

**COMENIUS UNIVERSITY IN BRATISLAVA
JESSENIUS FACULTY OF MEDICINE
MARTIN**



XXXIII. STUDENT SCIENTIFIC CONFERENCE

PROGRAM and ABSTRACTS

May 09, 2012

Martin, SLOVAK REPUBLIC

XXXIII. Student Scientific Conference
Jessenius Faculty of Medicine
Comenius University
Martin

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Dr. Jozef Lettrich Foundation



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PROGRAM AT GLANCE

Date: May 09, 2012

Place: Aula A Novomeskeho 7 (next to the student hostel)
Aula B Novomeskeho 7 (next to the student hostel)
Aula C Mala hora 5, Stefanik Institute
Aula Magna Mala hora 4/A, Deanery

Registration:

May 08 (19.00 – 20.00) student hostel, student club, or
May 09 (before the beginning of your section)

Opening ceremony (Aula A – Novomeskeho 7) **8.00 – 8.10**

Aula A

A1: Section of Preclinical Disciplines 8.15 – 10.00
- coffee break

A2: Section of Theoretical Disciplines 10.15 – 11.45

Aula B

B1: Molecular and Oncological Section 8.15 – 9.30
- coffee break

B2: Section of Clinical Disciplines 9.45 – 12.15

Aula C

C1: Section of Nursing 8.30 – 11.00
- coffee break

C2: Section of Non-Medical Study Programmes 11.15 – 12.45

Aula Magna

Section of Guests 13.00 – 14.25

Closing ceremony (Aula Magna – Mala hora 4/A) **14.30**

Duration of lectures (Slovak or English language):

8 minutes, discussion – 4 minutes

PROGRAM IN DETAILS

„Aula A“

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„Aula A“

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ABSTRACTS

All abstracts are available in English at www.jfmed.uniba.sk – ŠVOČ

**TITLE: EFFECTS OF RED-WINE POLYPHENOLIC COMPOUNDS IN
EXPERIMENTALLY INDUCED ALLERGIC ASTHMA**

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Introduction: Our work was aimed at the influence of red-wine polyphenolic compounds (Provinol®) on defence airways reflexes and on inflammation during experimentally induced allergic asthma. We studied the effects of Provinol®, and combinations of Provinol® with clinically used antiasthmatics (Budesonide and Theophylline).

Material and methods: We utilized the model of guinea pig airways hyperreactivity induced by 21 days allergen (ovalbumin -OVA) administration, during which the experimental animals were treated by Provinol® (20 mg/kg/day p.o.), Budesonide (1 mM by inhalation), Theophylline (10 mg/kg/day i.p.) or by half dose combinations of them. The airways smooth muscle reactivity *in vivo* was evaluated by specific airways resistance (sRaw) to nebulized histamine (10^{-6} mol.l⁻¹). The cough in guinea pigs, induced by citric acid aerosol (10^{-3} mol.l⁻¹) was measured by *in vivo* method in double chambered body-plethysmograph. The tracheal smooth muscle reactivity to bronchoconstrictor - histamine (10^{-8} - 10^{-3} mol.l⁻¹) was examined by *in vitro* method. Bronchoalveolar lavage fluid (BALF) levels of IL-4, IL-5 (using ELISA) and expression of nitric oxide synthases (NOS) from lung homogenate (using Western blot) were utilized as parameters of anti-inflammatory effect of Provinol®.

Results: Administration of Provinol® caused significant decrease of sRaw after histamine nebulization and the decline in tracheal smooth muscle contraction amplitude to this mediator. It also led to significant decrease of parameters of chemically induced cough reflex. The bronchodilatory and antitussive effects of Provinol® were comparable to Theophylline and Budesonide. The half-dose combinations Provinol®+Theophylline and Provinol®+Budesonide exerted bronchodilatory and antitussive effects, exceeding the activity of these substance used in monotherapy. Antiinflammatory effect of Provinol® was demonstrated by IL-4, IL-5 and eosinophil account decrease. Provinol® increased the expression of constitutive form of NOS. Conclusion: Provinol® had bronchodilatory, antitussive effect, suppressed asthmatic inflammation, amplified the effect of Budesonide and Theophylline. Provinol®'s antiasthmatic effect is probably partially mediated through the metabolism of NO.

BIDIRECTIONAL MODULATION OF THE COUGH REFLEX BY NASAL TRPA1 vs TRPM8 RELEVANT CHALLENGES

Tomáš Buday, Eva Lichnerová

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Cough, the most important airways defensive mechanism is modulated by many afferent inputs either from respiratory tussigenic areas, but also by afferent drive from other organs. Modulation of cough by nasal afferent inputs could either facilitate cough response or inhibit it in animal models, depending on the type of trigeminal afferents which are stimulated. In recent study we addressed the question of possible bidirectional modulation of cough response in human healthy volunteers by nasal challenges with TRPA1 and TRPM8 agonists respectively. After nasal challenges with AITC, cinnamaldehyde, (-) menthol and (+) menthol (all 10^{-3} M, nasal symptom score, cough threshold (C₂), urge to cough (Cu) and cumulative cough response had been tested).

Nasal challenges of TRPA1 relevant agonists induced considerable nasal symptoms, significantly enhanced urge to cough ($p \leq 0.05$) but modulation of C₂ and cumulative cough response did not reach significance level. Both TRPM8 agonists administered to the nose significantly modulated all parameters including C₂ ($p \leq 0.05$), Cu ($p \leq 0.01$) and cumulative cough response ($p \leq 0.001$) documenting strong anti irritating potential of menthol isomers. Except the role of trigeminal afferents expressing TRP channels, also olfactory nerve endings, trigemino – olfactoric relationships, smell perception process and other supramedullar influences have to be taken into consideration as relevant enough to modulate cough response in humans. Instead of these challenges were performed according the cough task force recommendation (ERS, 2007), there is still a lot of questions regarding the challenge technique, subjective factors and finally interpretation of the results.

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THE EFFECT OF ALCOHOL INTAKE ON RECOVERY TIME AFTER HEAVY RESISTANCE EXERCISE

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Alcohol consume has increased by over 20% from year 1993 to 2010 (Norway). Intake among athletes show no exceptions and reports may suggest even larger intake than the general population. At the same time, there has also been an increase in number of fitness centers where people conduct resistance exercise. It is well known that alcohol intake influences physical parameters such as cardiovascular performance, protein synthesis, glucose and fat combustion and water balance. Moreover, alcohol has been found to increase cortisol secretion and reduce insulin like growth factor, and testosterone. These factors may in theory negatively affect muscle tissue regeneration and hypertrophy after a bout of resistance training. Indications exist for that alcohol may prolong recovery, but little is known about such effect in subjects that exercise at a regular basis and the amount of alcohol needed to induce these negative effects. A possible dose-response on prolonged recovery is hitherto unexplored. Study objectives are: To assess whether 0.6 (♀) / 0.7 (♂) g/kg body weight of alcohol prolong recovery from resistance exercise. To assess the effect of 1.2 (♀) / 1.4 (♂) g/kg body weight of alcohol on the same parameters and to compare these effects to the effect after 0.6/0.7 g/kg of alcohol. To assess the effect of alcohol-placebo on the same parameters. Methods: 10-15 volunteers, age group 20-40, who regularly perform resistance exercise. Exercise bout: Squats, lunges, leg press and knee extensions; 3*8RM, 2 min rest between sets. Alcohol intake 1 hour post exercise. Tests of muscular strength and blood sampling will be done before, immediately after, 12, 24 and 36 hours after the exercise bout. We will test recovery by voluntary and electrical stimulated isometric force of knee-extensors, squat jumps, grip strength, muscle soreness and blood sampling: (Complete Blood Count, Creatin Kinase, Myoglobin, Alanin Amino Transferase, C-Reactive Protein).

MOLECULAR MARKERS FOR POSITIVE IDENTIFICATION OF VAGAL LOW THRESHOLD A-FIBER MECHANOSENSORS BY SINGLE CELL RT-PCR

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Introduction: Afferent regulation of the esophageal motor reflexes is mediated by the vagal low threshold A-fiber mechanosensors. Clinical studies demonstrated that in esophageal diseases the reflex regulation of esophagus undergoes neuroplastic changes leading to reflex derangement and symptoms. However, the nature of neuroplastic changes in the vagal A-fibre mechanosensors is unknown. One difficulty in addressing this question experimentally is the lack of suitable molecular markers for positive identification of vagal A-fibers. Our aim is to find molecular markers that can be selectively detected in vagal nodose A-fibers by single cell RT-PCR. We hypothesize that certain markers functionally linked to A-fiber phenotypes such as medium- and high-molecular weight neurofilaments (NEFM and NEFH), glutamate transporter VGLUT1, mechanosensitive channel PIEZO2 or transcriptional factor RUNX3 are selectively expressed in nodose A-fibers.

Materials and methods: Single cell RT-PCR was performed on individual neurons isolated from the guinea pig vagal nodose ganglia. In some experiments nodose neurons innervating the esophagus were labeled by injection of retrograde tracer Dil into the esophagus. *Results:* We have thus far investigated NEFM and NEFH. Three distinct primer pairs were used for each target. 19 single nodose neuron samples were evaluated. The majority of the samples (11/19) were positive for the C-fiber marker TRPV1 while the remaining samples (8/19) were TRPV1-negative potentially including A-fibre neurons. NEFM and NEFH were detected in 5/8 and 4/8 TRPV1-negative samples, respectively. Although these results were promising, NEFM and NEFH were also detected in 11/11 and 10/11 TRPV1-positive samples, respectively, showing that C-fibre neurons also express these markers. In control experiments these targets were not detected in 8 negative control samples.

Conclusion: The medium- and high-molecular weight neurofilaments are not suitable markers for positive identification of nodose A-fibers by single cell RT-PCR. Ongoing studies continue to address the suitability of other markers.

TRPA1 NASAL AGONISTS CHALLENGES – EFFECTS ON NASAL SYMPTOMS, COUGH AND SPECIFIC AIRWAY RESISTANCE

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Air pollution modulates functions of airways. Experimental models of air pollution use inhalation of air born irritants aerosols, or vapors to mimic real environmental exposure however, most exposed is always nasal mucosa. The aim of our study was to assess modulation of airway defensive reflexes in animal model by selective nasal challenges with TRPA1 agonist AITC allylisothiocyanate. TRPA1 channel is relevant for most air born irritants.

