НЕВРОСОНОЛОГИЯ И МОЗЪЧНА ХЕМОДИНАМИКА

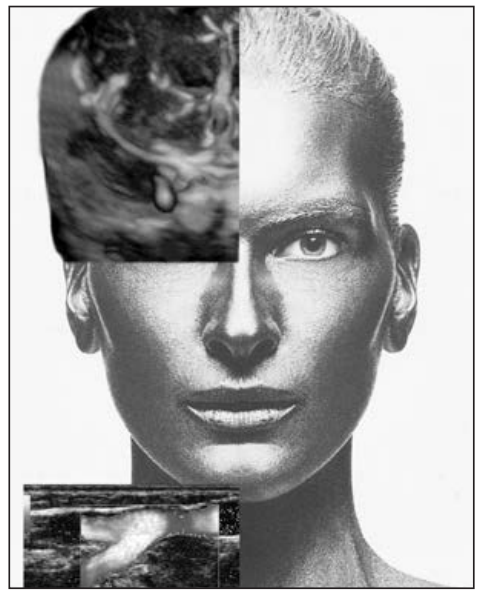
Издание на Българската асоциация по невросонология и мозъчна хемодинамика

NEUROSONOLOGY AND CEREBRAL HEMODYNAMICS

Official Journal of the Bulgarian Society of Neurosonology and Cerebral Hemodynamics

10 ГОДИНИ БАНМХ 10 YEARS BSNCH

ПЪРВИ НАЦИОНАЛЕН КОНГРЕС с международно участие



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10 ГОДИНИ
Българска асоциация по невросонология и мозъчна хемодинамика

10 YEARS
Bulgarian Society of Neurosonology and Cerebral Hemodynamics

Българската асоциация по невросонология и мозъчна хемодинамика (БАНМХ) е основана през 2005 г. като сдружение с нестопанска цел със седалище в град София. То се създава по подобие на Европейското дружество по невросонология и мозъчна хемодинамика по инициатива на акад. проф. Екатерина Титянова, д.м., д.м.н.

Сдружението се управлява от Управителен съвет в съответствие с Устав, приет от Общото събрание. Негови учредители и членове на първите два Управителни съвета (2005–2015) са: акад. проф. Екатерина Титянова – председател, акад. проф. Емилия Христова – зам. председател, доц. Ирена Велчева – зам. председател, д-р Соня Каракънева – секретар, доц. Бойко Стаменов – член, д-р Ивайло Петров – регионален представител за Северна България и д-р Сашо Кастрев – регионален представител за Южна България. В първия Управителен съвет участват още учредителите Галина Михайлова и Константин Титянов. Членове на Контролния съвет са: доц. Златка Стойнева – председател, д-р Красимир Кирилов и д-р Полина Паралчева. От 2010 година към Асоциацията се учредява помощен орган от асоциирани членове към УС, включващ доц. Силва Андонова, доц. Петя Минева, доц. Даниела Любенова, д-р Геновей Узунов, д-р Веселина Андонова и д-р Зафирка Караиванова.

Сдружението има собствено лого, сайт с адрес www.neurosonology-bg.com, както и страница в уикипедия www.bg.wikipedia.org.

Основните цели на БАНМХ, залегнали в устава на сдружението, са насочени към утвърждаване на високи

E. Titianova
President

I. Velcheva
Vice President

E. Christova
Vice President

S. Karakaneva
Secretary

The Bulgarian Society of Neurosonology and Cerebral Hemodynamics (BSNCH) was founded in 2005 as a nonprofit organization with headquarters in Sofia. It is modeled after the European Society of Neurosonology and Cerebral Hemodynamics on the initiative of Acad. Prof. Ekaterina Titianova, MD, PhD, DSc.

A Management Board in accordance with the Statute adopted by the General Assembly has been managing the Society. Its founders and members of the first two Management Boards (2005–2015) are: Acad. Prof. Ekaterina Titianova – President, Acad. Prof. Emilia Christova – Vice-President, Assoc. Prof. Irena Velcheva – Vice-President, Dr. Sonia Karakaneva – Secretary, Assoc. Prof. Boyko Stamenov – member, Dr. Ivaylo Petrov – Regional Representative for Northern Bulgaria and Dr. Sasho Kastrev – Regional Representative for Southern Bulgaria. Galina Mihaylova and Konstantin Tityanov are also founders and participants in the first Management Board. Prof. Zlatka Stoyneva (President), Dr. Krasimir Kirilov and Dr. Polina Paralcheva are the members of the Supervisory Board. A Subsidiary Board for associate members including Assoc. Prof. Silva Andonova, Assoc. Prof. Petya Mineva, Assoc. Prof. Daniela Lyubenova, Dr. Genovey Uzunov, Dr. Vesselina Andonova and Dr. Zafirka Karaivanova was founded in 2010.

The Society has its own logo, website address www.neurosonology-bg.com and page in Wikipedia.

The main objectives of BSNCH are to promote high professional criteria and professional ethics in Neurosonology and Cerebral Hemodynamics by organizing, assisting and supporting the school education and research in this area and other related areas of medicine in accor-

професионални критерии и професионална етика в областта на невросонологията и мозъчната хемодинамика чрез организиране, насърчаване, съдействие и подпомагане на учебно-образователната и научно-изследователската дейност в тази насока и други свързани области на медицината в съответствие с Европейските критерии и световните процеси на глобализация. В дългосрочен аспект целта е да се утвърди българска школа по невросонология, в която знанието може да се съхрани, обогати и развие в полза на здравето на българската нация.

За изминалите 10 години Асоциацията се утвърди у нас като авторитетна научна организация в областта на неврологията и невросонологията и водеща във въвеждането на европейските и световни стандарти в ултразвуковата диагностика на нервната система и терапевтичния ултразвук в неврологията. Тя нарастна по членска маса, разшири своята научна, образователна и практическа дейност и наложи политика на непрекъснато следдипломно обучение и професионално издигане на своите членове.

Наградни знаци

През последното десетилетие по предложение на Управителния съвет и Общото събрание на Сдружението са присъдени следните почетни звания:

„Почетен председател“ – званието е присъдено през 2005 година на проф. д-р Иван Георгиев, д.м.н., доайен на българската неврология.

„Почетен лектор“ – носители на това звание са: проф. Курт Нидеркорн (Австрия), проф. Гюнтер Клайн (Австрия), проф. Е. Бернд Рингелщайн (Германия), проф. Вида Демарин (Хърватия), проф. Ева Бартелс (Германия),

Проф. Иван Георгиев – почетен председател.

Prof. Ivan Georgiev – Honorary President

dance with European criteria and world processes of globalization. The long-term goal is to create and strengthen the Bulgarian School of Neurosonology by preserving, enriching and developing knowledge for the benefit of the Bulgarian nation's health.

For the past 10 years BSNCH has established itself as a respectable scientific organization in the field of Neurology and Neurosonology, introducing the European and world standards in ultrasound diagnostics of the nervous system and of therapeutic ultrasound in Neurology. The society has grown in membership, expanded its scientific, educational and practical activity and imposed a policy of continuous post-graduate training and professional advancement of its members.

Rewards

For the past 10 years on a proposal of the Management Board and the General Assembly these honorary titles have been given:

Пресконференция по проблеми на лечението на исхемичния мозъчен инсулт с тромболиза (хотел „Родина", град София, 2009 г.).

Press conference on the treatment of ischemic stroke with thrombolysis (Rodina Hotel, Sofia, 2009).

Участници в 4-та среща на БАНМХ (хотел „Родина", София, 2009 г.).

Participants at the fourth meeting of BANMH (Rodina Hotel, Sofia, 2009).

проф. Ина Тарка (Финландия), проф. Манфред Капс (Германия), проф. Рюн Аслид (Швейцария), проф. Марио Зиблер (Германия), проф. Майкъл фон Ройтер (Германия) и проф. Масимо Дел Сетте (Италия).

„Почетен плакет" – с него са удостоени учредителите на БАНМХ.

Форуми на БАНМХ

От 2005 година Асоциацията организира ежегодни научни срещи с международно участие, краткосрочни курсове и учебно-практически семинари по учебни програми на медицинските университети и високоспециализираните дейности в неврологията. Тя бе организатор и домакин на 16-ия Световен форум по невросонология на Световната федерация по неврология (17–20 октомври 2013 г., София), на първият регионален обучителен курс на Европейската академия по неврология (2–5

„Honorary Chairman" – the title was awarded in 2005 to Prof. Ivan Georgiev, MD, Doyen of the Bulgarian Neurology.

„Honorary Lecturer" – to Prof. Kurt Niederkorn (Austria), Prof. Gunther Klein (Austria), Prof. E. Bernd Ringelstein (Germany), Prof. Vida Demarin (Croatia), Prof. Eva Bartels (Germany), Prof. Ina Tarkka (Finland), Prof. Manfred Kaps (Germany), Prof. Rune Aaslid (Switzerland), Prof. Mario Siebler (Germany), Prof. Michael von Reutern (Germany), and Prof. Massimo Del Sette (Italy).

„Honorary Plaque" – to the BSNCH founders.

Forums of the BSNCH

Since 2005 a lot of activities have been organized: annual scientific meetings with international participation, short courses, educational workshops according to medical universities programs and highly specialized activities in Neurology. BSNCH was the organizer and host of the 16th World Neu-

От ляво на дясно: Й. Фандъкова, акад. проф. Е. Титянова и проф. М. Капс.

Left to right: Mrs. Y. Fandakova, Acad. E. Titianova and Prof. Kaps.

От ляво на дясно: проф. Зиблер, проф. Нидеркорн, проф. фон Ройтер, проф. Капс, проф. Хетцел и акад. Титянова.

Left to right: Prof. Siebler, Prof. Niederkorn, Prof. von Reuter, Prof. Kaps, Prof. Hetzel and Acad. Titianova.

Младежки форум „Ултразвуковите технологии – предизвикателства сред младите медици“ (2013).

Youth Forum “Ultrasound Technologies – Challenges Before Young Doctors” (2013).

октомври 2014, София) и на международния семинар „Ултразвуковите технологии – предизвикателства сред младите медици“, финансиран от програмата „Младежта в действие“ на Европейската комисия“ (Project № BG13/A3.1.2/225/R2 – 15-20 октомври 2013, София).

Тези прояви, които се отличават с широк спектър на научна тематика и интердисциплинарно национално и международно участие, са безспорен успех на българската неврология и невросонология. Те са отразени и продължават да се отразяват в официалните печатни органи и сайтове на различни национални, европейски и световни научни организации.

Кръжочна дейност

Тя се развива от 2010 година под ръководството на акад. проф. Е. Титянова съвместно с Медицинския факултет на Софийския университет и Националната спортна академия. Сдружението подпомага участието на млади

rosonology Meeting of the World Federation of Neurology (October 17–20, 2013, Sofia), the first regional training course of the European Academy of Neurology (October 2–5, 2014, Sofia), the international seminar „Ultrasound Technologies – Challenges before Young Doctors“, financed by the „Youth in Action Programme“ of the European Commission (Project № BG13/A3.1.2/225/R2 – October 15–20, 2013, Sofia).

These events, which feature a wide range of scientific topics and interdisciplinary national and international participation, are an indisputable success for the Bulgarian Neurology and Neurosonology. They are recognized and continue to be reflected in the official press and sites of various national, European and international scientific organizations.

Workshop activity

It has been developing since 2010 under the leadership of Acad. Prof. E. Titianova jointly with the Medical Faculty of Sofia University and the

Над 150 лекари и студенти участваха в Световния обучителен курс по невросонология в НДК (2013).

Over 150 doctors and students participated in the World Neurosonology Training Course held in the National Palace of Culture (2013).

Кръжочници от СУ „Св. Климент Охридски“ във форум на БАНМХ (Варна, 2012).

Students of Sofia University „St. Kliment Ohridski“ (Varna, 2012).

невролози, докторанти, студенти по медицина, медицинска рехабилитация и ерготерапия и студенти по кинезитерапия в обучителните курсове и научните форуми, организирани от Асоциацията. В кръжока се формира интерес към научната дейност чрез подготовка на презентации, научни обзори и постери. Получени са две научни награди от кръжочници – първа награда за най-добър постер на 16-я Световен форум по невросонология (С. Николов и

National Sports Academy. The Society supports the participation of young neurologists, students in medicine, medical rehabilitation and occupational therapy and physiotherapy students in training courses and scientific forums organized by BSNCH. The goal is to form an interest for scientific activities by preparing presentations, scientific posters and reviews. Two awards were received by participants in this activity – first prize for the best poster of the 16th World Neu-

Регионален обучителен курс на ЕАН (София, 2014).

Regional Teaching Course of the EAN (Sofia, 2014).

съавт., 2013) и грамота от постерна сесия на Националния конгрес по неврология (И. Талаганова и съавт., 2015).

Научна дейност

За периода 2005–2015 година са организирани: 9 научни срещи с международно участие, 1 национален конгрес, над 30 научни симпозиуми и обучителни курсове, един световен научен форум и един международен семинар по проект на Европейската комисия. Членовете на сдружението са участвали с над 40 научни статии и над 70 научни съобщения в различни национални и международни научни издания и форуми.

Акад. проф. Титянова има съществен принос за въвеждането на четири-измерния ултразвук в неврологията и за утвърждаване на направленията невро-офталмо-сонология и невро-миосонология. През 2009 година презентацията „Четириизмерна ултразвукова диагностика в неврологията“ с автори Е. Титянова, С. Каракънева, С. Чернинкова и И. Търнев получава наградата “Merrill Spencer” на 14-та среща на Европейската асоциация по невросонология и мозъчна хемодинамика.

Издателска дейност

Асоциацията издава специализирано двуезично (на български и английски език) периодично научно списание „Невросонология и мозъчна хемодинамика“ с честота 2 книжки годишно. Негов главен редактор е акад. проф. Екатерина Титянова, съредактори са акад. проф. Емилия Христова и доц. Ирена Велчева, научен секретар е доц. Бойко Стаменов, а технически секретар – д-р Радостина Димова.

rosonology Meeting (S. Nikolov et al., 2013) and a diploma from the poster session of the National Congress of Neurology (I. Talaganova et al., 2015).

Scientific activity

Nine scientific meetings with international participation, one National Congress, over 30 symposia and training courses, one world scientific forum and one international seminar of the European Commission were organized for the period 2005–2015. Members of BSNCH participated with 40 scientific articles and more than 70 scientific reports in various national and international scientific journals and forums.

Acad. Prof. Titianova has a significant contribution to the introduction of four-dimensional ultrasound in Neurology and to the promotion of Neuro-ophthalmo-sonology and Neuro-myosonology. In 2009 the presentation „Four-dimensional Ultrasound Diagnostics in Neurology“ by E. Titianova, S. Karakaneva, S. Cherninkova and I. Tournev received the „Merrill Spencer“ award of the 14th Meeting of the European Association of Neurosonology and Cerebral Hemodynamics.

Publishing activity

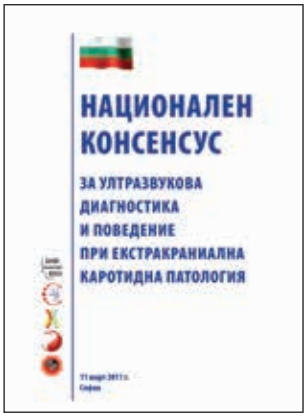
The Society publishes a specialized bilingual (Bulgarian and English) periodical scientific journal „Neurosonology and Cerebral Hemodynamics“ with a frequency of 2 books per year. Acad. Prof. Ekaterina Titianova is the Editor-in-Chief of the journal, with Co-Editors Acad. Prof. Emilia Christova and Assoc. Prof. Irena Velcheva, Scientific Secretary Assoc. Prof. Boyko Stamenov

Награда „Merrill Spencer”
(Рига – Латвия, 2009).

Merrill Spencer Award
(Riga, Latvia, 2009).

От ляво на дясно:
Р. Аслид, Е. Титянова и К. Нидеркорн.

Left to right:
R. Aaslid, E. Titianova and K. Niederkorn.



Издания на Българската асоциация по невросонология и мозъчна хемодинамика.

Editions of the Bulgarian Society of Neurosonology and Cerebral Hemodynamics.

Международен редакционен съвет спомага за високото качество на научните публикации и подбора на редакционните статии. Графичният дизайн на списанието се прави от г-жа Елена Колева чрез издателска къща „КОТИ" ЕООД. Списанието се разпространява онлайн и безплатно сред членовете на Асоциацията, българските библиотеки и по линия на международния книгообмен чрез Централната медицинска библиотека. През 2014 година бе честван 10-годишен юбилей на списанието, който е отразен в интернет-страницата на Асоциацията www.neurosonology-bg.com.

Със съдействие на БАНМХ са издадени няколко учебни помагала по невросонология: Ултразвукова диагностика в неврологията (с автор Е. Титянова), Атлас по невросонология (под редакцията на Е. Титянова, К. Нидеркорн и Е. Христова), Национален консенсус по ултразвукова диагностика и поведение при екстракраниална

and Technical Secretary – Dr. Radostina Dimova. An international Editorial Board promotes the high quality of scientific publications and selection of editorials. The graphic design of the journal is made by Ms. Elena Koleva trough the Publishing House „Coty" LTD. The journal is distributed online and free for the members of BSNCH and Bulgarian libraries and participates in the international book exchange through the Central Medical Library. The 10th anniversary of the journal was celebrated in 2014 (reported in the journal and on the website of the Society www.neurosonology-bg.com).

With the assistance of BSNCH several textbooks on Neurosonology were issued: "Ultrasound Diagnosis in Neurology" (Ekaterina Titianova) "Atlas of Neurosonology" (edited by Ekaterina Titianova Kurt Niederkorn and Emilia Christova) "National Consensus in Ultrasound Diagnostics and Behavior in Extracranial Carotid Pathology"

Авторите на „Атлас по невросонология". Отляво надясно: Г. Е. Клайн (Австрия), С. Каракънева (България), Е. Б. Рингелщайн (Германия), Е. Титянова (България), К. Нидеркорн (Австрия), Е. Христова (България), 2008.

Authors of "Atlas of Neurosonology". Left to right: G.E. Klein (Austria), S. Karakaneva (Bulgaria), E. B. Ringelstein (Germany), E. Titianova (Bulgaria), K. Niederkorn (Austria), E. Christova (Bulgaria), 2008.

Курс на Европейското дружество по невросонология и мозъчна хемодинамика (Будапеща, 2010).

Teaching Course of the European Society of Neurosonology and Cerebral Hemodynamics (Budapest, 2010).

каротидна патология (под редакцията на Е. Титянова, П. Стаменова, К. Гиров, И. Петров, И. Велчева) и първи национален справочник „Българската невросонология – кой кой е“ (под ред. на Е. Титянова, С. Андонова и С. Каракънева).

Партньорство

Българската асоциация по невросонология и мозъчна хемодинамика си партнира с различни български институции и неправителствени организации – Българското дружество по неврология, Медицинските университети в София, Плевен, Пловдив и Варна, Военномедицинска академия, Българското дружество по ендоваскуларна терапия, Българското национално дружество по съдова хирургия и ангиология, Българската академия на науките и изкуствата, Научното дружество по флебология, Българската диабетна асоциация, Асоциацията за развитие на планинските общини в Република

(edited by E. Titianova, P. Stamenova. K. Girov, I. Petrov and I. Velcheva) and the first national guide „Bulgarian Neurosonology – Who‘s Who“ (edited by Ekaterina Titianova, Silva Andonova and Sonya Karakaneva).

Partnership

The Bulgarian Society of Neurosonology and Cerebral Hemodynamics is a partner with various Bulgarian institutions and nongovernmental organizations – the Bulgarian Society of Neurology, Medical Universities in Sofia, Pleven, Plovdiv and Varna, Military Medical Academy, Bulgarian Society of Endovascular Therapy, Bulgarian National Society for Vascular Surgery, Bulgarian Academy of Sciences and Arts, Scientific Society of Phlebology, Bulgarian Diabetes Association, the Association for Development of Mountain Municipalities in Republic of Bulgaria and others. Since 2014 the Society

Лекция на акад. проф. д-р Титянова в Медицинския факултет в Белград, 2015 г.

Lecture of Acad. Prof. E.Titianova in Belgrade Medical Faculty, 2015.

България и др. От 2014 г. Асоциацията е член на Съюза на българските медицински специалисти. Тя поддържа контакти на сътрудничество и взаимопомощ с представителствата на фармацевтичните фирми у нас – Gedeon Richter, Actavis, Wörvag Pharma, Sanofi-Aventis, Pfizer, UCB, Астра-Зенека, Екофарма и др. Техните рекламни и спонсорски програми подпомагат дейността на Асоциацията и участието на специалистите в провежданите от нея форуми.

За 16-я Световен форум по невросонология сдружението беше активно подкрепено от кмета на Столична община – г-жа Йорданка Фандъкова като Патрон на събитието.

Сдружението е партньор на Европейската асоциация по невросонология и мозъчна хемодинамика (ESNCH), Изследователската група по невросонология към Световната федерация по неврология (NSRG), Японското дружество по невросонология, Грузинското дружество по невросонология и мозъчна хемодинамика (GSNCH), Медицинския университет в Грац – Австрия, Сръбската национална асоциация по невроангиология, Мексиканския научен институт по неврология и неврохирургия, Финландската академия, Сръбската кралска академия и др. Израз на добро сътрудничество е участието на изтъкнати чуждестранни учени в рубриките на списанието и в ежегодните международни симпозиуми, организирани от Асоциацията.

Високо признание за българската невросонология е избора на акад. Титянова за член на Управителния съвет на Изследователската група по невросонология към Световната федерация по неврология в два последователни мандата (2009–2017). Тя е лектор в обучителните курсове по невросонология на Европейското дружество по невросонология и мозъчна хемодинамика и Световната федерация по неврология. Била е гост лектор по невросонология по покана на Грузинското дружество по невросонология и мозъчна хемодинамика (2014), Европейската академия по неврология (2014) и Медицинския факултет на Университета в Белград (2015). От 2015 година е академик на Сръбската кралска академия на науките и изкуствата.

Културен обмен

Всички форуми на БАНМХ предоставят възможност на българските и чуждестранните участници да опознаят бита и културата на българската нация, формирани в течение на хилядолетия. Всяко събитие е съпроводено от подбрана културна програма, която отразява местните обичаи, обреди и традиции съобразно с региона, в който то се провежда. Национа-

is a member of the Union of the Bulgarian Medical Specialists. It maintains contacts of cooperation and mutual assistance with a lot of pharmaceutical companies in the country – Gedeon Richter, Actavis, Wörvag Pharma, Sanofi-Aventis, Pfizer, UCB, Astra-Zeneca, Ecopharm and others. Their advertising and sponsorship programs support the Society's activities and the participation of professionals in its ongoing forums.

The 16th World Neurosonology Meeting was actively supported by the Mayor of Sofia – Mrs. Yordanka Fandakova as a Patron of the event.

The Society is a partner of the European Association of Neurosonology and Cerebral Hemodynamics (ESNCH), Neurosonology Research Group of the World Federation of Neurology (NSRG), Japanese Society of Neurosonology, Georgian Society of Neurosonology and Cerebral Hemodynamics (GSNCH), Medical University of Graz – Austria, Serbian National Association of Neurology, Mexico Research Institute of Neurology and Neurosurgery, Academy of Finland, the Serbian Royal Academy and others. The participation of prominent foreign scientists in the journal and in the annual international symposia organized by BSNCH is an expression of this good cooperation.

The election of Acad. Titianova as a member of the Board of the Neurosonology Research Group of the World Federation of Neurology for two consecutive terms (2009–2017) is a high recognition for the Bulgarian Neurosonology. She is a lecturer in Neurosonology training courses organized by the European Society of Neurosonology and Cerebral Hemodynamics and the World Federation of Neurology. She was a guest lecturer of the Georgian Society of Neurosonology and Cerebral Hemodynamics (2014), European Academy of Neurology (2014) and the Faculty of Medicine of the Belgrade University (2015). In 2015 she became an Academician of the Serbian Royal Academy of Sciences and Arts.

Cultural exchange

All forums of the BSNCH enable Bulgarian and foreign participants to get to know the culture of Bulgarian nation formed over thousands of years. Each event is accompanied by selected cultural program that reflects local customs, rituals and traditions according to the region in which it takes place. National Museums, dancers in beautiful folklor costumes, voiced folk dances and bagpipes and delicious Bulgarian dishes touch permanently the hearts of foreign who refer unique memories of their stay in Bulgaria. Many of them return again and again!

Перперикон, 2007.
Perperikon, 2007.

налните музеи, танцьорите в красиви български носии, звучните фолклорни танци и гайди и вкусните български гозби докосват трайно сърцата на чуждестранните участници, които отнасят уникални спомени за своето пребиваване в България. Много от тях се връщат отново и отново!

Перспективи

През изминалото десетилетие Българската асоциация по невросонология и мозъчна хемодинамика създаде съвременна школа по невросонология и утвърди традиции в изграждането на високо квалифицирани и европейски сертифицирани специалисти в областта на диагностичния и терапевтичен ултразвук в неврологията. Принос за това имат членовете на Сдружението, нашите български и чуждестранни партньори и спонсори, както и многобройните ни симпатизанти и поддръжници.

Българската асоциация по невросонология и мозъчна хемодинамика се ползва с национално и международно признание и авторитет, което ни дава удовлетвореност, зарежда ни с нова енергия и оптимизъм за бъдещето при изпълнение на мисията, за която сме създадени.

От Управителния съвет на БАНМХ

Perspectives

Over the past decade BSNCH created a modern school in Neurosonology and established traditions in building highly qualified and certified European specialists in the field of the diagnostic and therapeutic ultrasound in Neurology. The members of the Society, our Bulgarian and foreign partners and sponsors and many sympathizers and supporters contributed for the achievement of this goal.

