efficacy of chemoradiotherapy with temozolomide in unoperative patients.

Material and Methods: The study included 27 observations with malignant gliomas of the brain. Operations were not conducted due to localization of tumors, which were difficult of access. In all cases histostructure was established by stereotactic biopsy of the tumor. In 11 cases glioblastoma (GB), in 2 cases malignant glioma of III - IV degree of anaplasia (dg. an.) close to glioblastoma, in 13 cases anaplastic astrocytoma (AA), in 1 case anaplastic oligo-astrocytoma (AOA) was diagnosed. The median age of patients was 41 years. All patients received standard radiation therapy and temozolomide (75mg/m2 No. 42) and 4-6 adjuvant cycles (150-200 mg/m^2)

Results and Discussion: The median of overall survival (OS) of 18 months was reached for glioblastomas: 33 months for gliomas of grade III-IV; OS was 35 months for AA and 23 months for AOA. Three patients with glioblastomas are still alive at the moment. All patients tolerated treatment without serious adverse events including hematologic ones.

Conclusions: The combined chemoradiation (concomitant and adjuvant) therapy with temozolomide is effective in the treatment of gliomas. In some cases, particularly in unoperative tumors, this method can be an alternative to direct surgical removal followed by chemoradiotherapy.

OLIGOASTROCYTOMAS: A COMPARATIVE STUDY BY GRADE AND HISTOLOGIC TYPE

V. D. Rozumenko, V. M. Semenova,
M. N. Shevelyov, A. V. Rozumenko,
V. N. Kluchka

*Romodanov Institute of Neurosurgery,
Kiev, Ukraine*

Aim and Object of the Research: To try and identify biologic differences based on tumor grade and histologic type among mixed gliomas - oligo-astrocytomas. Utilizing the World Health Organization (WHO) grading system, the incidence, patient characteristics, and survivals of 32 patients with low-grade (WHO II) and 131 patients with high-grade (WHO III) supratentorial tumors were compared. Among them women – 72, men – 91, average age was 37.4±11.4 years.

Methods Used: The diagnosis of OA was made on basis of the histopathologic analysis of H&E-stained slides. The WHO criteria for anaplastic oligo-astrocytoma (WHO grade III) are not well defined but suggest that "histological features of anaplasia" should be present. This list includes nuclear atypia, cellular pleomorphism, high cellularity, high mitotic activity, microvascular proliferation, and necrosis. In 15 cases comparative genomic hybridization (CGH) was used. The Kaplan-Meier method estimated progression-free survival (PFS) and overall survival (OS).

Results: Heterogeneity of OA established by hystological and genetic investigations. There were 3 groups of OA's distinguished: with prevalence of astocytic cells – 58 cases (35.6%), with oligodendroglial prevalence – 55 cases (33.7%), with astocytic and oligodendroglial as equals – 55 cases (30.7%).

PFS ranged from 5.1 to 9.5 years, depending on histologic type ($p < 0.008$). Patients with OA equal cells representation experienced intermediate outcomes compared with those with astrocytic (lower survival) and oligodendroglial prevalence (higher survival).

OS ranged from 5.1 to 9.5 years, depending on histologic type too ($p < 0.002$). Patients with oligodendroglial prevalence experienced higher survival compared with those with prevalence of astocytic cells or equal cells representation.

Conclusions: A lot of special features in clinical course, results of neurosurgical treatment between OAs with different histological structure were found. Additional clinical trials are needed for patients with OA that clear explaion differences in biology and response to treatment.

MICROSURGERY OF THE ENTRAPMENT NERVE SYNDROMES

G. Zapuhlih, S. Borodin

*Department of Neurosurgery,
Institute of Neurology and Neurosurgery,
Chişinau, Republic of Moldova*

Background: There are three large categories of peripheral neuropathies that can be successfully resolved by surgery. These are nerve injuries, entrapment syndromes, and nerve tumors.

Methods: We report the indications, technique, outcome and complications seen in 181 cases of entrapment syndrome, who were operated on in our clinic from 1985 till 2011.

Results: Three main electrophysiological parameters were studied: Efferent Conduction Velocity (ECV), Muscle Response Amplitude (MRA) and Distal Latency (DL). Surgical decompression methods included: external microsurgical neurolysis (23 cases), microsurgical epineurotomy (24 cases), internal microsurgical neurolysis (partial in 81 cases, extended in 52 cases) and the microsurgical nerve autoplasty (1 case). Complications included scar hypertrophy and hyperesthesia (8 cases), transient paresthesia (15 cases), relapse (4 cases).

Conclusion: Microsurgical decompression of the peripheral nerves in case of late stages of tunnel syndromes is a safe and very effective procedure, and should be considered as a golden standard.

Keywords: Entrapment nerve syndromes, microsurgical decompressive technique.

POSTER PRESENTATIONS

CONTINGENT NEGATIVE VARIATION IN CHILDREN WITH CEREBELLAR TUMORS

V. N. Lacusta, A. I. Litovcenco

Institute of Physiology and Sanocreatology, Academy of Sciences of the Republic of Moldova

The study aim is revealing the peculiarities of contingent negative variation (CNV) in children with cerebellar hemispheres tumors under the influence of surgery.

The CNV study program included: the electrode disposition in F3, F4 (reference electrode A1, A2), number of channels – 2; epoch of analysis 5000 ms. The interval S1-S2 was 3000 ms. The maximal amplitude in the 550-750 ms interval (amplitude of initial CNV – iCNV), as well as the maximal amplitude in the last interval (200 ms) before S2 (amplitude of late CNV – lCNV) were determined. The postimperative wave (interval S2 – TR) was assessed too.