15 male Dunkin Hartley guinea pigs were repeatedly exposed to nasal 10mM AITC, 15 μ l into nostrils and nasal symptoms magnitude, cough and specific airway resistance (Saw). Nasal administration of 10 mM AITC induces reproducible nasal symptoms including sneezing, discharge, crackles and conjunctival reaction with hazy eyes. Citric acid induced cough after nasal AITC challenge was significantly suppressed ($p < 0.05$) and this reaction was prevented by pretreatment with TRPA1 antagonist AP18. Possible explanation for this phenomenon could be AITC induced bronchoconstriction, which might prevent animal from appropriate inhalation of tussive agent to the airways, however, this possibility was excluded in further experiments and we are still working on more experiments to elucidate this reaction.

Nasal application of 10mM AITC induces spontaneous rise of Saw measured by Pennock's method in vivo and also increases airway resistance after methacholin inhalation ($p < 0.05$) rather than histamine, suggesting for nasobronchial reflex, which was after oxymetazoline (1% sol) and salbutamol pretreatment excluded, suggesting for main role of upper airways in resistance rise. All of mentioned reactions support the role of TRPA1 channel in development of airway symptoms induced by environmental/occupational exposure.

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THE INFLUENCE OF LONG-TERM ADMINISTRATION OF CRAC CHANNELS ANTAGONIST ON EXPERIMENTALLY INDUCED ALLERGIC ASTHMA IN GUINEA PIGS

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Introduction: The role of CRAC channels in secretory functions of mast cells, T cells and eosinophils is described in details. Previously, we demonstrated both, their role in contraction of airways smooth muscle cells (ASM) and pathophysiology of experimentally induced allergic asthma in guinea pigs test system. The aim of presented work was to evaluate the influence of long-term therapy by CRAC antagonist on airways hyperreactivity, pathological cough and degree of inflammation in condition of experimentally induced allergic asthma.

Material and methods: Allergic inflammation of the airways was induced by repetitive exposure of guinea pigs to ovalbumine. The selective antagonist of CRAC channels (3-fluoropyridine-4-carboxylic acid) was administered intraperitoneally in the dose 1.5 mg/kg b.w during 14 days. The following methods were used for assessment of long-term administration of CRAC antagonists and positive control drugs codeine and salbutamol:

1. Evaluation of specific airways resistance (sRaw), *in vivo* and contractile response of isolated ASM strips, *in vitro*; 2. Citric acid-induced cough reflex; 3. Measurement of exhaled NO levels (E_{NO}). 4. Assessment of NO-synthase isophorms levels; 5. Immunohistochemical staining methods evaluating the mast cells infiltration of tracheal and pulmonary tissue sections. Results: Long-term application of CRAC antagonist resulted in significant cough suppression, bronchodilatory effect *in vivo* and inhibited ASM contractility *in vitro* conditions exceeded activity of control drugs codeine and salbutamol. The measured levels of E_{NO} and the results of immunohistochemical analysis confirmed anti-inflammatory effect of CRAC antagonist.

Conclusion: The results confirmed role of CRAC in pathophysiology and symptoms of experimental asthma model and due to dual bronchodilatory and anti-inflammatory activities could in future to extend possibilities or design new strategy in asthma treatment.

SELECTIVE VISUALIZATION OF PAIN-MEDIATING NERVE TERMINALS IN THE ESOPHAGUS BY TRANSGENE EXPRESSION

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Introduction: Treatment-resistant pain from internal organs (visceral pain) is a prevalent grave clinical problem. The development of novel therapies is hampered by poor understanding of pain-mediating visceral nerves (visceral nociceptors). In particular, the locations and innervation patterns of their nerve terminals are essentially unknown. Novel methods to visualize visceral nociceptive terminals are necessary for progress in this area. We hypothesized that the transgene expression of green fluorescent protein (GFP) in nociceptive nerves will reveal the structure of their nerve terminals. We used adeno-associated virus vector encoding GFP (AAV-GFP) to induce GFP expression in neurons in dorsal root ganglia (DRG).

Materials & Methods: AAV-GFP (0.1microl) was microinjected into surgically exposed left thoracic (T2) DRG (n=10 guinea pigs). The esophagus, nerve ganglia and adjacent tissue were harvested 6-8 weeks later, stained for GFP in wholemount preparations of esophageal mucosa/submucosa and muscle, and evaluated by fluorescent microscopy.

Results. AAV-GFP injection resulted in expression of GFP exclusively in the afferent neurons in the injected T2 ganglia. In the esophagus, the GFP-positive DRG fibers run and occasionally branched in nerve fascicles in serosal layer. In the myenteric layer, the areas of dense network (ranging 0.5-11mm) of fine branching GFP-positive fibers often forming intraganglionic structures in myenteric ganglia were observed. The delimited myenteric areas of fine fiber networks were often apposed to GFP-positive fiber networks in the mucosa. This indicates that the fibers branch to innervate both muscle and mucosa.

Conclusions: GFP-expression induced in DRG neurons by adeno-associated virus vectors is an excellent method for visualization of visceral nociceptors. Esophageal nociceptive DRG terminals are delimited myenteric areas of networks of branching fine fibers often forming intraganglionic structures and projections into mucosa. This arrangement predicts that a single DRG nociceptive population responds to both mucosal and intramural stimuli.

MODULATION OF ESOPHAGEAL VAGAL AFERENT NERVES SENSITIVITY VIA ADENOSINE A2A RECEPTORS

Izabela Žitňaková

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Clinical studies demonstrated that adenosine is an important mediator in the pathogenesis of non-cardiac chest pain originated from the esophagus. However the precise mechanism of adenosine action on esophageal nociceptive pathways is not fully understood. Our previous studies have shown that adenosine directly activated nodose esophageal nociceptive fibres and that they express the adenosine A2A receptors in addition to A1 receptors. We focused on hypothesis that adenosine A2A receptors except activation sensitize esophageal vagal nodose nociceptive afferent nerves. Ex vivo extracellular single unit recordings were made from the esophageal nodose C-fibres in the isolated vagally-innervated guinea pig esophagus. The selective adenosine A2A receptor agonist CGS21680 induced an enhanced mechanical response of nodose receptors to esophageal distention (10-60mmHg) and mechanical sensitization was concentration-dependent (1-100nM). CGS21680 in suprathreshold effective concentration of 3nM enhanced the response to distention approximately 2.5-fold (n=10, p<0.01). This mechanical sensitization was completely abolished by selective antagonist of adenosine A2A receptor SCH58261 (0.1µM, n=5). Despite CGS21680 (3nM) evoked a strong mechanical sensitization, the activation of nodose nociceptors was relatively weak. The peak action potential discharge during baseline and CGS21680 (3nM) was 0.8 ± 0.2 Hz and 1.7 ± 0.4 Hz, respectively (n=10) compared with the increase in the peak activation evoked by esophageal distention (60mmHg) (7.8 ± 0.8 Hz, p<0.01). The adenosine A2A receptor typically couples to adenylate cyclase. Consistently with CGS21680 forskolin as activator of adenylate cyclase induced mechanical sensitization of nodose nociceptors despite relatively marginal activation.

We can summarize that stimulation of adenosine A2A receptors in spite of relatively trivial activation induce a robust mechanical sensitization of vagal nodose nociceptors of esophagus and that mechanism may likely contribute to the chest pain originated from esophagus.

MONITORING OF HEMOSTASIS CHANGES BY THROMBOELASTOMETRY IN NORMAL PREGNANCY

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Background: Pregnant women develop hypercoagulability, and this state minimises the risk of haemorrhage during pregnancy. Global hemostasis assays, as thromboelastometry (TEM), may detect hypercoagulable states. The thromboelastometry was studied on the modified rotation thromboelastogram analyzer (ROTEM®; Pentapharm Ltd, Munich, Germany), analyzes a velocity of clot formation with standard parameters.

Method: ROTEM was performed on 30 pregnant women in first trimester (average age 30 years, range 19-42) with no history of hemostasis defects and on 30 healthy women (average age 31 years, range 21-45) as a control group. We measured the clotting time (CT), the early clot amplitude at 5 and 15 minutes (CA5, CA15) and the maximum clot firmness (MCF) with two main tests : the INTEM test and the EXTEM test.

Results: Control specimens in INTEM was for aPTT : CT = 0,493 sig. (significant), CA5 = 0,117, CA15 = 0,06, MCF = 0,04 and for PLT: CT = -0,085, CA5=0,092, CA15 = -0,022, MCF = -0,159. Specimens of pregnant women was for aPTT : CT = -0,12, CA5 = -0,009, CA15 = 0,043, MCF = 0,044 and for PLT: CT = 0,227, CA5=0,46 sig., CA15 = 0,424 sig, MCF = 0,439 sig. Except these tests, we measured other blood parameters as blood count for completisation of results.

Conclusions: In our project we searched for changes in hemostasis in health pregnant women during first trimester. There were significant correlations between the results obtained with ROTEM and those from standard coagulation tests. CT were not significantly modified during early pregnancy whereas MCF, CA5 and CA15 (INTEM, EXTEM,) increased significantly between control and pregnant. We are planning to compare defined reference values with the basic hemocoagulating methods used in clinical practice to measure its significant value. We expect that this method will provide us complex valuation of homeostasis in pregnancy what later allow us using tromboelastometry in management of therapy of pregnant women with disorders of hemostasis.

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DIFFUSION- WEIGHTED IMAGING IN BRAIN TUMOURS

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Diffusion weighted MRI (DW-MRI) is an advanced application of MRI. The difference between DW-MRI and conventional MRI is insertion of diffusion gradients into the sequences, which enable to measure the magnitude of water diffusion in different directions. A series of values called 'diffusion tensor' is calculated from the data for each image pixel in a process called diffusion tensor imaging (DTI). In the white matter of the brain, DTI data enable to visualise neural pathways using a suitable fibre tracking software. The results may be also displayed as maps of diffusion parameters, such as apparent diffusion coefficient (ADC) or fractional anisotropy (FA). The latter two values are particularly useful in brain tumour differential diagnosis and grading. Our goal was to implement DW-MRI into brain tumour diagnostic panel of parameters. The very first step was to find a DTI sequence with optimal spatial resolution and signal-to-noise ratio (SNR). Generally in MRI measurements, twofold decrease of voxel size without changes in measurement time implies twofold decrease in SNR; to get the original SNR, measurement time shall be increased four times. We performed our measurements using a 1.5 Tesla Siemens Symphony clinical scanner with an 8-channel head coil. The measurements were performed one liquid spherical phantom, three healthy volunteers and three tumour patients. We used different measurement times and spatial resolutions to reach the optimal SNR with reasonable measurement time. The resultant protocol will be used in future measurements of brain tumour patients.

This work was supported by the project "CREATING A NEW DIAGNOSTIC ALGORITHM FOR SELECTED CANCER DISEASES".