The Bulgarian Society of Neurosonology and Cerebral Hemodynamics enjoys a national and international recognition and prestige that gives us satisfaction, loads us with new energy and optimism for the future in carrying out the mission for which we are created.

By the Editorial Board of BSNCH

Българо-сръбско сътрудничество в областта на невросонологията

Bulgarian-Serbian Cooperation in the Field of Neurosonology

Университетска клиника по неврология в Белград.
От ляво на дясно: Проф. Н. Стернич, доц. М. Михайлович и акад. проф. Е.Титянова.

University Clinic of Neurology in Belgrade.
From left to right: Prof. N. Sternic, Assoc. Prof. M. Mihajlovic and Acad. Prof. E. Titianova.

Между България и Сърбия съществуват дългогодишни традиции на научно сътрудничество в областта на медицината, а от 2012 г. – и в областта на невросонологията.

Българската асоциация по невросонография и мозъчна хемодинамика спонсорира участието на сръбски лектори и млади невролози в Световния форум по невросонология на Световната федерация по неврология, проведен в София през 2013 г., първия регионален курс по неврология на Европейската академия по неврология в София през 2014 г. и Първия национален конгрес по невросонология и мозъчна хемодинамика на БАНМХ с международно участие в София през 2015 г.

Сръбското национално дружество по невроангиология бе партньор в проекта на Европейската комисия „Ултразвуковите технология – предизвикателства пред младите медици“, в което участваха 10 млади лекари от Сърбия.

В началото на 2014 г. Българската академия на науките и изкуствата и Сръбската

Bulgaria and Serbia have established long-term traditions of scientific cooperation in the field of medicine, including neurosonology since 2012.

The Bulgarian Society of Neurosonology and Cerebral Hemodynamics (BSNCH) sponsored Serbian lecturers and young neurologists for their participation in several important scientific forums: the World Neurosonology Meeting of the World Federation of Neurology, conducted in Sofia in 2013; the First Regional Teaching Course of the European Academy of Neurology held in Sofia, 2014, and the First BSNCH National Congress of Neurosonology with international participation in Sofia, 2015.

The Serbian National Association of Neuroangiology participated as a partner in the Project of the European Commission: “Ultrasound Technologies – Challenges Before Young Doctors” where 10 Serbian young doctors took part in.

At the beginning of 2014 the Bulgarian Academy of Sciences and Arts and the Serbian Royal Academy of Sciences and Arts signed a 5-year

кралска академия на науките и изкуствата подписаха 5-годишен договор за съвместна изследователска, образователна дейност и културен обмен.

По покана на Декана на Медицинския факултет на Университета в Белград през май 2015 г. акад. проф. Е. Титянова изнесе две лекции в областта на невросонологията в Белград. По време на своята визита тя връчи поздравителен адрес от проф. Л. Спасов, декан на Медицинския факултет на СУ „Св. Кл. Охридски". Дискутирани бяха възможностите за съвместно сътрудничество между двата медицински факултета по новите програми за трансгранично сътрудничество на Европейската комисия.

На 4 октомври 2015 г. в София се провежда Първият българо-сръбския симпозиум на тема „Иновации в медицината", организиран от БАНМХ съместно с Българската и Сръбската кралска академии на науките и изкуствата.

От 2015 г. в списанието „Невросонология и мозъчна хемодинамика" се създава рубриката „Сръбска невросонология" под редакцията на проф. Н. Стернич и доц. М. Михайлович. Тя е част от идеята за „Балканска невросонология", която да обедини научните и научно-практически интереси в областта на ултразвуковата диагностика на нервната система на страните от Югоизточна Европа.

Пожелаваме успех на бъдещото балканско и българо-сръбско научно сътрудничество!

От Редакционната колегия

contract for cooperation in science, educational activities and cultural exchange.

In May 2015 Acad. Prof. Ekaterina Titianova was invited by the Dean of the Medical Faculty of the University of Belgrade to present two public lectures in the field of Neurosonology. During her visit there she also acquainted the audience with an official address by prof. Lyubomir Spasov, Dean of the Medical Faculty of Sofia University "St. Kliment Ohridski". Opportunities for joint cooperation between the two medical faculties have been discussed based on the potential development which Bulgarian-Serbian transborder programs of the European Commission provide.

The first Bulgarian-Serbian symposium "Innovations in medicine" is organized on 4th of October 2015 by the Bulgarian Society of Neurosonology and Cerebral Hemodymics, the Bulgarian Academy of Sciences and Arts and the Serbian Royal Academy of Sciences and Arts.

Since 2015 the scientific Journal "Neurosonology and Cerebral Hemodynamics" creates the rubric "Serbian Neurosonology" edited by Prof. Nadezhda Sternic and Assoc. prof. Milija Mijajlovic from Serbia. It is part of the idea of "Balkan Neurosonolgy", uniting scientific and practical interests in the field of ultrasound diagnosis of the nervous system in the countries of the Southeast Europe.

We wish success of the future Balkan and Bulgarian-Serbian scientific co-operation!

From the Editorial Board

Correlation between Transcranial Contrast Ultrasound and Transesophageal Echocardiography in Detection of right-to-left Cardiac Shunts

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Key words:
contrast-enhanced TCD, contrast transesophageal echocardiography (TEE), right-to-left cardiac shunt

Objective: Atrial septal defect and consequently the existence of right-to-left cardiac shunt (RLS) is a very common etiological factor in the onset of ischemic stroke and transient ischemic attack (TIA) in younger patients. Since the contrast transesophageal echocardiography (c-TEE) is considered the "gold" standard for right-to-left cardiac shunt detection, we compared its sensitivity with the sensitivity of contrast-enhanced transcranial Doppler ultrasound (TCD). We also studied the influence of vascular risk factors on TCD parameters.

Materials and methods: We conducted a retrospective review of de-identified reports from 58 patients with positive TCD that were subsequently subjected to c-TEE examination. Data were collected on vascular risk factors (hypertension, diabetes, dyslipidemia, smoking), as well as on the possible association between right-to-left cardiac shunt with changes in the carotid arteries (carotid intima-media thickness (CIMT), the presence of carotid plaque) and the presence of deep venous thrombosis (DVT).

Results: Correlation between TCD and c-TEE was found in 4 of 58 patients (6.9% of the cases). As for vascular risk factors, only statistically significant association between smoking and the total number of microembolic signal (MES) without Valsalva maneuver (VM) was observed ($p<0.05$). DVT was registered in 5.2% of patients and statistically, it correlates significantly positively with the total number of MES ($r=0.303$ and $p<0.05$), with the number of MES in the middle cerebral artery on the right ($r=0.293$, $p<0.05$) and with the number of contrast bubbles without VM ($r=0.273$, $p<0.05$). The number of MES without VM positively correlates with the interatrial septal defect (patent foramen ovale and atrial septal aneurysm) and the existing shunt ($p<0.05$). A significant positive correlation between CIMT thickness and the time of appearance of MES ($r=0.334$, $p<0.05$) was found.

Conclusion: Despite the greater sensitivity of TCD compared with c-TEE, these two methods are complementary in right-to-left cardiac shunt detection which represent an important etiological factor in the onset of ischemic stroke and TIA in patients under the age of 55.

Корелация между транскраниалната контрастна невросонография и трансезофагиалната ехокардиография при диагноза на дясно-ляв сърдечен шънт

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Ключови думи:
дясно-ляв сърдечен шънт, контрастна трансезофагиална ехокардиография, контрастна ТДС

Цел: Предсърдният септален дефект и дясно-левият сърдечен шънт (RLS) са честа причина за исхемичен мозъчен инсулт и преходни исхемични атаки (ТИА) при по-млади пациенти. Цел на проучването е да се сравни диагностичната чувствителност на трансезофагиалната ехокардиография (с-ТЕЕ), приета за "златен" стандарт, и контрастно усилената транскраниална доплерова сонография (ТДС) при дясно-ляв сърдечен шънт и се оцени влиянието на съдовите рискови фактори върху оценяваните невросонографни показатели.

Материали и методи: Проведен е ретроспективен анализ при 58 болни с положителен резултат от изследванията с ТДС и с-ТЕЕ. Оценявани са съдовите рискови фактори (хипертония, диабет, дислипидемия и тютюнопушене), сонографните промени на съните артерии (дебелина на интима-медия комплекса (ИМК) и наличие на каротидни плаки) и наличието на дълбока венозна тромбоза (ДВТ).

Резултати: Корелация между ТДС и с-ТЕЕ е намерена в 4 от 58 пациенти (6,9%). Установява се статистически значима връзка между тютюнопушенето и регистрирания общ брой микроемболични сигнали (МЕС) без прилагане на пробата на Valsalva ($p<0.05$). Дълбока венозна тромбоза се регистрира в 5.2%, което корелира положително с общия брой на МЕС ($r=0.303$ и $p<0.05$), броя на МЕС в басейна на дясна средна мозъчна артерия ($R=0.293$, $p<0.05$) и броя на контрастните мехурчета без прилагане на пробата на Valsalva ($r=0.273$, $p<0.05$). Броят на МЕС без пробата на Valsalva корелира с наличието на междупредсърден дефект (отворен форамен овале и предсърдно септална аневризма) и шънт ($p<0.05$). Установява се и значима положителна корелация между дебелината на ИМК и времето за поява на МЕС (с 0.334, $p<0.05$).

Обсъждане: Двата метода (ТДС и с-ТЕЕ) се допълват при диагноза на дясноляв сърдечен шънт, който е важен етиологичен фактор за поява на исхемичен мозъчен инсулт и/или ТИА при пациенти под 55-годишна възраст.

Right-to-left (R-L) cardiac shunt is a pathological communication between the right and left heart chambers, which occurs as a result of disturbed embryonic development of the human heart. It may exist in the form of a patent foramen ovale (PFO), at the site of physiological communication during the intrauterine period, or in the form of atrial septal defect (ASD), an abnormality in the structure of the interatrial wall. With a prevalence of about 20% in the general population, PFO is the most common type of R-L cardiac shunt [1].

Several studies have shown a significantly higher prevalence of PFO in patients who have suffered from (cryptogenic) stroke compared to healthy subjects, with prevalence from 41% to 50% [2]. The existence of atrial septal aneurysm (ASA) along with PFO, further increases the risk of ischemic stroke [3]. PFO can be detected in up to 50% of people under the age of 55, who suffered a stroke [4]. It is therefore of the most importance to detect the existence of the shunt, not only to prevent stroke, but to determine the role of the shunt in stroke etiology. Nowadays two complementary methods for detection of R-L cardiac shunts are used. These are the contrast transcranial Doppler (c-TCD) and the contrast transesophageal echo of the heart (c-TEE). c-TEE is considered the "gold" standard in the detection of R-L cardiac shunts and it is an invasive method that allows direct visualization of the heart chambers and precise localization of the shunt. c-TCD is a complementary method to c-TEE for R-L cardiac shunts detection, and it is based on detection of intravenously administered contrast in ultrasound range of investigated intracerebral arteries, usually the middle cerebral artery (MCA) and it is called "bubble test" because agitated saline enriched with microbubbles of air is used as a contrast agent. When performing the "bubble test", in case of a shunt, a contrast agent injected into the antecubital vein enters the cerebral arterial circulation and it is detected as microembolic signal (MES) in the MCA spectrum. One study showed higher sensitivity of c-TEE than c-TCD in the R-L cardiac shunt detection (92.3% vs. 84.6%), while Souteyrand et al. point out somewhat greater sensitivity of c-TCD [2,5]. There are studies that do not favor either of these methods, as shunts were detected by one method but not by the other method and vice versa [2].

The aim of our study was to compare c-TCD ("bubble test") with the "gold" standard (c-TEE) in detection of right-to-left cardiac shunt on a selected sample of patients with transient ischemic attack (TIA) and/or ischemic stroke. Sensitivity and specificity of the "bubble test" for the detection of right-to-left cardiac shunts, as well as the association with vascular risk factors, were also tested.

Materials and methods

A retrospective cross sectional study was conducted at the Neurology Clinic of the Clinical Center of Serbia. The study included patients who were treated ambulatory and in hospital during the period from 2010 to 2013. The selection of patients was made from hospital records for patient registration and the inclusion criterion encompassed registered positive c-TCD ("bubble test") followed by performed c-TEE in patients with TIA and/or ischemic stroke. A total of 58 patients were included in the study with both mentioned contrast methods for detection of R-L cardiac shunt performed at the same time.

Then outpatient and inpatient medical histories of patients were analyzed from the hospital information system Infomedis in order to collect demographic and ultrasound data, as well as data on vascular risk factors.

A c-TCD test with air bubbles ("bubble test") was carried out in all included patients. The test

is considered positive if intravenously injected contrast agent in the tested range of intracerebral artery (MCA) is detected.

A mixture of 9 ml of saline and 1 ml of air was used as a contrast agent, which is shaken several times in order to create microbubbles as ultrasound contrast. If there is R-L cardiac shunt, the contrast agent reaches the cerebral arterial circulation and contrast microbubbles are detected in ultrasound range of the tested blood vessel in the form of MES with the use of 2 MHz ultrasound probes of TCD appliance of the brand Rimed Digi-Lite (Rimed Ltd., Israel). The test is considered positive even if one MES is detected. First the test was performed without, and then with the Valsalva maneuver to increase the sensitivity of shunt detection. The size of the shunt was determined based on the number of detected microbubbles (shunt grade I-V). Then c-TEE was performed in these patients because of the positive results of the "bubble test". The test is carried out by injecting contrast agent (agitated saline) into the cubital vein and then it is monitored using transesophageal ultrasound probe whether there is transition of the contrast from the right to the left heart chambers. The Valsalva maneuver was performed during c-TEE examination, because in this manner the pressure in the right atrium is increased, thereby increasing the possibility to detect small or latent PFO or shunts. Presence of isolated PFO, ASD, ASA, and PFO with ASA was observed. The test is considered positive if at least one MES in the left atrium is detected during 3 cardiac cycles, from the moment of appearance of intravenously injected contrast into the right atrium. C-TEE test was performed in all patients by a trained cardiologist, upon written consent of the patient, using the ultrasound device Toshiba APLI 300 CV (Toshiba, Japan) and transesophageal ultrasound probe.

Basic demographic data on age and sex, as well as data on the presence of vascular risk factors were collected from patients' medical histories:

1. Hypertension (an indicator of hypertension was a systolic blood pressure greater than 140 mmHg and/or diastolic blood pressure greater than 90 mmHg, or if the patient was on medicines for treating high blood pressure).

2. Diabetes (patients are considered to be suffering from diabetes only if this condition had been previously diagnosed by an endocrinologist or if they have been receiving anti-diabetic therapy)

3. Dyslipidemia (based on blood tests and elevated levels of total cholesterol, low-density LDL cholesterol, triglycerides or if treated with hypolipemics for already diagnosed dyslipidemia)

4. It has been also recorded whether the patient is a smoker or non-smoker from medical history.

Ultrasound findings of the carotid arteries were recorded (intima-media complex thickness – IMT and the presence of carotid plaques), ultrasound examination of the carotid blood vessels using the ultrasonic device Aloka Prosound Alpha 10 (Aloka, Japan) with a linear ultrasound probe 5–13 MHz. Possible presence of deep venous thrombosis (DVT) was also recorded by ultrasound examination.

Statistical analysis

Data were analyzed by parametric or non-parametric statistical methods.

The research results are presented in tables. Descriptive statistical parameters of observed characteristics, mean values, standard deviation, and minimum and maximum of all values are presented.

We used the method of univariate statistical analysis to determine the statistically significant differences (Pearson's $\chi 2$-test and Sperman rho test for determining the relationship between parameters). The statistical SPSS package was used for the purpose of data processing.

We accepted the statistically significant differences if $p<0.05$, and cases where $p<0.01$ were separately indicated.

Results

The study cohort comprised of 58 patients, of whom 67.2% were women and 32.8% men. According to age, patients encompass a population from 19 to 66 years, with an average age for the entire group of 36 years.

The "bubble test" results were positive in all 58 patients and R-L cardiac shunt was detected, the lowest grade I and the highest IV. The most detected were R-L shunts grade I (48.3%, i.e. 28 of 58 cases), and the least detected were RL shunts of the largest registered grade IV (5.2%, 3 of 58 cases) (Table 1). The minimum number of total registered MES (contrast bubbles) is 1 and the maximum 182. The largest number of

Table 1. Grade R-L cardiac shunt (incidence) detected by c-TCD.

Bubble grade	Number	Percent %
I	28	48,3
II	17	29,3
III	10	17,2
IV	3	5,2
Total	58	100

Table 2. Incidence of anatomic interatrial septum defects registered by c-TEE.

Interatrial defects	Presence	Absence	Total
PFO	22 (37.9%)	36 (62.1%)	58 (100%)
ASA	11 (19.0%)	47 (81.0%)	58 (100%)
ASD	1 (1.7%)	57 (98.3%)	58 (100%)
PFO+ASA	8 (13.8%)	50 (86.2%)	58 (100%)

PFO: patent foramen ovale, ASA: atrial septal aneurysm, ASD: atrial septal defect.

Table 3. Incidence of vascular risk factors in the test group.

Risk factors	Yes	No	No data
Hypertension	12 (20.7%)	42 (72.4%)	4 (6.9%)
Diabetes melitus	3 (5.2%)	51 (87.9%)	4 (6.9%)
Dyslipidemia	14 (24.1%)	40 (69.0%)	4 (6.9%)
Smoking	18 (31.0%)	35 (60.3%)	5 (8.6%)

registered MES right was 90 and left 92. Without VM the maximum number of MES was 121, and with VM 61.

Time of appearance of contrast microbubbles is in the range of 4-18 seconds (on average 9.56).

c-TEE confirmed the diagnosis of R-L shunt, detected with c-TCD in 6.9% of cases (4 of 58 patients). In patients with no R-L shunt recorded using c-TEE, other anatomic defects at the level of interatrial septum were observed in significantly larger number of cases (42/58 patients; 72.4%) in the form of PFO, ASA, ASD, or PFO with ASA (Table 2).

Vascular risk factors, as well as their effect on "bubble test" parameters, were also analyzed in all patients (Table 3). The highest was the incidence of smoking (31%), and somewhat lower the incidence of dyslipidemia (24.1%) and hypertension (20.7%).

Statistically significant correlation between smoking and total number of MES without VM has been observed ($r=0.308$; $p<0.05$) (Table 4).

There was no statistically significant correlation between the total number of MES with or without VM with and other vascular risk factors (hypertension: $r=0.150$, $p>0.05$; DM: $r=-0.39$, $p>0.05$; dyslipidemia: $r=0.091$, $p>0.05$), nor correlation between smoking and other "bubble test" parameters.

Presence of DVT was analyzed in the study group and established in 3 out of 55 patients (5.2%) with recorded data. There was statistically significant positive correlation between the presence of DVT and the total number of MES ($r=0.303$, $p<0.05$), the number of microbubbles in the right MCA ($r=0.293$, $p<0.05$), and the number of contrast bubbles without VM ($r=0.273$, $p<0.05$) (Table 4). The number of MES without VM positively correlates with interatrial septal defect (PFO + ASA) ($r=0.262$, $p<0.05$) and the existing R-L shunt ($r=0.303$, $p<0.05$) (Table 4).

With regard to ultrasonic parameters, IMC thickness in the carotid arteries (ranged from 0.4 mm to 2 mm; mean IMC thickness on both sides for the whole group was 0.84 mm) and the presence of carotid plaques in the common and internal carotid arteries were registered (Table 5), the value of IMC thickness greater than 2 mm being marked as plaque. There was a statistically significant positive correlation between IMC thickness and time of MES appearance in cerebral blood flow (MCA) ($r=0.334$, $p<0.05$) (Table 4). There was no correlation between IMC thickness and other c-TCD and c-TEE parameters, nor correlation between the presence of carotid plaques and the degree of carotid stenosis, and examined parameters of c-TCD and c-TEE ($p>0.05$ for all variables). Among the 55 patients for whom data were available, 43 (78.2%) had no plaques in the right carotid arteries, whereas a diameter stenosis to 30% was registered in 8 patients (14.5%) and between 30% and 50% in 4 patients

Table 4. Correlation between parameters of "bubble test" and DVT, IMC thickness and smoking.

Correlation	R	P
MES total number right vs. DVT	0.293	< 0.05
MES total number vs. smoking	0.308	< 0.05
MES total number vs. DVT	0.303	< 0.05
MES without VM vs. DVT	0.273	< 0.05
MES without VM vs. PFO + ASA	0.262	< 0.05
MES without VM vs. R-D shunt	0.303	< 0.05
Time of MES appearance vs. IMC	0.334	< 0.05

DVT: deep venous thrombosis, IMC: intimomedial complex, MES: microembolic signals, VM: Valsalva maneuver.

Table 5. Presence of plaques in the right and left common and internal carotid artery.

	Yes	No	No data
Carotid plaque right	12 (20.70%)	43 (74.10%)	3 (5.2%)
Carotid plaque left	9 (15.50%)	46 (79.30%)	3 (5.2%)
Carotid plaque both sides	8 (13.79%)	47 (81.01%)	3 (5.2%)

(7.3%). In the left carotid arteries, plaques were not registered in 46 patients (83.7%), diameter stenosis to 30 % was registered in 8 (14.5%) and diameter stenosis between 30% and 50% in 1 patient (1.8%). Carotid plaques over 50% were not registered in any of the patients. Presence of unstable plaques was also not registered.

Discussion

Our study shows that the degree of correlation between the two methods for detecting R-L shunt, c-TCD and c-TEE is very low, and exists only in 6.9% of the cases. According to our research, c-TCD has much greater sensitivity (R-L shunt was detected by c-TCD in all 58 selected patients, whereas the shunt was detected by c-TEE in 4 patients). However, high percentage (72.4%) of other interatrial septal abnormalities as possible R-L shunt sites were detected by c-TEE examination. In contrast to our findings, some studies have shown a significant correlation between c-TCD and c-TEE in the detection of R-L cardiac shunts (63.6%), and also significantly higher sensitivity of c-TCD compared with c-TEE (93.8% c-TCD vs. 53.1% c-TEE) [2]. Prospective studies that have been done on a larger sample of patients showed no major fluctuations between the sensitivity of these two complementary contrast test, although the results of these studies are in favor of somewhat greater sensitivity of c-TCD (c-TCD – 69% vs. c-TEE – 58%) [6].

On the other hand, some studies have demonstrated greater sensitivity of c-TEE (92.3% c-TEE vs. 84.6% c-TCD) [7].

This result of our study could be attributed to the fact that the research was conducted on a small sample of highly selected patients and should not be generalized to the general population or larger series of patients, but also the sensitivity of c-TEE must not be underestimated, because a significant number of patients with a variety of interatrial septal defects (over 72% of patients) have been registered by this method. This finding implies the possibility of a shunt at the site of these anatomical defects of the interatrial septum, which was not detected by using c-TEE, namely it is possible that there are "false negative" results for R-L shunt. The reasons for "false negative" results could be the invasiveness of c-TEE method, which often prevents adequate performance of VM due to sedation of patients or appropriate application of the contrast agent. In addition, only 1 MES in the MCA spectrum is sufficient for R-L shunt detection using c-TCD, which suggests the possibility of a very small shunt not visible by c-TEE, thus making the result "false-negative". Furthermore, it should be noted as a limitation of our study, that the test was conducted on a sample of patients with already positive "bubble test", and afterwards a correlation with c-TEE was performed. Therefore, care should be taken with the estimate of "bubble test" or c-TCD sensitivity. The possibility of "false positive" results of the "bubble test" should not be ignored because of potential artifacts due to patient movement or speech, but we believe that the possibility of such findings is small, considering the fact that a special TCD software application was used for MES detection, which differentiates MES from artifacts with high certainty based on clearly defined criteria.

Vascular risk factors are etiologically important in the formation of atherosclerotic plaques, which may be the cause of ischemic stroke and/or TIA. However, studies have shown that atherosclerosis as an etiological factor in the occurrence of ischemic stroke or TIA is more common in patients without PFO (R-L shunt) than in patients with PFO [8]. This can be explained by the fact that the reasons for cerebral ischemia in young people, in whom R-L shunt is mostly detected, are not primarily atherosclerotic processes, but other rarer non-atherosclerotic etiological factors, including interatrial septal abnormalities commonly associated with R-L shunt and probable paradoxical embolization.

Our research has shown that there is no statistically significant correlation between vascular risk factors and "bubble test" results in patients with ischemic stroke/TIA. This may be due to the mainly younger population (mean age of the tested group 36 years), and to the fact that atherosclerotic changes in them were not pronounced enough to have a significant, i.e. primary etiologic impact on the occurrence of ischemic stroke and that in these patients the etiology of cerebral ischemia is often related to the existence of interatrial septal abnormalities, i.e. R-L cardiac shunt.

Moreover, a statistically significant correlation between c-TCD findings (presence of R-L shunt) and DVT, as possible source of thromboembolus and possible subsequent development of paradoxical embolism, suggests that it is necessary to insist on detection of interatrial septal abnormalities as potential sites of R-L shunt in patients with TIA and/or ischemic stroke. The reason for the low incidence of DVT detected in our study could be interpreted by the fact that it was the aim of testing in all patients and in some patients it was detected only in the lower extremities where DVT is most commonly present. However, this does not exclude the possibility that in a certain number of patients a potential source of paradoxical embolism of second localization (e.g. Mesenteric vein) was not detected, or that the ultrasound examination was postponed after the organization or dissolution of DVT, which could have been previously a source of paradoxical embolism and cerebral ischemia.