Children with cerebellar tumors (n = 25) in comparison with healthy children (n = 15) have preoperatively shown the following indices: iCNV – 5,5 ± 1,12 mcV ($p<0,05$); lCNV – 8,7 ± 0,97 mcV ($p<0,01$); S2 – TR – 283,8 ± 9,5 ms ($p<0,05$); in children with cerebellar tumors in the early postoperative period the following indices of CNV were revealed: iCNV – 5,0 ± 1,26 mcV ($p<0,05$); lCNV – 8,2 ± 1,13 mcV ($p<0,01$); S2–TR – 290,0 ± 7,63 ms ($p<0,01$). These data are evidence of the impairment of perception processes, disturbances of processes of preparing for voluntary purposeful movements (intentional phase) and of the impairment of their realization. There was a tendency of aggravation of these impairments postoperatively, after tumor removal in these children, especially of the phase of purposeful actions realization (S2 – TR interval). Worsening of these disturbances are probably due to surgical stress and development of morpho-functional modifications in the brain under the influence of neurosurgery.

MAPPING AND CONTINUOUS MONITORING OF THE PRIMARY MOTOR CORTEX AND CORTICOSPINAL PATHWAYS WITH MOTOR EVOKED POTENTIALS

K. Gabrovski, K. Minkin, M. Marinov, A. Bussarsky, D. Ferdinandov, V. Karakostov, V. Bussarsky

Department of Neurosurgery, University Hospital "St. Ivan Rilski", Sofia, Bulgaria

Introduction: Impending postoperative impairment often limits resection of central region tumors. The integrity of the primary motor cortex (PMC) and the corticospinal tract (CST) is essential for preservation of motor function. Several intraoperative neuorphysiological techniques have been proposed for identification and preservation of those eloquent structures during surgery, including somatosensory evoked potentials – phase reversal (SEP - PR), direct electrical stimulation (DES) and continuous monitoring with motor evoked potentials (MEPs). Although the 50 Hz bipolar direct electrical stimulation is the "gold standard" for localizing both motor and language areas it has some disadvantages – intraoperative seizures, inability to provide continuous monitoring of PMC and CST, patient movements. Those are avoided by the more recently introduced monopolar, short train stimulation technique and recording of MEPs.

Material and methods: Eight patients suffering intrinsic central region lesions (gliomas, metastases, cortical dysplasia) operated in the Department of Neurosurgery, University Hospital "St. Ivan Rilski", Sofia, Bulgaria were prospectively included in the study. Standard anesthesia protocol – TIVA (propofol and fentanyl) was used in all patients. The central sulcus (CS) was first mapped using SEP – PR. Motor mapping and monitoring of the PMC and CST ware achieved by monopolar short train technique (trains of 5 to 8 pulses, pulse width 4ms, ISI 4ms) and recording MEPs from 4 to 8 contralateral muscles corresponding to the part of the PMC of interest. For mapping PMC and CST a hend-held stimulating probe was used intermittently, and for continuous monitoring of the CST stimulation was provided through a strip electrode placed on the precentral gyrus.

Results: Mapping and continuous monitoring with MEPs was possible in 6 (75%) of 8 patients. In 1 patient MEPs were not recorded although mapping with 50 Hz bipolar stimulation was possible. In another 1 patient suffering a low grade glioma DES

with either short train technique or Penfield technique was impossible because of high incidence of intraoperative seizures. Identification of the PMC in the remaining 6 patients marked out safe access to the lesion. MEPs monitored during tumor resection were stable above 50% of baseline and no motor deficit was present in 5 patients. In one patient with postcentral glioma - about 70% decrease of amplitude of MEPs and transient weakness were observed. There was no permanent worsening of motor function in the whole group.

Conclusions: Intraoperative motor mapping and monitoring with MEPs provided safe approach to lesions in the central region and showed a potential of recognizing impending deficit, thus modifying surgical strategy in order to prevent it.

IMMUHISTOCHEMICAL STUDY OF HORMONE PRODUCTION AND PROLIFERATION RATE IN CLINICALLY FUNCTIONING AND NON-FUNCTIONING PITUITARY ADENOMAS

R. Ivanova[1], A. Hadzhiyanev[2], E. Nachev[1], A. Elenkova[1], M. Yaneva[1], G. Kirilov[2], I. Atanassova[2], S. Zaharieva[1], M. Marinov[2], S. Mihaylova[3].

[1]*Clinical Center of Endocrinology and Gerontology, Sofia, Bulgaria*
[2]*Department of Neurosurgery, University Hospital "Sv. Iv. Rilski",*

[3]*Medical University, Sofia*

Background: It is well known that the immunohistochemical analysis of pituitary adenomas (PA) has been led to the great advances in their morphologic diagnosis and classification. It has demonstrated the discordance between their preoperative clinical diagnosis and postoperative immunohistochemical diagnosis, especially in clinically non-functioning tumors which often show a broad range of patterns of immunopositivity for the different pituitary hormones. The measurement of proliferation activity, using the MIB-1 antibody has also been used for the prediction of biologic aggressiveness of PA.

Aim: This study was to investigate by immunohistochemistry the hormone production and proliferation rate of clinically functioning and non-functioning pituitary adenomas and the relationship with their clinical behavior. The expression of pituitary hormones (GH, ACTH, PRL, FSH, LH and TSH) and MIB-1 labeling index (LI) was studied in a total of 102 pituitary adenomas, diagnosed after surgery for a period of the last 5 years. There were 81 patients with clinically functioning (27- male, 54-female, mean age - 43.2 ±13.3 y) and 21 with non functioning adenomas (11-male, 10-female, mean age - 44.67 ±14.85 y) by endocrine assessment. Among the active PA, there were 47 patients with GH secreting tumors (somatotropinomas), 14 with ACTH-secreting (corticotropinomas) and 20 with PRL secreting (prolactinomas).