TIME DEPENDENT CHANGES IN INFLAMMATORY MARKERS DURING MECONIUM ASPIRATION SYNDROME: PILOT RESULTS

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Introduction: Meconium aspiration syndrome (MAS) is a serious event which is in general cause of many respiratory disorders in newborns. Aspiration of meconium into the lungs induces airway obstruction and inactivation of pulmonary surfactant in the first step and marked pulmonary inflammation in the second step. In rabbit experimental model of MAS, these inflammatory processes are demonstrated by lung edema, neutrophil migration into the tissue and presence of secondary products of oxidative damage.

Material and methods: Experimental animals were divided into two groups. The first group obtained saline solution intratracheally (n = 4) and in the second group (n = 4), MAS was induced by intratracheal meconium application. Leukocyte differential in arterial blood and plasmatic markers of oxidative damage (thiobarbituric acid reactive substances (TBARS) and 3-nitrotyrosine (3NT)) were determined before, and in the 1st, 3rd and 5th hour after saline/meconium instillation. Finally, after the end of experiment, the wet/dry weight ratio of rabbit lungs was evaluated.

Results: In meconium group, lung edema was observed together with marked decrease of leukocytes in peripheral blood and significant increase of plasmatic 3NT after the first hour, while TBARS levels were elevated after the third hour. Moreover, we found correlations between 3NT levels and neutrophil count.

Conclusion: Our results suggest that the first hour after meconium aspiration is key in inflammation-associated oxidative damage development, probably as a result of neutrophil activation.

MUTUAL INTERACTIONS OF DEFENSIVE AIRWAY REFLEXES

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Modulation of the cough response by nasal mechanical stimulation and mutual interactions of the cough and sneeze reflexes were studied on 10 spontaneously breathing cats (3.48 ± 0.21 kg) under the pentobarbitone anesthesia. Sneeze reflex (induced mechanically in the nose by a soft nylon fiber) differs from coughing (induced mechanically by soft catheter in the tracheobronchial area) by about 13 fold higher intensity in styloglossus muscle electromyogram (EMG) during the expulsive phase of the reflex ($p < 0.05$). Amplitudes of both the inspiratory esophageal pressure and diaphragm EMG moving average during sneezing were lower than those occurred during coughing (in both $p < 0.01$; 8 animals). The trials with the cough and sneeze reflexes being evoked during combined stimulations, were induced on 6 cats. The number of reflexes was not altered significantly. However, expiratory maxima of esophageal pressure and the amplitudes of abdominal muscles EMG moving averages were increased in coughs induced during combined trials, compared to control coughs (in both $p < 0.05$). Similarly, higher abdominal muscle activation was found in sneezes during combined trials, compared to control sneeze reflexes ($p < 0.05$). No significant effect of mechanical nasal stimulation on tracheobronchial cough (8 cats) was detected. It seems the effect of mechanical nasal stimulation on the tracheobronchial cough response is limited. However, simultaneous nasal – tracheobronchial stimulations can result in variety of enhanced cough and sneeze responses.

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DETECTION OF rs1800682 BY HRMA AND ITS RELEVANCE IN PREECLAMPSIA**Eva Imrišková**

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Introduction: Polymorphisms within the promoter regions of genes may have impact on their expression, which can cause predisposition to complex diseases as preeclampsia. Here, we choose promoter region of the gene *FAS* previously reported to be involved in preeclampsia, and developed High Resolution Melting Analysis (HRMA) genotyping method for SNP *FAS* -670 A>G (rs1800682). The goal our study was the validation of the HRMA analysis compared to allelic discrimination (AD) by TaqMan genotyping and evaluation of the association of this SNP with preeclampsia.

Patients and methods: Patients with preeclampsia were diagnosed at the Dept. of Obstetrics and Gynecology. Genomic DNA was isolated from peripheral blood. DNA samples with concentration 20ng/μl were genotyped by AD. For the primer design we used reference sequences from Genbank databases, NG_009089.2 between nucleotides 4645 a 4700, the size of PCR product was 55bp. For HRMA we used LighCycler 480 High Resolution Melting Master Mix and we evaluate it by software Lightcycler 480 GeneScanning.

Results: Results show that genotype AA has lower melting temperature compared to GG and heterozygous genotype has different melting curve – T_m for allele A is lower compared to T_m for allele G. Fifty randomly chosen DNA samples were analyzed by both methods and HRMA results show 100% conformity with AD. The presence of G allele in rs1800682 in *FAS* gene promoter region was observed in 39 patients from 50 (78,15%) compared to the 30 (66%) individuals from the control group. This gives non-significant correlation of G allele association with preeclampsia.

Conclusions: We developed HRMA method for detection of rs1800682 and validated it by AD. Previous publications confirm significant association of G allele rs1800682 with preeclampsia but we didn't confirm it by our analysis.

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STRESS PROFILE AND AUTONOMIC NERVOUS SYSTEM IN YOUNG HEALTHY SUBJECTS

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The aim was to assess the physiological autonomic reactivity in response to stressors in the interaction with subjective characteristics in healthy young people.

Methods: Forty students (age: 22.9 ± 0.1 yr., BMI: 21.7 ± 0.4 ; 20 women) were examined. The continuous ECG signal and electrodermal activity (EDA) were monitored: rest (T1) – Stroop test (T2) – rest (T3) – arithmetic test (T4) – rest (T5) – negative emotion (T6) – rest (T7). Heart rate variability (HRV) parameters and EDA were analyzed from each 5-minute period. HRV parameters: *linear analysis* - RR interval, spectral power in high frequency band (HF) reflecting cardiac vagal control; *symbolic dynamics* – 0V% as a potential index of cardiac sympathetic regulation, 2LV% as an index of parasympathetic activity. EDA (μ S) is considered as an index of sympathetic activity. Subjective characteristics were evaluated using Temperament and Inventory Character. Trait hostility was evaluated using Cook-Medley Hostility Scale.

Results: The 0V%, EDA were significantly higher and RR interval, HF-HRV, 2LV% significantly lower during stress compared to rest ($p < 0.001$). No significant differences were found for 0V% in response to negative emotion (T6). EDA was significantly higher in recovery phases (T3, T5, T7) compared to T1 ($p < 0.001$) and correlation was found between EDA and trait hostility ($r = 0.382$, $p = 0.018$).

Conclusion: Our study revealed higher sympathetic activity to cognitive stressors compared with emotional stress. In contrast to HRV parameters, EDA did not return to baseline values in recovery phases indicating a potential increased sympathetic arousal during all stress profile in healthy students. Moreover, baseline EDA positively correlated with a trait hostility as a predictor of health outcomes. Recent studies have explored the idea that both exaggerated/diminished physiological responses to stress indicating a loss of homeostatic regulation may signal increased risk of cardiovascular disease. We suggest that the detailed study of stress reactivity has gained more attention.

**DIFFERENTIAL IMPACT of INHIBITORS of SARCO/ENDOPLASMIC RETICULUM
Ca²⁺-ATPase on SURVIVAL of LEUKAEMIC HL-60 CELLS**

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Sarco/endoplasmic reticulum Ca²⁺-ATPase plays important role in maintaining of intracellular calcium homeostasis. It pumps cytoplasmic calcium back to the lumen of endoplasmic reticulum therefore inhibition of SERCA causes increased cytosolic Ca²⁺ ([Ca²⁺]_{cyt}) and depletion of endoplasmic reticulum (ER) Ca²⁺ stores that is associated with ER stress and might culminate in cell death.

The aim of this work was to study effect of inhibitors of SERCA on survival of leukaemic cell line HL-60. Incubation of HL-60 cells with thapsigargin, well known inhibitor of SERCA, was associated with cell death in concentration dependent manner. Concentration of thapsigargin leading to the death of 50% cells (LC₅₀) was estimated to be approximately 1 nmol/l. However, incubation of HL-60 cells with another inhibitor of SERCA, BHQ, did not lead to induction of death of HL-60 cells. Both thapsigargin and BHQ in concentrations used in this study were able efficiently inhibit SERCA that was documented by spectrofluorometric measurements of [Ca²⁺]_{cyt} increase, using Fluo-3 as calcium sensor. We have also documented that addition of BHQ after thapsigargin elicited additional increase of [Ca²⁺]_{cyt} and vice versa. This fact might indicate presence of two different ER pools in HL-60 cells that express different SERCA isoforms with different sensitivity to SERCA inhibitors used in this study. Presence of different ER pool expressing different SERCA isoforms would be a plausible explanation of differential impact of SERCA inhibitors on cell survival, since different ER pools might be differentially related to cell death initiation.

ASSOCIATION GENE POLYMORPHISM ACE AND MTHFR WITH RISK OF COLORECTAL CANCER.

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Introduction: We study gene variants in the methylenetetrahydrofolate reductase gene (*MTHFR* 677C>T polymorphism, rs1801133) and in the angiotensin-converting enzyme gene (*ACE* D/I polymorphism, rs1799752). *MTHFR* plays a key role in folate metabolism by channeling one-carbon units between nucleotide synthesis and methylation reactions. Severe enzyme deficiency leads to hyperhomocysteinemia and homocystinuria, with altered folate distribution. *ACE*, a key enzyme in the renin-angiotensin system, plays the important roles of regulating of blood pressure and serum electrolytes. It is differentially expressed in several carcinomas and may affect tumor cell proliferation, migration, angiogenesis, and metastatic behavior. Inhibition of *ACE* activity suppresses tumor growth and angiogenesis in vitro and vivo of animal models; moreover, epidemiologic studies have also indicated that *ACE* inhibitors might decrease the risk and mortality rate of cancers. In the light of the established association of *ACE* with several types of cancer, the possible contribution of the insertion/deletion (I/D) polymorphism that affects *ACE* gene expression, in the development of colorectal cancer was investigated.

Material and methods: DNA samples of 330 healthy controls and 231 patients with colorectal cancer (adenocarcinomas) were examined by allele-specific PCR reaction for *ACE* polymorphism and RLFP for *MTHFR* polymorphism followed by electrophoretic analysis. The resulting allele and genotype frequencies of the patients were compared to those of the controls by Fischer's exact test and odds ratios (OR).

Results: Frequency of the minor allele (Val) was significant lower ($p=0.01$) in control group of women. Frequency of homozygous variants genotype *MTHFR* (V/V) was lower among cases in women (5,4%) than control women (9,8%). No significant association was found between the I/D polymorphism and over all cancer risks (OR = 0.87).

Conclusion: Our results in this time suggest that the D/I polymorphism in *ACE* gene may not contribute to susceptibility to colorectal cancer. A common polymorphism in a folate-metabolizing gene, methylenetetrahydrofolate reductase (*MTHFR*) 677C > T has been associated with reduced risk of colorectal cancer.