A positive correlation between IMC thickness and time of MES appearance in the cerebral arteries was also observed. Some studies have shown that in patients with cryptogenic ischemic stroke, IMC thickness positively correlates with the degree of systemic atherosclerosis development, and IMC thickness > 0.78mm is considered indicative of the search for cardiovascular sources of embolus as causes of ischemic stroke [9]. With regard to this fact, the results could be explained by the fact that pronounced thickening of IMC in the carotid arteries attributes to a more pronounced and diffuse atherosclerotic process that leads to certain hemodynamic changes in cerebral circulation, even in the absence of high-grade carotid stenosis (most of our subjects had a diameter stenosis of the carotid artery up to 50%).

Due to great variations in the sensitivity of tests for the detection of R-L cardiac shunt, there is a need for continuous search for more valid data on the real sensitivity of each of the tests in use, as well as their mutual correlation, in order to enable detection of larger number of patients with this cardiac anatomic abnormalities to take appropriate diagnostic, therapeutic and especially preventive measures on time.

Potential limitation of our study is the relatively small number of subjects, but bearing in mind that c-TEE is an invasive method that is performed rarely and in specific indications, the number of subjects in our study is comparable with most published studies dealing with this issue.

Regardless of the discrepancies in the findings of different studies about the sensitivity and specificity of contrast methods for detection of R-L cardiac shunt, it should be noted that these methods are complementary, and that c-TCD has probably somewhat higher sensitivity and it is significantly more comfortable diagnostic method for patients due to its non-invasiveness, whereas the c-TEE is indispensable method for detecting anatomical abnormalities of the heart, especially interatrial septum and it is reserved for a selected sub-population of patients with ischemic stroke.

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Heart Rate Variability in Hand-Arm Vibration Syndrome Patients

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Key words:
autonomic nervous system, hand-arm vibration syndrome, Raynaud's phenomenon

Objective: To measure heart rate variability and assess cardiac autonomic function in patients with hand-arm vibration syndrome and Raynaud's phenomenon (vRP).

Materials and Methods: Forty persons were examined: by 10 healthy subjects, vRP patients, patients with primary Raynaud's phenomenon (pRP) and patients with secondary to systemic sclerosis Raynaud's phenomenon patients (sclRP). Heart rate variability by recording ECG at rest and during active ortostatism, deep breathing and cold tests were analyzed.

Results: Increased sympathetic and decreased parasympathetic modulation at rest in all patients with Raynaud's phenomenon was established. Abnormal heart rate variability with low power spectral density in the LF and HF components and reduction of the LF/HF ratio were obtained, pointing to reduced parasympathetic control in patients with scleroderma and Raynaud's phenomenon. The measurements of cardiac vagal and adrenergic autonomic responses by deep breathing established reduced heart rate variability in the patients with hand-arm vibration syndrome and scleroderma, while the LF power is higher in the patients with hand-arm vibration syndrome than in the control subjects. The cardiac autonomic responses to orthostatism showed an increased sympathetic reactivity in the patients with hand-arm vibration syndrome and reduced reactivity in the patients with scleroderma. Hyperreactivity during orthostatism and cold test were established in the primary Raynaud's phenomenon patients, confirming the increased activity of sympathetic nervous system.

Conclusion: The established cardiac autonomic dysregulation in patients with hand-arm vibration syndrome and Raynaud's phenomenon could affect the clinical manifestations and the course of the disease.

Вариабилност на сърдечната честота при болни с вибрационна болест от локални вибрации

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Ключови думи:
автономна нервна система, вибрационна болест, R-R вариабилност, феномен на Рейно

Цел: Да се изследва сърдечно-честотната вариабилност и се оцени кардиалната автономна функция при болни с вибрационна болест и феномен на Рейно.

Материал и методика: Изследвани са 40 лица: по 10 здрави, болни с вибрационна болест и вторичен феномен на Raynaud (vRP), болни с първичен феномен на Raynaud (pRP) и болни със склеродермия и феномен на Raynaud (sclRP). Анализирана е вариабилността на R-R интервалите от ЕКГ запис в покой и по време на активен ортостатизъм, дълбоко дишане и студово въздействие.

Резултати: Установена е увеличена симпатикова и намалена парасимпатикова модулация в покой при всички групи болни с феномен на Raynaud. Наблюдава се абнормна сърдечно-честотна вариабилност с ниска мощност на спектралната гъстота при LF и HF компонентите и редуциране на отношението LF/HF, насочващи към намален парасимпатиков контрол при пациентите с феномен на Raynaud и склеродермия. Измерването на сърдечни вагусови и адренергични автономни отговори чрез дозирано дишане установява редуцирана вариабилност на R-R интервалите при болните с вибрационна болест и склеродермия, а LF мощността е по-висока при болните с вибрационна болест отколкото при контролите. Кардиалните автономни тестове при ортостатизъм показват усилен симпатиков отговор при болните с вибрационна болест и потисната реактивност

при болните със склеродермия. Хиперреактивност при ортостатизъм и студово въздействие се установява и при първичен феномен на Raynaud, потвърждаващ повишена активност на симпатиковия дял на вегетативната нервна система.

Заключение: Кардиалната автономна дисрегулация при вибрационна болест от локално вибрационно въздействие би могла да оказва влияние върху клиничните прояви и хода на протичане на заболяването.

Спектралният анализ на сърдечно-честотната вариабилност е неинвазивен метод за количествена оценка на кардиоваскуларния неврален контрол и промените в активността на автономната нервна система в покой и при функционални въздействия. Компонентите на сърдечно-честотната вариабилност оценяват степента на автономната модулация и отразяват нарушенията в барорефлексната активност и автономната дисфункция.

Сърдечно-честотната вариабилност при краткотрайни електрокардиографски записи показва типично три пика в много ниски (0 до 0.04 Hz; VLF), ниски (0.04 до 0.15 Hz; LF) и респираторни или високи (0.15 до 0.40 Hz; HF) честотни обхвата. Респираторните HF честоти на R-R интервалните флуктуации отразяват вагусовата еферентация към сърцето (флуктуациите във вагусовата активност). Ниските честоти (LF) на R-R интервалите характеризират симпатиковия неврален спектър [11]. Флуктуациите в симпатиковата и вагусовата неврална активност в покой и при външни влияния варират във времето и са в постоянно взаимодействие. Двата дяла на автономната нервна система са контролирани и балансирани [3].

Редица проучвания доказват дисфункция на автономната нервна система при вибрационна болест от локално вибровъздействие паралелно с периферни съдови, нервни и мускулно-скелетни нарушения в горните крайници [2, 5]. Установяват се повишени стойности на серумните катехоламини при хиперреактивност на симпатиковия дял на автономната нервна система при студово въздействие [14].

Цел на проучването е да се изследва сърдечночестотната вариабилност и оцени кардиалната автономна функция при болни с вибрационна болест и феномен Raynaud.

Материал и методи

Изследвани са 40 лица след писмено информирано съгласие, разпределени 4 подгрупи: първата група включва 10 здрави лица, втората – 10 болни с вибрационна болест и вторичен феномен на Raynaud (vRP), третата – 10 болни с първичен феномен на Raynaud (pRP) и четвърта – 10 болни със склеродермия и феномен на Raynaud (sclRP). Изключени

Spectral analysis of heart rate variability is a noninvasive method for quantitative evaluation of neural cardiovascular control and study of changes in the activity of the autonomic nervous system at rest and during functional effects. The components of the heart rate variability assess the extent of the autonomic modulation and reflect distortions in baroreflex activity and autonomic dysfunction. Heart rate variability in short electrocardiographic recordings shows three typical peaks in the very low (0 to 0.04 Hz; VLF), low (0.04 to 0.15 Hz; LF) and respiratory or high (0.15 to 0.40 Hz; HF) frequency bands. Respiratory HF frequencies of R-R interval fluctuations reflect vagal efferent pathway to the heart, i.e. fluctuations in vagal activity. Low frequencies (LF) of the R-R intervals characterize sympathetic neural spectrum [11]. Fluctuations in vagal and sympathetic neural activity at rest and under external influences vary over time and are in constant interaction. The two parts of the autonomic nervous system are controlled and balanced [3].

Several studies show dysfunctions of the autonomic nervous system in hand-arm vibration syndrome (HAVS) besides the characteristic peripheral vascular, neurological and musculoskeletal disorders in the upper limbs [2, 5]. Hyperreactivity of the sympathetic nervous system in hand-arm vibration syndorme patients during cold impact is established by elevated serum catecholamines [14].

The aim of the study is to measure heart rate variability and assess cardiac autonomic function in patients with hand-arm vibration syndrome and Raynaud's phenomenon (vRP).

Materials and methods

Forty persons were examined after informed consent: first group included 10 healthy subjects; second group – 10 patients with HAVS and secondary Raynaud's phenomenon (vRP); third group – 10 patients with primary Raynaud's phenomenon (pRP); fourth group – 10 patients with secondary to systemic sclerosis Raynaud's phenomenon (sclRP). Hypertensive patients with blood pressure over 140/90 mm Hg were excluded from the experimental protocol. The studies were performed in su[ine position in the morning after a light breakfast and abstinence from smoking, alcohol intake, coffee consumption and vasoactive drugs since the previ-

от експерименталния протокол са хипертензивните пациенти с артериално налягане над 140/90 mm Hg. Изследванията са извършвани в легнало изходно положение сутрин след лека закуска и въздържание от тютюнопушене, приемане на алкохол, консумация на кафе и вазоактивни медикаменти от предишната вечер. Сърдечната честота е регистрирана чрез снемане на електрогардиографски сигнали върху компютърна система.

Анализирана е софтуерно вариабилността на R-R интервалите от ЕКГ записа в покой (b1), по време на активен ортостатизъм (o), изходно положение (b2) по 5 min, дълбоко дишане за 1 min (dd), изходно положение (b3) 5 min, студово въздействие с потапяне на лявата ръка в ледена вода 50C за 30 s, 3.5 min изходно положение непосредствено след студовото въздействие – първа фаза след студов стрес (b4) и 5 min в изходно положение в периода на възстановяване след студовия тест – втора фаза след студов тест (b5).

Проведен е мощностен спектрален анализ на сърдечно-честотната вариабилност на краткотрайни ЕКГ записи за оценка на общата вариабилност на R-R интервалите, нискочестотната мощност (LF; 0.04-0.15 Hz), високочестотната мощност (HF; 0.15-0.40 Hz). Получени са ниско-честотни и високочестотни обхвати на спектралната гъстота на сърдечно-честотната вариабилност от мощностните спектри на R-R интервалите, като е използван алгоритъм за бърза трансформация по Fourier. Анализирано е и отношението на LF/HF, показател за равновесието между симпатиковата и парасимпатиковата активност [18].

Сигналите са обработени чрез програмен продукт, основан на софтуерните програми MATLAB и SUMULINK за детекция на QRS комплексите и изчисляване на показателите на сърдечно-честотната вариабилност. Показателите са анализирани чрез Student t-теста за сравнение на независими променливи при оценка по групи и за сравнение на зависими променливи при оценка в динамика. Прието е ниво на значимост $p<0.05$.

Таблица 1. Възраст и пол.
Table 1. Age and Gender.

Групи/ Groups	Мъже/ Males	Жени/ Females	Възраст/Age (years±SD)
Здрави контроли/ Controls	10	10	36.4±8.02
vRP	20	0	45.2±7.38
pRP	2	18	31.4±7.65
sclRP	2	18	55.5±12.1

vRP – вибрационна болест с феномен на Рейно; pRP – първичен феномен на Рейно; sclRP – вторичен феномен на Рейно при склеродермия.

vRP – hand-arm vibration syndrome with Raynaud's phenomenon; pRP – primary Raynaud's phenomenon; sclRP – systemic sclerosis Raynaud's phenomenon.

Резултати

Характеристика на контингента по възраст и пол е представена на табл. 1.

Изследванията на сърдечно-честотната вариабилност в четирите групи показва динамика в стойностите при функционалните тестове – ортостатичен и студов.

Спрямо контролите се установява значимо по-ниска вариабилност във втора vRP група по време на първата фаза след студовото

ous evening. Heart rate was registered by taking ECG signals on a computer system. The variability of R-R intervals of the ECG recordings were analyzed at rest as basal supine position (b1), during an active orthostasis (v), basal position (b2) – each of these phases for 5 min., followed by 1 min deep breathing (db), 5 min basal position (b3), cold test by immersion of the left hand in ice water 50C for 30 sec., and then 3.5 minutes early (b4) and 5 min. late post-cold test basal position (b5).

Power spectral analysis of the heart rate variability of short-term ECG recordings was made to assess the overall variability of R-R intervals, low frequency power (LF; 0.04-0.15 Hz), high frequency power (HF; 0.15-0.40 Hz). Low-frequency and high-frequency ranges of spectral density of the heart rate variability were received from the power spectrum of the R-R intervals using an algorithm for fast transformation of Fourier. The ratio of LF/HF, an indicator of the balance between the sympathetic and parasympathetic activity [18], was also analyzed.

The signals were processed by software based on software programs MATLAB and SUMULINK detection of the QRS complex and the calculation of the indices of heart rate variability. The indices were analyzed by Student t-test for comparison of independent variables for between group evaluation and comparison of dependent variables for within group evaluation in dynamics. A significance level $p<0.05$ was assumed.

Results

The clinical characteristics of the investigated subjects are shown at Table 1.

The heart rate variability in all four groups showed dynamic changes in the values during the applied postural, deep breathing and cold functional tests.

Таблица 2. Ниско-честотна спектрална мощност.
Table 2. Low frequency spectral power (LF).

Групи Фази	1 (msec²)	2 (msec²)	3 (msec²)	4 (msec²)	1-2 p	1-3 p	1-4 p	2-3 p	3-4 p	2-4 p
B1	412.17	415.59	471.81	236.40	0.986	0.773	0.413	0.758	0.254	0.350
O	600.75	633.070	586.45	290.58	0.841	0.922	0.046	0.753	0.035	0.031
B2	438.17	541.74	551.39	249.94	0.577	0.484	0.210	0.961	0.078	0.131
Dd	839.40	627.44	631.35	379.42	0.355	0.294	0.038	0.982	0.097	0.192
B3	424.69	901.98	561.71	319.55	0.182	0.449	0.542	0.365	0.269	0.126
C	408.23	694.45	696.63	281.60	0.335	0.107	0.529	0.995	0.101	0.227
B4	661.31	675.11	738.03	309.07	0.953	0.741	0.125	0.751	0.025	0.059
B5	567.70	756.45	607.11	361.76	0.260	0.821	0.284	0.295	0.157	0.021

B1 – изходна позиция в покой; o – ортостатизъм; b2 – изходна позиция; dd – дълбоко дишане; b3 – изходна позиция; c – студов тест; b4 – изходна позиция непосредствено след студовия тест; b5p – изходна позиция 3.5 мин. след студовия тест; p – ниво на значимост между посочените групи.

B1– basal position at rest; o – orthostatism; b2 – basal position; dd – deep breathing; b3 - basal position; c – cold test; b4 – basal position for 3.5 min after cold test; b5p – basal position 3.5 min after cold test; p – level of significance between the pointed groups.

въздействие ($p<0.05$) и по-висока вариабилна мощност във втората фаза след студово въздействие ($p<0.02$). Значими разлики се наблюдават във вариабилността между четвъртата sclRP и първата група по време на ортосататизъм ($p<0.05$) и в мощността на вариабилността при дълбоко дишане ($p<0.05$).

Достоверна е разликата във врариабилността на R-R интервалите по време на дълбоко дишане ($p<0.02$) и във вариабилната мощност във втората фаза след студово въздействие ($p<0.02$) между vRP втора и sclRP четвърта група. Промените във вариабилността при първичен феномен на Raynaud е както при контролните лица, но с известна хиперреактивност.

Данните за спектралната мощност на ниско-честотните компоненти (LF), показател за активността на симпатиковия дял на автономната нервна система, и нивото на достоверност между изследваните групи са представени на табл. 2.

Достоверна разлика в стойностите се установява между четвъртата и контролната (първа) група по време на ортостатизъм и дълбоко дишане, показващи хипореактивност на болните със склеродермия и феномен на Raynaud. По-високи са стойностите в трета група спрямо четвърта група във фазите на ортостатизъм и студово въздействие. По-висока ниско-честотна спектрална мощност има и във втора група с вибрационно обусловен феномен на Raynaud спрямо четвърта група по време на фазите на ортостатизъм и след студово въздействие.

Промените в нискочестотната спектрална мощност са редуцирани при болните със

The variability in the second group of HAVS patients was reliably lower compared to the control group during the first phase after cold effect ($p<0.05$) while the variability power in the second phase after cold-effect was higher ($p<0.02$).

Statistically significant differences in the variability between the fourth sclRP and the first control groups during ortosatatism ($p<0.05$) and in the variability power during deep breathing test were established ($p<0.05$).

The difference between the second vRP and fourth sclRP groups in the of R-R variability during deep breathing ($p<0.02$) and in the variability power in the second phase after cold-effect ($p<0.02$) were reliable. The variability changes in the pRP were like in the control individuals, but with hyperreactivity.

The data about the spectral power of the low-frequency components (LF), an index of the activity of the sympathetic nervous system and the level of significance between the groups are presented in Table 2. Significant differences of the values between the fourth sclRP and the first control groups during orthostatic and deep breathing tests were established, showing hyporeactivity in sclRP patients. The values in the third pRP group were higher than in the fourth sclRP group during orthostasis and cold test. There was a higher low-frequency spectral power in the second vRP group compared to the fourth sclRP group during orthostatic and cold tests.

The low-frequency spectral power changes were reduced in the patients with scleroderma. There was a paradoxical dynamics in the LF spectral power during the phases after the deep breathing and the cold test in the vRP patients and during the cold immersion in the pRP patients.

Таблица 3. Високочестотна спектрална мощност HF.
Table 3. High frequency spectral power HF.

Групи Фази	1 (msec²)	2 (msec²)	3 (msec²)	4 (msec²)	1-2 p	1-3 p	1-4 p	2-3 p	3-4 p	2-4 p
B1	262.80	781.91	802.21	299.49	0.074	0.050	0.872	0.948	0.079	0.107
O	979.46	1069.10	1132.89	603.43	0.707	0.470	0.197	0.782	0.069	0.132
B2	718.32	979.46	886.01	449.97	0.589	0.566	0.360	0.979	0.148	0.185
Dd	1153.24	865.00	1157.85	738.98	0.261	0.985	0.163	0.279	0.175	0.680
B3	770.50	1181.75	925.07	409.61	0.327	0.601	0.171	0.565	0.103	0.079
C	854.11	1110.66	1484.94	1036.17	0.357	0.077	0.687	0.339	0.399	0.878
B4	802.42	987.67	1038.19	489.69	0.448	0.307	0.234	0.818	0.030	0.059
B5	833.38	1422.54	940.25	630.08	0.214	0.678	0.485	0.310	0.302	0.116

B1 – изходна позиция в покой; o – ортостатизъм; b2 – изходна позиция; dd – дълбоко дишане; b3 – изходна позиция; c – студов тест; b4 – изходна позиция непосредствено след студовия тест; b5p – изходна позиция 3.5 мин. след студовия тест; p – ниво на значимост между посочените групи.

B1 – basal position at rest; o – orthostatism; b2 – basal position; dd – deep breathing; b3 – basal position; c – cold test; b4 – basal position for 3.5 min after cold test; b5p – basal position 3.5 min after cold test; p – level of significance between the pointed groups.

склеродермия, а парадоксална динамика в LF спектралната мощност има във фазите след дълбоко дишане и след студово въздействие при болните с вибрационна болест. и по време на студовото въздействие при първичен феномен на Raynaud.

На табл. 3 се представени данните за спектралната мощност на високочестотните компоненти (HF). Значима разлика се установява в базалните стойности между първа и трета група и стойностите след студово въздействие между трета и четвърта група.

Динамиката във високочестотната спектрална мощност (HF) установява парадоксален отговор при болните с първичен феномен на Raynaud по време на и след дълбоко дишане и студово въздействие и по-изразен отговор във втората фаза след студово въздействие.

Отношението на LF/HF спектралните мощности, относителен показател за равновесието между симпатиковия и парасимпатиковия дял на вегетативната нервна система, не показва достоверни разлики в стойностите между групите.

Обсъждане

Спектралният анализ показва нискочестотен компонент (LF), който отразява бета-арденорецепторната функция и високочестотен компонент(HF), показател за сърдечната парасимпатикова функция [19]. Сърдечните LF и HF компоненти при болните с различна форма на феномен на Raynaud са абнормни в сравнение със здравите контролни лица. Изразено по-ниска спректрална мощност на

The data about the spectral power of high-frequency components (HF) are presented at Table 3. Significant differences in the basal values between the first control and the third pRP groups and between the values after the cold test in the third pRP and fourth sclRP groups are seen.

The dynamics in the high-frequency spectral power (HF) established paradoxical responses in patients with pRP during and after deep breathing and cold test and more expressed response during the second phase after the cold test.

The data about the ratio LF/HF of the spectral powers, which is a relative index of the balance between the sympathetic and parasympathetic autonomic nervous systems, did not show reliable differences in the values between the groups.

Discussion

Spectral analysis shows a low frequency component (LF), which reflects the beta-ardenoreceptor function and a high-frequency component (HF), an indicator of cardiac parasympathetic function [19]. The cardiac LF and HF components in the patients with primary and secondary Raynaud's phenomenon showed dynamic changes different from the healthy controls. Much lower spectral power and reliably decreased reactivity to functional orthostasis and deep breathing test were established in sclRP patients. Abnormal heart rate variability with low power spectral density of LF and HF components and reduced LF/HF ratio show reduced parasympathetic control in scleroderma. The data about sympathetic (LF) and vagal (HF) components of the heart rate variability indicate reduced variability at rest in scleroderma

показателите се установява при склеродермия, където реактивността е намалена значимо при функционални провокации на дълбоко дишане и ортостатизъм. Установява се абнормна сърдечно-честотна вариабилност с ниска мощност на спектралната гъстота при LF и HF компонентите и редуциране на отношението LF/HF, насочващи към намален парасимпатиков контрол при склеродермия. Данни за симпатиковите (LF) и вагусовите (HF) компоненти на сърдечно-честотната вариабилност сочат редуцирана вариабилност в покой при болните със склеродермия в сравнение с тези с първичен феномен на Raynaud и със здравите лица. По време на ортостатизъм, дълбоко дишане и студово въздействие болните със склеродермия поддържат сходна сърдечно-честотна вариабилност, което предполага нарушена барорецепторна и терморегулаторна модулация на автономния контрол с кардиоваскуларна автономна дисфункция. Предполага се увеличена симпатикова възбуда при склеродермия поради достоверна редукция на сърдечно-честотната вариабилност [16]. Значима кардиоваскуларна симпатикова и парасимпатикова дисфункция при склеродермия са съобщава и от други автори [7, 8, 13, 15].

Хемодинамиката при постурална промяна предизвиква автономни неврални отговори на сърдечно-съдовата система, която буферира флуктуациите в артериалното налягане и предизвиква барорефлексно-медиирани влияния [12]. Сърдечно-съдовите вегетативни функции в отговор на свързаното с гравитацията барорецепторно стимулиране, показва усилен симпатиков отговор в първа и втора група и потисната реактивност в четвърта група. Хиперреактивност при ортостатизъм и студово въздействие се установява при първичен феномен на Raynaud, потвърждаващ повишена активност на симпатиковия дял на вегетативната нервна система. Пациентите с първичен феномен на Рейно се характеризират с нормална сърдечно-честотна вариабилност, но с известна симпатикова хиперреактивност при функционална стимулация.

Изследването на сърдечната R-R вариабилност в покой и при дълбоко дишане, обусловена от респираторната аритмия, отразява парасимпатиковата активност. Измерването на сърдечни вагусови и адренергични автономни отговори чрез дозирано дишане установява редуцирана вариабилност на R-R интервалите при болните с вибрационно обусловен феномен на Raynaud и при склеродермия, а LF мощността е по-висока при

compared to those in primary Raynaud's phenomenon, and healthy persons. During orthostatic, deep breathing and cold tests the patients with scleroderma maintained similar heart rate variability, suggesting impaired baroreceptor and thermoregulatory modulation of the autonomic control and cardiovascular autonomic dysfunction. The sympathetic activity was increased in the patients with scleroderma. A state of sympathetic arousal is suggested because of a reliable reduction of heart rate variability [16]. Reliable abnormalities in cardiovascular reflexes with sympathetic and parasympathetic dysfunctions suggestive of autonomic neuropathy in scleroderma have been described by other authors [7, 8, 13, 15].

Hemodynamics in postural changes causes autonomic neural responses of the cardiovascular system, which buffers the fluctuations in blood pressure and causes baroreflex-mediated effects [12]. Cardiovascular autonomic functions in response to gravity-related baroreceptor stimulation showed enhanced sympathetic response in the first control and second vRP groups and suppressed reactivity in the fourth sclRP group. Hyperreactivity to orthostatic and cold tests was observed in pRP, confirming increased activity of the sympathetic nervous system. Patients with pRp have normal heart rate variability, but sympathetic hyperactivity to functional stimulation.

The study of R-R variability at rest and during deep breathing, determined by respiratory arrhythmia, reflects parasympathetic activity. The measurements of cardiac vagal and adrenergic autonomic responses by deep breathing established a reduced R-R variability in HAVS patients and scleroderma, but LF power was higher in the HAVS patients than in controls.