Results: The immunohistochemical analysis of the hormone profile of all clinically functioning PA showed a positive correlation between the tumor immunoprofile and the type of hormone, responsible for the endocrine syndrome, but in 26 cases (32%) it was found expression of more than one hormone (17-GH secreting, 7 PRL secreting and 2 –ACTH-secreting). Among the group of clinically non-functionting PA, 7 cases were diagnosed as null-cell adenoma (no immunoreactivity for all pituitary hormones), 12 cases – as gonadotropinomas (FSH + - 3, FSH + LH -6, FSH+LH+PRL- 2, FSH+LH+PRL+TSH -1) and in 2 cases there was only weak focal positive reaction for GH or ACTH (silent adenomas). The whole group of PA showed a low proliferation activity with evident variations in a small number of cases–the mean value of MIB-1 LI was 0.58±0.67, range from 0.1 to 3.58. There was a significant difference between the mean values of MIB-1 LI among the clinically functioning (0.48±0.57) and non- functioning PA (0.92±0.90, p=0.008), but no difference in comparison of cases with GH-, ACTH and PRL-secreting tumors.

Conclusion: Immunohistochemical analysis of hormone expression of clinically functioning and non-functioning pituitary adenomas contribute to their correct classification. Our results showed that the proliferation activity of non-functioning tumors is higher and may have also predictive utility.

EVALUATION OF PROGNOSTIC UTILITY OF MIB-1 AND P53 EXPRESSION IN PITUITARY ADENOMAS: CORRELATIONS WITH CLINICAL BEHAVIOR AND FOLLOW-UP RESULTS

A. Hadzhiyanev[1], R. Ivanova[2], E. Nachev[2], A. Elenkova[2], M. Yaneva[2], G. Kirilov[2], I. Atanassova[2], S. Zaharieva[2], M. Marinov[1], A. Ivanova[3]

[1]Department of Neurosurgery, University Hospital "Sv. Iv. Rilski", Sofia, Bulgaria
[2]Clinical Center of Endocrinology and Gerontology, Sofia, Bulgaria
[3]Medical University – Sofia, Bulgaria

Background: Pituitary adenomas (PA) show a broad clinicomorphological spectrum – from micro-adenomas to tumors with local invasion, expansion and recurrence after surgery. The proliferation activity, evaluated by MIB-1 labeling index (LI) and p53 expression have been pointed as predictive markers for invasiveness and progression. But the real value of these markers in different studies is controversial.

Aim: This study was to evaluate the proliferation activity and p53 expression and to look for any relationships with the clinical behavior and follow-up results in a large series of patients with pituitary adenomas.

Material and Methods: A total of 93 patients (33-male, 60-female, mean age – 42.6±13.09 y, from 16 to 73 y old) with PA (functioning – 80 and nonfunctioning -12) who were operated and follow-up for a period of 5 years, were included. The MIB-1 LI and p53 expression determined by immuno-histochemistry were correlated with various clinical and tumors variables.

Results: The whole group of PA showed a low proliferation rate with evident variations in a small number of cases–the mean value of MIB-1 LI was 0.50±0.56, range –from 0.1 to 3.30. There was a positive correlation with the size of the tumor (21,0±16.9 mm, p=0,012) and significant difference between the mean values of MIB-1 LI of the group with microadenomas (n=34, 0.32±0.28) compared to those with meso- (n= 27, 0.57±0.55, p=0.007) and macroadenomas (n=32, 0.63±0.73, p=0.008). There was also relation between the MIB-1 LI values and sex (male - 0.68±0.70, female -0.40±0.43, p=0.23) and tumors with total and partial surgical excision (n=67, 0.44±0.43 and n=21, 0.74±0.85, p=0.036). We found no significant differences regarding the age, functional activity, invasion (n=33), expansion (n=37) and appearance of recidives (7 cases). Only 10 cases (10.8%) showed a focal, nuclear p53 immunoreactivity. The p53 positive tumors had higher proliferation rate (1.19±0.9, p=0.0001) but no relationship with the other clinical and tumor variables. Among all cases there was only 1 case with higher MIB-1 LI (3.3 %), positive p53 expression and tumor recidive after surgery.

Conclusions: Our results show that the most of pituitary adenomas have low proliferation rate (MIB-1 LI) and lack of p53 expression. Except of the sex, tumor size and p53 expression, there was no significant relationship between the tumor growth rate and invasion, expansion or postsurgical progression.

Proceedings of the 20th National Congress of Neurosurgery

17-20 November 2011

Pravets, Bulgaria

ORAL PRESENTATIONS

ХИРУРГИЧНИ АСПЕКТИ ПРИ ЛЕЧЕНИЕТО НА МЕТАСТАТИЧНИ ТУМОРИ НА ШИЕН ГРЪБНАК

А. Даварски, Б. Китов, Х. Желязков, С. Райков, И. Кехайов, И. Коев

УМБАЛ "Св. Георги" ЕАД, .Пловдив, Клиника по Неврохирургия

Представени са данни за лекувани в Клиниката по Неврохирургия при УМБАЛ "Св.Георги" гр. Пловдив пациенти с вторични злокачествени заболявания в областта на шиен гръбнак между 2004 и 2011година.Общият брой случаи разгледани в настоящата статия са 17, от които оперирани са 12, а неоперирани са 5.Образните изследвания използвани при диагностиката са били шийни спондилографии, КТ и МРТ самостоятелно или в комбинация. При седем от случаите е бил обхванат един прешлен, при четири от случаите два съседни прешлена, при един-три прешлена, при два от случаите четири, а при три случая е бил ангажиран повече от един гръбначен сегмент.

За оценка на стадия на заболяването и избор на лечебен подход сме използвали скалата на Frankel за степен на неврологичната увреда, хирургичната класификация на спиналните тумори на Tomita и класификацията на Harrington за поведение при спинални тумори.

Оперативната техника използвана при случаите в нашата серия е била: корпоректомия на едно ниво при 6 болни,корпоректомия на две нива при 3 болни, корпоректомия на три нива при 1 болен, а при два от случаите е използван заден достъп с ламинектомия. Тотално отстраняване на туморната маса е постигнато при 6 от случаите, субтотално при 3, а парциално при 1. Инструментацията използвана за вертебродеза и стабилизация в 2 от случаите е била „ADD plus", в 8 от случаите титанова плака и автотрансплантат, а в един случай задна шийна стабилизация.

