11th PhD Symposium

Doctoral School of Neuroscience

PROGRAM & ABSTRACTS

University of Debrecen
2021

Doctoral School of Neuroscience

University of Debrecen
2021

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10th PhD Symposium of Doctoral School of Neuroscience

3rd September, 2021
Venue: UD Life Science Centre, Lecture room F008-F009

08:30-9:00 **Arrival**

9:00-9:10 **Welcome Address**

Miklós Antal (Head of Doctoral School of Neuroscience)

Part I. Chairman: Álmos Klekner
Reviewers: Álmos Klekner and András Birinyi

9:10-9:20 **Krisztina Szonja Bábel** (4th year PhD student)
Supervisor: László Oláh
INVESTIGATION OF THE CEREBRAL HEMODYNAMICS IN DIFFERENT DISEASES WITH POTENTIAL EFFECTS ON THE VASCULAR SYSTEM, INCLUDING HYPERTENSION AND SLEEP DEPRIVATION.

9:20-9:30 **Eszter Balogh** (4th year PhD student)
Supervisor: László Oláh
EFFECT OF READING WITH DIRECT OR INDIRECT LIGHT ON THE VISUALLY EVOKED FLOW RESPONSE IN THE POSTERIOR CEREBRAL ARTERY.

9:30-9:40 **Dóra Sulina** (3rd year PhD student)
Supervisor: László Oláh
INVESTIGATION OF THE CEREBRAL HEMODYNAMICS IN DIFFERENT DISEASES WITH POTENTIAL EFFECTS ON THE VASCULAR SYSTEM, INCLUDING HYPERVISCOSITY SYNDROME AS WELL AS GRAND MAL SEIZURE.

9:40-9:50 **Dávid Horsai** (2nd year PhD student)
Supervisor: László Novák
LONG TERM FOLLOWING THE DISORDERS OF THE CEREBROSPINAL FLUID CIRCULATION IN PRETERM NEWBORNS.

9:50-10:00 **Dorottya Juhász** (2nd year PhD student)
Supervisor: László Bognár
3D VISUALISATION IN NEUROSURGERY

10:00-10:10 **Anna B. Máthé** (1st year PhD student)
Supervisor: Ede Frecska
COHERENCY EXAMINATION OF INFLAMMATORY BIOMARKERS IN PATIENTS DIAGNOSED WITH DEPRESSION, BIPOLAR DISORDER AND SCHIZOPHRENIA

10:10-10:25 **Coffee break**

Part II. Chairman: László Oláh
Reviewers: László Oláh and Péter Szücs

10:25-10:35 **Alexandra Réka Berki** (1st year PhD student)
Supervisors: Tünde Csépány, Gábor Papp
THE EFFECT OF REGULAR EXERCISE IN INFLAMMATION AMONG PATIENTS SUFFERING FROM MULTIPLE SCLEROSIS

10:35-10:45 **Lilla Hudák** (1st year PhD student)
Supervisor: László Csiba
DISCREPANCIES BETWEEN CLINICAL AND AUTOPSY FINDINGS IN ACUTE STROKE PATIENTS

10:45-10:55 **László Szivós** (3rd year PhD student)
Supervisor: Álmos Klekner
INVESTIGATION OF PROGNOSTIC FACTORS IN GLIOMAS

10:55-11:05 **Katalin Szamos** (4th year PhD student)
Supervisor: Tamás Végh
EFFECT OF LUNG PROTECTIVE ONE-LUNG VENTILATION WITH FIX AND VARIABLE TIDAL VOLUMES ON OXYGENATION AND POSTOPERATIVE OUTCOME: RANDOMIZED, CONTROLLED TRIAL.

11:05-11:15 **Zsolt Kocsis** (4th year PhD student)
Supervisor: Zoltán Kisvárday

HIGH-RESOLUTION RETINOTOPIC MAPPING WITH INTRINSIC SIGNAL OPTICAL IMAGING IN THE CAT PRIMARY VISUAL CORTEX.