Similar results in exposed to vibration have been established by other researchers [4]. Basal vagal activity according to the R-R variability is reduced in vibration disease [1, 5]. Studies suggest a prevalence of sympathetic tone in HAVS. Decreased parasympathetic activity was found in HAVS patients, which is a negative correlation with the duration of the vibration exposure [9, 10]. A number of authors found significant differences between the indices of heart rate variability during deep breathing and the duration of vibration exposure. Segmental vibration has an independent negative relation with indicators of heart variability and effects on autonomic functions [17]. Prolonged vibration exposure has a negative effect on the parasympathetic activity causing autonomic dysfunction [6].

In conclusion, increased sympathetic and decreased parasympathetic modulation at rest was established in all Raynayd's phenomenon groups studied. The measurements of cardiac vagal

болните с вибрационна болест отколкото при контролите.

Подобни резултати при експонирани на локални вибрации получават и други изследователи [4]. Изходната вагусова активност според вариабилността на R-R интервалите е редуцирана при вибрационна болест [1, 5]. Изследванията предполагат превалиране на симпатиковия тонус в симпатико-вагусовия баланс при вибрационна болест. Установява се намалена кардиална парасимпатикова активност при болни с вибрационна болест, която е в отрицателна корелация с продължителността на вибрационното въздействие [9, 10]. Редица автори установяват достоверни разлики между индексите на сърдечно-честотната вариабилност при дълбоко дишане съобразно продължителността на вибрационната експозиция. Локалното вибровъздействие има независима отрицателна връзка с показателите на сърдечната вариабилност и ефекти върху автономните функции [17]. Установява се достоверна разлика във всички честотни обхвати и тяхната асоциирана спектрална мощност между групите с кратка и дълготрайна вибрационна експозиция. Продължителната вибрационна експозиция има негативен ефект върху парасимпатиковата активност като предизвиква автономна дисфункция [6].

В заключение, проучването установява увеличена симпатикова и намалена парасимпатикова модулация в покой при всички изследвани групи болни с феномен на Raynaud. Измерването на сърдечни вагусови и адренергични автономни отговори чрез дозирано дишане показва редуцирана вариабилност на R-R интервалите при болните с вибрационна болест и склеродермия, а LF мощността е по-висока при болните с вибрационна болест отколкото при здравите лица. Кардиалните автономни отговори при ортостатизъм показват усилен симпатиков отговор при болните с вибрационна болест и потисната реактивност при болните със склеродермия. Абнормна е сърдечно-честотната вариабилност с ниска мощност на спектралната гъстота при LF и HF компонентите и редуцирано отношението LF/HF, насочващи към намален парасимпатиков контрол при пациентите с феномен на Raynaud и склеродермия. Хиперреактивност при ортостатизъм и студово въздействие се установява при първичен феномен на Raynaud, потвърждаващ повишена активност на симпатиковия дял на вегетативната нервна система. Кардиалната автономна дисрегулация би могла да оказва влияние върху клиничните прояви.

and adrenergic autonomic responses by deep breathing established a reduced R-R variability in vibration disease, and scleroderma. Cardiac autonomic orthostatic responses showed enhanced sympathetic reactivity in vibration disease and suppressed reactivity in scleroderma. Increased sympathetic activity was found in primary Raynaud's phenomenon. Abnormal heart rate variability with low power spectral density at LF and HF components and reduced LF/HF ratio, reflecting reduced parasympathetic control was seen in scleroderma. The established cardiac autonomic dysregulation could affect the clinical manifestations and the course of the disease.

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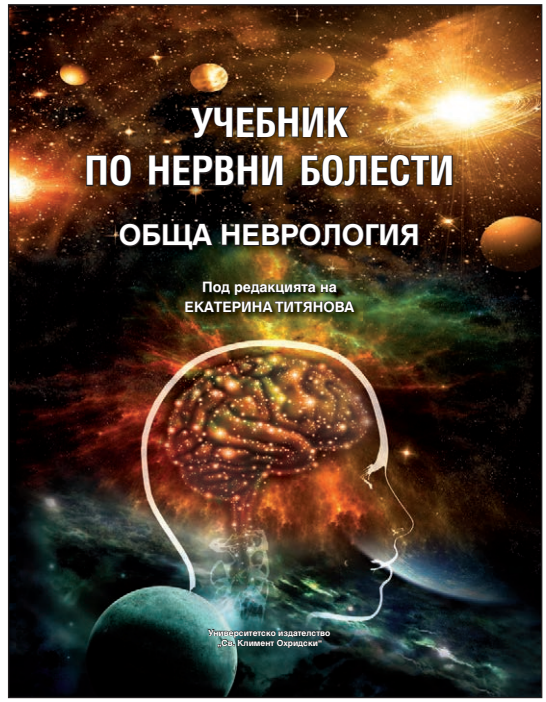
Учебник по нервни болести. Обща неврология

Textbook on Nervous Diseases. General Neurology



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Появата на нов учебник по неврология вече не е изненада. През последните години се издадоха множество такива ръководства. Обикновено разликата е в количеството обхванат материал, като доминира тенденцията да са с множество автори и да представят особено голям обем информация от дадени области на невронауките. Така изборът на учебник по нервни болести е богат, но труден.

Предлаганото пособие се отличава със стремежа си да даде оптимално количество знания по достъпен начин. Така то продължава традицията на класическите учебници по неврология, като пречупена информацията през съвременните разбирания на невронауките и неврорехабилитацията.

Разделното представяне на общата и специалната неврология в самостоятелни учебни пособия се налага поради динамичното раз-

The emergence of a new textbook of neurology is no longer a surprise. In recent years many such manuals were issued. Typically, the difference is in the amount of the covered material and the dominating tendency is to have many authors who present a particularly large volume of information in certain fields of neuroscience. Thus the choice of a textbook on nervous diseases is rich, but difficult.

The proposed issue is characterized with its search to provide an optimal amount of knowledge in an accessible way. So it continues the tradition of the classical textbooks in neurology, but the information is refracted through modern concepts of neuroscience and neurorehabilitation.

The presentation of general and special neurology in separate textbooks is due to the dynamic development of the theory and practice in special neurology. However general neurology is conser-

витие на теорията и практиката на специалната неврология. Общата неврология обаче е консервативна. Тя е фундамента или онова най-важно първо стъпало, чието изкачване е необходимо за навлизане във вселената на невронауките. Един добър учебник по обща неврология не може да остарее бързо, той остава като изходен ориентир в съвременния информационен бум. Явява се необходимо настолно и справочно четиво не само за невролозите, но и за широка аудитория от специалисти, занимаващи се с невронауки. Настоящият учебник отговаря на тези изисквания, като представя достатъчно пълно най-важното от съвременната обща неврология. Използвайки данните от това основно помагало бързо може да се направи връзка с многобройните информационни източници за максимални детайли в различните области на общата неврология. Учебникът запазва връзката между отделните области на неврологичното знание и предотвратява потъването в дълбините на отделни направления. В това учебно ръководство намираме новости в съдържанието и поднасянето на информацията.

Кратко, но максимално пълно и перфектно илюстрирано е представена съвременната невросонология. Наред с последните новости в областта на съдовата патология, невросонологията издига на качествено ново ниво определени области на миологията, невроофталмологията, интраоперативната навигация и дори подпомага диагнозата на невродегенеративните заболявания. Дадено е едно модерно въведение в изследването на автономната нервна система. В близко бъдеще напредъкът в тази област ще ни даде ново разбиране и възможности за диагноза и лечение на различни соматични заболявания. Самостоятелен принос е раздела за изследване и оценка на походката – в норма и при болест.

В учебника е отделено специално внимание на неврорехабилитацията – онзи дял от клиничната неврология, който подпомага връщането към истинския живот на пациента с неврологично заболяване и неговото семейство. В съвременния период на кратък клиничен престой за диагностика и лечение в активната фаза на болестта, бума на медикаментозната терапия и инвазивно лечение, дори опитните специалисти се откъсват от неврорехабилитацията. Това е една порочна практика, която трябва да се преодолява още от студенската „скамейка“.

Учебникът съдържа 271 страници и представя в достатъчен обем общата неврология в съответствие със съвременните програми за обучение по нервни болести. Всеки раздел е

vative. It is the foundation or that most important first step, whose climbing is necessary to enter into the world of neuroscience. A good textbook on general neurology can not get old quickly, it remains the starting reference point in the modern information boom. It appears a necessary desktop and reference reading not only for neurologists, but also for a wide audience of specialists dealing with neuroscience.The present textbook meets these requirements, providing sufficiently the most important from the modern general neurology. Using data from this essential handbook one can quickly make connections with the multiple data sources for maximal details in the various fields of general neurology. The textbook retains the connection between different fields of neurological knowledge and prevents sinking and drowning in the depths of separate directions. In this educational manual we find innovations in the content and the presentation of the information.

The contemporary neurosonology is presented shortly, but maximally detailed and perfectly illustrated. Along with the latest innovations in the field of vascular pathology, neurosonology rises to a qualitatively new level certain areas of myology, neurooftalmology, intraoperative navigation and even assists the diagnosis of neurodegenerative diseases. A modern introduction to the study of the autonomic nervous system is presented. In the near future the progress in this field will give us a new understanding and opportunities for the diagnosis and treatment of different somatic diseases. A substantive contribution is the section on the study and evaluation of gait – normal and pathological.

In the textbook special attention is paid on neurorehabilitation – the branch of clinical neurology, which helps the patient with neurological disease and his family to return to real life. In the modern period of short hospital stay for clinical diagnosis and treatment in the active phase of the disease, booming of drug therapy and invasive treatment, even experienced professionals disregard the neurorehabilitation. This is a vicious practice that must be overcome still from the students “bench”.

The textbook consists of 271 pages and presents in a sufficient volume general neurology in accordance with the current educational programs in neurology. Each section is saturated with optimal information and is well illustrated with author`s color photos and schemes. The using of a special area for illustrations facilitates the relationship between figures and text. Especially helpful is the obligatory final summary of each topic with the so-called “Minimal required level of competence” (MRLC). It has a detailed and perspicuous contents and index, which are an efficient tool for the information sought.

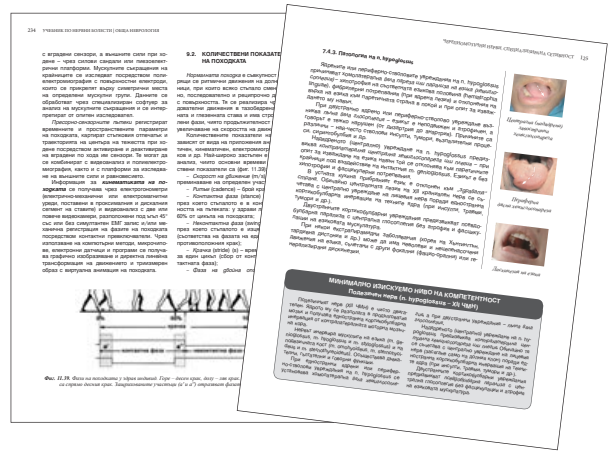
наситен с оптимална информация и е добре илюстриран с цветни авторски снимки и схеми. Използването на специално поле за илюстрации улеснява връзката между фигурите и текста. Особено полезно е задължителното финално обобщение на всяка тема с така нар. „Минимално изискуемо ниво на компетентност“ (МИНК). Той има подробно и прегледно съдържание и показалец, които са ефикасен инструмент за търсената информация.

Учебникът е дело на авторитетни лекари, които са утвърдени специалисти в различни здравни и академични институции в България и чужбина, а главният редактор акад. проф. д-р Екатерина Титянова, д.м., д.м.н., е със забележителна академична кариера в няколко университета. Това осигурява хармоничното и последователно представяне на неврологичната информация в унисон с богатите традиции на българската неврологична школа. Гарант за достойнствата на този учебник по нервни болести са рецензентите проф. д-р Людмил Мавлов, д.м., д.м.н., професор по неврология и невропсихология и проф. д-р Христо Чучков, д.м., д.м.н., професор по анатомия, хистология и цитология. Финалният завършек на този учебник се постига от перфектното полиграфично изпълнение на Университетско издателство „Св. Климент Охридски“ – София.

Учебникът по обща неврология е насочен към широка аудитория с интереси в областта на неврологията – студенти, лекари и специализанти по нервни болести, студенти и специалисти по физикална и рехабилитационна медицина, кинезитерапевти и специалисти по здравни грижи. Той може да се ползва от неврохирурзи, стоматолози, общопрактикуващи лекари, психолози, психиатри и други специалисти с интереси в областта на невронауките. Чрез своя уникален облик и съдържание учебникът запълва една съществена празнина в съвременната учебна литература като съвременно практическо ръководство по нервни болести.

Всичко това ми позволява да препоръчам на заинтересованите студенти и специалисти настоящия Учебник по нервни болести. Обща неврология.

Доц. д-р С. Андонова, дм, дмн



The textbook is the work of respected physicians who are recognized experts in various health and academic institutions in Bulgaria and abroad, and the editor in chief Acad. Prof. Dr. Ekaterina Titianova, PhD, DSc, has a remarkable academic career in several universities. This ensures concordant and consistent presentation of the neurological information in assent with the rich traditions of the Bulgarian neurological school. A warranter of the merits of this textbook on neurology are the reviewers – Prof. Dr. Lyudmil Mavlov, PhD, DSc, professor of neurology and neuropsychology and Prof. Dr. Hristo Chuchkov, PhD, DSc, professor of anatomy, histology and cytology. The final outcome of this textbook is achieved by the perfect printing execution of the University publishing house “St. Kliment Ohridski” – Sofia.

The textbook in general neurology is designed towards a wide audience with interests in neuroscience – students, physicians and specializing doctors in neurology and in physical and rehabilitation medicine, physiotherapists and healthcare professionals. It can be used by neurosurgeons, dentists, general practitioners, psychologists, psychiatrists and other specialists with interests in the field of neuroscience. Through its unique appearance and content the textbook fills a significant gap in the modern education literature as a contemporary practical guide on nervous system diseases.

All this allows me to recommend to interested students and professionals this textbook on nervous diseases. General Neurology.

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Уважаеми колеги,

На 2–4 октомври 2015 година Българска асоциация по невросонология и мозъчна хемодинамика отбелязва своя 10-годишен юбилей с провеждане на Първи национален конгрес с международно участие.

През изминалото десетилетие Асоциацията се утвърди у нас и в чужбина като авторитетна научна организация, която е водеща във въвеждането на световните стандарти в ултразвуковата диагностика на нервната система и терапевтичния ултразвук в неврологията. Тя нарастна по членска маса, разшири своята научна, образователна и практическа дейност и наложи политика на непрекъснато обучение и професионално издигане на своите членове. Списанието „Невросонология и мозъчна хемодинамика“ и интернет-страницата на Асоциацията се превърнаха в национален и международен форум за обмен на актуална информация в областта на невросонологията и широко популяризиране на дейността на нашето сдружение.

Активността на Асоциацията се оценява високо от международните организации по неврология и невросонология, доказателство за което е ежегодното участие на изтъкнати чуждестранни учени в годишните срещи на сдружението и рубриките на списанието. Сдружението ни е търсен партньор като организатор и домакин на научни форуми на Световната федерация по неврология (2013 г.) и Европейската академия по неврология (2015 г.).

Изминатият от Българската асоциация по невросонология и мозъчна хемодинамика път е наситен с научни събития, творческа дейност и практически инициативи. Създадохме школа по невросонология, която предлага на българското здравеопазване високо квалифициран и европейски сертифициран човешки ресурс в областта на ултразвуковата диагностика на нервната система в цялата страна. Това ни дава удовлетворение от постигнатото досега и ни зарежда с оптимизъм за бъдещето.

Честит юбилей!

Dear colleagues,

On 2nd–4th of October 2015 the Bulgarian Society of Neurosonology and Cerebral Hemodynamics celebrates its 10th Anniversary by conducting the First National Congress with international participation.

Over the past decade the Bulgarian Society of Neurosonology and Cerebral Hemodynamics has established itself at home and abroad as a respectable scientific organization, leading in the introduction of international standards in ultrasound diagnostics of the nervous system and therapeutic ultrasound in Neurology.

The BSNCH has increased in membership, expanded its scientific, educational and practical activity and imposed a policy of continuous training and professional advancement of its members.

The bi-lingual (Bulgarian–English) scientific journal "Neurosonology and Cerebral Hemodynamics" and the website of the Society became national and international forums for the exchange of relevant information in the field of Neurosonology and widespread promotion of the activities of our association.

The activity of the Society is highly appreciated by international organizations of Neurology and Neurosonology, proof of which is the annual participation of prominent foreign scientists in the meetings of BSNCH and the sections of the Journal. Our association is a partner organizer and host of international scientific forums such as the Meeting of the World Federation of Neurology (2013) and the European Academy of Neurology (2015).

The history of BSNCH is rich on scientific events, creative activities and practical initiatives. We created a school in Neurosonology with a potential to offer highly qualified Bulgarian healthcare and European certified specialists in the field of ultrasound diagnostics of the nervous system throughout the country.

We are satisfied with our achievements and optimistic for the future.

Happy Anniversary!

Акад. проф. Екатерина Титянова
Председател на Българската асоциация по невросонология и мозъчна хемодинамика
Академик на Българската академия на науките и изкуствата
Академик на Сръбската кралска академия на науките и изкуствата

Acad. Prof. Ekaterina Titianova
Chair of the Bulgarian Society of Neurosonology and Cerebral Hemodynamics
Academician of the Bulgarian Academy of Sciences and Arts
Academician of the Serbian Royal Academy of Sciences and Arts

TIMETABLE

Time	FRI 2.10.2015	SAT 3.10.2015		SUN 4.10.2015	Time
08.00–08.30	Credits: 22 CME BULGARIAN MEDICAL ASSOCIATION 10 Years of BSNCH FIRST NATIONAL CONGRESS with International Participation	Reception desk opening		Reception desk opening	08.00–08.30
08.30–09.00		INTERNATIONAL ROUND TABLE: Plenary Session I: STROKE MANAGEMENT	Credits: 12 CME BULGARIAN ASSOCIATION OF HEALTH PROFESSIONALS IN NURSING	SATELLITE SYMPOSIUM: Innovations in Medicine	08.30–09.00
09.00–09.30					09.00–09.30
09.30–10.00					09.30–10.00
10.00–10.30		Coffee Break		Coffee Break / Poster Session III	10.00–10.30
10.30–11.00		Plenary Session II: ADVANCE IN NEUROSONOLOGY			10.30–11.00
11.00–11.30				Innovations in Medicine	11.00–11.30
11.30–12.00					11.30–12.00
12.00–12.30					12.00–12.30
12.30–13.00		Lunch			12.30–13.00
13.00–13.30				Closing Ceremony	13.00–13.30
13.30–14.00		Poster Session I			13.30–14.00
14.00–14.30	Reception desk opening for registration	WORKSHOPS: Workshop I: SITS Register – Global Stroke Network	NURSING TRAINING COURSE: Plenary Session I	БАНМХ BSNCH BULGARIAN SOCIETY OF NEUROSONOLOGY AND CEREBRAL HEMODYNAMICS YEAR OF THE BRAIN 2015 EUROPE	14.00–14.30
14.30–15.00					14.30–15.00
15.00–15.30	General Assembly of BSNCH (for members)				15.00–15.30
15.30–16.00		Coffee Break	Coffee Break		15.30–16.00
16.00–16.30		Workshop II: Ultrasound Diagnostics of Rare Neurological Cases	Plenary Session II		16.00–16.30
16.30–17.00					16.30–17.00
17.00–17.30	Satellite Symposium of UCB "Aging Brain and Nootropics."	Poster Session II	БАНМХ BSNCH BULGARIAN SOCIETY OF NEUROSONOLOGY AND CEREBRAL HEMODYNAMICS SOFIA UNIVERSITY "ST. KLIMENT OHRIDSKI"		17.00–17.30
17.30–18.00					17.30–18.00
18.00–18.30	Opening Ceremony	Free Time Culture Programme			18.00–18.30
18.30–19.00	10 Years of BSNCH				18.30–19.00
19.00–19.30	Satellite Symposium of Actavis "Transcranial Doppler – Past, Present and Future"				19.00–19.30
19.30–20.00					19.30–20.00
20.00–21.00	**Welcome Dinner**	**Gala Dinner** Poster Awards.			20.00–21.00
21.00–22.00					21.00–22.00

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Programme

FRIDAY, 2 October 2015

FIRST NATIONAL CONGRESS of the Bulgarian Society of Neurosonology and Cerebral Hemodynamics with International Participation

14.00 – 15.00		**Registration**
15.00 – 17.00		**General Assembly of BSNCH** *(for members)*
17.00 – 17.30		**Satellite Symposium of UCB.** *Moderator: E. Titianova (Bulgaria)*
		Aging Brain and Nootropics. *B. Stamenov (Bulgaria)*
17.30 – 18.00		**Coffee Break**
18.00 – 18.15		**Opening Ceremony**
18.15 – 18.45		**10 Years of the Bulgarian Society of Neurosonology and Cerebral Hemodynamics.** *E. Titianova (Bulgaria)*
18.45 – 19.30		**Satellite Symposium of Actavis.** *Moderator: E. Titianova (Bulgaria)*
	L1	**Transcranial Doppler – Past, Present and Future.** *R. Aaslid (Switzerland)*
19.30 – 19.45		**Discussion**
20.00 – 22.00		**Welcome Dinner**

SATURDAY, 3 October 2015

08.00 – 18.00		**Registration**

INTERNATIONAL ROUND TABLE

09.00 – 10.30		**Plenary Session I: Stroke Management.** *Moderators: K. Niederkorn (Austria), E. Titianova (Bulgaria)*
09.00 – 09.20	L2	**Stroke in Bulgaria.** *E. Titianova, I. Velcheva, S. Andonova (Bulgaria)*
09.20 – 09.40	L3	**Thrombectomy in Acute Stroke – Now an Evidence Based Method.** *K. Niederkorn (Austria)*
09.40 – 10.00	L4	**Innovations in the Treatment of Cardiovascular Diseases.** *I. Petrov (Bulgaria)*
10.00 – 10.20	L5	**Can Improvement of Organization in Health Service Increase the Number of Stroke Patients Treated by Thrombolysis?** *S. Stojchev (Macedonia)*
10.20 – 10.30		**Discussion**
10.30 – 11.00		**Coffee Break**

11.00 – 12.30		**Plenary Session II: Advance in Neurosonology.** *Moderators: R. Aaslid (Switzerland), S. Andonova (Bulgaria)*
11.00 – 11.20	L6	**Trends in Brain Parenchyma Sonography.** *M. Mijajlovic (Serbia)*
11.20 – 11.40	L7	**Application of TCCS/TCD in Posterior Circulation Disorders.** *M. Alpaidze (Georgia)*
11.40 – 12.00	L8	**Comparative Neurosonographic and Hemorheological Studies in Cerebrovascular Diseases.** *I. Velcheva, E.Titianova, N. Antonova (Bulgaria)*
12.00 – 12.20	L9	**Small Vessel Disease as the Cause of Cognitive Impairment.** *N. Sternic, M. Mijajlovic (Serbia)*
12.20 – 12.30		**Discussion**
12.30 – 14.00		**Lunch**
13.00 – 14.00		**Poster Session I**
14.00 – 15.30	W1	**Workshop I: SITS Register – Global Stroke Network.** *Moderator: S. Andonova (Bulgaria)*
15.30 – 16.00		**Coffee Break**
16.00 – 17.00	W2	**Workshop II: Ultrasound Diagnostics of Rare Neurological Cases.** *Moderator: M. Klissurski (Bulgaria)*
17.00 – 18.00		**Poster Session II**
20.00		**Gala Dinner.** *Poster Awards.*

SUNDAY, 4 October 2015

SATELLITE SYMPOSIUM
Bulgarian Academy of Sciences and Arts
Serbian Royal Academy of Sciences and Arts and
Bulgarian Society of Neurosonology and Cerebral Hemodynamics

INNOVATIONS IN MEDICINE

Moderators: N. Boyadjieva, D. Svinarov, E. Titianova

08.00 – 09.00		**Registration**
09.00 – 09.10		**Opening Ceremony**
09.10 – 09.30	LS1	**Epigenetics in Pharmacotherapy.** *N. Boyadjieva (Bulgaria)*
09.30 – 09.50	LS2	**Stem Cells in Tumors.** *G. Bocheva (Bulgaria)*
09.50 – 10.10	LS3	**Nutrigenomics.** *T. Handjieva–Darlenska (Bulgaria)*
10.10 – 10.30	LS4	**New Trends in Diagnosis and Prognosis of Neuroblastoma.** *M. Kamenova (Bulgaria)*
10.30 – 10.50	LS5	**Stem Cell Therapy in Post Myocardial Infarction Patients.** *I. Petrov (Bulgaria)*
10.50 – 11.10		**Cofee break**

10.50 – 11.10		**Poster Session III**
11.10 – 11.30	LS6	**Hypothyroidism and Metabolic Syndrome – Phathophysiology and Cardiovascular Risk.** *B. Lozanov (Bulgaria)*
11.30 – 11.50	LS7	**Innovations in Diabetes Mellitus.** *I. Daskalova, Tz. Totomirova (Bulgaria)*
11.50 – 12.10	LS8	**Diabetes in Older Adults. Rationale for the Prevention of Diabetes, Complications and Therapeutic Peculiarities.** *P. Djordjevic (Serbia)*
12.10 – 12.30	LS9	**Modern Aspects in the Treatment of Pancreatic Carcinoma.** *N. Vladov (Bulgaria)*
12.30 – 12.50	LS10	**New Highlights on Pediatric Tumors.** *I. Hristozova (Bulgaria)*
12.50 – 13.00		**Closing Ceremony**

БАНМХ
BSNCH
BULGARIAN SOCIETY OF NEUROSONOLOGY AND CEREBRAL HEMODYNAMICS

Credits: 22 CME
BULGARIAN MEDICAL ASSOCIATION

SATURDAY, 3 October 2015

NURSING TRAINING COURSE

(Bulgarian Participants only)