TELOMERASE ACTIVITY IN PREMALIGNANT CERVICAL LESIONS

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Introduction: Telomerase is a ribonucleoprotein that synthesizes telomeric DNA onto chromosomal ends. It is involved in maintenance of chromosome length and stability. There is strong association between tumorigenesis and upregulation of telomerase in various human tumors. This study investigated the gain of the human telomerase RNA gene (hTERC) located in the 3q26 region in patients with premalignant cervical lesions.

Material and methods: Four colour fluorescence in situ hybridization probe set (type FFACT™) was used to detect amplification of hTERC gene. Image analyses were performed with a fluorescence microscope (Olympus, 100X objective). hTERC signals were enumerated by screening the slides visually with these optical filters: red for 3q26 (locus of hTERC gene), green one for 5q15 (TERT gene) and the blue one for centromere7 region. Signals were evaluated by signal counts per nucleus on 100 cells on each slide. Slides for FISH analyses were prepared from samples of LBC specimens obtained under informed consent during the gynecologic exam. Cytological categories were defined according to the Bethesda system: NILM (negative for squamous intraepithelial neoplasia, n=3), L-SIL (low grade squamous intraepithelial neoplasia, n=3) and H-SIL (high grade intraepithelial neoplasia, n=4). Histopathological diagnosis was stated according to WHO criteria and included WNL (within normal limits, n=5), CIN2 (n=2), CIN3 (n=3) subclass.

Results: The number of cells with hTERC gene gain in the samples increased significantly with severity of cervical lesion. Average number of copies of hTERC gene to number of centromere7 copies was 2,15:2,00 in NILM (n=3), 2,41: 2,013 in L-SIL (n=3), and 2,63:2,05 in H-SIL (n=4) samples. According to histopathological criteria, the results were: WNL= 2,26:2,01, CIN2= 2,38: 2,01, CIN3= 2,71:2,08.

Conclusion: Amplification of hTERC gene as an early event in cervical carcinogenesis represents a valuable genetic biomarker, which can achieve higher sensitivity and specificity in distinguishing high grade cervical lesions and invasive cancers from low grade lesions compared to conventional methods.

TUMOR ASSOCIATED MACROPHAGES TYPE 1 AND 2 IN CLASSICAL HODGKIN LYMPHOMA

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Introduction: In contrast to other malignant tumors, classical Hodgkin lymphomas (cHL) show unique histological patterns: tumor cells comprise a minority and admixed reactive cells a majority of the cell population. Among the reactive cells especially the macrophages – so called tumor associated macrophages (TAMs) are recently a subject of interest. They might be divided into suppressive TAM1 type (CD68+) and promotional TAM2 type (CD163+) cells.

Material and methods: From the archives of the Lymphoma Register we have selected a series of 30 consecutive cHL cases as a pilot retrospective study to prove a possibility of an evaluation of the TAM1 and TAM2 proliferation resp. in routine biopsy cases. The paraffin sections were stained immunohistochemically with antibodies against CD68 and CD163 antigens. In all the cases, the number of TAMs within the tumor tissue was evaluated semiquantitatively using cut-offs 0-10%, 10-50% and >50%.

Results: In 12 of the cases, the level of CD68+ and CD163+ cells was concordant: 0-10% 4 cases, 10-50% 2 cases and >50% 6 cases. In 18 cases the results were discordant and these cases may be divided into 2 groups: a) cases with 10-50% of CD68+ cells showing either 0-10% of CD163+ cells (n=10) or >50% CD163+ cells (n=3) and b) cases with >50% CD68+ cells showing either 0-10% of CD163+ (n=4) or 10-50% of CD163+ cells (n=1).

Conclusion: We found that in routine cHL biopsies it is possible to evaluate the proliferation of TAM1/2 populations and to document its heterogeneity. As TAMs 2 have been reported to be associated with a worse prognosis for several tumors, the identification of TAM1+ versus TAM2 proliferation could be useful for prediction of cHL patients prognosis.

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RELATIONSHIP BETWEEN mRNA EXPRESSION OF ABC-TRANSPORTERS AND CHEMORESISTANCE IN PATIENTS WITH COLORECTAL CARCINOMA

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Introduction: At the world the colorectal cancer is classified as the most common gastrointestinal malignancies. In Slovakia we have for nearly 3,000 new cases every year. Early diagnosis is the key to successful therapy. The choice of treatment always depends on the size and location of tumor, stage of disease and the overall condition of the patient. The expression of ATP-binding cassette superfamily transporter genes, such as P-glycoprotein (MDR-1) and breast cancer resistance protein (BCRP) are often up-regulated in various tumor types and are involved in responses to some anticancer chemotherapeutic agents.

Material and methods: We focused to determination of mRNA expression by reverse transcriptase real-time polymerase chain reaction in 29 samples. *In vitro* drug resistance was analyzed with methyl-thiazol tetrazolium (MTT) assay.

Results: In patients (n= 9) with colorectal carcinoma the primary resistance to 5-fluorouracil was identified in 15% of tested samples, cisplatin 21%, paclitaxel 45.5%, dacarbazine 74% and doxorubicin 82%. *In vitro* resistance was not associated with the expression of ABC-transporters. However, in carcinomatous tissues and non-carcinomatous margin tissues (n= 8) we found significant difference of MDR-1 expression ($P < 0.05$). The mRNA levels were expressed as the relative concentrations of investigated mRNA to b-actine mRNA.

Conclusion: MTT assays are a widely used and validated method to analyse *in vitro* drug resistance but they may not be a useful tool to detect resistance which is caused by drug efflux in patient samples. If that is the case, MTT assays and the expression of ABC-transporters could provide complementary information on the drug resistance profile of patients with colorectal carcinoma.

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THE MORPHOLOGY OF GASTROINTESTINAL STROMAL TUMORS (GISTS) AFTER TARGETED TYROSINE KINASE INHIBITION THERAPY

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Introduction: Gastrointestinal stromal tumors (GISTs) are the mesenchymal tumors of the gastrointestinal tract harboring activating mutations in *KIT* and *PDGFRA* genes and being resistant to radio-/chemotherapy. Therefore surgery in combination with tyrosine kinase inhibitors (TKIs) therapy represents a modern therapeutic modality. In contrast to usual tumor changes under conventional oncological therapy, the TKI leaves the tumor size unreduced by “switching off” the GIST metabolism.

Material and methods: We evaluated the biopsies of 18 patients suffering from GIST relapse under TKI therapy from National GIST Register. In our study we a) evaluated semiquantitatively regressive changes - pseudocystic degeneration, hemorrhage, necrosis and b) fibrosis using cut-offs <10%, 10-50% and >50%, as well as c) compared primary phenotype with that of relapse.

Results: a) Pseudocystic degeneration, hemorrhage or necrosis in extent <10% was present in 4/18, 12/18 and 7/18 cases respectively. One case showed extensive necrosis (>30%) of tumor cells. In all the necrotic areas intact reticulin fibers stretching through the area were preserved. b) Fibrosis was present in 11/18 cases - focal: <10% (n=5) or more extensive: 10-50% (n=3) and >50% (n=3), and c) substantial changes in morphology and phenotype of tumor cells before and after TKI therapy were not recognized.

Conclusion: There are insufficient data on the morphology of GIST cells and/or on the persistence or even increase of the GIST size under the TKI therapy. Our data show that extensive fibrosis of the tumor mass is present in approx. 1/3 of cases. In contrast, TKI treatment in relapsing cases causes more extensive regressive changes only exceptionally. The persistence of intact necrotic area reticulin network might lead to speculation that it “prevents” the necrotic tumor mass from collapse.

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THE ROLE OF EXHALED NITRIC OXIDE AS A POTENCIAL MARKER OF LUNG CANCER

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Introduction: Nitric oxide (NO) and its metabolites play an important role in airway physiology acting as mediators of signaling processes. However, excessive production of NO and reactive oxygen species (ROS) is implicated in the pathogenesis of lung cancer. Measurement of nitric oxide (eNO) in exhaled breath may serve as potential diagnostic tool in predicting lung cancer and its progression.

Aims: The aim of our study was to assess the levels of exhaled nitric oxide in patients with lung cancer in relationship to cancer type, staging, smoking status, etc. and compare it with eNO levels in healthy controls.

Methods: We measured eNO using analyzer NIOX[®] according to ATS/ERS guidelines. We used methods of descriptive statistics and Mann-Whitney test for statistic processing.

Results: Median of eNO in 13 patients with lung cancer was 16,5 ppb, IQR 12,5 and median of eNO in 52 healthy controls was 9,8 ppb, IQR 4,25. There was found statistically significant difference between patients with lung cancer and healthy subjects ($p=0,0145$). The most frequent stage of tumor according TNM classification was T2N2M1 with the percentage of T2 (38,5%), N2 (53,8%), M1 (46,2%). The percentage of tumor types varied as follows: spinocellular Ca - 23,07%, adenocarcinoma - 30,14%, small cell Ca - 15,38%, not specified tumor - 15,38%.

Conclusion: NO in exhaled breath is increased in patients with lung cancer, that can be useful for further investigations to provide new method for lung cancer screening.

INFLUENCE OF APPLICATION BOTULOTOXINUM TYPE A ON SECRETION OF TEARS IN NEUROOPHTHALMOLOGIC INDICATIONS

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Background: Many patients with facial dystonia suffer from dry eye syndrome. Botulotoxinum type A is effective symptomatic therapy for reduction of spasms. We evaluated the influence of therapy of facial dystonia with botulotoxinum type A on lacrimal system.

Material and methods: The injections of botulotoxinum - A were applied from neuroophthalmologic indications, subcutaneously to fifty patients. In group were enrolled fifty eyes. The influence of therapy on lacrimal secretion was rated by Schirmer test 2 times. Before therapy and 2 weeks after chemodenervative therapy.

Results: In consideration of non gausse distribution of values of Schirmer test (detected by Schapiro - Wilkov test), we evaluated difference between values before and after therapy with nonparametric Wilcox's test. In 58% there were significant ($p < 0,012$) decrease in secretion of tears, In 22 % increase of retention and there were no changes in 20 %.

Conclusion: In therapy of focal facial dystonia in neuroophthalmologic indications, after application injections botulinum toxine type A, secretion of tears has significantly decreased ($p < 0,012$) in 58% patients.

ASSESSMENT AND MONITORING OF GASTROESOPHAGEAL REFLUX DEGREE IN PREMATURE CHILDREN AND IN CHILDREN BORN AT TERM

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Introduction: Gastroesophageal reflux (GER) is defined as a spontaneous leakage of the stomach content backwards into the esophagus as result of dysfunction of the lower esophageal sphincter (LES). In younger sucklings it is usually a physiological phenomenon. At such age mainly a functional immaturity of the LES contributes to reflux. In most children born at term it comes to a spontaneous adaptation until the 18. month of live, while in preterm infants, the bound of a spontaneous adaptation shifts to older ages.