Основните изводи налагащи се при анализа на тази серия са, че все по-нарастващата честота и социална значимост на малигнените заболявания, както и тежката инвалидизация съпътстваща метастатичните тумори на шиен гръбнак оправдават по-агресивния подход при лечението на тази патология, като основно място заемат хирургичната резекция на туморната маса, медуларната декомпресия и стабилизация на сегмента.

РЕТРОСПЕКТИВЕН АНАЛИЗ С ИЗВОДИ ЗА ТАКТИКАТА НИ ПРИ ТРАВМИ НА ШИЙНИЯ ГРЪБНАК

Хр. Желязков, Б. Китов, Б. Калнев, Г. Божилов, А. Петкова, А. Даварски, И. Кехайов, Ст. Райков

Катедра по неврохирургия – МУ Пловдив Клиника по неврохирургия – УМБАЛ „Св. Георги" Пловдив

Бързото развитие на образната диагностика и хирургичните технологии през последните десетилетия налагат непрестанен сравнителен анализ на тактиката ни при травми на шийния гръбнак. Това провокира необходимостта от този ретроспективен анализ на нашите подходи в оценката и лечението на шийните гръбначно-мозъчни травми /ШГМТ/.

Методика: Анализирани са 119 пациенти, преминали през Клиниката по Неврохирургия на УМБАЛ „Св. Георги" Пловдив за период от пет години - 72% мъже и 28% жени. Възрастовото разпределение е: до 40 г.- 26%; от 41 до 60 г.- 29 % и над 61 г.- 45%. Консервативно са лекувани 33 болни /11 с високи шийни травми; 12- с „мекотъканни" травми- дисторзии или „камшичен" тип травми и 10 болни с центромедуларни травми- контузия на медулата при дегенеративна стеноза/. Оперирани са 88 болни със следните травматични увреди: фрактури- 24 случая; фрактури-луксации – 23; луксации и сублуксации – 35 и травматични дискови хернии- 4 случая. Най-честото ниво е С5- 33 %. При всички е използван преден оперативен достъп, като стабилизация е постигната чрез: само cage или cage+плака; само шпан или шпан+плака, или чрез предно дистрахиращо устройство /ADD +/.

Резултати: Резултатите са оценени според клиничното подобрение и по рентгеновия контрол. Починали са 7 болни; подобрение се отчита при 69 болни и при 12 отчитаме незадоволителен резултат.

Заключение: Резултатите от нашия анализ сравнихме с литературата. Считаме, че само при извършени сагитални КТ и МРТ можем да направим адекватна оценка на травмата и да бъдат класифицирани по SBAXIAL INJURY CLASSIFICATOIN – затова сме предпочели по-обобщената, използвана досега класификация. Очевиден извод от литературния анализ е загубата на консенсус в хирургичната тактика при ШГМТ. Все по-често се препоръчват задни и съчетани стабилизации при грубо нестабилните фрактури-луксации и при ротационни увреди – практика, която ни липсва и която трябва да бъде използвана.

ИЗПОЛЗВАНЕ НА МОДИФИЦИРАНА ТЕХНИКА НА MAGERL ЗА СТАБИЛИЗАЦИЯ НА СУБАКСИАЛНИЯ ШИЕН ОТДЕЛ

Д. Харитонов[2], Св. Калевски[1,2], Н. Пеев[2]

[1]Медицински университет – Варна
[2]Клиника по неврохирургия, МБАЛ „Св. Анна“, Варна

Цел и обект на изследването: Съществуват различни хирургични техники за маса латералис винтова инструментация на субаксиалния шиен отдел на гръбначния стълб – тези на Roy-Camille, Magerl, Anderson и An. Всяка от тях се различава по стартовата точка и траекторията на имплантиране на винта.При всяка една техника съществува потенциален риск от афектиране на съдови и неврални структури. В този материал споделяме скромен опит при използването на модифицирана техника на универсалния метод на Magerl за стабилизация.

Използвани методи: Представяме ретроспективно проучване на 15 пациенти оперирани по повод шийни травми, при които сме използвали модифицираната техника на Magerl. При 8 от тях е осъществена и предна декомпресия и стабилизация. При всички е използван пред-оперативен СТ и МРТ на субаксиалния отдел С3-С7 за оценка на анатомичните особености и измервания, следоперативен СТ за оценка на позицията на имплантите, пред- и следоперативно са използвани VAS и ODI.

Резултати: При посочените пациенти е осъществена задна или комбинирана задна и предна стабилизация,като задната е маса латералис винтова стабилизация с мултиаксиални винтове.Имплантирани са 76 мултиаксиални винта, като при тази техника най-честата дължина на импланта е 16 мм /42 от 76 или 55,26%/.

Заключение: Базирайки се на световната литература, опита и направения анализ на клиничните случай, считаме че тази модифицирана техника за фиксация на субаксиалния шиен отдел е сигурна, ефективна и в голяма степен безопасна.

АНЕВРИЗМИ DE NOVO В ХИРУРГИЧНА СЕРИЯ ОТ ПАЦИЕНТИ С МНОЖЕСТВЕНИ МОЗЪЧНИ АНЕВРИЗМИ

Е. Кръстев, В. Георгиева, Е. Малинов, М. Милев

Клиника по неврохирургия,
УМБАЛСМ „Н. И. Пирогов”, София, България

През 1964 г за първи път Graf и Hamby съобщават за появата на de novo аневризми при много добре документирани случаи, след успешно проведено лечение. De novo аневризмите представляват интракраниални сакуларни аневризми, които не са предходно диагностицирани, сформирани след клипинг или койлинг на инициалната респективно инициалните церебрални аневризми.