ЗДРАВНИ ГРИЖИ ПРИ НЕВРОЛОГИЧНИ ЗАБОЛЯВАНИЯ

Медицински факултет на Софийски университет "Св. Климент Охридски"
Българска асоциация по невросонология и мозъчна хемодинамика
Българска асоциация на професионалистите по здравни грижи

с участие на студенти по специалността „медицинска сестра“

Модератор: Г. Чанева

14.00 – 14.10	**Откриване**
14.10 – 14.40	**Поведение и отговорности на медицинската сестра при епилептичен гърч.** *Г. Чанева, С. Петрова, Г. Цибранска (България)*
14.40 – 15.20	**Оценка на потребностите от грижи при болест на Паркинсон.** *Д. Иванова, Е. Минчева, М. Цветкова (България)*
15.20 – 15.30	**Дискусия**
15.30 – 16.00	**Кафе пауза**
16.00 – 16.40	**План за сестрински грижи при мултиплена склероза.** *Д. Иванова, М. Костова, Й. Моллова (България)*
16.40 – 17.10	**Оценка на приема на йод от бременни жени в България.** *Л. Иванова, Р. Б. Иванова (България)*
17.10 – 17.20	**Дискусия**
17.20 – 17.30	**Закриване**

БАНМХ BSNCH
БЪЛГАРСКА АСОЦИАЦИЯ ПО НЕВРОСОНОЛОГИЯ И МОЗЪЧНА ХЕМОДИНАМИКА

СОФИЙСКИ УНИВЕРСИТЕТ „СВ. КЛИМЕНТ ОХРИДСКИ“

Credits: 12 CME

БЪЛГАРСКА АСОЦИАЦИЯ НА ПРОФЕСИОНАЛИСТИТЕ ПО ЗДРАВНИ ГРИЖИ

Poster Sessions

SATURDAY, 3 October 2015

09.00 – 13.00 POSTER SESSION I

Poster Session I–1. Stroke Management.
Chairpersons: N. Sternic (Serbia), S. Stojchev (Macedonia), I. Velcheva (Bulgaria)

P1 **Left Ventricular Thrombi Causing Cerebral Embolic Ischemic Stroke with Hemorrhagic Transformation: a Case Report.**
S. Dzambazovska-Zikova, S. Stojchev, F. Adili, M. Grozdanovski, D. Ristic (Macedonia)

P2 **Confusion Syndrome as a Debut of Stroke and the Role of Neurosonology: a Case Report.**
R. Kalpachki, E. Misheva, Tsv. Pramatarova, D. Mladenova, M. Bozhkova, A. Postadjian (Bulgaria)

P3 **Polymorphism in Prothrombotic Genes in Young Stroke Patients: a Case Report.**
D. Ristic, M. Grozdanovski, S. Dzambazovska Zikova, T. Deleva Stoshevska, S. Stojchev (Macedonia)

P4 **Preoperative Assessment of Cerebral Autoregulation in Patients with Carotid Stenosis and Thrombosis.**
V. Semenyutin, G. Asaturyan, A. Nikiforova, G. Panuntsev, V. Aliev, A. Patzak, V. Iblyaminov, I. Dudanov, R. Laptev (Russia)

P5 **Acute Ischemic Stroke: the Need to Create a National Registry of Patients with Stroke.**
S. Andonova (Bulgaria)

P6 **Recombinant Tissue Plasminogen Activator and Stroke: a Case Report.**
T. Deleva Stoshevska, S. Stojchev, M Grozdanovski, D. Ristic, B. Stoshevski, S. Nikoloska, M. Nikoloski (Macedonia)

P7 **Interventional Treatment of Acute Basilar Artery Occlusion: A Successfully Recanalized Case.**
I. Petrov, M. Klissurski, S. Halibryam (Bulgaria)

P8 **Cerebral Venous Thrombosis of Straight Sinus and Right Transverse Sinus: a Case Report.**
S. Andonova, V. Dimitrova, E. Kalevska, V. Argirova, D. Georgieva, R. Georgiev, M. Novakova (Bulgaria)

P9 **Chronic Ischemic Heart Disease as a Risk Factor for Cognitive Impairment after Ischemic Stroke.**
M. Valkova, B. Stamenov, D. Peychinska (Bulgaria)

P10 **Post Stroke Depression Measured by Self-Assessment Geriatric Depression Scale.**
M. Valkova, B. Stamenov, D. Peychinska (Bulgaria)

Poster Session I–2. Experimental, Vascular and Non-Vascular Neurosonology.
Chairpersons: M. Alpaidze (Georgia), M. Mijajlovich (Serbia), Zl. Stoyneva (Bulgaria)

P11 **Numerical Analysis of the Blood Flow in the Carotid Artery Bifurcation.**
N. Antonova, D. Xu, I.Velcheva, E. Kaliviotis, P. Tosheva (Bulgaria, China, Cyprus)

P12 **Use of Temporal Artery Ultrasound in Giant Cell Arteritis: a Case Report.**
T. Svabic-Medjedovic, A. Radojicic, Z. Jovanovic, M. Mijajlovich, J. Zidverc-Trajkovic, A. Pavlovic, N. Veselinovic, N. Sternic-Covickovic (Serbia)

P13 **Basilar Artery Fenestration – Correlative MRI and Neurosonographic Studies.**
K. Genova, K. Giurov, E. Titianova (Bulgaria)

P14 **Ultrasound Imaging of Optic Nerves in Healthy Subjects: Effects of Power Output and Refractive Errors.**
Tz. Dimitrova, S. Karakaneva, E. Titianova (Bulgaria)

P15 **Comparative Neurosonographic and Computed Tomographic Assessment of the Third Ventricle in Patients with Brain Atrophy.**
I. Talaganova, P. Damyanov, N. Topalov, I. Velcheva (Bulgaria)

P16 **Ultrasound Brain Parenchyma Imaging in Parkinson′s Disease.**
I. Talaganova, S. Karakaneva, I. Milanov, E. Titianova (Bulgaria)

P17 **Ultrasound Neuronavigation in Brain Metastasis.**
I. Todorov, T. Eftimov, V. Nakov, I. Hadzhiangelov, P. Simeonov, E. Stavrev, K. Ninov (Bulgaria)

P18 **Correlative Electromyographic and Multimodal Ultrasound Imaging Studies of Calf Muscle Lesions.**
R. Dimova, E. Titianova, S. Karakaneva, I. Daskalova (Bulgaria)

P19 **Effect of Auditory and Vestibular Stimuli on the Cerebral Blood Flow in the Middle Cerebral Artery in Patients with Transient Ischemic Attacks and Chronic Cerebral Infarctions.**
O. Kolev, P. Damyanov, I. Asenov, K. Stambolieva, I. Velcheva (Bulgaria)

17.00 – 18.00 POSTER SESSION II

Poster Session II–1. Microcirculation, Case Reports and Student Presentations
Chairpersons: E. Christova (Bulgaria), B. Stamenov (Bulgaria), M. Staneva (Bulgaria)

P20 **Disturbances in Blood Viscosity and Skin Microcirculation in Patients with Type 2 Diabetes Mellitus.**
V. Kostova, N. Antonova, N. Chaushev, I. Velcheva (Bulgaria)

P21 **Microcirculatory and Peripheral Vascular Disorders in Hand-Arm Vibration Syndrome.**
Z. Stoyneva, E. Tityanova (Bulgaria)

P22 **Modeling the Navigational System of the Brain: a Review.**
P. Iliev, M. Lalova (Supervisor: E. Titianova) (Bulgaria)

P23 **Tolosa-Hunt Syndrome: Prospective Clinical and Neuroimaging Studies.**
T. Vladimirov, D. Farandzha, Tz. Dimitrova, E. Titianova (Bulgaria)

P24 **Clinical and Neuroimaging Studies in Dysgenesis of Corpus Callosum: a Case Report.**
G. Adam, A. Korkova, E. Stoyanova, K. Genova, E. Titianova (Bulgaria)

P25 **Transcranial Sonography in Creutzfeldt-Jakob Disease.**
N. Veselinovic, A. Pavlovic, B. Petrovic, A. Ristic, I. Novakovic, T. Svabic-Medjedovic, D. Pavlovic, N. Covickovic-Sternic (Serbia)

P26 **Bacterial Anthrax Meningoencephalitis: a Case Report.**
S. Andonova, V. Dimitrova, D. Georgieva, E. Kalevska, V. Argirova, A. Jorgakieva, M. Novakova, R. Georgiev (Bulgaria)

P27 **Cardiovascular Autonomic Dysfunction in Multiple Sclerosis.**
P. Damyanov, K. Stambolieva, I. Velcheva (Bulgaria)

Poster Session II–2. Neurorehabilitation.
Chairpersons: S. Andonova (Bulgaria), V. Semenyutin (Russia), P. Mineva (Bulgaria)

P28 **Influence of Proprioceptive Neuromuscular Facilitation on Motor Recovery in Patients with Cervico-Brachial Plexopathy.**
D. Lubenova (Bulgaria)

P29 **Influence of Kinesitherapy in Patients with Lumbar Discal Disease.**
D. Lubenova (Bulgaria)

P30 **Acupoints for Cervical Spondylosis.**
J. Zhu, B. Arsovska, D. Vasileva, S. Petkovska, K. Kozovska (Macedonia)

P31 **Influence of Physiotherapy on Quality of Life in Patients with Degenerative Spinal Diseases after Surgery.**
T. Bizheva, D. Lubenova, V. Georgieva (Bulgaria)

P32 **Influence on Balance in Community-Dwelling Elderly and Old People.**
Kr. Grigorova-Petrova, A. Dimitrova, D. Lubenova, D. Zaharieva, D. Vasileva (Bulgaria, Macedonia)

P33 **Influence of Kinesitherapy on Functional Mobility in Patients with Parkinson's Disease.**
A. Dimitrova, D. Lubenova, K. Grigorova-Petrova, M. Nikolova, D. Vassileva (Bulgaria, Macedonia)

P34 **Influence of Kinesitherapy on Motor Recovery and Functional Independence in Patients with Ischemic Stroke in the Chronic Period.**
D. Vasileva, D. Lubenova, M. Mihova, K. Grigorova, A. Dimitrova (Macedonia, Bulgaria)

P35 **Effect of Kinesitherapeutic Methodology on Balance and Locomotion in a Patient with a Vertebro-Basilar System Stroke.**
M. Nikolova (Bulgaria)

SUNDAY, 4 October 2015

INNOVATIONS IN MEDICINE

10.50 – 11.10 **POSTER SESSION III. Modern Aspects of Obesity and Pediatric Tumors.**
Chairpersons: V. Vlahov (Bulgaria), M. Kamenova (Bulgaria)

PS1 **Effect of Low Caloric Diet on Metabolic Parameters: Study on NIRDIABO-Region Sofia.**
L. Lazarov, T. Handjieva-Darlenska, G. Bogdanov, K. Kamenova, N. Boyadjieva (Bulgaria)

PS2 **Fat Distribution in Patients with Obesity and Pre-Diabetes: Study on NIRDIABO-Region Sofia, Pleven And Plovdiv.**
L. Lazarov, T. G. Stavreva, A. Pendicheva, D. Getova, Handjieva-Darlenska, G. Bogdanov, G. Dimitrova, K. Kamenova, N. Boyadjieva (Bulgaria)

PS3 **Effect of Topiramate on Leptin and Insulin of Rats with Experimental Obesity.**
R. Klisurov, K. Kamenova, N. Boyadjieva (Bulgaria)

PS4 **Effect of Topiramate on Free Radicals of Rats with Experimental Obesity.**
R. Klisurov, N. Boyadjieva (Bulgaria)

PS5 **NIRDIABO-Grant for the Prevention of Diabetes and Obesity in Bulgaria: Recent Results.**
N. Boyadjieva, K. Kamenova (Bulgaria)

PS6 **Contemporary Aspects in the Diagnosis and Molecular Genetic Features of Pediatric Renal Tumors.**
D. Serteva, M. Kamenova (Bulgaria)

Abstracts

Lectures

L1

TRANSCRANIAL DOPPLER – PAST, PRESENT AND FUTURE

R. Aaslid

Hemodynamics AG – Bern, Swaziland

In 1982, the introduction of the Transcranial Doppler (TCD) modality opened a new window on the cerebral circulation. After its first use in monitoring of cerebral vasospasm and intracranial collaterals in carotid occlusive disease, a wide range of investigational and clinical applications followed.

This presentation shall illustrate this development up to the present with examples from the literature.

In reflecting upon the current state-of-art of TCD in clinical applications, one cannot help to notice that there are many areas where improvements are desired, both on the instrumentation side as well as in the manner in which the available information is processed and presented. This shall be discussed in depth with examples from the author's work in this field.

Future developments of the TCD method should be aimed at increasing accuracy and to improve the diagnostic abilities. This can be made possible by interdisciplinary cooperation where methods from engineering and advanced data processing are introduced and used in the clinical setting.

Key words: *future development, TCD.*

L2

STROKE IN BULGARIA

E. Titianova[1,2], I. Velcheva[3], S. Andonova[4]

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Over decades stroke is a leading cause of mortality and disability in Bulgaria. The country ranks first in EU in terms of stroke mortality rates according to the Health Strategy 2014–2020. Analysis of the data from recent years shows three major trends in stroke morbidity and mortality in Bulgaria: (1) As compared to 2005, the number of deaths from cardiovascular diseases in 2012 increased with 9.2/100 000 population but the death rates from stroke decreased with 19.6 per 100 000 population; (2) The number of women with ischemic stroke increased from 50.5% in 2010 to 52.7% in 2013; (3) For the same period the number of patients of both sexes with ischemic stroke under the age of 55 decreased from 9.2% to 8.1%. These trends are associated with a demographic aging process with increasing life expectancy of the Bulgarian population, improved diagnostics of cardiovascular diseases and implementation of endovascular coronary treatment at younger age. Although the number of venous thrombolyses as a specific treatment of acute ischemic stroke in Bulgaria is growing, its frequency remains significantly lower than the recommended minimum and represents less than 0.4% of the new stroke cases per year. The endovascular procedures in hemorrhagic stroke are also very low – approximately 0.5–1.4% per year. Efforts are needed for adequate financing of the health care facilities, professional training of human resources and education of the population by creating unified national strategy as a state health policy.

Key words: *Bulgaria, stroke.*

L3

THROMBECTOMY IN ACUTE STROKE – NOW AN EVIDENCE BASED METHOD

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Mechanical thrombectomy (TE) devices have been used for treatment of acute ischemic stroke caused by brain vessel occlusion for more than ten years. The initial results were based on case reports, case series and in the last several years on registries mainly concerning stent retrievers.

Randomized controlled trials (RCT) comparing intravenous thrombolysis (IVT) with TE performed separately and with IVT plus TE were not available until 2013. During the International Stroke Conference, Febrary 6–8, 2013, three RCT´s – the IMS III, MR RESCUE and SYNTHESIS trials were presented and simultaneously published in the New England Journal of Medicine (NEJM). These trials, criticized

for the very long recruitment periods and for the use of various endovascular treatment approaches, did not show additional benefit of endovascular stroke therapy over IVT.

In the light of the very positive results of registry based studies using stent retrievers, RCT´s using these devices and focusing on proximal vesssel occlusions were planned and launched. In October 2014 the MR CLEAN Study from the Netherlands was presented and showed a significant benefit of TE starting within 6 hours after the stroke onset using the Solitaire device over IVT alone.

During the next half year a number of further studies were presented and mostly simultaneously published in the NEJM. The most important of these trials are SWIFT PRIME, ESCAPE and REVASCAT, all showing a clear and statistically significant superiority of TE – mostly plus IVT versus IVT alone.

These results refer to the anterior circulation. In Basilar Artery Occlusion TE is feasible and reduces mortality to around 35%, as shown in recent registry data. However prospective data for the posterior circulation are not yet available.

The future development must focus on neurological and radiological facility development, ambulance logistics and also training standards for neurointerventionalists to enable health systems to provide state of the art stroke care.

Key words: *acute stroke, thrombectomy.*

L4

INNOVATIONS IN THE TREATMENT OF CARDIOVASCULAR DISEASES

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The innovations in the treatment of cardiovascular diseases give new opportunities for patients otherwise left untreated or treated unsuccessfully.

Trans-catheter aortic valve implantation (TAVI) is a relatively new option for patients with severe aortic stenosis and high risk of an open surgery (multiple comorbidities, elderly patients). This technique is still applicable only in high risk patients and the use of the method in moderate risk patients is limited by the lack of clinical data and randomized trials.

The bio-absorbable stents are considered the third revolution in stent technology (after the development of the first bare metal stents and the first drug eluting stents). Long-term results of the ABSORB study showed that on the fifth year of follow-up of 30 patients with implanted Absorb BVS, no stent thrombosis, need for revascularization as a result of in-stent restenosis and death due to cardiovascular event were reported.

Proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors are a new opportunity for better lipid control in patients intolerable to statins or with poor control with the maximum tolerated statin dose. The three major trials for evolucomab (PCSK9 inhibitor) show a mean of 57% lowering of the total cholesterol and LDL.

Key words: *cardiovascular diseases, innovations, treatment.*

L5

CAN IMPROVEMENT OF ORGANIZATION IN HEALTH SERVICE INCREASE THE NUMBER OF STROKE PATIENTS TREATED BY THROMBOLYSIS?

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City General Hospital "8th of September" – Skopje, Macedonia

Currently, there are only 10 Intensive Care Unit beds for stroke in the Republic of Macedonia, located in the City General Hospital "8th of September". Thrombolysis, besides the City General Hospital is performed in the Clinic of Neurology and sporadically, in another 2 clinical hospitals in the country. In spite of the huge number of treated stroke patients in the country, a very small percentage of them are treated by thrombolysis.

Objective: To assess whether improved organization of health service can increase the number or stroke patients treated by thrombolysis.

Material and Methods: Medical records of all patients with stroke admitted to the City General Hospital in the period from 01.04.2013 to 28.06.2015 were analyzed and those treated by thrombolysis were assessed.

Results: Five hundred and fifty three patients with ischemic stroke and 98 patients with hemorrhagic stroke were treated in the ICU for stroke for a period of 27 months. Out of 553, only 26 underwent thrombolysis. The time between symptoms onset and arrival in hospital was variable, from 10 to 150 minutes. Door-to-needle time varied between 45 and 140 minutes. In 18 out of 26 patients the door-to-needle time was equal or less than 60 minutes. Seven patients died, in 6 of them the door-to-needle time was less than 60 minutes. The time between symptoms onset and arrival in hospital in those who died was between 30 and 120 minutes, but mostly less than 60 minutes. Twelve patients had improvement according to the NHISS score, and the door-to-needle time was between 45 and 105 minutes.

Discussion: Although the organization in health service is considered to be of utmost importance for treating stroke patients with thrombolysis it appears that there are many other factors contributing to better or worse outcome in these patients.

Key words: *stroke, thrombolysis.*

L6

TRENDS IN BRAIN PARENCHYMA SONOGRAPHY

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Transcranial sonography (TCS) has been recently recognized as a reliable and sensitive tool in detecting basal ganglia (BG) abnormalities in several movement disorders, where different patterned hyperechogenic lesions were demonstrated. TCS revealed reduced echogenicity of the brainstem raphe (BR) as a characteristic finding in unipolar depression and in depression associ-

ated with Parkinson's (PD) or Wilson's disease (WD), but not in healthy adults, schizophrenia, multiple sclerosis with depression or Parkinson's disease without concomitant depression.

TCS showed substantia nigra hyperechogenicity in idiopathic PD and lenticular nuclei hyperechogenicity as a characteristic finding in atypical parkinsonian syndromes and several forms of dystonia.

TCS also revealed BG hyperechogenic changes in several other movement disorders with trace metal accumulation such as WD, several forms of spinocerebelar ataxia as well as some entities of neurodegeneration with brain metal accumulation.

In distinct brain disorders TCS detects abnormalities that cannot be visualized or can only be visualized with significant effort with other imaging methods.

The postoperative position control of deepbrain stimulation electrodes, especially in the subthalamic nucleus, can reliably and safely be performed with TCS. The increasingly broad application of TCS in the early and differential diagnosis of neurodegenerative and psychiatric disorders in many centers all over the world is probably the best evidence for the value of the method.

Main advantages include the easy applicability, the fact that it is quick and repeatedly performable with no limitations as known from other neuroimaging techniques and that it is relatively cheap and side effect free.

Principal limitations are still the dependency on the bone window and operator experience. New automated algorithms may reduce the role of investigator skill in the assessment and interpretation, increasing TCS diagnostic reliability. Based on the convincing evidence available, the EFNS accredited the method of TCS a level A recommendation for supporting the diagnosis of PD and its differential diagnosis from secondary and atypical parkinsonism.

Key words: *brain parenchyma sonography.*

L7

APPLICATION OF TCCS/TCD IN POSTERIOR CIRCULATION DISORDERS

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Posterior circulation disorders (PCD) refer to the symptoms elicited due to the decreased blood flow in the posterior circulation (PC) of the brain. PCD have the following clinical manifestations: vertebro-basilar insufficiency, transitory ischemic attacks and stroke (brain-stem infarction). Main causes for PCD are: stenosis or occlusion of PC vessels. Risk factors include VA hypoplasia, dissection, course anomalies, arterio-arterial embolism etc. The PCD may be caused by occlusive compression during head positional changes also.

Objective: To evaluate the significance of extracranial duplex-sonography (EDS), transcranial color-coded sonography (TCCS), Transcranial Dopplerography (TCD) and head rotational functional tests (RFT) in PCD.

Material and Methods: Ninety eighth patients (age range 15-75) and a control group of 20 age-matched persons without PCD signs were examined by EDS, TCCS, TCD, microemboli signals (MES) detection and RFT.

Results: We found clinically manifested extracranial VA pathologies in 82.6% of the patients, steno-occlusive diseases – in 34.7% (extracranial - 22.4%, intracranial -11.3%) and VA hypoplasia – in 60.2% (unilateral-48.7%, bilateral-11.2%). A diameter ≤ 2.5mm revealed high correlation with the clinical manifestation (r=0.003). High resistive flow and elevated PI (3.2±0.3, p<0.0001). Correlation between diameter and PI PMCC = 0.025; VA steno-occlusive diseases -27.6% – extracranial 22.4%, intracranial-5.2%; VA Course anomalies - 38.8%. Decrease of MFV in V4 (distal of VA hypoplasia or >50% stenosis) by 37.8±5.3% in 99.7%, in BA by 32.6±4.7% in 53% of patients (P<0.002). Extracranial pathologies with concurrent intracranial vasoconstriction were found in 54% of patients, positive MES – in 33.4%, symptomatic- in 66.7%, asymptomatic- in 33.3% p<0.04. Positive RFT in 46.9%, decrease of MFV in BA by 31.45±6.7% p< 0.001, correlation with clinical manifestation r=0.031.

Discussion: The EDS, TCD/TCCS are valuable and real time high sensitive methods for discovering of PCD risk and etiology factors, proper selection of treatment strategy and monitoring follow-up.

Key words: *posterior circulation, TCCS/TCD.*

L8

COMPARATIVE NEUROSONOGRAPHIC AND HEMORHEOLOGICAL STUDIES IN CEREBROVASCULAR DISEASES

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The blood viscosity, vessel blood flow and vessel walls functions are tightly related. Their relationship has been the object of a number of our long-time correlative neurosonographic and hemorheological studies. In them parallel disturbance of the hemorheological variables and the neurosonographic parameters of the extra- and intracranial cerebral arteries in patients with risk factors for cerebrovascular disease (CVD) and with different types of CVD were found. Correlations between hematocrit, fibrinogen, plasma and whole blood viscosity on the one hand and blood flow velocity, intima-media thickness and vessel diameter on the other hand were established. The influence of blood pressure (BP) on their relationship was shown. By using blood viscosity, BP values and sonographic parameters in the common carotid artery, the local hemodynamic factors were calculated and their significance for the development of carotid atherosclerosis was confirmed. In patient with small vessel disease the increased blood viscosity values were associated with impaired cerebrovascular reactivity. Parallel influence of hematocrit, BP, cardiac function, intima-media thickness and lumen diameter on the carotid blood flow asymmetry in patients with unilateral cerebral infarctions was detected.

The parallel neurosonographic and hemorheological studies could contribute to clarify the pathophysiology of the CVD and to individualize the therapeutic approach.

Key words: *cerebrovascular diseases, hemorheology, neurosonography.*

L9

SMALL VESSEL DISEASE AS THE CAUSE OF COGNITIVE IMPAIRMENT

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Cognitive decline is commonly associated with widespread small ischemic vascular lesions involving subcortical brain areas such as basal ganglia and hemispheric white matter. The lesions may affect neuronal networks related to cognition, memory and behavior. Small vessel diseases (SVD) are prevalent but still underestimated cause of vascular cognitive impairment (VCI).

There are data indicating that 20% of elder persons have "silent" lesions whereas 25% of all symptomatic ischemic infarctions belong to SVD. Symptomatic subcortical ischemic SVD are the most frequent and the most homogenic cause of VCI.

According to our results VCI in SVD patients is associated with older age, functional status, presence of white matter lesions (WML) and severity of confluent WML. Independent VCI predictors are the functional status and severity of WML.