Aim: The aim of our study was, based on ultrasonographic examination(USG), to compare the number of reflux episodes (RE) in the 2nd and 6th month of live in children born at term and in premature children.

Methodes: For assessment of GER in our study was chosen USG as a primary screening method. There were 18 at term (38th -42nd week) and 18 preterm infants(<38th week) examined. During 10 minutes of USG, a frequency of RE were recorded. The results were statistically analyzed and graphically compared.

Results: The average count of RE in children born at term examined in the 2nd month was 2,72, in the 6th month it was 1,27. The average count of RE in premature children examined in the 2nd month was 2,83 and in the 6th month it was 2,33.

Conclusion: Our analysis indicates, that there isn't significant difference between the average count of RE in infants born at term and preterm, examined in the 2nd month. However, we can see significant difference between the average count of RE in children examined in the 6th month. In preterm infants this count is higher than that in children born at term. GER in premature infants persists longer mainly for slower maturation of the lower esophageal sphincter.

PLAY ANKLE-BRACHIAL INDEX SIGNIFICANT ROLE IN THE PREDICTION OF SEVERITY OF THE CORONARY HEART DISEASE?

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Introduction: To evaluate the significance of ankle-brachial index (ABI) in prediction of severity of the coronary heart disease in patients with acute coronary syndrome undergone invasive cardiac examination. To evaluate the relation between ABI, known peripheral artery disease and necessity of coronary stent implantation in the patient with coronary heart disease.

Methods: ABI was investigated with Doppler ultrasound device and calculated from systolic ankle and brachial pressure measurements in patients one second day after cardiac catheterization with or without percutaneous coronary intervention (PCI). We enrolled 168 patients (103M/65F, 64.4 ± 14.5 y.) with coronary artery disease after PCI. This group included 87 (52%) patients after acute coronary syndrome (NSTEMI 59 pts (68%) / unstable angina 28 pts (32%)) and 81 (48%) patients who undergone elective catheterization.

Results: We found significant ABI difference between patients with NSTEMI versus patients with unstable angina (1.19 ± 0.21 vs. 1.33 ± 0.30, p<0.01). There were also significant ABI differences in patients with or without necessity of stent implantation (1.34 ± 0.23 vs. 1.16 ± 0.15, p<0.001). We also documented, that patients with decreased left ventricle ejection fraction (EF < 40%) had significant lower ABI versus patients without significant left ventricle systolic dysfunction (1.18 ± 0.16 vs. 1.29 ± 0.24, p<0.05).

Conclusion: Low ABI might be a marker of severity of the coronary arterial disease in patients after acute coronary syndrome and could be linked with prediction of coronary stent implantation necessity.

BONE CYST ODONTOGENIC ORIGIN IN MAXILLOFACIAL REGION, CAUSES, DIAGNOSIS, THERAPY

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Objective: Analysis of patients diagnosed with bone cyst in maxillofacial region odontogenic origin for the period four years.

Methods: Bone cysts odontogenic origin recorded in medical records of Clinic of Stomatology and Maxillofacial Surgery University Hospital in Martin for the period 2011 - 2008 were evaluated in absolute numbers, percentages, processed in tables and graphs.

Results: The object of observation consists of a set of 50 patients: 31 men (62%), 19 women (38%). The average age of patient was 44.6 year, the average age of men was 44 years and the average age of women was 45.6 year. Bone cysts were mostly located in the maxilla, by 30 patients (60%) in I. quadrant (maxilla dextra), in the mandible by 11 patients (22%) laterally, together in the maxilla and mandible by 5 patients (10%) and in sinus maxillaris by 4 patients (8%). The most frequently occurring radicular cysts by 38 patients (76%), followed by follicular cysts 6 patients (12%) and residual cysts 6 patients (12%). Most commonly causative teeth of radicular cyst were teeth of number 13,12,14,11, followed teeth 21,22,23,24,25. For the first place of surgical treatment is used exstirpation of the cyst (30%) or exstirpation of the cyst with apicoectomy (30%), followed exstirpation of the cyst with extraction causative teeth (26%).

MONITORING SELECTED CLINICAL AND LABORATORY PARAMETERS OF PATIENTS WITH SCLEROSIS MULIPLEX

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Introduction: Multiple sclerosis (MS) is a chronic inflammatory demyelinating disease of central nervous system.

Epstein-Barr virus (EBV), which infects up to 95 % of the human population worldwide has been associated with multiple sclerosis (MS) through epidemiological and serological studies. There has also been found a positive association between smoking and MS. The aim of our study was to investigate the presence of IgG EBNA-1 (EBV-encoded nuclear antigen-1) antibodies in a cohort of 246 patients with different stages of MS and 43 healthy control subjects.

Material and methods: Data were collected by direct conversation with patients and from medical records. Laborator parameters were evaluated by Institute of Microbiology and Immunology Jessenius Faculty of Medicine in Martin. All collected data were processed to table and statistically evaluated.

Results: IgG EBNA-1 antibodies were measured in 246 patients. Positivity was proved in 99,2% of patients. In healthy population positivity of IgG EBNA antibodies was in 88,2% of subjects. Smoking behaviour we determined in a group of 153 MS patients and 145 control subjects. In MS group, 20,92% were current smokers, 34% were ex-smokers, 55,08% were never-smokers and 36% were exposed to cigarette smoke during their childhood and adolescence. In the control group, 31% were current smokers, 19% were ex-smokers and 38% were exposed to cigarette smoke during their childhood.

Conclusion: Positivity of IgG EBNA-1 antibodies is almost 100% in patients with MS but it is also high in healthy population (87%). Although positivity of IgG EBNA-1 antibodies can't be used as a diagnostic marker to confirm the diagnosis of MS, negative finding in individual subject makes the diagnosis of MS improbable.

We wasn't able to confirme smoking as risk factor for development of MS in our group.

DIABETIC NEPHROPATHY- DISEASE COURSE AND PROGRESSION IN DIALYSIS PATIENTS IN DIALYSIS CENTERS AND AMBULANCES IN MARTIN

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Chronic renal failure resulting from diabetic nephropathy was evaluated/ accounted from the records of 2 nephrology ambulances and 2 dialysis centers in the region Martin. From the total number of patients was randomly evaluated 20 patients of nephrology ambulances (14 men with an average age of 68 years and 6 women- with an average age of 69 years) and 24 patients of dialysis program (15 men with an average age of 66 years and 9 women with an average age of 63 years). Duration of diabetes is 23 years (9-34 years) in patients in outpatient care and 27 years (19-36 years) in dialysis patients. The average age of entry into hemodialysis was 59 years (40-78 years).

Neuropathy as main complication of diabetes is present in 75% of dialysis patients versus 50% of non-dialysis patients. Also retinopathy is positive in 71% of dialysis patients in comparison with 50% of non-dialysis patients. Other complications: hypertension is present in 88% of dialysis patients versus 75% of non-dialysis patients, dyslipidemia is present in 42% of dialysis patients in comparison with 20% of non-dialysis patients, stroke is positive in 25% of dialysis patients in comparison with 30% of non-dialysis patients, ischemic heart disease is present in 83% of dialysis patients versus 70% of non-dialysis patients, atherosclerosis of lower extremities is positive in 42% of dialysis patients in comparison with 20% of non-dialysis patients.

We studied some laboratory parameters like glucose (7,12 mmol/l in dialysis patients and 7,67 mmol/l in non-dialysis patients), glycated hemoglobin (6,84% in dialysis patients and 7,56% in non-dialysis patients), creatinine (502,4 μ mol/l in dialysis patients and 186,45 μ mol/l in non-dialysis patients), urea (25,73 mmol/l in dialysis patients and 11,81 mmol/l in non-dialysis patients), glomerular filtration (0,28 ml/s in dialysis patients and 0,75 ml/s in non-dialysis patients).

Conclusion: The results in enlarged groups of patients showed that non-dialysis patients is poorer glycemic control than dialysis patients. However, complications other than stroke are more numerous in the group of dialysis patients. The results show that improved glycemic control at the time of dialysis does not improve development and progress of diabetic complications. The chronic diabetic complications progress depends on the nephropathy.

NON-VARICEAL BLEEDING FROM UPPER PART OF GASTROINTESTINAL TRACT – YESTERDAY AND TODAY

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Non-variceal upper gastrointestinal bleeding was in the past and still remains a significant medical problem despite the development of new methods of hemostasis.

The aim of our retrospective study was to compare the incidence of non-variceal bleeding in two groups of patients hospitalized in the Surgical Clinic of the University Hospital Martin in the years 1990 - 1992 and 2009 – 2011, identifying risk factors, sources of bleeding, methods and success of the treatment, relapse incidence and lethality of upper gastrointestinal bleeding.

The average age of patients increased in the second file of 10.2 years and 25.2% the proportion of patients older than 60 years, also significantly increased the proportion of patients with comorbidities. In the second file was up to 16.7% of patients experienced a history of anticoagulant therapy as a possible cause of bleeding.

The most common source of bleeding in both groups were ulcerative lesions. Initial success of conservative and endoscopic hemostasis in both groups was above 90%, but in the second file was more frequent recurrence of bleeding by 9%. Definitive conservative and endoscopic treatment was comparable in both groups, 84.5% respectively. 83.3%. The need for emergency operations in the second file was 3.8% lower. In recurrence of bleeding in the second file was a need for urgent surgery up to 40% lower thanks to the success of repeated radiological and endoscopic hemostasis. Lethality was comparable in both groups, 5.2%, respectively. 5.0%, despite the fact that since 2004, are hospitalized in surgical departments only patients with hemodynamically significant bleeding.

Despite many advances in conservative, radiological and endoscopic hemostasis remains non-variceal upper gastrointestinal bleeding still actual, not only medical but also socio - economic problem.

POLYMORFISMS ACE AND MTHFR AND RISK ABDOMINAL AORTIC ANEURYSM**Lucia Rišková**

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Introduction: The mortality of Abdominal Aortic Aneurysm (AAA) rupture could be greatly reduced by determining which patients are at the risk, then screening those patients prior to rupture. Polymorfism of Angiotensin converting enzyme (ACE I/D) gene is associated with increase in ACE serum and tissue levels, resulting in lower levels of angiotensin II, which may lead to the remodelling of vascular tissue. Methylentetrahydrofolate reductase (MTHFR) is the primary enzyme of homocysteine metabolism. The MTHFR +677C>T polymorphism cause an alanin to valine change in the protein, which can influence aortic wall structure. Our aims were: to investigate polymorfisms of ACE and MTHFR genes and their association with AAA; to assess the relation of MTHFR gene mutations with normal homocysteine level. To assess the relation of MTHFR gene mutations with normal homocysteine level.