Цел и обект: Установяване честотата на de novo сформираните аневризми при множествени мозъчни аневризми.

Метод: Наблюдение, ретроспективен и проспективен анализ.

Резултати: За период 1991-2010 г. са оперирани общо 510 пациенти с мозъчни аневризми, от тях 68 пациенти са с множествени мозъчни аневризми – 13,33%. При 37 пациенти с множествени аневеризми е проведено контролно ангиографско изследване – КТ и/или ДСА при среден период на проследяване за тези 37 пациенти – 8,9 години. При 7 пациенти са открити de novo аневризми, което определя годишна честота 2,12 %.

Заключение: Авторите предлагат проследяване на такива пациенти, поради съществуващия риск от развитие на de novo аневризми.

ПОДХОД В ХИРУРГИЧНОТО ЛЕЧЕНИЕ НА ГОЛЯМ СКАЛПОВ ДЕФЕКТ В РЕЗУЛТАТ НА УХАПВАНЕ ОТ КУЧЕ

В. Арнаудова, П. Станимиров

Клиника по неврохирургия,
УМБАЛ „Света Анна", София, България
Клиника лицево-челюстна хирургия,
УМБАЛ „Света Анна", София, България

Цел: Да представим подход в оперативното покриване на голям скалпов дефект в окципиталната област.

Случай на 21 годишен мъж с формиране на голям дефект на меките тъкани в пълна дебелина на окципиталната област с размер 20/20 см. Травматичният дефект е от ухапване от куче и е с характеристика на скалпиране, със загуба на периост и с оголване на калварията в широк участък.

Използвани методи: За реконструиране на зоната е използвана комбиниран подход от свободна трансплантация на кожа и ротиране на големи езиковидни ламба от вратната, париеталната и фронталната област. Участъците с пълна загуба на периост са покрити с кожни ламба, а зоните на новообразуваните дефекти от ротирана на ламбата са покрити със свободен кожен трансплантат.

Резултати и обсъждане: Свободната кожна трансплантация е надежден метод за покриване на дефекти на калварията, само в случаите, когато е запазван слой от подлежащи меки тъкани. Поради малката разтегливост на кожата на главата, големи дефекти на меките тъкани на окосмената част на на калварията се покриват трудно. В тези случаи предлагаме подход с формиране на езиковидни ламба по съседство включващи и галеята, със запазване на периоста и субапоневротичните меки тъкани, а зоните на новосформираните дефекти от преместването на ламбата покриваме с кожн трансплантати.

ТУМОРИ В СЕЛАРНА ОБЛАСТ – АНАЛИЗ НА ХИРУРГИЧНИТЕ РЕЗУЛТАТИ

Т. Ефтимов, И. Тодоров, И. Хаджиангелов, И. Стоев, Т. Шамов, Е. Ставрев, П. Симеонов, К. Романски

Клиника по неврохирургия, ВМА – София

Въведение: Туморите в селарната област включват питуитарни аденоми, менингиоми, краниофарингеоми, кисти от джоба на Ратке, герминоми, хамартоми и други по-редки тумори. Най-често срещани при възрастни пациенти са питуитарните аденоми.

Цел: Да се анализират предимно ранните хирургични резултати при туморите в селарна област.

Материал и медтоди: За деветгодишен период в Клиниката по неврохирургия на ВМА са оперирани 119 болни с тумори в селарна област на средна възраст от 48 години – 75% с аденоми, 11% с менингеоми, 8% с краниофарингеоми, 2% с холестеатом, 1% киста на Ратке, 1% тератом, 1% метастаза и др. Предоперативната диагноза е поставена мултидисциплинарно и с невроизобразителни изследвания. Транссфеноидалният достъп е основен хирургичен метод, комбиниран с ендоскопска инспекция при 65% от пациентите с питуитарни аденоми.

Резултати: Едноетапен радикализъм на туморната резекция е постигнат при 62% от болните. Най-честите ранни следоперативни усложнения са: хирургични - в 14% от оперираните пациенти, ендокринни – в 6%, неврологични – в 3% и инфекциозни – в 1%. Назоликвореята, ендокринният и водно-електролитен дисбаланс са сред водещите и пролонгирани следоперативни усложнения. Общата смъртност за периода е била 8%.

Обсъждане: Пълноценната предоперативна диагностика, прецизната хирургична техника и радикалният обем на интервенцията, както и адекватното постоперативно проследяване и лечение са основните определящи фактори за благоприятния изход от хирургичното лечение на пациентите с тумори в селарната област.

Ключови думи: Тумори, селарна област, хирургия, усложнения.

ПОВЕДЕНИЕ И ХИРУРГИЧЕСКИ ДОСТЪПИ ПРИ ПАЦИЕНТИ С ШИЙНИ ГРЪБНАЧНИ И ГРЪБНАЧНО-МОЗЪЧНИ ТРАВМИ

Ив. Хаджиангелов[1], Т. Ефтимов[1], Ил. Стоев[1], Вл. Пранджев[1], Р. Кедия[1], Н. Нейчев[2], Д. Зидарова[2]

[1]Клиника по Неврохирургия – ВМА, София

[2]КАРИЛ – ВМА, София

Въведение: Травмите на шийната част на гръбначния стълб и гръбначния мозък и асоциираните неврологични и системни

последствия са значима причина за трайна инвалидизация и смърт и представляват сериозен медицински, социален и икономически проблем.

Цел: Да се анализират резултатите от различните оперативни методи в зависимост от вида на фрактурата и хирургичната стабилизираща техника.