Key words: *cognitive impairment, small vessel disease.*

Workshops

W1

SITS REGISTER – GLOBAL STROKE NETWORK

Modarator: S. Andonova

Second Clinic of Neurology, UMHAT "St. Marina" – Varna, Bulgaria

Over the past 30 years stroke is a leading cause of mortality and disability in Bulgaria. Although the number of venous thrombolyses for the period 2007–2014 as a specific treatment of acute ischemic stroke in Bulgaria is growing, their frequency remains significantly lower than the recommended minimum of 1–2% annually and represents less than 0.4% of the new stroke cases per year. The endovascular procedures in hemorrhagic stroke are also very low – approximately 0.1% per year. In Bulgaria there is no official national register of patients with acute ischemic stroke in whom thrombolytic or endovascular treatment has been conducted. There are no national data about the effects of the treatment on the outcome of the disease and its complications. Since 2011 the University Hospital for Active Treatment "St. Marina" – Varna participates in the International Register for the treatment of patients with stroke "Safe Implementation of Treatments in Stroke" (SITS). By the end of 2013 eight centers in Bulgaria had been included in SITS register with only four active now.

Key words: *stroke, register SITS.*

W2

ULTRASOUND DIAGNOSTICS OF RARE NEUROLOGICAL CASES

Modarator: M. Klissurski

Cardiology and angiology department, "City Clinic" – Sofia, Bulgaria

Will be presented different rare neurological cases with possibility of adding cases from the participants.

Lectures

Satellite Symposium
INNOVATIONS IN MEDICINE

LS1

EPIGENETICS IN PHARMACOTHERAPY

N. Boyadjieva

Bulgarian Academy of Sciences and Arts – Sofia, Bulgaria

LS2

STEM CELLS IN TUMORS

G. Bocheva

Sofia, Bulgaria

LS3

NUTRIGENOMICS

T. Handjieva–Darlenska

Sofia, Bulgaria

LS4

NEW TRENDS IN DIAGNOSIS AND PROGNOSIS OF NEUROBLASTOMA

M. Kamenova

Bulgarian Academy of Sciences and Arts – Sofia, Bulgaria

Neuroblastoma (Nbl) is the most common solid tumor in childhood. It still shows high mortality rate, despite the advances in its diagnosis and treatment. The tasks of the modern diagnosic process is to integrate biological, clinical, laboratory, diagnostic imaging and histological methods focusing on genetic and epigenetic changes in the Nbl and to determine the risk factors. According to the latest risk staging system, INRGSS, factors with proven prognostic importance are age, histological type, stage of the disease, amplification of MYCN, chromosomal aberrations – 1p deletion, 17q amplification and DNA-index (triploidy carries good prognosis). In search of new, more precise risk factors and target molecules for targeted therapy, the following trends are outlined: 1. The introduction of high technology studies of the genome with CGN array technique, genomic, exome and transcriptomic sequencing allows the discovery of new prognostic factors and prognostic groups based also on molecular-pathological evidence. 2. Thorough study of the carcinogenesis, directed at finding new damaged molecules, whose inactivation can be used in targeted therapy of Nbl. Such opportunity emerges with the ALK-kinase mutation. 3. Increasing the chances of detection of minimal residual disease by examination of bone marrow biopsy. All these revolutionary changes in the technology of genetic studies sketch new prospects and hopes for more effective treatment of Nbl.

LS5

STEM CELL THERAPY IN POST MYOCARDIAL INFARCTION PATIENTS

I. Petrov

"City Clinic", Cardiology and angiology department – Sofia, Bulgaria

Cardiovascular diseases are a leading cause of morbidity and mortality worldwide. Despite advances in medical treatment and cath-based therapy for acute myocardial infarction (AMI) the mortality rate on the first year is 13% and the 5-year prognosis for patients to develop heart failure (HF) is 50%. Left ventricular systolic dysfunction after STEMI is a major determinant of prognosis and is associated with significant loss of cardiomyocytes. Cell transplantation is a new therapeutical approach in patients with HF after a myocardial infarction. Most of the trials used intra-coronary delivery of bone marrow stem cells, following successful stenting of the infarct-related artery. The improvement in the LVEF, reduction in size of scar tissue and reduction in cardiac volume were markers to assess the efficacy of cell therapy. Four main randomized controlled trials (RCTs) were published with positive findings (improved LVEF, improvement in regional contractility and reduction of the infarcted area). Three randomized controlled trials showed no changes in global LVEF and no changes in global or regional LV systolic function after BMSC infusion. There were no safety issues it the conducted trials. Possible reasons for the inconsistent findings are the variations in the number of delivered cells, timing of delivery after AMI and the differences in the cell isolation protocol.

Conclusions: The safety of stem cell therapy has been demonstrated uniformly in the vast majority of the studies. Beneficial effects of cell therapy have been demonstrated in patients with AMI, chronic ischemic HF and DCM. The best type and route of application are still controversial. Larger RCTs with longer term follow-up, assessing morbidity and mortality rates are needed.

LS6

HYPOTHYROIDISM AND METABOLIC SYNDROME – PHATHOPHYSIOLOGY AND CARDIOVASCULAR RISK

B. Lozanov

Bulgarian Academy of Sciences and Arts – Sofia, Bulgaria

LS7

INNOVATIONS IN DIABETES MELLITUS

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Clinic of Endocrinology and Metabolic Diseases, Military Medical Academy – Sofia, Bulgaria

The burden of diabetes increases the patient health care costs and is associated with significant morbidity and mortality. New approaches for early diagnosis, treatment and control of the disease are very important to protect from complications and to diminish the health expenses.

EZSCAN is a new technology based on strong association between small nerve neuropathies, sweat gland dysfunction and insulin resistance and increased blood sugar. This diagnostic method is easy to operate, reproducible and not expensive and identifies those with increased risk. EZSCAN has the potential to be useful tool in diabetic risk diagnostics and early detection of complications.

Continuous glucose monitoring (CGM) performs multiple blood glucose measurements and is used for defining the control and changing the treatment regimen in diabetic patients, especially those with varying glucose levels and experiencing frequent hypoglycemic episodes. iPro 2® Professional is a forth generation continuous glucose monitoring system, valuable for detecting high and low glucose fluctuations and is small enough for patient to forget they have it on. iPro2 Professional CGM uses a tiny glucose sensor to record 288 glucose readings over a 24-hour period. Glucose data are captured in the system and are uploaded to CareLink iPro Software. The reports are useful for educating and motivating patients to implement changes in their diabetes management after viewing what effects specific foods, exercise, stress and medications have on their glucose levels.

The continuous subcutaneous insulin infusion therapy (insulin pump) is a medical device used for the administration of short acting insulin and is thought to be the most physiological way for insulin replacement. Recently it is used not only in type 1, but also in type 2 diabetes. Combining insulin pump technology with continuous blood glucose monitoring system improves real-time control of the blood sugar level. Closing the loop will allow the system to function as an artificial pancreas.

LS8

DIABETES IN OLDER ADULTS. RATIONALE FOR THE PREVENTION OF DIABETES, COMPLICATIONS AND THERAPEUTIC PECULIARITIES

P. Djordjevic

General Hospital Medical System Belgrade – Belgrade, Serbia

Diabetes is Global Threat all over the world and Europe. In 2013 in Republic of Serbia there were 872.290 diabetic patients and 10.572 diabetes related deaths, in Bulgaria - 426.690 and 6.621 diabetes related deaths. Forty six percent of patients with type 2 diabetes (DM2) can remain undiagnosed for many years, unaware of the long-term damage leading to serious complications and early death.

Epidemiological data show that population aging is unprecedented, the proportion of older persons (over 60 years) in 2050 will rise to 25% of the world population. These changes present significant challenges to welfare, pension and health care systems.

Rationale for high quality diabetes care for older people is oriented to treatment of high glucose levels, blood pressure and lipids. However the prevention of DM2 and cardiovascular complications in older people (lifestyle/exercise programme), especially those with pre-diabetes has to be an earlier step.

Among risk factors for DM2, the age over 45 years is in first place as the prevalence of pre-diabetes increases with aging.

There are many prevention programmes in the world. Belgrade Prevention Programme (Serbia) is one of the most efficient with 64% reduction of DM2 incidence. One of the most important results is that the treatment of obesity and prevention of DM2 realizes preventive cardiology.

These results have been confirmed by many European Prevention Plans: DE-PLAN, IMAGE, and others, some still ongoing: for example the ePREDICE project. The prevention team from Belgrade is leaded by Acad. Prof. Predrag Djordjevic.

Glucose control management and targets in older diabetic patients requires levels of Hba1c up to 7.0–7.5%. In order to achieve this goal the first-line therapy is Metformin. If the patient is intolerant to Metformin, Sulfonylureas are the next step. A dipeptidyl dipeptidase 4 (DPP-4) inhibitor may also be considered if available and affordable. It is possible to combine peroral therapy (second-line therapy) if Metformin is not able to achieve glycaemic targets. The third-line therapy option is to start with basal or pre-mixed Insulin and continue with intensive Insulin regimen if necessary.

Blood pressure management needs to start with non-pharmacological intervention. Pharmacological therapy should be initiated if after 6 weeks blood pressure targets are not achieved. ACE inhibitors are the treatment of first choice, especially in the presence of diabetic nephropathy. Angiotensin II receptor blockers (ARBs) can be used as initial therapy in people who can not tolerate ACE inhibitors. Diuretics and calcium channel blockers can be used as a first add-on therapy.

LS9

MODERN ASPECTS IN THE TREATMENT OF PANCREATIC CARCINOMA

N. Vladov

Bulgarian Academy of Sciences and Arts – Sofia, Bulgaria

LS10

NEW HIGHLIGHTS ON PEDIATRIC TUMORS

I. Hristozova

Sofia, Bulgaria

Poster Sessions

Poster Session I–1. Stroke Management.

P1

LEFT VENTRICULAR THROMBI CAUSING CEREBRAL EMBOLIC ISCHEMIC STROKE WITH HEMORRHAGIC TRANSFORMATION: A CASE REPORT

S. Dzambazovska-Zikova, S. Stojchev, F. Adili, M. Grozdanovski, D. Ristic

General Hospital "8th September" – Skopje, Macedonia

Objective: Identifying the etiology of an ischemic stroke is essential to its treatment. Cardioembolic strokes occur in about 20% of stroke patients. Left ventricular thrombi come second to atrial thrombi from atrial fibrillation as a cause of cardiogenic embolisation. Large sized cerebral infarcts are known to be associated with high risk for hemorrhagic transformation.

Material and Methods: A 41 year old right-handed man presented with acute onset of inability to speak and right-sided weakness. His previous medical history included hypertension, hyperlipidemia, aortic regurgitation (2 grade) and mitral regurgitation (1 grade). Two years ago he suffered anterior ST elevation myocardial infarction, with primary PCI: PTCA/stent on proximal LAD. The patient was on two antihypertensive medications, a statin, a beta-blocker and antiplatelet therapy (Clopidogrel) 75mg/day. The patient was not a candidate for tPa because of the inability to determine the time of onset of symptoms. At admission, his blood pressure was 140/90 mmHg, regular heart rate of 95/min, central right facial palsy, aphasia with right-sided hemiplegia. Initial brain CT showed a small post-ischemic zone in the left parietal lobe. Doppler ultrasound of carotid arteries was normal. A repeated CT brain after 48 hours showed a large left middle cerebral artery infarction with focal areas of hemorrhagic transformation. Echocardiography revealed a septoapical aneurysm with akinetic walls, a mobile thrombus in the apical region and thrombi in the left ventricle. Brain MRI confirmed the CT scan finding. Multidisciplinary team of a neurologist, cardiologist and transfusiologist discussed over the decision whether to use anticoagulant therapy.

Results: This case report emphazises the importance of echocardiography in identifying the etiology of an ischemic embolic stroke with hemorrhagic transformation.

Discussion: Early and prompt cardiac evaluation using echocardiography in the emergency department is necessary in order to detect the etiology of embolic strokes.

Key words: *cardioembolic stroke, echocardiography, .*

P2

CONFUSION SYNDROME AS A DEBUT OF STROKE AND THE ROLE OF NEUROSONOLOGY: A CASE REPORT

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Objective: To present a case in which vascular neurosonologic targeted research is crucial for the diagnosis of cerebral infarction.

Material and Methods: A 60 years old patient entered the Emergency Department of the University Hospital St. Anna - Sofia because of sudden confusion during a family dinner. The consultation with a neurologist expressed doubt about agnosia. After a thorough physical and neurological examination a neurosonologic study of cerebral arteries was performed.

Results: A clot in the left common internal carotid artery was found. At the last minute the patient exacerbated symptoms to right-sided hemiplegia and aphasia. Intravenous thrombolysis according to the agreed algorithm was held. The patient was discharged without any focal neurological symptoms.

Conclusions: The implemented on time and directed neurosonology examination may have a key role in the diagnosis and monitoring of treatment outcomes of patients with stroke. Adequate assistance and best results can be achieved with a specialized team prepared for treating strokes, including a clinical center with availability of diagnostic imaging, laboratory, resuscitation and neurosonology specialists.

Key words: *carotid artery, clot, neurosonology, stroke.*

P3

POLYMORPHISM IN PROTHROMBOTIC GENES IN YOUNG STROKE PATIENTS: A CASE REPORT

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General City Hospital "8th of September", Department of Neurology – Skopje, Macedonia

Objective: Mechanisms of ischemic stroke in young adults (18-45 age) are poorly understood. The aim of this case report was to investigate the assotiation between gene polymorphism of factor XIII -FXIII (V34L), auther protrombotic genes and ischemic stroke.

Material and Methods: We present a case of a 25 year old right-handed man with abrupt onset of moderate grade right sided weakness. His previous medical history was negative, not smoking.

Initial Computed Tomography of the brain (CT) was normal. He was treated with intravenous (iv) fibrinolytic therapy with recombinant tissue plasminogen activator r-tPA (Actilyse) 90mg total dose. At the first 24 hours he had stable vital parameters. The control brain CT scan was normal. In the next days his neurological condition became better with mild weakness of the right extremities. Several tests were made. The Magnetic Resonance Imaging (MRI) of brain found one ischemic zone in the left thalamus, CT angiography of cerebral blood vessels and Doppler ultrasound of carotid and peripheral arteries were normal. Echocardiography showed a thinning central part of the inter-atrial septum without left-to-right shunt.

Results: The patient was tested for 17 mutation/polymorphism of genes associated with cardiovascular diseases by methods of reverse hybridization (DNA isolated from white blood cells). He was genotyped as heterozygous for mutation V34L (F XIII), endothelial Nitric Oxide Synthase (eNOS), 786 gene and Lymphotoxin alpha (LTA).

Discussion: Factor XIII has emerged as a key regulator of fibrinolysis, but also F XIII is involved in atherogenesis. The polymorphism of prothrombotic genes is associated with the risk of coronary artery disease and atherothrombotic ischemic stroke.

Key words: *Factor XIII, ischemic stroke, protrombotic genes.*

P4

PREOPERATIVE ASSESSMENT OF CEREBRAL AUTOREGULATION IN PATIENTS WITH CAROTID STENOSIS AND THROMBOSIS

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Background: Patients with ≥ 70% stenosis and stroke history have always been considered the best candidates for carotid surgery. Any benefit of surgery for other patients has not been proven. Recent literature cast doubts on the necessity of surgical treatment for all patients with even severe carotid stenosis but selection criteria are to be more defined. Therefore cerebral autoregulation (CA), being one of the most important factors of the compensatory capacity of the cerebral hemodynamics, seems to be useful in proper choice between surgery and conservative treatment.

Objective: To assess the dynamics of CA in patients with stenosis and thrombosis of the carotid arteries in perioperative period.

Material and Methods: Thirty-nine patients (27 men and 12 women) with atherosclerotic stenosis or thrombosis of carotid arteries aged 48-78 years were studied. Critical stenosis was revealed in 28 patients. Severe stenosis was found in 5 patients, thrombosis – in 6. Fourteen patients had a history of stroke, 25 were always asymptomatic. Stenting of the carotid artery was performed in 16 patients, carotid endartherectomy – in 17, upper cervical sympathectomy – in 4, extra-intracranial arterial bypass – in 2. There were no any postoperative complications. Cerebral autoregulation was evaluated with cross-spectral analysis of spontaneous oscillations of systemic blood pressure (BP) with CNAP (Austria) and blood flow velocity (BFV) with Multi Dop X (Germany) within the range of Mayer's waves (evaluation of phase shift – PS).

Results: Carotid endartherectomy and stenting resulted in significant improvement of CA in 18 patients (10 – asymptomatic, 8 – symptomatic) with impaired CA. On the ipsilateral side PS before surgery was 0.2 ± 0.2 rad, BFV – 77 ± 20 cm/s and BP – 82 ± 17 mmHg. After surgery PS was 0.9 ± 0.5 rad ($p<0.01$) without significant changes of the BFV and BP. Mean values of PS on the ipsilateral side without impaired CA were 1.3 ± 0.5 rad, BFV – 61 ± 10 cm/s and BP –95 ± 11 mmHg, and they also stayed unchanged in 21 patients (15 – asymptomatic, 6 – symptomatic) in the postoperative period.

Discussion: Preserved CA in patients with carotid stenosis is an important factor in stroke prevention. Our data show preserved CA in many patients with different grades of stenoses and in most cases of the asymptomatic stenoses. Accurate CA assessment could be useful in patient selection for surgery or conservative treatment, as well as in treatment strategy as a whole.

Key words: *carotid pathology, cerebral autoregulation.*

P5

ACUTE ISCHEMIC STROKE: THE NEED TO CREATE A NATIONAL REGISTRY OF PATIENTS WITH STROKE

S. Andonova

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Introduction: Thrombolysis (TL) using rt-PA is currently an approved pharmacotherapeutic treatment of ischemic stroke (IS). In the absence of a national register of patients with ischemic stroke treated with intravenous thrombolysis in Bulgaria it is impossible to monitor the effect of this treatment.

Objective: To conduct a prospective study of treatment outcome in patients with acute ischemic stroke with/without TL hospitalized in the Second Clinic of Neurology for the period 2009–2013.

Material and Methods: We studied 166 patients with acute ischemic stroke with thrombolytic therapy and 1532 patients with acute ischemic stroke without TL therapy. The prospective study involved a five-year period. We compared these results with data from the international registry of patients with stroke SITS.

Results: The data about the outcome after treatment with TL during hospitalization from our center, compared to other centers in the registry show a higher percentage of patients with good or very good treatment outcome – 70%. The percentage of patients worsened after treatment is relatively the same (around 7%), and deaths registered during the hospital stay – about 6.6%. Significant changes are observed in the mortality on the third month. On the third month the mortality is increased to about 24%, in contrast to the mortality rate in other centers of the International Registry (about 14%).

Discussion: There is no precise information about the causes that leed to significant increase in deaths over the same three-month period. The comparative results give us reason to propose the creation of a national registry of patients with acute ischemic stroke. The data from the registry would serve also for planning and directing the efforts for training the human resources and public education.

Key words: *stroke thrombolisis register.*

P6

RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR AND STROKE: A CASE REPORT

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Objective: To assess the role of recombinant tissue plasminogen activator application in patients with stroke.

Material end Methods: A 46 years old male patient, smoker, with history of stroke in the immediate family without comorbidities (normal blood pressure with normal values of lipids and glucose) was admitted in the Emergency Service after 2 hours of acute weakness in right limbs and speech difficulties. Physical and neurological examination were performed immediately. The CT examination was normal. Afterwards fibrinolytic therapy was administered as per protocol for the treatment of ischemic stroke, with good tolerance of the drug and a good therapeutic response. Nine hours after the administration of the drug almost complete recovery of right motor deficit was present, with persisting speech difficulties. Treatment was continued with low molecular weight heparin. On the second CT an infarction in the vascular area of the left middle cerebral artery was seen, and the third CT showed almost complete regression of the ischemic area. The patient was released from hospital with latent weakness of limbs and right sensorimotor dysphasia.

Discussion: Our experience on acute stroke thrombolysis with recombinant tissue plasminogen activator shows that adequate thrombolysis in accordance with established treatment guidelines saves lives.

Key words: *rTPA, stroke, thrombolysis.*

P7

INTERVENTIONAL TREATMENT OF ACUTE BASILAR ARTERY OCCLUSION: A SUCCESSFULLY RECANALIZED CASE

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Objective: To describe a case of a 67-year old man with atrial fibrillation who was brought to the emergency room in a comatose state, with quadriplegia and decerebration posture. The symptoms occurred three hours earlier. His GLCS was 11 points, NIHSS > 24, BP 210/107 and mRS 5.

Material and Methods: Non-contrast CT was performed and intracerebral hemorrhage was excluded. A decision to perform an immediate cerebral panangiography and intraarterial treatment was taken because of evidence of acute basilar artery occlusion (BAO). The patient was sedated and intubated. The cerebral angiography showed BAO in the middle and distal segment. Via right femoral approach, a guiding catheter Simmons-2 was positioned in the mid left vertebral artery.

Results: The BAO was recanalized with a "014 Runthrough wire supported by a low profile Sprinter 1.25/15 mm balloon. After 3 inflations of balloon with incremental sizes (1.25–3.5 mm), a full recanalization and flow restoration was achieved. Twenty mg Actilyse were administered. Supraselective thrombolysis was carried out 4 hours after the onset with an excellent angiographic result (TICI 3). After the procedure the patient was treated in ICU where another 10 mg Actylise were infused over the next 3 hours. Since the neurological condition was improving, he was extubated 12 hours later. On the first day, the patient regained consciousness, was able to speak and had no deficit in the right limbs. On control CT there were no new signs of ischemic stroke. CT angiography showed complete basilar artery recanalization in the distal part, a moderate residual stenosis in the middle and aplasia of the left posterior communication artery. After a rehabilitation program, on the 7th day the patient was discharged with NIHSS 7, GLCS 20 and mRS 3.

Discussion: The success in our case was a result of the prompt diagnosis, fast access to the CathLab and early mechanical-pharmacological recanalization.

Key words: *acute basilar artery occlusion, interventional treatment, mechanical thrombolysis, supraselective fibrinolysis.*

P8

CEREBRAL VENOUS THROMBOSIS OF STRAIGHT AND RIGHT TRANSVERSE SINUSES: A CASE REPORT

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Objective: To discuss the diagnostic possibilities for evaluation of pathologic intracranial venous circulation.

Material and Methods: The study was performed in a 53-years old patient with headache, nausea, right side hemiparesis from a few days before hospitalization. MRI, MRI venography and color coded duplex sonography were done.

Results: On MRI multifocal subcortical hemorrhages by cerebral venous thrombosis of sinus sagittalis superior and the right sinus transversus were detected.

Discussion: The diagnostic possibilities based on clinical (previous history, clinical symptoms and evolution) and imaging data (type of signal abnormalities, location of lesions) are presented in this clinical case. The diagnosis of the underlying etiology may be difficult to reveal by the performed imaging studies.

Key words: *cerebral venous sinus thrombosis*.

P9

CHRONIC ISCHEMIC HEART DISEASE AS A RISK FACTOR FOR COGNITIVE IMPAIRMENT AFTER ISCHEMIC STROKE

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Objective: Cerebro-vascular disease, in particular ischemic stroke is frequently accompanied by chronic ischemic heart disease (CIHD). The aim of our study is to establish the CIHD influence on post stroke cognitive parameters.

Material and Methods: We examined 54 patients without and 45 patients with CIHD tree months after the stroke incident via Mini Mental State Examination (MMSE), Instrumental activities of daily living scale, Blessed dementia memory concentration test, 10 words test for short-term memory and delayed recall, Benton Visual Retention Test (BVRT), Isaacs verbal fluency test, Simple apraxia battery, Clock drawing test, Wisconsin card sorting test and Hamilton Depression Scale (HDS).

Results: Patients with CIHD showed poor results on MMSE, short-term memory, delayed recall, BVRT, Isaacs verbal fluency test and HDS ($p<0.05$).

Discussion: Chronic ischemic heart disease is associated with more severe cognitive deficit. Patients with CIHD have more pronounced memory and verbal fluency impairments and higher depression levels.

Key words: *chronic ischemic heart disease, cognition, post stroke cognitive deficit, post stroke depression*.

P10

POST STROKE DEPRESSION MEASURED BY SELF-ASSESSMENT GERIATRIC DEPRESSION SCALE

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Objective: Post stroke depression is associated with low quality of life and poor functional outcome. Two groups of depression rating scales exist: self-assessment and health care professional rating. The aim of our study is to apply the self-assessment Geriatric Depression Scale (GDS) and to examine post stroke depression and its risk factors.

Material and Methods: We examined 109 post stroke survivors (aged 66.67±9.03 years, 67 males and 43 females) at the 3rd month after the incident via GDS. Statgraphics 5.0 was used for statistical analysis. All results were assessed at 95% confidential level.

Results: Post stroke depression was found in 67% of our patients. Post stroke survivors with left hemispheric strokes were more depressed than those with right hemispheric and brainstem ones. Patients with subcortical strokes showed more severe depressive signs than those with cortical incidents. Stroke severity and size and coexistence of multifocal encephalopathy were at good correlation with depression severity ($p<0.05$).

Discussion: The severity of post stroke depression measured with GDS depends on the stroke localization, size, severity and coexistence of multifocal encephalopathy.

Key words: *Geriatric depression scale, risk factors, post stroke depression*.

Poster Session I–2. Experimental, Vascular and Non-Vascular Neurosonology

P11

NUMERICAL ANALYSIS OF BLOOD FLOW IN THE CAROTID ARTERY BIFURCATION

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Objective: To study numerically the time-varying blood flow in the common carotid artery (CCA) bifurcation on the basis of Navier-Stokes equations for four different cases, including cases without stenosis and with one, two and three stenoses at different sites in the vicinity of the bifurcation.