Material and methods: This was case-control study of patients from middle region of Slovakia. We investigated 449 individuals in 3 groups: Patients who has diagnosed AAA (n=33), their first-degree relatives (n=86) and control (n=330). ACE I/D and MTHFR +677C>T polymorfisms analysis was performed by polymerase chain reaction (PCR), respectively restriction fragment length polymorfism (RFLP) and gel electrophoresis. The association between genotypes and development of AAA were examined using logistic regression analysis to calculate odds ratio (OR).

Results: We found that the ACE I/D genotype (OR=1,13) are associated with elevated risk. A significant correlation also was found for MTHFR 677C>T Val/Val genotype (OR=1,99).

Conclusion: We conclude that genotypes of ACE I/D and MTHFR 677C>T Val/Val determines the risk of development of AAA. Early investigation of polymorfisms overall clinical investigation may markedly eliminate development and rupture of AAA.

ANKLE-BRACHIAL INDEX IN THE RISK STRATIFICATION OF THE VASCULAR ACCESS COMPLICATIONS IN PATIENTS AFTER CARDIAC CATHETERIZATION

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Introduction: Despite the extensive increase in cardiac catheterization and percutaneous coronary intervention (PCI) rates, vascular complications remain a possible source of impaired outcomes for patients. Local vascular complications have reported incidences as low as 0.1% and as high as 61%. Most complications occur in patients who have had a percutaneous coronary intervention (PCI). The aim of this study was evaluate the significance of ankle-brachial index (ABI) in prediction of risk of developing vascular access complications (hematoma, pseudoaneurysm) in patients, who undergone invasive cardiac examination.

Methods: ABI was investigated with Doppler ultrasound device and calculated from systolic ankle and brachial pressure measurements in patients on second day after cardiac catheterization. We enrolled 64 patients (42M/22F, 62.2 ± 10.6 y.) with coronary artery disease after invasive cardiac examination. This group included 11 (17%) patients with history of the peripheral artery disease. We documented in our study group 4 pts (0.6%) with post-procedural pseudoaneurysm and in 18 pts (28%) we found local hematoma. There were no present indications for surgical or transfusion therapy in this patients.

Results: We confirm known significant relation between presence of peripheral artery disease and ABI (0.96 ± 0.27 vs. 1.29 ± 0.22 , $p < 0.001$) in our study group. But there was no significant ABI difference between patients with and without pseudoaneurysm (1.27 ± 0.22 vs. 1.26 ± 0.25 , $p = \text{NS}$). There were significant ABI differences in patients with and without vascular access related hematoma (1.14 ± 0.21 vs. 1.27 ± 0.26 , $p < 0.01$).

Conclusion: Peripheral artery disease with lower ABI might be a risk factor for developing of vascular access related complications in patients after cardiac catheterization. Vascular complication rates after cardiac catheterization can be reduced when we will be more focused on higher risk patients.

MYELOPROLIFERATIVE NEOPLASMS AND THROMBOSIS

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One of the most common complications in myeloproliferative neoplasms (MPNs) are thromboembolic episodes. In the last time many studies were published to verify the influence of JAK2V617F mutation on the thrombotic risk in MPNs, mainly in essential thrombocythemia (ET). However, results of these studies are inconsistent.

The aim of our research is to clarify the existence of relation between a presence of JAK2V617F mutation and thromboembolism in patients with MPNs, especially in those with ET. Forty-four outpatients with MPN monitored at Department of Haematology and Transfusiology in Martin were enrolled in the pilot retrospective study. Patients fulfilled the inclusive criteria (age 18-60 years, absence of serious cardiovascular disease and diabetes mellitus in patient history). JAK2V617F mutation was examined from the bone marrow biopsy or peripheral blood by PCR. Blood count (leukocyte and platelet count), coagulation and biochemical parameters were measured, too.

So far we have examined a presence of JAK2V617F in 14 of 25 patients with ET. 9 patients (64%) of 14 with ET were JAK2 mutation positive. In patients with ET and positivity of JAK2V617F mutation there were found thromboembolic complications in 7 patients (77%). On the contrary from 5 patients with ET and without JAK2 mutation only 2 patients had thrombosis (40%). From 15 patients with polycythemia vera 14 (93,3%) had a positivity of JAK2V617F mutation. Our preliminary results in the group of patients with ET can support the hypothesis, that presence of JAK2V617F mutation can be associated with the risk of thrombosis in patients with MPNs.

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ELECTRODERMAL ACTIVITY CHANGES IN ATTENTION DEFICIT/HYPERACTIVITY DISORDER (ADHD)

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Attention deficit/hyperactivity disorder (ADHD) is very serious health as well as social problem with increased prevalence. ADHD is associated with autonomic nervous system (ANS) changes; however, the question related to sympathetic activity in ADHD remains unclear. Thus, the aim was to evaluate electrodermal activity (EDA) as an index of sympathetic activity in ADHD children at rest and during orthostasis as the first study.

Methods: Twenty two ADHD patients (3 girls, age: 10.9 ± 2.8 yr.) and age, gender-matched controls were examined. EDA was monitored using the GSR Psychometer (London, UK) in the first supine position (S1), in response to orthostatic test (O) followed the second supine position (S2). The duration of each position was 5 minutes and the EDA values were recorded every minute (five values of EDA for each interval).

Results: Electrodermal activity was significantly lower in ADHD group compared to controls in every minute of both supine positions ($p < 0.004$) and during orthostatic test ($p < 0.001$). Surprisingly, the EDA reactivity in response to stress was significantly higher in ADHD group compared to controls (22% vs. 7%, $p = 0.003$).

Conclusion: Our results revealed lower electrodermal activity at rest and during physical stimulus – orthostasis indicating sympathetic autonomic underarousal in ADHD children. In contrast, the EDA reactivity in response to orthostatic test was exaggerated reflecting a subtle dysregulation in sympathetic nervous system evoked by central nervous system potential abnormalities characterizing the ADHD. We suggest that further research using other parameters of autonomic regulation (e.g. heart rate variability) is needed.

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LIFESTYLE IN ADOLESCENCE

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Introduction: The period of adolescence is a period of stabilization, searching of own identity and preparing for adulthood. Adoption of particular type of lifestyle in this period affects the following developmental periods in the life of human beings.

Methods: Aim of the work was to identify the lifestyle in the period of adolescence with the stress on nutrition, motion activity, risky behaviour - smoking, alcohol consumption, drugs and sexual behaviour. To obtain empirical data we have used the questionnaire of own construction, which consisted of 21 questions. The sample of respondents consisted of 136 adolescents at the age 15-18 years.

Results: The majority of respondents (42,7 %) eats 4-times during the day, 64 % of respondents have breakfast, 79,4 % of respondents have snack, 89 % of respondents have lunch and dinner, 2,2 % of respondents have only one meal per day. 42,7 % of respondents do not perform any physical activity in free time during the day. The most commonly reasons are laziness and the lack of time. 44,1 % of respondents spend more than 2 hours a day watching TV and 65,4 % of respondents using computer. 32,4 % of respondents still haven't tried smoking, 67,7 % respondents had smoked in the past and 22,8 % respondents smoke currently. 22,8 % of respondents have experienced smoking marihuana, 2,2 % of the respondents smoke it currently. 8,8 % of respondents had stated to have sexual experience at the age below 15 years.

Conclusion: Unhealthy eating is a growing problem in almost all European countries. The number of young people going in for sports is decreasing. Adolescence is one of the most sensitive periods to develop risk behaviour.

SPIRITUAL NEEDS OF SENIORS LIVING IN THE COMMUNITY INSTITUTIONS

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Introduction: In the period of senility it comes to assessment of the previous life, looking for the sense and purpose of remaining days, also to confrontation with own mortality. Spiritual needs come to the centre of attention more than in other periods of life.

Methodology: The aim of this thesis has been to find out not only which spiritual needs become the most frequent among the seniors but also how important they are from the view of seniors and employees of community institutions. The sample consisted of 116 seniors and 23 employees of community institutions. The thesis was written with the help of questionnaire “Spiritual needs survey” which contained 29 spiritual needs in seven domains.

Results and discussion: The most frequent spiritual need among the seniors was “to give and get love” and this need also had the extreme importance. In average the seniors had 17 spiritual needs and they consider them as very important in their lives.

The view of employees of community institutions was different. They did not recognize the spiritual needs of seniors and they considered chosen seniors’ needs as medium important or not so important in the life of seniors.

Conclusion: Results show that the spiritual needs exist in the seniors’ lives very often and seniors themselves consider their fulfilling as very important. On the other hand, employees who participate in taking care of seniors do not have enough information about the spiritual needs important for seniors. The employees also do not reflect the importance of those needs in the life of seniors what can result in lower quality of care.

Key words: spirituality, spiritual needs, seniors, community institutions

PAIN MANAGEMENT IN ELDERLY RESIDENTS IN CARE HOMES

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Introduction: Pain is always bothersome and it affects everybody's life. Acute pain is considered to be a symptom of a disease or injury. Chronic pain is specific health condition, it is a disease itself. Chronic pain is common problem in elderly. Opinion often stated is that pain belongs to the ageing and old people are less sensitive to it. However, it is not a true. Every person claiming to feel a pain has to receive interventions to relieve it. Pain assessment is often problematic and needs close cooperation between elderly person and a nurse. Nursing diagnosis of *acute/chronic pain* in elderly has specific features that should be known by a nurse to avoid suffering from pain that is not diagnosed or treated properly.

Material and methods: The aim of the study was to look into the issue of pain management in elderly residents in care homes. We have focused on nursing interventions in pain management – how they are perceived by nurses themselves: their importance, their competence to implement them and their feasibility in real practice of elderly care homes. In order to collect data we have used questionnaire of own construction. The research sample consisted of nurses working in elderly care homes selected.

Results: Based on data analysed we have proved statistically significant differences in nurses' perception of their competence to implement nursing interventions and feasibility of nursing interventions in practice based on education of nurses as well as the years of their practice in care homes. The differences in nurses' perception of nursing interventions' importance, their competence to implement them and their feasibility in real practice have been proved to be statistically significant as well.

Conclusion: The study findings may contribute to stress the importance of further education of nurses in the field of pain management in elderly.

CHRONIC PAIN – NURSING DIAGNOSIS WITHIN HOSPITAL CARE

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Introduction: Chronic pain represents serious biological, psychological and social problem of patients. Interdisciplinary care of chronic pain patients should be aimed to recover physical and psychological well-being, ability to work and to fit into social life despite suffering from pain.