11:15-11:25 **Camila de Oliveira Miranda** (3rd year PhD student)
Supervisor: Miklós Antal

GLYCINERGIC NEURONS IN NEURONAL CIRCUITS PROCESSING PAIN IN THE SPINAL DORSAL HORN.

11:25-11:35 **Adél Dakos** (1st year PhD student)
Supervisor: András Birinyi

THE ROLE OF EXTRACELLULAR MATRIX IN BRAIN DEVELOPMENT

Closing remarks

ABSTRACTS

in alphabetical order

INVESTIGATION OF THE CEREBRAL HEMODYNAMICS IN DIFFERENT DISEASES WITH POTENTIAL EFFECTS ON THE VASCULAR SYSTEM, INCLUDING HYPERTENSION OR SLEEP DEPRIVATION

Krisztina Szonja Bábel MD [1] (3nd year PhD student)

Supervisor: László Oláh MD [2]

[1,2] *Department of Neurology, University of Debrecen, 4032 Debrecen, Hungary*

Abstract

Effects of sleep deprivation (SD) and hypertension on cerebral hemodynamics have been examined in the study. Investigation of cerebral hemodynamics included examination of neurovascular coupling (NVC) and cerebrovascular reactivity (CR). NVC means changes in local cerebral blood flow caused by neuronal activation. In our study the effect of visual stimulation has been assessed by measurement of flow velocity in the posterior cerebral artery (PCA). CR shows cerebral blood flow changes in response to a vasoactive chemical stimulus, e.g. breath holding test (BHI).

Our aim is to examine the effects of SD and hypertension on cerebral hemodynamics. Till now we could include 4 patients in the hypertension study, therefore statistical analysis has not been performed yet.

In the SD study 14 healthy subjects (mean age: 29 years) have been included. BHI test, visual evoked potential (VEP) test, and the examination of NVC before and after 24 hours of SD were performed. Using paired t-test, no differences were found in P100 amplitude, pulsatility index and BHI values measured in rested state and after sleep deprivation. P100 latency (VEP) was significantly longer after SD (111.3±5.4 ms), than in rested state (106.6 ms±3.3 ms; $p<0.01$). Repeated measures analysis of variance revealed that the visual stimulation evoked relative flow velocity changes in the PCA, as well as the maximal flow velocity changes were significantly lower after SD (118.9±5.4 %) than in rested state (122.1±4.6 %, $p<0.05$).

Prolonged P100 latency after SD refers to disturbance of neuronal activation. Decreased visual stimulation evoked flow response after SD shows damage of NVC. Unchanged pulsatility and BHI values suggested that sleep deprivation does not affect the vascular tone and does not influence directly the mechanism of vasodilatation. According to our results, dysregulation of neuronal activation or local vasodilation might explain the disturbance of NVC after sleep deprivation.

Acknowledgement: I would like to thank the organisers for the opportunity to do this presentation.

EFFECTS OF ACUTE ALCOHOL CONSUMPTION ON NEURONAL ACTIVITY AND CEREBRAL VASOMOTOR RESPONSE

Eszter Balogh[1] (4th year PhD student)
Tamás Árokszállási[1]
Katalin Körtefái[1]
Veronika Nagy[1]
László Csiba[1]

Supervisor: László Oláh[1]