Материал и методи: За период от 5 години в Клиниката по неврохирургия на ВМА – София са третирани хирургично 14 пациенти с нестабилни фрактури на С2 прешлен и 104 пациенти с травма в субаксиалния сегмент на гръбначния стълб. Дигностиката е извършвана чрез стандартни и динамични шийни спондилографии, КТ и МРТ, както и електрофизиологични изследвания. За оценка на двигателната функция и нивото на лезията при субаксиалните травми са използвани ASIA Motor Scoring System, а степента на увреда на гръбначния мозък е оценявана по Frenkel Scale. При 12 пациенти с фрактури на денса е осъществена предна фиксация с 1 или 2 винта, а при двама пациенти - окципитоспинодеза. При 14 от пациентите с травми в субаксиалния сегмент е извършена микродисцектомия и корпородеза с костен шпан, при 26 пациенти – микро-дискектомия, корпородеза с костен шпан и стабилизация с титаниева плака на 1 ниво, при 25 пациенти – корпоректомия, корпородеза с костен шпан и стабилизация с титаниева плака на 2 нива, при 25 пациенти - микродискектомия, корпородеза с фиброкарбонов спейсър и стабилизация с титаниева плака 1 ниво, при 10 пациенти – корпоректомия, корпородеза с титаниев меш и плака за 2 нива и при 4 пациенти – задна декомпресия и стабилизация с транспедикуларни винтове на 3 и 4 нива.

Резултати: Третираните фрактури на С2 прешлен са с много добър клиничен резултат и рентгенови данни за линиране и консолидация до 6-ия месец след травмата при всички пациенти. При пациентите със субаксиални травми са наблюдавани следните усложнения: преходна лезия на n. laryngeus recurrens – при трима пациенти (3%), раневи инфекции, овладени с антибиотици – при трима пациенти (3%), гръбначна нестабилност с прогресираща кифотична деформация на подлежащо ниво при 1 болен (1%) с предна едносегментна стабилизация.

Обсъждане: В анализирания материал се касае за пациенти с предна гръбначно-мозъчна компресия и нарушаване стабилността на гръбначния стълб в зоната на предна и средна колона. Предният достъп е бил метод на избор, с цел бързо релиниране, адекватна декомпресия на гръбначния мозък и стабилизация. Задният достъп е за предпочитане в редки случаи на изолирана задна компресия без нестабилност, както и като втори етап на хирургичното лечение при инсуфициенция на предния достъп.

Ключови думи: Гръбначен стълб, шийни гръбначно-мозъчни травми, хирургия, стабилизация, преден достъп, усложнения.

POSTER PRESENTATIONS

СЛУЧАЙ НА ГЕМИСТОЦИТЕН АСТРОЦИТОМ, ПОСЛЕДВАН ОТ МУЛТИФОРМЕН ГЛИОБЛАСТОМ, ПРИ ПАЦИЕНТ С НАРУШЕН ИМУНЕН ОТГОВОР

Ил. Коев[1], Ем. Славов[2], Д. Стайков[3], Кр. Халачева[2], Хр. Желязков[1,3], В. Сарафян[3]

[1]УМБАЛ "Св. Георги", Пловдив, Клиника по неврохирургия
[2]Тракийски университет – Ст. Загора
[3]Медицински университет – Пловдив

Въпреки комбинацията на радикална хирургична резекция с химио-, имуно- и лечетерапия преживяемостта при малигнените глиоми рядко надминава 14 месеца след поставяне на диагнозата. Етиологичните фактори, клетъчните и молекулни механизми в появата и развитието на глиомите не са изяснени. Все по-голям брой доказателства подкрепят съществената роля на имунната система в патогенезата на глиомите.

Докладваме случай на мултицентрични глиоми с различна хистопатологична характеристика и преживяемост от 3 месеца след появата на симптомите. При пациент с нарушен клетъчен имунен отговор се диагностицира гемистоцитен астроцитом, последван от мултиформен глиобластом, в противоположното полукълбо. Силното повишаване на супресорните Т-лимфоцити (CD8+CD11b+) и рязкото спадане на цитотоксичните клетки (CD8+CD11b-), които са основната популация с противотуморна активност, е индикация за нарушен баланс между Th1 и Th2 имунния отговор. Този силно потиснат клетъчен имунен статус е възможно обяснение за бързата поява и развитие на мултипления глиобластом и леталния изход при пациента.

ВЪЗМОЖНОСТИ ЗА ЛЕЧЕНИЕ НА ДИСТАЛНИ МОЗЪЧНИ АНЕВРИЗМИ – ПРЕДСТАВЯНЕ НА ПЕТ СЛУЧАЯ

Сл. Кондов, Хр. Цеков, С. Петков, Т. Спириев, Н. Алиоски, Л. Лалева

Отделение по неврохирургия на МБАЛ "Токуда Болница", София- България

Въведение: Дисталните мозъчни аневризми (ДМА) са редки васкуларни лезии и представляват предизвикателство, както по отношение на диагнозата, така и по отношение на тяхното лечение.

Цел: Да представи и анализира нашия опит в лечението на ДМА.

Материали и методи: Петима пациенти, диагностицирани и лекувани в Отделението по неврохирургия на МБАЛ "Токуда Болница" София, България за период от три години (2008-2011). Три от случаите бяха третирани чрез микрохирургичен клипинг; а ендоваскуларна емболизация е направена в два случая. Следоперативното проследяване е от 6 до 12 месеца.

Резултати: Случай 1: Жена, 42 години, с първоначална диагноза кистозен тумор в десния париетален мозъчен дял, с размер 55 мм/д, установен след направена МРТ на гл. мозък. Извършени са микрохирургично клипсиране и ексцизия на аневризмалния сак.

Случай 2: 57-годишна жена с КТ-ангиографски данни, насочващи към аневризма на А2 (a. pericallosa sin.). Пациентката претърпява спешна процедура. Аневризмалната руптура е в резултат на интрацеребрален хематом, локализиран в левия фронталени мозъчен дял. Аневризмата е третирана чрез микрохирургичен клипинг. За оценка на дисталния кръвоток, се наложи приложението на интраоперативната дуплекс сонография.