Material and methods: Within the process of looking for nursing opportunities being beneficial to improve chronic pain patients' quality of life and to provide effective nursing care based on evidences we have decided to validate nursing diagnosis Chronic Pain 00133 (NANDA International Taxonomy II). The aim was to determine defining characteristics and interventions that are considered to be most significant by nurses in clinical practice of selected hospitals. We have used questionnaire of own construction to collect scientific data. Nursing diagnosis was validated by modified Fehring model of diagnostic content validation.

Results: Validation findings have proved that major defining characteristics of nursing diagnosis Chronic Pain 00133 established by NANDA-I Taxonomy II altered ability to continue previous activities, verbal report of pain and reduced interaction with people have been agreed to be most significant by both, total sample of nurses and subsample of nurse-experts. The most significant nursing interventions in this diagnosis identified by total sample of nurses were: applying analgesic medications, assessing physical, psychological, social and spiritual condition of the patient suffering from pain, assessing pain, its manifestation and patient's needs, developing a plan to reduce/eliminate analgesics' side effects, enabling the patient to participate in pain management, assisting the patient and significant others in dealing with the issues of death and dying, mutual support in progressive disease.

Conclusion: Our validation study of defining characteristics of and nursing interventions in nursing diagnosis Chronic pain 00133 can contribute to further validation of nursing diagnoses, education of nurses and nursing research with the aim of effective clinical nursing practice based on evidences.

QUALITY OF LIFE OF PATIENTS WITH UROSTOMY

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Introduction: Cancer diseases are becoming major problem for health care in the world. Today, for many people the cancer becomes curable disease, this improves quality of life. It is particularly important for patients, which underwent a surgery with the formation of urostomy that affects their body image and overall quality of life. In this thesis we aimed to assess the quality of life of patients with urostomy, and to compare it with norm of population. Furthermore, we compared detected quality of life with socio-demographic factors.

Method: The research was formed 50 patients with urostomy who were operated and hospitalized at clinic of urology in Martin and department of urology in Zilina from 2003 to 2011. For measurement of quality of life these patients was used the questionnaire WHOQOL-BREF. The questionnaire contains from 2 separate items - overall quality of life and general health and 4 domains - physical health, psychological area, social relations and environment.

Results: We showed that patients with urostomy have only reduced quality of life in the domains - physical health, psychological area and social relations. These patients evaluated domain - environment with higher scores in comparison with population norms. We recorded, patients with urostomy attach great importance to their sense of lifes, are most satisfied with their environment, the life's conditions and availability of health care. Overall, a least were satisfied with their sexual lives.

Discussion and conclusion: Subjective appraisals of the respondents show that their quality of life of patients with urostomy is average. Our role is to help improving quality of life for this group of the patients. Further studies would greatly enhance understanding of quality of life in patients undergoing radical cystectomy for bladder cancer. By understanding, this issues more completely, we could better assess the impact urostomy on their quality of life and help them to move back to normal life.

Key words: radical cystectomy, urostomy, quality of life, nursing care, WHOQOL-BREF

CARE OF THE DYING FROM THE POINT OF VIEW OF CAREGIVER

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Introduction: The issue of providing care of the dying patient is in the this time current, not only in relation to their increasing incidence but also with reduced availability of palliative care services. In caregiving for patients with different types of cancer and other terminally diagnosis, several commonalities can create caregiver burden and strain. The aim of our study was to find as providing care of dying influence the areas of life of caregiver before and after education program.

Material and methods: To collect the empirical date we used a questionnaire, Caregiver burden scale and indicators of Nursing Outcomes Classification system (Caregiver Physical Health, Caregiver Emotional Health, Caregiver Lifestyle Disruption, Caregiver Role Performance). We conducted an intervention study. We have drawn up an education program and three education units. This research included the sample size of 5 caregivers, who provide home care of the dying.

Results: Education program contribute to reduce burden (objective burden, subjective stress burden), problems in physical and emotional health and to increase of knowledge levels of providing care of the dying. A significant difference was found in the physical health, emotional health of caregiver, in lifestyle disruption, as well in caregiver role performance.

Conclusion: The results of our study accept the conclusion of several intervention studies. Caregiver burden assessment, realization nursing interventions can improve quality of life of caregiver and can prevent development of burnout syndrome. Education program of caregivers, who provide care of the dying in home care, should be introduced as standard in the clinical practice in our social-cultural context.

CARE OF THE DYING FROM NURSING STUDENTS' PERSPECTIVE

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Introduction: The care of dying patient, contact with his/her family and encounter with death and suffering often represent excessively stressful and emotional situation for students of nursing. Students' attitudes toward care of dying patient and care of his/her family and significant others are influenced by their education and training particularly in the field of palliative care. This issue and topic of interest is not sufficiently elaborated and studied in Slovakia when compared with evidences from foreign research studies.

Material and methods: The aim of study was to determine nursing students' attitudes to terminal care of dying patients. The scientific data were collected by standardized questionnaire – The Frommelt Attitude Toward Care of the Dying Scale (FATCOD). The research sample consisted of full-time students of bachelors' degree study programme in nursing.

Results: Based on data analysed we have found out that nursing students have predominant positive attitude toward care of dying patients. Statistical analysis of data from the perspective of four demographic categories selected (length of the study; personal experience with the provision of care to dying patient or his/her family; attending the lectures, seminars or training focused on care of the dying; religion) haven't proved statistically significant differences in attitudes toward care of dying patients in our research sample.

Conclusion: We assume that systematic training of nursing students prior their personal experience and encounter with death and dying can contribute to the development of positive attitudes toward care of dying patients.

AN ACUTE PAIN AS A NURSING PROBLEM IN SURGICAL ICU

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Introduction: At the present is the acute pain an important problem all over Europe. Each patients after operation are performed procedures that are associated with the presence of a pain. There is great individual differences in perception of acute pain between patients, because the perception of acute pain is subjective. The perception is influenced by several factors- as a physical, psychical, socio-cultural and spiritual factors.

Methods: The aim of our survey was to determine the existence of significant differences in the perception the acute pain in adults. For empirical data collection we used standardized instrument, which included a numeric rating scale for pain intensity and pain behavioural observation instrument. We examined a pain, which was caused five procedures- wound care, wound drain removal, peripheral line insertion, mobilization of patient and positioning of patient according the type of operation. The acute pain, was caused procedures, was assessed nurse in traumatology ICU and patient before, during and after realization procedures. Pain was recorded on 53 patients, who were hospitalized for surgical ICU.

Results: Data showed that intensity of pain was the greatest during procedures and procedure- wound care. Significant differences were found out between an assessment of intensity patient and nurses, gender. After comparing our survey with results of foreign survey we found out identity- that more younger than older patient received analgetics.

Conclusion: The acute pain is the most common use nursing diagnosis. Pain is considered to the fifth vital sing. Therefore should be assessed and documented regularly by nurses.

COMPLIANCE IN PATIENTS WITH CARDIOVASCULAR DISEASE

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Introduction: Cardiovascular disease (CVD) is still the leading cause of mortality and morbidity in Europe. The chronic process of a widespread outbreak in the population requires high standards of medical expenses. Overall risk management and treatment has a comprehensive character and contains a variety of pharmacological and nonpharmacological interventions. The effectiveness of cardiac treatment regime and the restriction measures aimed at changing lifestyles and behavior affects the patient by himself. The rate or the level of his cooperation agreement between the treatment and its observance is called compliance. Empirical studies on the issue of chronic disease predictors and the factors, that can shape this compliance, can be positive or negative. Describing are the theories and methods of evaluation and the compliance measurements.

Methods: Bibliographic research is focused on finding and presentation of relevant national and international bibliographies (books, magazines) entering the keywords related to the issue of compliance and its measurement.

Results: Analysing, synthesising and comparing of literary knowledge in the spectrum of medicine and nursing compliance explains the concept and the relation to other concepts - noncompliance, adherence, nonadherence, concordance, nonconcordance. We present the predictors and factors of noncompliance and the possibilities of compliance measurements.

Conclusion: Communication with patients, effective education, realistic achievements, monitoring of adherence, management of the predictors can significantly shape this compliance.

Keywords: Cardiovascular diseases, treatment, compliance, noncompliance, adherence, nonadherence, concordance, nonconcordance, measure.

VIOLENCE AGAINST HEALTH CARE PROFESSIONALS

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Introduction: The occurrence of patients' aggression against health care professionals in clinical practice has become discussed at present. Research of this issue is insufficient in our country. Biomedical model of management of patients' aggression is predominant although interpretation regarding this management varies between patients and health care professionals.

Material and methods: We have used standardized questionnaire MAVAS (The management of Aggression and Violence Attitude Scale) to identify attitudes of patients and health care professionals regarding factors contributing to patients' aggression and its management in psychiatric clinical practice. Study group consisted of health care professionals and patients from psychiatric settings selected.

Results: We have found out various opinions regarding factors contributing to patients' aggression. Both groups of respondents have mostly agreed with the influence of internal factors including mental disorders. Different opinions have been found regarding external factors' influence. Patients considered external environment to be more relevant factor contributing to aggression in comparison with health care professionals. In the group of health care professionals significantly different results have been found due to the fact whether staff member was or was not the object of patient's aggression in the past. As for the influence of situational-interactive factors, non-significant differences have been found between two groups of respondents. We have found out differences in respondents' attitudes to the management of aggressive behaviour. Surprisingly, patients have manifested positive attitudes to restriction and isolation because of aggression nevertheless they have identified deficiencies in application of negotiation, de-escalation and alternative approaches within the control of aggression. Significant differences in attitudes have been proved between health care professionals based on the shift work.

Conclusion: Identification of predisposing factors of patients' aggression and their interpretation by patients and health care professionals may be beneficial to implement efficient measurements of prevention and management of patients' aggression in clinical practice.

STRATEGIES FOR THE PREVENTION OF CATHETER SEPSIS IN INTENSIVE CARE

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Introduction: Catheter sepsis is a common and dangerous complication that occurs in patients with established intravascular catheters. Catheter sepsis is around 10% - 20% of all nosocomial infections according to statistics.

Methods: The aim of our study was to investigate the effects of the length of catheter, disconnecting set of central venous catheter (CVC), use of protective barrier equipment and techniques, the use of coatings and the use of hyperosmolar solutions on the onset of symptoms of catheter sepsis in patients with insertion of central venous catheter. We recorded observed data in the form of research which included identification data, data on the catheter, catheter sepsis symptoms and care CVC. The selection of research consisted of 102 central venous catheters.