[1]*Department of Neurology, University of Debrecen, 4032 Debrecen, Hungary.*

Introduction: Alcoholism is a global problem nowadays. Our aim was to study the effects of acute alcohol consumption on the neuronal activity, the neurovascular coupling and the cerebral vasoreactivity.
Methods: Thirty young healthy adults (15 women, 15 men) was included in our study. Neuronal activity of the visual pathway was evaluated by pattern-reversal visual evoked potential (VEP) examination. By using a visual cortex stimulation paradigm, visually evoked flow velocity response during reading was measured by transcranial Doppler in both posterior cerebral arteries (PCA). Cerebral vasoreactivity was investigated by analysing the effect of breath holding on the flow velocity increase (breath holding index, BHI) in both middle cerebral arteries. Every examination was evaluated before and after drinking alcohol. The aim blood alcohol content (BAC) was 1 ‰.
Results: The BAC was 0.82 g/L and 0.94 g/L 30 and 60 min after drinking alcohol, respectively. Latency of the VEP P100 wave increased after alcohol consumption. Resting absolute flow velocity values increased, whereas pulsatility indices in the PCA decreased after alcohol ingestion, indicating vasodilation of cerebral microvessels. Breath holding index and the visually evoked maximum relative flow velocity increase in the PCA and steepness of rise of the flow velocity curve were smaller after than before alcohol consumption.
Conclusion: Our measurements proved that acute alcohol consumption inhibits the neuronal activity of the visual pathway and results in dilation of cerebral arterioles. Cerebral vasodilation may explain the decrease of cerebral vasoreactivity and might contribute to the disturbance of visually evoked flow response after alcohol consumption.

THE EFFECT OF REGULAR EXERCISE IN INFLAMMATION AMONG PATIENTS SUFFERING FROM MULTIPLE SCLEROSIS

Alexandra Réka Berki [1] (1st year PhD student)

Supervisors: Tünde Csépány. Gábor Papp

[1] *Department of Neurology, University of Debrecen, 4032 Debrecen, Hungary*

Multiple sclerosis is a chronic autoimmune mediated disease affecting the white matter of the central nervous system causing inflammation and demyelinisation of axons. The clinical symptoms may vary depending on the affected area, amount of damaged axons and level of defectiveness. Destruction of myelin appears in plaques. In acute inflammatory plaques lymphocytes surround the vessels and at the edges of these plaques macroglia increasement can be seen. In the pathogenesis of the disease there is a significant role of the imbalance between pro-inflammatory (ex.:IL-12, IL-17, IL-22, IFN-gamma, TNF-alpha) and anti-inflammatory (ex.: IL-4, IL-5, IL-10, TGF-beta) agents.

In our study we plan to examine 18 women suffering from multiple sclerosis between the age of 20 and 50. 12 of them will take part in two different (yoga and aerobics) exercise twice a week for 6 months with the supervision of a physiotherapist, and 6 remain without exercise, they will be the control group. Before the whole program we will assess the patients level of disabilities (EDSS), fatigue (FSS), mood (BDS) and take blood-sample from a peripheral vein. We will separate serum from blood and measure the level of IL-4, IL-5, IL-6, IL-10, IL-12, IL-17, IL-22, TNF-alpha, TNF-beta and IFN-gamma with either ELISA or Western-blot methods. We will repeat the assessments and measurements after 3 months and at the end of the 6 months exercise program. We will also perform MRIs before, half-time and at the end of the program.

We expect to get significant results which may lead to a better understanding of the regular exercise's effect on the inflammation in multiple sclerosis. With our laboratory investigations we may decide which exercise type is better in multiple sclerosis. Our findings may give a foundation for developing physical exercise programs which could be a new tool of the complex therapy of multiple sclerosis.

Acknowledgement: I would like to thank the organizers for holding this symposium so I could got a chance to talk about our investigations.

THE ROLE OF EXTRACELLULAR MATRIX IN BRAIN DEVELOPMENT

Adél Dakos (1st year PhD student)

Supervisor: András Birinyi

Department of Anatomy, Histology and Embryology, University of Debrecen, 4032 Debrecen, Hungary;

The extracellular matrix (ECM) which takes about 20% of the adult brain volume contains different macromolecules including glycosaminoglycans such as hyaluronan, proteoglycans and glycoproteins. These macromolecules are organized into diffuse or condensed ECM. The diffuse ECM is found throughout the brain and fills the extracellular space. The condensed ECM forms mesh- or lattice-like structures around the cell bodies and proximal dendrites of special subpopulation of neurons called perineuronal net (PNN). In our research we would like to investigate the distribution of different ECM molecules and the formation of perineuronal net (PNN) in the brainstem during embryonal and postnatal development.