Случай 3: Мъж, 47 години, с диагностицирана аневризма на лявата предна мозъчна артерия, сегмент А2/А3, размер - 4 mm/д (a.callosomarginalis, преден медиален клон). На 40-ия ден след САХ и последващо лечение на вазоспазъма, беше извършена ендоваскуларна процедура.

Случай 4: Мъж, 56 г. с остър САК /Hunt-Hess-2 ст./ и диагностицирана с КТ ангиография и класическа панангиография аневризма на А2/А3 12мм/д (a.callosomarginalis dex., преден медиален клон).

Случай 5: Жена, 51 г., постъпва с данни за спонтанен интрацеребрален хематом в ляво париетално. Пациентката е сомнолентна с десностранна хемиплегия При евакуация на хематома по спешност се попадна на некървяла аневризма в съседство, разположена на М4 a. sulci postcentralis sin., която беше изключена от кръвообращението, чрез клипсиране.

Заключение: ДМА са редки мозъчно-съдови лезии, които изискват прецизно планиране и индивидуален план за лечение на всеки пациент.

Интраоперативната ултрасонография и доплер, могат да бъдат особено полезни като диагностчини методи при поставянето на диагнозата и за отфиференцирането на ДМА от неопластичните лезии.

Ключови думи: Дистални мозъчни аневризми /ДМА/, интраоперативна ултрасонография.

INSTRUCTIONS TO AUTHORS

Bulgarian Neurosurgery is a peer-reviewed journal publishing articles from all areas of neurosurgery with a focus on clinical research. Manuscripts are accepted in English or Bulgarian language in compliance with the uniform requirements for biomedical academic papers. The journal publishes research articles, reviews, and case reports, as well as letters to the editors, comments on articles, and short communications. As an official journal of the Bulgarian Society of Neurosurgery, correspondence and related information for passed and forthcoming events is also published here.

Manuscripts must be submitted online by one of the authors and should not be submitted by anyone on their behalf. The author/co-author carries responsibility for the article during submission and peer review. Authors of manuscript in Bulgarian language are required to provide title page, abstract, and keywords also in English. The following word processor formats are acceptable for the main manuscript document: DOC/DOCX, RTF and PDF. The specific requirements for the different article type are given below.

RESEARCH ARTICLES

Bulgarian Neurosurgery publishes original research articles in all related to clinical and experimental neurosurgery fields. The manuscripts should comply with universally accepted scientific publication methodology and requirements of evidence based medicine. The work should confirm or reject a theory, extend previous results or contribute to a new knowledge. Manuscripts for articles submitted to Bulgarian Neurosurgery are limited in length to no more than 10 pages.

The ***Title Page*** should provide the title of the article (up to 30 words), a short running title (up to 10 words), list the full names, institutional address, and email address of all authors. The corresponding author should be indicated. Please note that abbreviations within the title should be avoided.

The ***Abstract*** of the manuscript should not exceed 300 words and must be structured into separate sections: *Introduction*, including aim of the study, *Material and Methods*, *Results*, and *Conclusions*. Please minimize the use of abbreviations and do not cite references here. If your research reports on results of a controlled health care intervention, please give your trial registry along with the unique identifying number.

The ***Introduction*** of the article must clearly state the background of the study and its aims. Reports of clinical research should, where appropriate, include a summary of a search of the literature to indicate how this study would contribute to the field. The section should end with a brief statement of what is being reported in the article.

The ***Material and Method*s** section should include the design of the study, the subjects or materials involved, description of all interventions and comparisons, and the type of analysis used.

The ***Results*** section contains a concise presentation of the obtained results, including statistical data, and illustrated with figures and tables, if possible, for large datasets. This section may be broken into subsections with short and informative headings.

In the ***Discussion*** an interpretation of the results should be provided. Statements to support or reject the research hypothesis should be given together with a comparison of available literature data related to the topic. We encourage discussion focused on the advantages and drawbacks of the research as well as the problems that were met during implementation. This section may be broken into subsections with short and informative headings.

In the ***Conclusion*** statement the authors should concisely present their main conclusions from the research and give a clear explanation of their importance and relevance.

REVIEWS

Reviews are summaries of recent insights in specific research areas within the scope of Bulgarian Neurosurgery. The aim is to provide systematic and substantial coverage of mature subjects, evaluations of progress in specific areas, and/or critical assessments of emerging technologies. Reviews are not limited in length but a concise style not exceeding 12 pages is recommended.

The **Title Page** should provide the title of the article (up to 30 words) as well as a short running title (up to 10 words), list the full names, institutional addresses, and email addresses for all authors as well as indicate the corresponding author. Please note that abbreviations within the title should be avoided.

The ***Abstract*** should be no more than 300 words and have to be structured in a single paragraph where the major points are raised making evident the key work highlighted in the article.

In the ***Introduction*** section the emphasis should be put on the scientific or technological background.

The structure of the ***Review Body*** is recommended to be divided into subsections with short and informative headings.

The ***Conclusion*** should give a clear explanation of the importance and relevance of the analyzed subject.

CASE REPORTS

Bulgarian Neurosurgery welcomes well-described reports of cases that include unexpected or unusual presentations of a disease, side effects or complications of treatment; presentations, diagnoses and/or management of new or rare disease or pathological entity, rare association between diseases and symptoms or event in the course of patient' surveillance; findings that shed new light on the possible pathogenesis of a disease or a complication.

Manuscripts submitted to Bulgarian Neurosurgery should make a contribution to medical knowledge and must have educational value or highlight the need for a change in clinical practice. Case Reports should include relevant positive and negative findings from history, examination and investigation, as well as clinical photographs. The manuscript should include an up-to-date review of previous cases in the field. Case Reports are limited in length to no more than 6 pages.

The ***Title Page*** should provide the title of the article (up to 30 words) and a short running title (up to 10 words), lis the full names, institutional addresses, and email addresses of all authors. The corresponding author should be indicated. Please note that abbreviations within the title should be avoided.