Material and Methods: The cases studied were: a) without stenoses, b) with one stenosis upstream the bifurcation, c) with two opposite stenoses upstream the bifurcation and d) with an additional stenosis on the apex of the bifurcation. The blood flow in the arteries is modeled as incompressible viscous flow. The governing Navier-Stokes equations describing pulsatile, three-dimensional flow of an incompressible Newtonian fluid are approximated using a finite volume method. To create the complicated shape of the computation area a CAD system is applied with tetrahedral elements The mesh was generated via a geometry reconstruction and imported into a Computational Fluid Dynamics (CFD) solver.

Results: The numerical results of the blood flow in the CCA bifurcation give a detailed picture of the axial and radial velocity distribution and presented as velocity and vorticity magnitudes. The structures of the flow around the bifurcation from the CCA to the internal and external carotid arteries are obtained considering characteristic time points for one pulse wave period. The axial velocity distribution and wall shear stress distribution and contours are presented.

Discussion: The obtained velocity and WSS distribution around the bifurcation allow a prediction of the probable sites of stenosis growth. More specifically, it was observed that the appearance of stenotic regions upstream the bifurcation affect both the velocity and vorticity characteristics, whereas a stenosis on the apex of the bifurcation seems to have a small effect on the vorticity characteristics downstream the flow in the external and internal carotid arteries.

Key words: *3D numerical calculations, CCA bifurcation, stenosis, velocity and WSS distribution.*

P12

USE OF TEMPORAL ARTERY ULTRASOUND IN GIANT CELL ARTERITIS: A CASE REPORT

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Objective: Giant cell arteritis is an important cause of morbidity with irreversible visual loss as the most serious complication. Early diagnosis and start of treatment is essential. The color-duplex sonography is an easy-to-perform and non-invasive diagnostic tool that may be helpful for the diagnosis and assessment of response to steroid therapy in this vasculitis.

Material and Methods: A 75-year-old man presented to the Neurology Department with severe new-onset headache localized in the right temporal area. Clinical examination revealed abnormalities of both superficial temporal arteries and elevated acute phase reactants in his blood. Diagnosis of giant cell arteritis was suspected and corticosteroid therapy was immediately started. Before biopsy color-duplex sonography of temporal arteries was performed. On both sides tortuous superficial temporal arteries with segmental dark halos and stenoses were present. These findings supported our clinical suspicion and we continued to treat our patient. A few days later the temporal artery biopsy confirmed histopathologically the initial diagnosis. In the further course of the illness color-duplex sonography took an important place in the evaluation of the treatment efficacy.

Discussion: This case report emphasizes on the usefulness of color-duplex sonography in diagnosis of giant cell arteritis and reminds of the high specificity of bilateral halo sign.

Key words: *giant cell arteritis, ultrasound.*

P13

BASILAR ARTERY FENESTRATION – CORRELATIVE MRI AND NEUROSONOGRAPHIC STUDY

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Objective: To demonstrate a rare case of congenital basilar artery fenestration using various neuroimaging methods.

Material and Methods: A 58-year-old man with an isolated lesion of the right oculomotor nerve was examined

with brain MRI/MRA and multimodal neurosonography.

Results: A typical fenestration in the proximal portion of the basilar artery immediately after the fusion of the vertebral arteries was detected on MRA. It was correlated with the ultrasound pattern – a parallel blood flow image and retrograde flow velocity curves were obtained from the fenestrated segments of a. basilaris.

Discussion: Imaging (MRI/MPA and ultrasonic) methods are useful for non-invasive diagnosis of basilar artery fenestration, which in the past was proved only by conventional cerebral angiography or autopsy.

Key words: *basilar artery fenestration, MRI, neurosonography.*

P14

ULTRASOUND IMAGING OF OPTIC NERVES IN HEALTHY SUBJECTS: EFFECTS OF POWER OUTPUT AND REFRACTIVE ERRORS

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Objective: To evaluate the ultrasound parameters of optic nerves in healthy subjects in relation to different power output and refractive errors.

Material and Methods: The study was performed in 31 clinically healthy volunteers (17 men and 14 women, ranged from 22 to 97 years, mean age 51±20 years) without history of ophthalmic disorders or neuro-ophthalmic syndromes. The optic nerves were evaluated by multimodal 2D/3D/4D neurosonography at power output ranged from 50% to 100%. The diameters of the optic nerve/sheath complex and their ratio were measured 3 mm behind the globe. The effect of refractive error was tested experimentally by changing of two hydrophilic aspheric contact lenses (+6 and -10 diopters) on the right eye. Correlations between the anthropological factors (age, sex, height, weight and body mass index – BMI), power output, refractive errors (myopia and hypermetropia) and ultrasound parameters of the optic nerves were evaluated.

Results: In our group of healthy persons the changes of the ultrasound power output (from 50% to 100%) and the refraction (from +6 and -10 diopters) were not associated with significant alteration in the ultrasound pattern of the optic nerve/sheath complex.

Discussion: In our group of healthy persons the changes of the ultrasound power output (from 50% to 100%) and the refraction (from +6 and -10 diopters) were not associated with significant alteration in the ultrasound pattern of the optic nerve/sheath complex.

Key words: *optic nerve, power output, refractive errors, ultrasound.*

P15

COMPARATIVE NEUROSONOGRAPHIC AND COMPUTED TOMOGRAPHIC ASSESSMENT OF THE THIRD VENTRICLE IN PATIENTS WITH BRAIN ATROPHY

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Background: In recent years transcranial sonography of brain parenchyma has proven its role in the diagnosis of several central nervous system disorders manifested with brain atrophy. This method allows comparatively precise measurement of the third ventricle's diameter, which enlargement over 7 mm/10 mm in patients under/over 60 years is a sign of brain atrophy.

Objective: To perform an ultrasound assessment of the third ventricle's diameter in patients with brain atrophy and to compare the results with the brain CT measurements.

Material and Methods: The values of the third ventricle's diameter were measured in axial plane at the level of the thalami by transcranial sonography in 14 patients at medium age of 73.50±9,67, suffering from vascular or degenerative dementia, whose CT showed brain atrophy. Parallel ultrasound and computed tomographic measurements of the third ventricle's diameter were performed. The results were processed by correlation and variation analysis.

Results: A high correlation between the values of the third ventricle's diameter, detected by transcranial sonography and the CT measurements ($r=+0,89$; $p<0.001$) was observed. The inter-observer correlation coefficient for the ultrasound values of the third ventricle's diameter was even higher ($r= +0.96$, $p<0.001$).

Discussion: Transcranial sonography allows fast and non-invasive assessment of the third ventricle's diameter. The results from the measurements are comparable with those obtained from CT of the brain, showing a very good reliability of the method and a possibility for its more frequent application in everyday clinical practice.

Key words: *brain atrophy, CT, third ventricle, ultrasound.*

P16

ULTRASOUND BRAIN PARENCHYMA IMAGING IN PARKINSON'S DISEASE

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Objective: To demonstrate the diagnostic abilities of the multimodal neurosonography for imaging of brain parenchyma in Parkinson's disease.

Material and Methods: A multimodal high-deffinition ultrasound was used for imaging the brain parenchyma in three patients with Parkinson's disease and one with essen-

tial tremor, confirmed by SPECT (DaTscan). The severity of Parkinson's disease was evaluated by the scales of Hoehn and Yahr and Unified Parkinson's Disease Rating Scale (UPDRS), and the cognitive capacity – by Mini Mental State Examination Scale. The results were compared with healthy controls at the same age.

Results: In contrast to controls and the patient with essential tremor an asymmetric and enlarched hyperechogenic substantia nigra was found in all three patients with Parkinson's disease. These data correlated with the results from DaTscan Imaging.

Conclusion: The study confirms that ultrasound brain parenchyma imaging could help the early diagnosis of Parkinson's disease.

Key words: *brain parenchyma, Parkinson's disease, ultrasound.*

P17

ULTRASOUND NEURONAVIGATION OF BRAIN METASTASES

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Objective: To analyze the application of ultrasound neuronavigation in the surgery of cerebral metastases.

Material and Methods: For a period of 7 years 116 surgeries on cerebral metastases were performed under intraoperative ultrasound guidance. A powerful ultrasound scanner integrated with neuronavigation system (Sonowand Invite, Sonowand) was used to locate metastatic lesions and to confirm their total removal. Tumor size and location, number of metastases and preoperative status of patients, measured according to the Karnofsky performance scale (KPS) were analyzed. Surgical results were assessed in respect to the extent of resection, postoperative complications and local recurrence of the disease.

Resuslts: Gross-total resection was achieved in nearly all patients (98%). Major postoperative complications were observed in 14.6% of patients, most of them surgical (8.3%). Mortality rate was comparatively high (5.2%), although most of the deaths could be attributed to the patient's poor preoperative condition (average KPS of patients with poor outcome was 50). Local recurrence rate was 5.2%. In few cases considerable brain shift was observed only by ultrasound neuronavigation.

Discussion: In cases of deep seated tumors, small metastases or multiple lesions the intraoperative ultrasound navigation gives the surgeon confidence and facilitates the surgery by elimination of the factors that would affect neuronavigation accuracy (brain shifting, reference frame dislocation, patient to image co-registration).

Key words: *cerebral metastases, neuronavigation, ultrasound navigation.*

P18

CORRELATIVE ELECTROMYOGRAPHIC AND MULTIMODAL ULTRASOUND IMAGING STUDIES OF CALF MUSCLE LESIONS

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Objective: To summarize our experience in parallel electromyographic (EMG) and multimodal ultrasound imaging studies of calf muscle structure and function in patients with different neurological and non-neurological disorders.

Material and Methods: Different types of triceps surae (TS) muscle disturbances due to traumatic injury, genetic disorders, peripheral neuropathy, chronic spastic hemiparesis, venous pathology and combined hemiparesis after cervical and lumbar spinal surgery were evaluated by EMG and electroneurography. The findings were juxtaposed to corresponding images obtained by simultaneous multimodal 2D/3D/4D myosonography in rest, during maximal plantar flexion and electrical stimulation. The results were compared to EMG findings and myosonograms of healthy persons.

Results: Typical EMG findings and calf muscle architectonics were found in relation to the location, type and severity of TS lesions, muscle fibers contractility, degree of muscle atrophy, fat tissue infiltration, fibrosis and vascularization. Both methods give the opportunity to evaluate possible discrepancy between peripheral nerve damage and associated functional muscle changes.

Discussion: The combined use of EMG and myosonology is superior to the single application of each of both methods providing additional information about the structural and functional changes of calf muscles in normal and pathological conditions.

Key words: *electromyography, myosonology, m. triceps surae.*

P19

EFFECT OF AUDITORY AND VESTIBULAR STIMULI ON THE CEREBRAL BLOOD FLOW IN THE MIDDLE CEREBRAL ARTERY IN PATIENTS WITH TRANSIENT ISCHEMIC ATTACKS AND CHRONIC CEREBRAL INFARCTIONS

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Objective: To study the response of the cerebral hemodynamics to auditory and vestibular stimulation in patients with cerebrovascular diseases compared to healthy subjects.

Material and Methods: The study included 30 healthy subjects, 28 patients with transient ischemic attacks (TIA) and 30 patients with chronic unilateral cerebral infarctions (CUCI). In all of them the auditory system was stimulated with pure tone of 1000 Hz and intensity of 100 dB for 30 sec, while the vestibular system was stimulated calorically – irrigation of outer ear canal with cold water. The velocity parameters of the blood flow in the middle cerebral artery (MCA) were monitored by transcranial Doppler sonography before and after the stimulation.

Results: In the healthy subjects the vestibular stimulus induced significant increase of the systolic (SBF), the diastolic (DBF) and the mean blood flow (MBF) velocity in the MCA, while the auditory stimulus caused increase only of the SBF. The tendency for increase of the velocity parameters of the MCA is preserved in the patients with cerebrovascular diseases. It is more expressed after vestibular stimulation and predominates in the patients with TIA, where significant increase of the DBF was observed.

Discussion: The auditory and vestibular stimuli exert influence on the blood flow velocity in the MCA. It is less pronounced in the patients with cerebrovascular diseases with impaired vascular reactivity in comparison to healthy controls.

Key words: *cauditory and vestibular stimuli, cerebral blood flow, ultrasound.*

Poster Session II–1. Microcirculation, Case Reports and Student Presentations

P20

DISTURBANCES IN BLOOD VISCOSITY AND SKIN MICROCIRCULATION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective: The aim of the study is to investigate the relationship between the rheological properties of the blood and the changes in the skin microcirculation in patients with type 2 diabetes mellitus (DM) and in a control group of healthy subjects.

Materials and Methods: The basic hemorheological variables: apparent dynamic viscosity of whole blood, plasma viscosity, hematocrit and hemoglobin were examined in 27 patients with type 2 DM and in a control group of 11 healthy subjects. The whole blood and plasma viscosity were measured using a rotational viscometer Contraves Low Shear 30 (Switzerland) at a steady flow and at shear rates from 0, 0237 s-1 to 128, 5 s-1. The temperature oscillations on the skin surface were measured using a Microtest device (000"Вектор-ПМ", Perm, Russia) and were analyzed by a wavelet analysis. The skin temperature was continuously registered on the palm surface of the distal phalanx of the second finger with two closely-spaced sensors (platinum-sensitive element) under basal conditions (10 min), during contralateral hand immersion in cold water (3 min) and thereafter (10 min).

Results: Significant increase of whole blood viscosity in the DM patients in comparison to the controls within the whole range of shear rates 0,0237 s-1 to 128, 5 s-1 was established. The applying of the cold stress was associated with reduction in the mean amplitude of the skin temperature oscillations in the endothelial and the neurogenic frequency ranges during the test and its increase after the cooling effect is over. The average values and standard deviations of the root mean square values of the amplitude of oscillations of the skin temperature in the endothelial frequency range showed significant difference between the DM patients and the controls before and during the cold stress ($p<0.05$) and 3 min and 10 min after its discontinuance ($p<0.01$).

Discussion: The increase of blood viscosity is associated with impairment of the peripheral microcirculation, which is confirmed by the results of the Microtest device measurement. The analysis of the low amplitude temperature oscillations on the surface of the skin with applying an indirect cold test provides useful additional information about the regulatory mechanisms influencing the skin microcirculation.

Key words: *endothelial oscillation range, hemorheological properties, skin temperature fluctuations, type 2 diabetes mellitus (DM).*

P21

MICROCIRCULATORY AND PERIPHERAL VASCULAR DISORDERS IN HAND-ARM VIBRATION SYNDROME

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Hand-arm vibration syndrome (HAVS) is characterized by vascular, nervous and musculoskeletal disorders of the upper limbs, caused by systematic everyday hand-transmitted vibration exposure. It is a commonly diagnosed typical specific occupational disease and is compensated for.

Objective: To assess microcirculatory and peripheral vascular disorders in hand-arm vibration syndrome (HAVS) by investigating different vascular segments of the hand and to estimate their relationships.

Material and Methods: Thirty patients with HAVS and 30 healthy control subjects were investigated by nailfold capillaroscopy, laser Doppler flowmetry with heating test, and distal Doppler sonography.

Results: Functional spastic, some polymorphic, structurally twisted, dilated capillaries or megacapillaries were established. Increased vascular resistance in the superficial palmar arcus and the proper palmar digital arteries in 23.3% of the patients, and cut-off of the digital arteries in 46.7% of the patients were found. Decreased fingerpulp perfusion values

initially and during heat test were measured and abnormal thermal indices calculated. Negative correlation between digital arterial blood flow and skin perfusions, capillary changes and skin perfusions were found. Discussion: The significant functional spastic changes and structural shortened, dilated capillaries and megacapillaries with twisted parts, reduced number and hemorrhages in HAVS patient are in negative correlation with the decreased global cutaneous blood flow and the thermal indices. Significant negative correlation was found also between the increased vascular resistance of the proper palmar digital arteries and the global skin circulation. The thorough investigation of different vascular segments of the hand in HAVS gives better objective information for microcirculatory and peripheral arterial disorders and could help the assessment of the severity of the disease, the expertise, and the effect of treatment.

Key words: *capillaroscopy, doppler sonography, hand-arm vibration syndrome, laser doppler flowmetry.*

P22

MODELING THE NAVIGATIONAL SYSTEM OF THE BRAIN: A REVIEW

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Objective: To summarize and review the scientific knowledge concerning the brain's navigational system for which in 2014 a Nobel Prize in Physiology or Medicine was awarded.

Materials and Methods: Articles selected as basic for the discoveries by the Nobel Prize Committee for Physiology or Medicine were reviewed.

Results: The navigational system of the brain is a complex synaptic system comprised of characteristic cell populations, named place cells and grid cells. Place cells are discovered in 1971 by John O'Keefe and are localized in the hippocampus. Grid cells are discovered in 2005 by Edvard and May-Britt Moser and are found mainly in the entorhinal cortex. These two cell populations have functional differences and form the so-called "internal GPS". Place cells are responsible for dynamically changing specific locations (place fields). Grid cells control the current navigation by integrating information about the body position, the direction and speed of movement.

Discussion: The discoveries of how the brain's navigational system works show new aspects of cognition. Their clinical application in relation to Alzheimer's disease, dementia and other neurodegenerative diseases is yet to be explored.

Key words: *entorhinal cortex, grid cells, hippocampus, navigational system, Nobel Prize, place cells.*

P23

TOLOSA-HUNT SYNDROME: PROSPECTIVE CLINICAL AND NEUROIMAGING STUDIES

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Objective: To demonstrate the diagnostic abilities of various neuroimaging methods in Tolosa-Hunt syndrome.

Materials and Methods: The present report describes a 35-year-old man with a history of intermittent pain in the left retrobulbar area lasting approximately six months. The disease debuted with a general infectious syndrome, left-sided exophthalmos with transient visual disturbances and local inflammation of the conjunctiva. The condition was considered initially as conjunctivitis, and later – as Tolosa-Hunt syndrome, which was successfully treated with eye drops, nonsteroidal anti-inflammatory drugs (NSAIDs), antibiotics and three courses of corticosteroids. For the final diagnosis prospective clinical and neuroimaging investigations (2D/3D/4D multimodal neurosonology, CT and MRI of the head) were performed.

Results: The ophthalmic status at the beginning of the disease showed left-sided retrobulbar pain with mild exophthalmos, edema of the left eyelid, conjunctival injection and restricted horizontal movement of the left eye. Head CT showed a pseudotumor formation in the left medial retrobulbar space with slight swelling of the left optic nerve. Four months later the local neuro-ophthalmic status established mild left exophthalmos, ptosis of the left eyelid, conjunctival hyporeflexia of the left eye and hyposmia associated with CT data for left ethmoid sinusitis. There were found periods of accelerated erythrocyte sedimentation rate (ESR), normalized after treatment with corticosteroids. Thyroid hormones and tumor markers (carcinoembryonic antigen and prostate specific antigen) were within reference ranges. The multimodal ultrasound neuroimaging showed left optic disc drusen, slightly increased diameters of the left optic nerve/sheath complex and thickened intima-media of the left internal carotid artery. The control MRT/MRA studies performed 6 months after the onset of the disease, established normal brain parenchyma, intracranial vascular system, orbits and retrobulbar spaces. The diagnosis of Tolosa-Hunt syndrome was based on the criteria of the Intrenational Headache Society.

Discussion: Our study confirms that the diagnosis of Tolosa-Hunt syndrome is difficult and based on exclusion of other causes of painful ophthalmoplegia (e.g. orbital pseudotumor, thrombosis of the cavernous sinus, collagenosis, lymphoma, metastasis at al.). The complex use of clinical, laboratory and neuroimaging methods allowed prospective follow-up of the clinical evolution of the syndrome. The multimodal neurosonology has a limited diagnostic value for imaging the retrobulbar granulomatous inflammation but contributes for the noninvasive assessment of the optic disc and optic nerve changes, associated with the disease.

Key words: *Tolosa-Hunt syndrome, CT, MRI, ultrasound.*

P24

CLINICAL AND NEUROIMAGING STUDIES IN DYSGENESIS OF CORPUS CALLOSUM: A CASE REPORT

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Objective: Dysgenesis of corpus callosum (DCC) is a rare anomaly in the development of the neural bands connecting the two cerebral hemispheres. It is polyethiologic, with different levels of structural changes and various clinical manifestations. The aim of our study is to present a clinical case with typical brain neuroimaging findings associated with DCC.

Material and Methods: Parallel clinical, neuropsychological and neuroimaging studies (MRI and MRI tractography) were conducted in a 23-years old patient with proved DCC. The results were compared to a brain MRI of a clinically healthy person of the same age.

Results: The patient had one febrile seizure in the early childhood followed by antiepileptic medical treatment for many years. Because of his delayed neuropsychological development and severe memory deficiency, he hardly finished his secondary education. According to his father he suffered from headache, had poor vocabulary background and impaired movement coordination. The clinical assessment showed obvious left facial hypotrophy without any other abnormalities. The neurological status revealed apraxia of the upper limbs and the neuropsychological studies – mild cognitive deficiency. The brain MRI visualized the typical DCC changes – lack of part of the truncus and the whole splenium, parallel direction of lateral ventricles – "racing car" sign, dorsal communication of the third ventricle with the interhemispheric fissure, dilated Meckel cavities and medially dislocated carotid siphons. These findings were in contrast with the brain MRI of the healthy control.

Discussion: This study confirms the characteristic neuroimaging morphological changes in the brain in DCC. In correlation with clinical and neuropsychological studies, the degree of brain tissue reorganization in different stages of the structural anomaly can also be assessed.

Key words: *dysgenesis of corpus callosum, magnetic resonance imaging.*

P25

TRANSCRANIAL SONOGRAPHY IN CREUTZFELDT-JAKOB DISEASE

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The diagnosis of sporadic Creutzfeldt-Jakob disease (CJD) is still made on clinical grounds, with rapidly progressive dementia and electroencephalogram (EEG) changes as hallmarks, while definite confirmation requires neuropathological evaluation. Several publications demonstrated that signal increase in the cerebral cortex, caudate nucleus and putamen on diffusion-weighted imaging (DWI) and fluid attenuated inversion recovery (FLAIR) magnetic resonance imaging (MRI) is useful in diagnosis of sporadic CJD. Transcranial B-mode sonography (TCS) enables visualization of different tissue echogenicity, which can be associated with changes in cerebral metabolism of various metals, one of potential mechanisms of brain damage in CJD.

Objective: To reveal the role of TCS in pre-mortem diagnosis of CJD.

Material and Methods: We report a 63-year-old woman with typical clinical presentation of sporadic CJD, in whom one month after the disease onset brain MRI revealed diffuse cortical but no obvious basal ganglia involvement. However, TCS depicted moderate hyperechogenicity of both lentiform nuclei. Rapid disease progression led to patient's death two months later.

Discussion: In a subpopulation of CJD patients TCS may reveal changes not detected with MRI scans and therefore provide additional information useful for pre-mortem diagnosis. Due to common availability and easy applicability, we propose the role of TCS to be investigated in a larger series of CJD cases. TCS hyperechogenicity may be reflecting metal homeostasis changes in CJD.

Key words: *Creutzfeldt-Jakob disease, TCD.*

P26

BACTERIAL ANTHRAX MENINGOENCEPHALITIS: A CASE REPORT

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Objective: To present the differential diagnostic difficulties in diagnosing the etiology of this meningoencephalitis.

Material and Methods: We present a 53-year-old patient with a gradual onset of lesions in both hands with lymphangitis, lymphadenitis and toxic infectious syndrome. Routine blood counts and biochemistry, lumbar puncture, microbiological testing of blood and CSF and CT of the head were performed.

Results: On the head CT there were bilateral intraparenchymal hemorrhages in the basal ganglia; on the CFS test – proteinorahiya – 4,92 g/l, Ery mass and Leuc – 1120/3.

Discussion: The presentation of this clinical case based on clinical (medical history, clinical symptoms development), neuroimaging studies and changes in CSF showed differential diagnostic problems.

Key words: *CT, hemorrhage, meningoencephalitis.*

P27

CARDIOVASCULAR AUTONOMIC DYSFUNCTION IN MULTIPLE SCLEROSIS

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Autonomic dysfunction in multiple sclerosis (MS) is most often presented with urinary symptoms, while cardiovascular are less frequently reported. They can be evaluated with cardiovascular autonomic tests.

Objective: To investigate the alterations in the cardiovascular autonomic function in patients with MS and to correlate them with the type, severity and duration of the disease.

Material and Methods: Forty three patients with MS (32 female, 11 male, mean age 41.3±10.3 years), 28 of them with relapsing-remitting and 15 with secondary progressive type of the disease were included in the study. The mean duration of MS was 11.6±7.5 years and the mean EDSS score – 4.03±2.18. The FSS score revealed high level of fatigue in 14 (32%) patients.

Non-invasive monitoring of heart rate, blood pressure and respiration at rest and during autonomic tests (metronomic breathing, head-up tilt and handgrip) was performed. The time domain and spectral analysis parameters of the heart rate variability were calculated. The autonomic examination was also applied in 57 age-matched healthy subjects.

Results: At rest decrease of the spectral parameters: total power, low frequency (LF) and high frequency (HF) power and slight increase of the LF/HF ration (1.8±1,6 vs. 1.6±1.3) in comparison to controls was established. The deep breathing test caused increase of the frequency components, especially of LF, which predominated in the patients group. The results of the FSS score correlated with the decrease of the systolic blood pressure after the head-up tilt.

Discussion: Our findings reveal impairment of the autonomic function in patients with MS with predominating parasympathetic dysfunction. Correlation between the sympathetic autonomic dysfunction and the fatigue syndrome is also established.

Key words: *autonomic dysfunction, multiple sclerosis.*

Poster Session II–2. Neurorehabilitation

P28

INFLUENCE OF PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION ON MOTOR RECOVERY IN PATIENTS WITH CERVICO-BRACHIAL PLEXOPATHY

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Objective: To evaluate the effect of application of proprioceptive neuromuscular facilitation (PNF) on motor skills recovery in patients with cervico-brachial plexopathy.