During the last decades, several studies showed that besides giving structural support, the ECM has several important functions in the developing CNS. It forms a physical barrier which limits diffusion of ions and water and restricts movements of the cells. Moreover, it binds and sequesters growth factors and concentrate them close to their receptors on the surface of developing neurons and glial cells. Finally, the ECM molecules may directly activate intracellular signalling pathways through interaction with their cell surface receptors or may act as co-receptors for other soluble factors in extracellular space. Via these principal mechanisms the ECM was proved to be involved in almost all aspects of neural development. Mutations of genes responsible for synthesis of different ECM molecules results serious malformations in brain development and experiments using animals where similar genes were knocked out also emphasised the pivotal role of ECM in normal brain development.

GLYCINERGIC NEURONS IN NEURONAL CIRCUITS PROCESSING PAIN IN THE SPINAL DORSAL HORN

Camila de Oliveira Miranda (3rd year PhD student)

Supervisor: Antal Miklós

Department of Anatomy, Histology and Embryology, Faculty of Medicine, University of Debrecen, 4032 Debrecen, Hungary

Glycinergic neurotransmission in the spinal dorsal horn is reported to be important in the development of hyperalgesia and allodynia. However, how they contribute to the formation of neural circuits underlying spinal pain processing is still waiting for explanations. Our present experiments are focused on the morphological and neurochemical characteristics of glycinergic neurons in laminae I-IV of the spinal dorsal horn using well-characterized GlyT2::Cre mice. Double-label staining with GlyT2 and GAD65/67 showed that besides the neurons in which glycine co-localizes with GABA, there are glycine-only neurons in laminae I-IV. The dendritic morphology of these neurons was defined with serial confocal images taken from spinal cord sagittal sections. According to the morphological properties we divided the reconstructed neurons into 3 and 6 groups in laminae I/II and laminae III/IV, respectively. The transgenically labeled neurons were immunostained for galanin, calretinin, NPY, nNOS, and PV for neurochemical characterization. We found that in laminae I/II 28% of glycinergic neurons were positive for nNOS and in laminae III/IV 6.5%, in addition to GABA-glycine neurons, while 40% of them were positive for PV. The results show that in laminae I-IV of the spinal dorsal horn there are glycine only neurons with special morphological and neurochemical characteristics.

Acknowledgement: The author thanks Krisztina Hegedűs for continuous technical help, and Hanns Ulrich Zeilhofer for the donation of GlyT2::Cre mice.

LONG TERM FOLLOWING THE DISORDERS OF THE CEREBROSPINAL FLUID CIRCULATION IN PRETERM NEWBORNS.

Dr. Horsai Dávid[1] (2nd year PhD student)

Supervisor: Dr. Novák László

[1] *Department of Neurosurgery, University of Debrecen, 4032 Debrecen, Hungary*

The outcome of normal life quality is significant lower after intracranial hemorrhage (ICH) in premature newborns. The incidence of ICH decreases with increasing gestational age respectively low birth weight. Due to advances in neuroimaging ICH has been recognised more frequently in term and late preterm newborns, although its true incidence and prevalence is not known. The newborns, who have had ICH usually needs long term intensive care and surgery intervention which helps to restore the cerebrospinal fluid (CSF) circulation. Generally 700-800 operations are performed on hydrocephalus per year in Hungary. The premature newborn's ICH and the consecutive CSF circulation disturbances make it necessary to use new surgical methods. They include various endoscopic surgeries and implementation of different shunting techniques. Our plan is to retrospectively search for the connection between the gestational age and the incidence of ICH, to find the average shunt life-time based how many reoperation was needed and which shunting technique was chosen, to find predictive factors of the ICH, and to qualitatively analyze the intraoperative liquor samples and the perioperative blood samples, especially it's biomarkers to make long term conclusion about the prognosis.