The ***Abstract*** of the manuscript should not exceed 300 words. No special structure is required. Please minimize the use of abbreviations and do not cite references in the abstract.

The ***Introduction*** provides the reader with an explanation to the background of the discussed topic. This section should include a short literature review and ends with a brief statement of what is being reported in the article.

The ***Case Presentation*** reports on all details regarding the case (patient's demographics, relevant medical history, symptoms and signs, tests and treatment carried out, and a description of any treatment) and contains a discussion with references to the literature. This section may be divided into subsections with appropriate subheadings.

In the ***Conclusion*** the importance and relevance of the cease report should be outlined.

A statement to confirm that the patient has given a **Consent** for the manuscript to be published is necessary. The editorial office may request copies of the informed consent documentation at any time. If the patient has died or is a minor, or unable to provide consent, then consent must be sought from the relatives or legal guardians of the patient.

GENERAL INSTRUCTIONS

Figures

Illustrations should be provided as separate files, not embedded in the text file. Each figure should include a single illustration which fits on a page in portrait format with size not exceeding 17x25.7 cm. A figure that consists of separate parts should be submitted in a single composite illustration. Each part should be marked in consecutive sequence (A, B, etc.). The legends should be listed in the main manuscript text file at the end of the document. The number in sequence (Figure 1, Figure 2, etc.), short title up to 10 words and detailed legend up to 200 words should be provided. The reference of a figure taken from another publication stands at the end of the legend.

The following graphic file formats are acceptable for the figures: DOC/DOCX, PPT/PPTX, PDF, JPG, TIF, PNG, BMP.

Tables

Tables should be inserted at the point of the text where they have to be placed logically. Each should be numbered and cited in consecutive sequence (Table 1, Table 2, etc.). A title no longer than 10 words that summarizes the information is required. Detailed legend up to 200 words may than follow. The reference of a table taken from another publication stands at the end of the legend.

Tables should not exceed 17x25.7 cm. Both portrait and landscape presentations are acceptable. Larger datasets than the above mentioned size should be divided into appropriate number of pages. Columns and rows should be made visibly distinct by ensuring that the borders of each cell display as black lines. Color and shading may not be used. Parts of the table can be highlighted using symbols or bold text but the meaning of which should be explained in the legend. Tables should not be embedded as figures or spreadsheet files.

Keywords

Please give up to 5 words representing the main content of the article.

Disclosure

Authors must disclose any financial competing interests including reimbursements, fees, funding, salary, stocks, shares, patents, etc. They should also reveal any non-financial competing interests, including political, personal, religious, ideological, academic, intellectual, commercial, etc., which may cause them embarrassment after publication of the manuscript. All declared relationships will be listed at the end of the published articles otherwise the listing will read "The author(s) declare that they have no competing interests".

Authors' contribution

In order to give appropriate credit to each author the individual contributions of authors to the manuscript should be specified in this section. An author is generally considered to be someone who has made substantive intellectual contributions to a published study. Acquisition of funding, collection of data, technical help, writing assistance, or general supervision of the research group does not justify authorship. All contributors who do not meet the criteria for authorship should be listed in an acknowledgements section.

Authors' information

You may use this section to include any relevant information about the authors that may aid the reader's interpretation of the article, and understand their standpoint. This may include details about the authors' qualifications, current positions they hold at institutions or societies, or any other relevant background information.

Acknowledgements

In this section list anyone who contributed towards the article by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. If a medical writer or a language editor has made significant revision of the manuscript, we recommend that you acknowledge this person. Please acknowledge anyone who contributed materials essential for the study. Include here also sources of funding for each author, the research project and the manuscript preparation.

Endnotes

Endnotes should be designated within the text using a superscript lowercase letter and all notes should be included in this section. Please format this section in a paragraph rather than a list.

References

All references must be listed in alphabetical order and numbered consecutively. Citations in the manuscript should be given in square brackets with their individual reference number [1, 2, 3, etc.]. Please avoid excessive referencing. If automatic numbering systems are used, the reference numbers must be finalized and the bibliography must be conclusively formatted before submission. Journal abbreviations follow Index Medicus. The reference list should include all named authors.

Unpublished abstracts, unpublished data and personal communications should not be included in the reference list, but may be included in the text and referred to as unpublished observations or personal communications giving the names of the involved researchers. Obtaining permission to quote personal communications and unpublished data from the cited colleagues is the responsibility of the submitting author.

Formatting

Please provide the manuscript in clear format style with unjustified text in a single column and a double line spacing. A standard page is defined as approximately 450 words, font Times New Roman 12 pt, single line spacing, 2.5 cm page margins. All pages should be numbered. Capitalize only the first word and proper nouns in the title. Footnotes are not allowed, but endnotes are permitted.

Abbreviations

We recommend abbreviations to be used sparingly. They should be defined when first used and a list of abbreviations must be provided following the main manuscript text.

Brand names

When proprietary brands are used in research, include the brand names in parentheses in the Material and Methods section. The international generic names should be used for all drugs.

Symbols

Greek and other special characters may be included. If you are unable to reproduce a particular special character, please type out the name of the symbol in full. Please ensure that all special characters used are embedded in the text, otherwise they might be lost during conversion.

Units

SI units should be used throughout.

Misconduct

All suspicions and allegations of misconduct or plagiarism are investigated. In such circumstances the Editorial Board requests a written case statement and manuscript correction if necessary. Any reasonable evidence on the second check is a ground for manuscript rejection. Reviewers and editors will be replaced in the review process during investigation when allegations against them exist.

Copyright

The authors declare that their contribution has neither been published nor submitted for publication elsewhere. They agree that the copyright of their paper passes to the Bulgarian Society of Neurosurgery as soon as the contribution has been accepted for publication.

Please note that it is the responsibility of the submitting author to concede permission from the copyright holder to reproduce figures or tables that have previously been published elsewhere.