Materials and Methods: Ten patients with cervico-brachial plexopathy were studied. For the purpose of the study the circumference of the arm, forearm, elbow joint and wrist joint, and muscle strength of the affected upper limb before and after treatment were measured. Muscle strength was evaluated by standard manual muscle testing. All patients performed individual PNF for 10 consecutive days. The average duration of every physiotherapy session was 60 min, with moderate intensity. Our methodology includes targeted exercises to strengthen weak muscles, increase the range of motion and improve the coordination.

Results: After the course of treatment patients with cervico-brachial plexopathy reduced their motor deficit, increased significantly their muscle strength by an average of one unit and the muscle mass of the affected upper limb.

Discussion: The method of proprioceptive neuromuscular facilitation is suitable for patients with cervico-brachial plexopathy and improves their motor possibilities.

Key words: *cervico-brachial plexopathy, motor abilities, PNF.*

P29

INFLUENCE OF KINESITHERAPY IN PATIENTS WITH LUMBAR DISCAL DISEASE

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Objective: To evaluate the effect of our hydrokinesitherapeutic program on the mobility of lumbar spine in patients with lumbar discal disease.

Materials and Methods: 20 patients with chronic lumbar discal disease, divided into two groups of 10 patients were studied. For the purpose of the study the mobility of lumbar spine through the dynamic part of the test of V. Zhelev and L. Venova was estimated. All patients were subjected to a 10-day kinesitherapeutic treatment. The experimental group underwent hydrokinesitherapeutic program and control patients – routine kinesitherapy.

Results: Hydrokinesitherapeutic program improves significantly the mobility of the lumbar spine in patients of the experimental group. In the control group there are also significant positive changes, but the absolute values are less pronounced.

Discussion: Kinesitherapy is an essential part of the complex therapeutic approach in patients with chronic lumbar discal disease. Hydrokinesitherapy shows better results and is a method of choice, according to its potential for use in sanatoriums and spa hotels.

Key words: *hydrokinesitherapy, lumbar disc disease, mobility.*

P30

ACUPOINTS FOR CERVICAL SPONDYLOSIS

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Cervical spondylosis is a chronic degenerative condition of the cervical spine that affects the vertebral bodies and intervertebral disks of the neck, as well as the contents of the spinal canal. This is one of the most common degenerative disorders of the spine. The disease can be symptomatic and asymptomatic. Distinctive symptoms for cervical spondylosis are: tingling, numbness and weakness in the limbs, lack of coordination, stiff neck, shoulder pain, occipital pain, vertigo, poor balance, blurred vision, etc. Acupuncture is commonly used in the treatment of cervical spondylosis. In Traditional Chinese Medicine the concept of "meridian" and the vital energy "Qi" forms is part of the theoretical basis for needling at specific acupuncture points. Acupuncture points have certain electrical properties, which affect chemical neurotransmitters in the body. The "gate control theory" and the release of endogenous opioids have been suggested as explanations for the apparent analgesic effect of acupuncture. These biochemical changes stimulate the body's natural healing abilities and promote physical and emotional well-being. Points tend to be located where nerves enter a muscle, the midpoint of the muscle or at the enthesis where the muscle joins with the bone. In our practice we have proved that the following points are the most effective for the treatment of cervical spondylosis: Du16 (Feng Fu), Du20 (Baihui), Du21 (Qian Ding), SJ16 (Tiann you), Bl10 (Tian Zhu), SI15 (Jian zhong shu), SI14 (Jian wai shu). Acupuncture for cervical spondylosis involves the insertion of very fine sterile needles into these points to regulate the patient's qi, supplementing it if the qi is deficient and dispersing it if qi has become stagnant. There are no side effects from acupuncture for cervical spondylosis.

Key words: *acupuncture, acupuncture points, cervical spondylosis, traditional Chinese medicine.*

P31

INFLUENCE OF PHYSIOTHERAPY ON QUALITY OF LIFE IN PATIENTS WITH DEGENERATIVE SPINAL DISEASES AFTER SURGERY

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Objective: To evaluate the effect of physiotherapy exercises on the quality of life in patients with degenerative spinal diseases in the early postoperative period.

Material and Methods: Twenty patients treated in the Department of Neurosurgery of the Sofiamed University Hospital – Sofia were studied. Assessment of the quality of life was made before surgery and on the discharge day. A point scale for quality of life (SF36) was used. All patients performed physioterapy exercises once daily until the day of discharge. The average duration of every physiotherapy session was 30 min, with moderate intensity. Our methodology included targeted exercises to facilitate the transition from one starting position to another, exercises to improve coordination of movements, training in ADL (activities of daily living) and gait training.

Results: The physiotherapy improved the physical health, emotional state and social activity of patients .

Discussion: The study shows that the implementation of early postoperative physiotherapy after spinal surgery improves the quality of life of patients.

Key words: *degenerative spinal disease, physiotherapy, quality of life.*

P32

INFLUENCE ON BALANCE IN COMMUNITY-DWELLING ELDERLY AND OLD PEOPLE

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Objective: To determine the influence of application of virtual reality (through console gaming platform) on the balance in community-dwelling elderly and old people.

Material and Methods: Ten people with average age of 80.6 ± 7,25 years, two men and eight women, most of them with length of stay less than 1 year were monitored. The total point of Berg Balance Scale (to measure balance by assessing functional tasks) was reported. The whole study group performed console Xbox 360 platform for commercial video games with a standard display technology - "Skiing", "Box", "Shootout", "Dance". The method was applied for 20 to 40 minutes daily, 5 days a week, for four weeks.

Results: Significant improvement in total points of Berg Balance Scale was observed and the risk of falling was decreased from moderate to low.

Discussion: An intervention using commercial video games may influence the balance reactions and risk of falling in community-dwelling elderly and old people.

Key words: *community-dwelling elderly and old people, balance, risk of falling.*

P33

INFLUENCE OF KINESITHERAPY ON FUNCTIONAL MOBILITY IN PATIENTS WITH PARKINSON'S DISEASE

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Objective: To investigate the effect of kinesitherapy on general physical activity in patients with PD.

Material and Methods: Four patients with Parkinson's disease (Schwab&England 60%) were studied. We assessed the patients' changes in motor activity before treatment, after 10th session and after the 20th session of kinesitherapy. Daily activities and motor disability tested by Unified Parkinson's Disease Rating Scale, time of position change (lying to sitting, sitting to standing) and 10 meters walking have been studied.

Results: All patients performed 20 individual sessions of kinesitherapy 2-3 times weekly for two months. Improved gait, expressed by the increased speed of walking was found. The methodology of kinesitherapy improved the changes in body position and the daily motor activity of the patients. They improved their general physical activity after treatment.

Discussion: Motor dysfunction in patients with PD is a serious problem and requires special attention, concerning the performance of daily activities. Kinesitherapy is an important therapeutic method and the correct selection of exercises could improve the efficacy of influence on the motor abilities of patients.

Key words: *kinesitherapy, Parkinson's disease.*

P34

INFLUENCE OF KINESITHERAPY ON MOTOR RECOVERY AND FUNCTIONAL INDEPENDENCE IN PATIENTS WITH ISCHEMIC STROKE IN THE CHRONIC PERIOD

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Objective: The study aims to trace the influence of specialized kinesitherapeutic methodology (SKTM) on motor recovery and functional independence in patients with ischemic stroke in the chronic period (ISChP).

Material and Methods: The study was conducted in 56 patients with ISChP (32 men and 24 women, mean age 63.2 ± 8.8 years, weight 77.9 ± 10.1 kg, height 169.2 ± 6.4 cm and duration of illness up to 1 year).

Assessment of the motor recovery and the level of functional independence was used to test Brunnstrom and functional independence – FIM. The stage of functional recovery and the level of functional independence were assessed at the beginning, 10th day, 1st month and 3rd month after the start of the kinesitherapy. All patients were treated with a specialized 10-day SKTM, which continued to be performed later by the patients as adapted exercise program at home for a period of three months.

Results: After the application of SKTM the highest tendency towards improvement in the motor recovery and functional independence was established at the 1st month with a level of significance $p < 0.000$.

Discussion: The applied specialized kinesitherapeutic methodology continued later as adapted exercise program at home, significantly improved motor recovery and functional independence in patients with functional impairment due to ISChP.

Key words: *functional independence, ischemic stroke, kinesitherapy, kinesitherapy.*

P35

EFFECT OF KINESITHERAPEUTIC METHODOLOGY ON BALANCE AND LOCOMOTION IN A PATIENT WITH A VERTEBRO-BASILAR SYSTEM STROKE

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Objective: To assess the effect of a kinesitherapeutic methodology administered in a patient with ischemic stroke in the vertebro-basilar system (VBS) during the post-acute stage.

Material and Methods: A 62 years old female patient, who survived an ischemic stroke and pulmonary thromboembolism and was administered a kinesitherapeutic regimen of individual procedures, 3 times a week for a month was studied. The kinesitherapeutic methodology included exercises for general performance, for improving the lower limbs strength, the static and dynamic trunk control from different starting postures and the coordination and gait.

The following methods of investigation and evaluation of changes were used for the functional performance status of the patient, with assessments at two time points – at baseline and after completion of the kinesitherapeutic procedures: transfer from a supine position to a standing position via sitting position, "Berg Balance Scale", "Timed Up & Go", "Five Time Sit To Stand", sittings and gettings up for 30 sec, number of steps per 10 m of walking, Ten Meter Walk Test with interrupted pathway, Six Minutes Walk Test, and the Borg scale for exertion dyspnea.

Results: After completion of the kinesitherapeutic procedures, the static and dynamic balance, the strength of the lower extremities, the gait, and exertion dyspnea were improved.

Discussion: This case study shows that the administration of targeted methods for influencing the static and dynamic trunk control results in improved coordination, balance and performance status in a female patient with VBS stroke and in a benefit on the dynamic balance and gait.

Key words: *balance, walking, VBS ischemic stroke.*

INNOVATIONS IN MEDICINE

Poster Session III. Modern Aspects of Obesity and Pediatric Tumors.

PS1

EFFECT OF LOW CALORIC DIET ON METABOLIC PARAMETERS: STUDY ON NIRDIABO-REGION SOFIA

L. Lazarov, T. Handjieva-Darlenska, G. Bogdanov, K. Kamenova, N. Boyadjieva

Bulgarian Academy of Sciences and Arts – Sofia, Bulgaria

PS2

FAT DISTRIBUTION IN PATIENTS WITH OBESITY AND PRE-DIABETES: STUDY ON NIRDIABO-REGION SOFIA, PLEVEN AND PLOVDIV

L. Lazarov, T. G. Stavreva, A. Pendicheva, D. Getova, Handjieva-Darlenska, G. Bogdanov, G. Dimitrova, K. Kamenova, N. Boyadjieva

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PS3

EFFECT OF TOPIRAMATE ON LEPTIN AND INSULIN OF RATS WITH EXPERIMENTAL OBESITY

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Objective: Obesity is spreading globally and the management of obesity includes lifestyle modifications. Topiramate is an antiepileptic drug and the mechanism for weight loss is not clear. The aim of our study is to investigate the effects of topiramate on male rats with experimental obesity.

Materials and Methods: Male Wistar rats were used to develop the experimental obesit . Rats were treated with topiramate for a period of 3 weeks. Control of non obese rats were also treated with topiramate for a same period of time. The body weight was measure every week and the blood concentration of leptin and insulin were determined at the final point of experiments.

Results: Topiramate changed the blood levels of both insulin and leptin in animals with experimental obesity. No significant change of both hormones in non obese rats.

Discussion: Our data suggest that topiramate may modulate the metabolism of rats by affecting their hormonal levels of insulin and leptin. Moreover, it is possible that topiramate affects the appetite of animals.

Key words: *experimental obesity, rats.*

PS4

EFFECT OF TOPIRAMATE ON FREE RADICALS OF RATS WITH EXPERIMENTAL OBESITY

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Obesity is spreading globally and the management of obesity Topiramate is well known antiepileptic drug. It modulates voltage-activated sodium channels and calcium channels as well as mediates GABA receptor-mediated inhibitory currents and antagonizes alpha-amino 3-hydroxyl-4 isoxazole-propionic acid kainite receptors. There are data indicated that topiramate increase body weight in obese people. Our experimental results on rats with obesity demonstrated that topiramate influenced blood levels of insulin and leptin and may affect the appetite.

Objective: To determine the effects of topiramate on free radicals in blood and liver of rats with experimental obesity.

Materials and Methods: Male Wistar rats with or without experimental obesity were treated with topiramate for a period of 3 weeks. The levels of free radicals were determined in the blood and the liver of each rat.

Results: The results demonstrated the effects of topiramate on free radicals of rats with experimental obesity.

Discussion: Taken together our data and data published previously suggest that topiramate may affect the metabolism by acting on hormonal levels of insulin and leptin and on free radicals.

Key words: *experimental obesity, free radicals, rats.*

PS5

NIRDIABO-GRANT FOR THE PREVENTION OF DIABETES AND OBESITY IN BULGARIA: RECENT RESULTS

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Type 2 Diabetes is a heterogeneous disease with different mechanisms of development. Type 2 Diabetes (TD2) develops through an intermediary state called prediabetes and for a successful prevention, it is important to understand the exact pathomechanisms of pre-diabetes, which is also heterogeneous. This state is heterogeneous and very important, because it already confers a higher risk for diabetes-associated complications. Effective therapeutic interventions based on lifestyle changes, weight reduction, increasing physical activity, and eating a balanced diet are often unsuccessful due to poor self-control of patients as well as to missing of established strategic prevention for people with pre-diabetes.

The NIRDIABO project focuses on the prevention of pre-diabetes within Bulgarian population of obese males and obese females from 3 regions in Bulgaria (Sofia, Plovdiv and Pleven). The establishment of long lasting life stile with nutritional and physical activity habits is in the aims of NIRDIABO. The anti-stress programme will decrease stress-related obesity and pre-diabetes. The effects of probiotic from Lactobacilus bulgaricum as well as the "Balquanic" diet will be investigated for the prevention of pre-diabetes and normalization of metabolism and body weight. Finally, molecular and genetic studies will be perform.

NIRDIABO is a project supported by MON, Bulgaria.

Key words: *Bulgaria, diabetes, NIRDIABO, obesity.*

PS6

CONTEMPORARY ASPECTS IN THE DIAGNOSIS AND MOLECULAR GENETIC FEATURES OF PEDIATRIC RENAL TUMORS

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Pediatric renal tumors constitute a significant portion of the group of childhood solid neoplasms. The most common representative is Wilms' tumor (nephroblastoma), accounting for 85% of pediatric renal masses. The classification of these tumors has been revised and a few separate distinct entities included, such as congenital mesoblastic nephroma, clear cell sarcoma of the kidney, rhabdoid tumor of the kidney, specific pediatric variants of renal cell carcinoma, renal primitive neuroectodermal tumor and desmoplastic small round cell tumor. The diagnosis and treatment of these neoplasms is largely dependent on the histopathological features, molecular and genetic findings and immunohistochemical profile. This poster intends to highlight important diagnostic criteria, which are also helpful in choosing the correct treatment and determining the prognosis of these patients.

The importance of genetic factors has been proved in many cases. Two loci on chromosome 11 have been implicated in the genesis of Wilms' tumor: locus 11p13 (WT1gene), and locus 11p15 (WT2 gene). An abnormal WT1 gene is present in patients with WAGR syndrome (Wilms tumor, aniridia, genitourinary abnormalities and mental retardation). Denis-Drash syndrome (male pseudohermaphroditism and progressive glomerulonephritis) has WT1 dominant negative missence mutation. An abnormal WT2 gene is present in patients with Beckwith-Wiedemann, Bloom's and Li-Fraumeni syndrome, trisomy 18, etc. However, the genetics of Wilms' tumor appear to be multifactorial, and abnormalities at other sites, including 1q gain, 1p loss, 16q loss and p53 abnormalities in anaplastic foci are actively investigated due to their prognostic potential.

There also exist some inherited conditions which increase the risk of renal cell carcinoma in children, such as von Hippel-Lindau syndrome (VHL), hereditary leiomyomatosis and renal cell cancer (HLRCC), familial non-VHL clear cell renal cell carcinoma, tuberous sclerosis. Screening for renal masses in children with increased risk is done regularly with diagnostic imaging techniques.

Medical science is yet to determine whether genetic anomalies can be used to help position a tumor in a certain risk group.

Key words: *molecular genetics, renal tumors.*

Първи конгрес на Европейската академия по неврология

First Congress of the European Academy of Neurology

20–23 юни 2015 г.
Берлин, Германия

20-23 June 2015
Berlin, Germany

От 20 до 23 юни 2015 г. в гр. Берлин (Германия) се проведе Първият конгрес на Европейската академия по неврология (ЕАН). Събитието бе организирано от президента на Европейската академия проф. Günther Deuschl (Германия) и вицепрезидента проф. Franz Fazekas (Австрия). Представители на научния комитет на Академията бяха проф. Michael Brainin (Австрия), Antonio Federiko (Италия), Claudio Bassetti (Швейцария) и др.

Над 6400 делегати от 106 страни участваха в конгреса. В 8 симпозиума, 24 обучителни курса, 23 работни срещи, 3 интерактивни сесии и 1546 постера организаторите и участниците в европейския форум фокусираха вниманието върху различни аспекти от неврологията. Българската асоциация по невросонология и мозъчна хемодинамика бе представена от невролози и невросонолози от София, Варна, Русе и др.

Първият конгрес на ЕАН, която обедини Европейското дружество по Неврология (European Neurological Society – ENS, 1985–2014 г.) и Европейската федерация на неврологичните дружества (European Federation of Neurological Societies – EFNS, 1991-2014), започна със симпозиум, организиран от Европейската организация по мозъчен инсулт (ESO), посветен на

The First Congres of the European Academy of Neurology (EAN) was held in Berlin, Germany, on June 20th–23th, 2015.

The meeting was organized by President Prof. Günther Deuschl (Germany) and Vice President Prof. Franz Fazekas (Austria). Presenter from the Honorary Committee of the EAN were Michael Brainin (Austria), Antonio Federiko (Italy), Claudio Bassetti (Swizerland) and other.

More than 6400 participants from 106 countries contributed to the success of this congress with their scientific work and participation in 8 Symposia, 25 Teaching courses, 23 Focused workshops, 5 Hands-on courses, 3 Interactive sessions, 5 Special Sessions and showed 1546 posters.

The Bulgarian Society of Neurosonology and Cerebral Hemodynamics (BSNCH) was presented by participants from Sofia, Varna, Ruse et al.

The first congress of the European Academy of Neurology, which unite European Neurological Society – ENS (1985–2014) and European Federation of Neurological Societies – EFNS (1991–2014), began with symposium, organizing by the European Stroke Organisation (ESO) in the field of spontaneous intracerebral haemorhages.

спонтанните интрацеребрални хеморагии. Основните теми в програмата бяха свързани с различни клинични мултицентрови проучвания в областта на етиологията, епидемиологията и диагностиката на мозъчносъдовите, невродегенеративните и инфекциозните заболявания, ангажиращи нервната система. Лекционният спектър бе организиран в различни сесии: „Горещи точки в неврологичната наука“, „Актуални новини в неврологията“, „Иновативни методи на лечение на неврологичните заболявания“, „Неврогенетика“, „Неврофизиология“. Конгресът бе място за среща на различни субспециалности като неврофталмология, невроотология, интензивна неврология, неврорадиология и др.

Следващият конгрес на ЕАН ще се проведе в Копенхаген – Дания от 28 до 31 май 2016 г.

Доц. д-р С. Андонова, дм, дмн

The main topics in the programme were related to major clinical multicenter studies devoted to the etiology, epidemiology and diagnosis of stroke, neurodegenerative and neuroimmune diseases. Further topics covered a wide spectrum reaching from Hot spots in neurology science, Breaking news in neurology; Innovative methods in treatment of neurology diseases, Neuroophtalmology, Neurootology, Neurogenetics, Neurophysiology. The congress was a meeting point of all the subspecialties.

This congress was not only about science, it was an event with many faces.

The Second Congress of the European Academy of Neurology will be organised from May 28–31, 2016 in Copenhagen, Denmark.

Assoc. Prof. S. Andonova, MD, PhD, DSc

Други научни форуми
Other Scientific Events

2015

First Congress of the Bulgarian Society of Neurosonology and Cerebral Hemodynamics
2–4 October 2015
Sofia, Bulgaria
www.neurosonology-bg.com

Meeting of the European Association of Neurosurgical Societies (EANS)
18–21 October 2015
Madrid, Spain
www.eans2015.com/index-m.html

22th World Congress of Neurology
31 October – 05 November 2015
Santiago de Chile, Chile
www.wcn-neurology.com

21th WFN World Congress on Parkinson's Disease and Related Disorders
05–09 December 2015
Milan, Italy
www.oic.it/iaprd2015

10th World Congress on Controversies in Neurology (CONy) 2016
17–20 March 2016
Lisboa, Portugal
www.comtecmed.com/cony/2015/congresses.aspx

2016

9th International Symposium on Neuroprotection and Neurorepair
19–22 April 2016
Leipzig, Germany
www.neurorepair-2016.de

21th Meeting of the ESNCH
May 2016
Budapest (Hungary),
www.esnch.org

9th World Congress for NeuroRehabilitation
10–13 May 2016
Philadelphia, USA
www.wcnr2016.org

2nd Congress of the EAN
28 – 31 May 2016
Copenhagen, Denmark
www.eaneurology.org/copenhagen2016/

10th World Congress of the International Society of Physical and Rehabilitation Medicine (ISPRM)
May 29 – June 2 2016
Kuala Lumpur, Malaysia
www.isprm2016.com

16th European Congress of Neurosurgery
4–8 September 2016
Athens, Greece
www.eans.org/events/event-519

4th Global Experts Meeting on Neuropharmacology
15–17 September 2016
San Antonio, USA
www.neuro.pharmaceuticalconferences.com

Second Congress of the Bulgarian Society of Neurosonology and Cerebral Hemodynamics
October, 2016
www.neurosonology-bg.com

10th World Congress of Neurology
26–29 October 2016
Hyderabad, India
wsc.kenes.com

Информация за обучение по високоспециализираните дейности в неврологията през 2015-2016 г.

Високоспециализирани дейности за лекари

Невросонология
Клинична електроенцефалография
Клинична електромиография
Диагностика на автономната нервна система

База на обучение

Клиника „Функционална диагностика на нервната система“,
Военномедицинска академия – София

Продължителност на обучение – три месеца

Краткосрочни курсове

„Клинична електроенцефалография“
Клиника „Функционална диагностика на нервната система“, ВМА – София
18–20 ноември 2015 г.

„Теоретични основи на невросонологията“
Клиника „Функционална диагностика на нервната система“, ВМА – София
2–4 декември 2015 г.

„Клинична невросонология“
Клиника „Функционална диагностика на нервната система“, ВМА – София
23–25 март 2016 г.

„Клинична електромиография“
Клиника “Функционална диагностика на нервната система”, ВМА – София
9–11 март 2016 г.

Високоспециализирани дейности за медицински сестри

„Роля на специалиста по здравни грижи“
Клиника „Функционална диагностика на нервната система“, ВМА – София
6–8 април 2016 г.

Курсовете включват лекции и практически упражнения съгласно програмите за обучение.

Информация и записване

ВМА – София 1606, бул. „Георги Софийски“ № 3, Учебно-научен отдел, ет. 1, стая 9, тел. 02 92 25 316(866)
Медицински факултет на СУ „Св. Климент Охридски“ – София, тел. 02 868 71 40

д-р Валентин Йотов

Valentin Yotov, MD

1964 – 2015

През 2015 година загубихме един достоен български лекар и дългогодишен член на Българската асоциация по невросонология и мозъчна хемодинамика.

Д-р Валентин Йотов е роден през 1964 година. Завършва медицина през 1989 година в Медицински университет „Проф. д-р Параскев Стоянов“ – Варна. Получава специалност по нервни болести и има допълнителна професионална квалификация за високоспециализираните методи в неврологията – ултразвукова диагностика на нервна система (невросонология) и клинична електромиография. Работи като невролог и началник на неврологично отделение в МБАЛ – град Велики Преслав, а през последните години – в МБАЛ, град Русе.

Дълбок поклон пред живота и дейността му!

От Редакционната колегия

Указания към авторите

Списанието "Невросонология и мозъчна хемодинамика" е официален орган на Българската асоциация по невросонология и мозъчна хемодинамика. То публикува оригинални статии в областта на ултразвуковата диагностика в неврологията, неонатологията и ангиологията, както и актуални проучвания върху мозъчната хемодинамика и други свързани проблематики. Списанието съдържа следните рубрики:

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- кратки научни съобщения – до 4 страници.
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Примери:

[1] Aaslid R, Huber P, Nornes H. Evaluation of cerebrovascular spasm with transcranial Doppler ultrasound. *J Neurosurg* **60**, 1984:37-41.

[2] Ringelstein E, Otis S. Physiological testing of vasomotor reserve. In: Newell D, Aaslid R (eds). Transcranial Doppler. Raven Press. New York, 1992, 83-99.

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За справки:

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Clinic of Functional Diagnostics of Nervous System
Military Medical Academy, 3, "St. Georgi Sofiiski" Blvd.
1606 Sofia, Bulgaria, e-mail: titianova@yahoo.com

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Examples:

[1] Aaslid R, Huber P, Nornes H. Evaluation of cerebrovascular spasm with transcranial Doppler ultrasound. *J Neurosurg* **60**, 1984:37-41.

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