DISCREPANCIES BETWEEN CLINICAL AND AUTOPSY FINDINGS IN ACUTE STROKE PATIENTS

Lilla Hudák[1] (First year PhD student)
Attila Csaba Nagy[2]Gábor Méhes[3]Sarolta Molnár[3]Katalin Erzsébet Nagy[1]László Oláh[1] László Csiba[1]

Supervisor: László Csiba

[1]*Department of Neurology, University of Debrecen, 4032 Debrecen, Hungary*
[2]*Department of Preventive Medicine, University of Debrecen, 4032 Debrecen, Hungary,*
[3]*Department of Pathology, University of Debrecen 4032 Debrecen, Hungary*

Objectives: according to international observations, the incidence of clinical autopsies is declining worldwide, plummeting below 5% in the US and many European countries. It is an unfavorable trend as, in 7-12% of cases, recent clinicopathologic studies found discrepancies that would have changed the therapy or the outcome, had they been known premortem. Because previous large-scale observations have focused on varied patient populations, we aimed to examine the differences between clinical and pathological diagnostic findings in stroke patients.
Material and methods: we assessed the postmortal non-neuropathological findings and postmortal neuropathological findings of 534 consecutive stroke patients who passed away. Systemic neoplasms, pneumonias, thromboembolisms, and hemorrhagic transformations revealed only by the autopsy were considered severe abnormalities, but we also recorded the incidence of benign abnormalities (e.g., cysts, myomas) important from an educational or scientific point of view.
Results: Regarding the 534 autopsies, the presence of 26 (4.9%) systemic neoplasms were confirmed in the clinical stage, but 8 (1.5%) malignant tumors were only recognized during the autopsy. 80 (15%) thromboembolic events, 73 (13.6%) pneumonias, and 66 (18%) hemorrhagic transformations were diagnosed only by the autopsy. Longer hospital stay (from admission to death) resulted in less discrepancies between clinical and autopsy diagnosis of thromboembolic events and pneumonias ($p<0.01$). In 169 cases, educationally or scientifically important abnormalities were detected.
Conclusions: while the type of acute stroke is reliably diagnosed by imaging studies, whole-body and brain autopsies remain important in assessing the frequency of systemic and cerebral complications and evaluating the treatment efficacy.
Acknowledgement: I would like to thank Prof. László Csiba for their generous support and encouragement during my work and I would like to thank the Doctoral School of Neuroscience for organizing a symposium and gave an opportunity for me to perform my results.

3D VISUALISATION IN NEUROSURGERY

Dr. Dorottya Juhász (2nd year PhD student)

Supervisor: Prof. Dr. László Bognár

Department of Neurosurgery, University of Debrecen, 4032 Debrecen, Hungary;

Objective

With the development of radiology and medical imaging, neurosurgical diagnostics and therapy have improved parallelly as well. In the technological world of the 21st century, 3D visualisation and spatial images became common and these are widespread not only in games and in the branches of information technology, but these technologies also conquered industries.

Methods

Currently for the operative preparation the patients' 2D preoperative Ct and MR images are available. The patients' images are sliced based on artificial planes. However, the pathological mutations and the all-time anatomical conditions do not follow these orthogonal planes. The real intraoperative anatomy cannot be seen by currently used radiological imaging technology. 3D visualisation helps before the operation show an actual spatial structure, based on which individual surgical approaches can be performed. Moreover, intraoperative risks can be decreased knowing the accurate structural conditions.

Results

At the DEKK Neurosurgery Clinic in case of complex brain tumours, we picture the patients' radiological images using open-source software. Among many others, we process base tumours and vascular malformations digitally. According to our experiences, following the preoperative 3D preparation operation time shortens and the number of complications decreases. Thereby using the new visualisation technics the patients' postoperative life quality can be improved and additional costs caused by complications can be minimized.

Conclusion

As 3D visualisation and work processes are getting more and more widespread in several industries, these technics deserve a place in the surgical profession, within that in the neurosurgery.

Acknowledgement: I would like to thank you for my supervisor, Prof. Dr. László Bognár, the technical development team: all the workers of the 360.world company including especially Gergely Dobos

HIGH-RESOLUTION RETINOTOPIC MAPPING WITH THE IMAGING OF INTRINSIC SIGNALS IN THE CAT'S PRIMARY VISUAL CORTEX

Zsolt Kocsis[1] (4th year PhD student)
Mohit Srivastava[1], Zoltán Kisvárday[1]

Supervisor: Zoltán Kisvárday

[1]MTA-Debreceni Egyetem Neuroscience Research Group, Department of Anatomy, Histology and Embryology, University of Debrecen, 4032 Debrecen, Hungary

Retinotopy represents the visual field projected onto the retina and from there to the visual cortex.
Our aim is to obtain high-resolution retinotopic maps of the primary visual cortex to assign visual field positions to anatomical structures.
Intrinsic signal optical imaging was performed on anaesthetised and paralysed cats. The monocular visual stimulus consisted of a series of windows containing drifting luminance grating. These windows were shifted sequentially (1.5° increments) perpendicular to their longitudinal axis. Noise reduction was applied by normalising the activity maps with the cocktail blank, performing first frame analysis and spatial filtering.
The analysis consisted of the following steps: determining the position of the vertical meridian, the iso-azimuth and iso-elevation lines, and the contrast functions, depending on the size of the aperture and the spatial resolution. High-resolution retinotopic map was generated via linear interpolation method.
Our measurements were compared with literature data using fitting algorithms in the Matlab environment. The resultant proto-retinotopic map shows the continous change in cortical magnification factor as a function of eccentricity.
High-resolution retinotopic maps can be used to determine the probabilistic cortical representation of visual field points and neuronal connections can be related to visual field positions, allowing better investigation of the role of cortico-cortical connections in contour integration processes.

Acknowledgement: Supported by NAP2(2017-1.2.1-NKP-2017-00002) and TKI (Nr. 11008).

COHERENCY EXAMINATION OF INFLAMMATORY BIOMARKERS IN PATIENTS DIAGNOSED WITH DEPRESSION, BIPOLAR DISORDER AND SCHIZOPHRENIA

Anna B. Máthé [1](1st year PhD student)

Supervisor: Ede Frecska, Dr.

[1] Adult Psychiatric Unit, Kenézy Gyula University Hospital, University of Debrecen, 4031 Debrecen, Hungary; Psychiatric Clinic, Clinical Center, University of Debrecen, 4032 Debrecen, Hungary

Affective disorders and schizophrenia both have widely written etiologies, but the importance of inflammation in these disorders is still a new area of research. Studies showed that patients suffering from depression, bipolar disorder (especially during manic episodes) and schizophrenia had elevated levels of pro-inflammatory agents in their blood serum, such as *CRP, TNF-α, IL-1, IL-6*. Therefore, any drug/method that reduces inflammation is worth to be considered; the underlying mechanisms must be elucidated.

Due to *COVID-19* this year, research on in care patients was restricted, thus, in the current review, the main aim was to pursue molecular and cellular approaches. Using a high sugar diet inducing inflammatory model, we assessed the timing of life cycle and viability of the *Drosophila* w^{m4h} strain. These experiments will be followed by the analysis of Ayahuasca effects on viability and life cycle of fruit flies, paying attention to the attenuation of inflammation. The studied Ayahuasca extracts were further analyzed for their putative cytotoxic effects on S_2 *Drosophila* cell lines. Moreover, the extracts bioactive compound content was determined by HPLC-MS. The following Ayahuasca containing plant extracts were included into the studies: *Psychotria viridis***,** *Diplopterys cabrerana***,** *Banisteriopsis caapi***,** *Banisteriopsis caapi, var. rubra and Mimosa hostilis*.

The used methods were based on *Drosophila* strains and cell lines using nutritional genetic and cultured cell methods coupled with viability assays.

The result of our observations can be explained starting from a high sugar induced inflammation. Additionally, the results of the experiment with S_2 cell culture lines, proves that the Ayahuasca plant extracts do not have cytotoxic effects, and therefore they would be suitable for complementary therapies to reduce or prevent inflammation even in the case of affective disorders.

In conclusion, these findings pinpoint towards future experiments related to neuroinflammation. It is important to understand the relevance of molecular mechanisms, in order to have a clear perspective, before starting research on humans. The presented experiments and results correspond to a preliminary study; the final goal being the investigation and prevention/treatment of neuroinflammation in relation to psychiatric disorders.

Acknowledgement: The author would like to thank the Nutritional Institute for their help carrying out the experiments.

INVESTIGATION OF THE CEREBRAL HEMODYNAMICS IN DIFFERENT DISEASES WITH POTENTIAL EFFECTS ON THE VASCULAR SYSTEM, INCLUDING HYPERVISCOSITY SYNDROME AS WELL AS GRAND MAL SEIZURE

Dóra Sulina (3rd year PhD student)

Supervisor: László Oláh MD

1,2 Department of Neurology, University of Debrecen, 4032 Debrecen, Hungary

Abstract

Hyperviscosity is known to elevate the risk of cerebrovascular diseases. Our aim is to examine whether hyperviscosity influences the neurovascular coupling (NVC) or cerebrovascular reactivity (CR). Before and 2 days after phlebotomy and removal of 300 mL blood in patients with polycythaemia, TCD monitoring of the visually evoked flow velocity (FV) changes in the posterior cerebral arteries (NVC), breath-holding test (CR) and measurement of P100 wave parameters during visual evoked potential (VEP) examinations (neuronal activation) were performed. In patients with hyperviscosity caused by other diseases, rheopheresis was performed. The same protocol was used in the rheopheresis group before and 2 days after the procedure.

In the second part of our study, we sought the answer whether disturbance of CR or NVC can be detected several hours after grand mal seizure, when the patient already regained his/her consciousness and became oriented. TCD monitoring of the visually evoked FV changes in the posterior cerebral arteries (NVC), breath holding test (CR), VEP examination (neuronal activation) were performed within12 hours after the seizure and one week later (control).

Till now we could include 9 patients in the rheopheresis group and 11 patients to the phlebotomy study. The whole blood viscosity decreased after phlebotomy or rheopheresis. After rheopheresis, the NVC and the CR significantly improved. Phlebotomy resulted in a decrease of the pulsatility index indicating decreasing vascular resistance, and there was a tendency for improvement of the NVC.

Six patients were included in the epilepsy study. Lower cerebral blood FV, significantly larger P100 wave latency, and higher pulsatility index were found shortly after the seizure than one week later. These data indicate disturbance of neuronal activation, high vascular resistance and decreased cerebral blood flow shortly after the epileptic seizure.

Our data indicate that hyperviscosity and epileptic seizure deteriorate the cerebral hemodynamics.

EFFECT OF LUNG PROTECTIVE ONE-LUNG VENTILATION WITH FIX AND VARIABLE TIDAL VOLUMES ON OXYGENATION AND POSTOPERATIVE OUTCOME: RANDOMIZED, CONTROLLED TRIAL

Katalin Szamos (3rd year PhD student)

Supervisor: Tamás Végh

Department of Anesthesiology and Intensive Care, University of Debrecen, Debrecen, Hungary;

Physiological breathing patterns are usually highly variable and, to some extent, unpredictable. The variability of a pattern is usually quantified by the coefficient of variation (CV), which is approximately 33 ± 14.9 % of the tidal volume in healthy spontaneous breathing at rest. Breath-by-breath variation in tidal volume and respiratory rate contribute to sustaining fast state transition while minimizing the ratio between tissue stress and strain. In experimental models, in ARDS the mechanical ventilation with variable parameters improved the breathing mechanisms and the oxygenation compared to mechanical ventilation with fix parameters. The results of using double lung ventilation (DLV) with variable parameters during abdominal surgery are contradictory. There are no data if variable parameters have already been used during one-lung ventilation (OLV).

Aim of our study was to compare the effect of one-lung ventilation with fix and variable tidal volumes on oxygenation and postoperative outcome during thoracic surgeries.

After approval from the Ethics Committees written informed consent was obtained from 140 ASA I-III patients scheduled for lung resection surgery and finally data of 128 persons were analyzed.

During standard anaesthesia, patients were randomized into two groups. In FIX Group patients were ventilated with 6 ml/kg tidal volume, while in the Variable Group tidal volume was 6 ml/kg±33 % during one-lung ventilation. Tidal volumes were determined with randomization software and changed in every 5 minutes. Arterial blood gas results (ABG), hemodynamic and ventilatory parameters were recorded during DLV and OLV in every fifth minute. During hospital stay lung function tests, ABG, x-ray examinations were done. These tests were repeated on the 30th and the 90th postoperative day.

There were no significant differences in the oxygenation, ventilatory and hemodynamic parameters, nor in the postoperative lung function, neither in postoperative complications and mortality.

In patients at increased risk for postoperative pulmonary complications undergoing thoracic surgery, intraoperative variable ventilation did not improve intraoperative oxygenation and outcome. The clinical value of intraoperative variable ventilation remains unproven.

INVESTIGATION OF PROGNOSTIC FACTORS IN GLIOMAS

László Szivos (3rd year PhD student)

Supervisor: Álmos Klekner DSc

[1]Department of Neurosurgery, University of Debrecen, 4032 Debrecen Móricz Zs. krt. 22, Hungary;

Molecular definition of patho-physchiological properties of neoplasms and their implementation into routine clinical practice is the next great step in oncology, especially in neuro-oncology where epidemiological and clinico-pathological circumstances bear additional challenges. Recently, result of a robust, multi-institutional teamwork called cIMPACT-NOW *(the Consortium to Inform Molecular and Practical Approaches to CNS Tumor Taxonomy)* proposed a new classification system of primary intracranial neoplasms.

Our research group constantly followed all the minor steps of cIMPACT-NOW workflow and has put together the relevant, in-line changes about lower grade gliomas in a Hungarian review. Now, all the changes could be assessed in one piece to achieve the state-of-art neuro-oncological classification of gliomas.

Among molecular biological techniques the non-, or minimally invasive liquid biopsy technique is the most promising one. Samples likes plasma, urine or cerebrospinal fluid could serve outstanding information about original cancerous cells characteristics by the quality and quantity of their extracellular vesicles content. As part of a co-operation with Biological Research Centre (University of Szeged), Raman spectroscopy is applied as a novel technique in distinction of primary and secondary intracranial neoplasms by analyzing these oncosomes. Our aims were (1) to brief about novel and overall accomplishments of cIMPACT-NOW regarding gliomas with their clinical significance and paradigm shift properties in neuro-oncology. Its earliest integration into the Hungarian daily clinical practice is demanding and crucial. (2) To specify the relevance and significance of liquid biopsy and Raman spectroscopy along with their connection, potential benefits and novelty based on previous researches.

Keeping up with latest scientific achievements is essential and indispensable to shape the path of our current research projects and maximize the relevance of our results.

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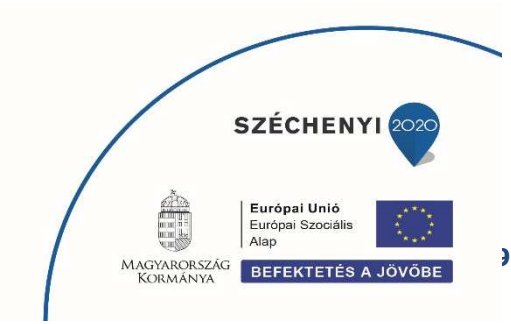
TÁMOGATÓ: **EFOP-3.6.3-VEKOP-16-2017-00009**

„Az orvos-, egészségtudományi- és gyógyszerészképzés tudományos műhelyeinek fejlesztése”

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