Results: The symptoms that determine the incidence of catheter sepsis is most frequently found in body temperature above 37°C, leukocytosis, redness, bleeding, exudation and swelling at the injection site. Significant relationship between symptoms and length of catheter sepsis catheter, use of protective barrier equipment and techniques have been found in either case. Relationship between disconnecting the infusion sets and central venous catheter sepsis onset of symptoms was confirmed in the case of the existence of redness, exudation, body temperature above 37°C and leukocytosis.

Discussion: The research results point to increased risk of catheter sepsis in relation to frequent disconnecting the infusion sets for the purpose of administration of drugs, intravenous solutions and parenteral nutrition, CVP measurements, blood sampling and detection of catheter patency. Removing the infusion sets should minimize the use of closed systems. The existence of the relationship between the onset of symptoms and length of catheter sepsis catheter, use of protective barrier equipment and techniques and the difference in the use of hyperosmolar solutions and coatings are confirmed in our study.

Conclusion: Relationship to symptoms of catheter sepsis is essentially disconnecting the frequency of infusion sets.

NURSE – PATIENT INTERACTION IN PALLIATIVE CARE

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Introduction: Mutual interaction between the nurse and the patient in palliative care is very important. More and more emphasis is put on the development of relationship between nurse and patient in general, particularly in the care of patients with incurable diseases or the dying. The research of this issue is insufficient in the field of palliative care in our conditions. In our study we have focused on the nurse – patient interaction from the nurses' perspective.

Material and methods: We have used the method of standardized questionnaire – CNPI-70 (Caring Nurse – Patient Interactions) to collect empirical data about nurses' perception of nurse – patient interaction in palliative care. The aim was to study perception of caring attitudes and behaviours grouped into particular dimensions of the questionnaire based on evaluation of their importance, own competence to perform them and their feasibility in the practice.

Results: Based on the results we may state that nurses perceive caring attitudes and behaviours to be very important, however, they feel less competent to implement them in nurse – patient interaction and consider them even less feasible within the conditions of palliative care. We have found out that perception of importance, own competence and feasibility of attitudes and behaviours is affected by nurses' individual characteristics such as religion, specialization, type of education, place of work, period of practice, frequency of contacts with patients in palliative care and the dying.

Conclusion: Building up the nurse – patient interaction in palliative care is demanding and many times a slow-paced process requiring participation of the nurse and the patient. Our findings may represent a basis to explore some attitudes of nurses in the care of patients with incurable diseases and the dying. Further research is necessary in this field with the stress on various aspects affecting the nurse – patient interaction in palliative care.

BREASTFEEDING KNOWLEDGE IN PRIMIPARAS

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Introduction: Breastfeeding is the most natural hence the best way of new-borns' nutrition. Therefore it is essential to conduct research on breastfeeding knowledge in primiparas. Following the right breastfeeding technique along with proper breast care help develop lactation to sustain child's correct development.

Method: The aim of the paper was to find out the level of breastfeeding knowledge in primiparas and evaluate the role of medical personnel in informing mothers about breastfeeding. The research was conducted by means of a questionnaire constructed by the author. It consisted of 21 items within 3 areas: breastfeeding, technique of expressing breast milk, breast care. 60 questionnaires were distributed among primiparas aged 19 to 34 (mean 26.83; standard deviation 6.4). 52 questionnaires were returned, which represents response rate of 87%.

Results: The results revealed that 52 (100%) of respondents were determined to breastfeed their children, 11 (21%) had a lack of information about breastfeeding, 13 (25%) did not know how to express breast milk properly, 14 (27%) would use general lotions for nipple-soreness, 31 (60%) would breastfeed for more than 1 year, 19 (37%) would let their fully-breastfed babies drink other liquids unlimitedly, 9 (17%) was worried about breastfeeding, 18 (35%) had to look up further information when left hospital. 48 (92%) of mothers had not undergone any breast check-up during pregnancy and only 17 (32%) had their baby latched on for the first time within 30 minutes - on the contrary of recommendation (Čulík,1998; Boledovičová, 2008; Barnes,2008). Furthermore, only 15 (29%) of mothers was familiar with the concept of lactation consultant.

Conclusion: The results point at lack of general knowledge about breastfeeding and less effective role of medical personnel. These two factors may lead to worsened new-born's nutrition. One way of dealing with the problem may be creating and implementing a standardised educational breastfeeding plan for primiparas.

Key words: breastfeeding, breastfeeding technique, general knowledge, primiparas education, lactation consultant.

ANTIVACCINATION ACTIVITIES IN SLOVAKIA

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Introduction: Antivaccination activities require regular monitoring so that it would be possible to react sensitively on actual problems and improve health communication. The aim of our work was to analyze information on vaccination available at web pages from Slovakia.

Material and methods: We performed a systematic research on Internet.

Results: There are 45 web pages (86.5%) promoting positive attitude towards vaccination. There are 7 web pages (13.5%) promoting negative attitude. It is more probable that a common user of Internet can find some positive information at web pages from Slovakia. This is present at web pages of regional public health authorities and other public bodies and organizations. Great part of the information is given without showing scientific evidence.

Conclusion: We are convinced that it is necessary to highlight a systematic application of principles of the EBM philosophy, so that we could submit reasons for good decisions in a scientific way.

IMAGE OF MOTHERHOOD

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Born a girl, becomes a woman, but how to be a mother she learns throughout all her life. In our thesis we deal with the topic of the motherhood image and we observe how it has changed in the course of the last years / decades. We focus on how the importance and the value of motherhood as well as the motherhood image has changed throughout the history. The motherhood image is being influenced by many factors - there are effects of the society, culture, but also religion and ethnicity. Perception of the motherhood is influenced by understanding various roles of a woman, but firstly by how the mother role is perceived. The term motherhood can obtain different meaning for different people. In general, the motherhood is not only pregnancy and delivery and full-time employment of women. The research sample consists of 40 women (age 23.3 ± 3.0) and 40 women-mothers (age 27.8 ± 2.9) from different regions of Slovakia. As the measuring item a questionnaire was used by own design, which detected also demographic indications too questionnaire ascertained view of women and mothers to motherhood. Results have proven that most of the respondents – women and women-mothers have agreed on when they would like to have the first child (24 – 27 years of age), as well as on the number of children (2 children). The decision to become a mother is mostly influenced by their partner. Respondents think that women can combine professional career and parental responsibilities. Also our research results point to the changes in the motherhood image. The value of motherhood is being decreased in the society, what our research has confirmed. It is needed to pay attention to this topic to promote changes in the society. Therefore one of the roles of midwife is to prepare for motherhood also young girls but mostly women in the psychoprophylaxis preparation before delivery.

SELF-ASSESSMENT OF NURSES REGARDING HAND HYGIENE AS ONE OF THE TOOLS FOR MEASUREMENT OF PROVIDED HEALTH CARE QUALITY

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Introduction: Hand hygiene (HH) is in medical practice the essential measure to prevent hospital acquired infections during health care providing. According to known data less than 50% of health professionals (HP) perform proper HH. Hand washing compliance is affected by many factors, whereby individual perception, self-assessment and attitudes influence significantly health professional behaviour in relation to HH.

Methods: The aim of the study was to evaluate the self-assessment and to identify the attitudes of 639 HP in relation to HH. The questionnaire for measurement of self-assessment and attitudes of HP in relation to HH was used. The questionnaire data from the were analyzed by methods of descriptive statistics, including determination of absolute and relative frequency of answers as well as quantitative characteristics of answers, i.e. mean, standard deviation, median, modus, minimal and maximal value. The predefined hypothesis were tested and results were compared according to particular respondent samples (using Mann-Whitney test and Chi-square test) on the significance level $\alpha=0,05$.

Results: The results revealed that self-assessment of all respondents regarding the appropriate compliance for HH as well as the knowledge of recommended indications for HH is high, with frequency 74% and 83%, respectively. By contrast, only 51% of respondents assess their co-workers' compliance to HH as high. Only 63% of respondents consider themselves as proper example of HH for their co-workers. 54% of respondents declare that adherence to HH is not difficult. When assessing the attitudes of respondents, we found, that 83 - 97% of them perceive HH as a useful measure in clinical settings specified in questionnaire and 70 – 95% of them perceive infringement of HH in those clinical settings as significant risk factor for infection transfer. Finally, 44% of respondents suppose, that they should improve their HH, 46% suppose, that they might improve their HH and only 10% of respondents believe, that they their HH is excellent.

Conclusion: Based on proven facts, despite high level of self-assessment and high attitudes of health professionals, which can significantly affect their behaviour, the introduction of new incentive and education techniques in HH is necessary. Self-assessment, according to several trials, should be implemented into future education strategies (Cole, 2009, p. 385).

OBESITY AS A RESULT OF INAPPROPRIATE LIFESTYLE DURING PREGNANCY

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Background: An obesity during pregnancy in context of serious chronic diseases has not been adequately discussed in Slovakia, however, it is a significant factor affecting not only quality of life, management of disease or interaction between patient and doctor, but also influencing etiopathogenic and prognostic processes concerning the mother and the baby directly after birth, as well as their upcoming years of life.

The aim of this retrospective study was to study feeding habits, physical activity, stress coping ability, weight gain during pregnancy, occurrence of gestational diabetes mellitus and their interactions with age, education, place of living (city or village) and a parity.

Methods: Group of 86 women hospitalized in gynecology and obstetrics ward participated in our study (average age 28.5). Standardized questionnaire, based on The Food Guide Pyramide (Anna Britt Agnsäter, 1974) was used. Nutritional data were analysed by demographic data, psychosocial burden, personal and family history. Problems in the area of nutrition and physical activities were pointed out.

Results: Pregnant women preferred to consume fruits over vegetables. Over 10 % women consumed higher portions of fat and more than 44 % respondents consumed higher portions of sugars than recommended.

Conclusions: Overall consumption of fruits and vegetables was much lower than recommended by the food pyramid guide. Pregnant women preferred consumption of foods with higher fat and sugar content, possibly leading to overweight and other medical problems such as gestational diabetes mellitus and obesity.

EFFICACY OF TOBACCO CONTROL LEGISLATION IN SLOVAKIA

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Introduction: Legislative measures focused on non-smokers protection and regulation of sale and distribution of tobacco products are crucial in prevention of smoking-related diseases in a population. The aim of the study was to analyze efficacy of tobacco control legislation in Slovakia through Global Youth Tobacco Survey (GYTS) data.

Material and methods: The GYTS is a school-based survey of schoolchildren aged 13–15 years developed by the World Health Organization and the Centers for Disease Control and Prevention. Series of the questionnaire surveys were conducted in Slovak Republic in 2002, 2007 and 2011 on representative samples of 4 594, 4 696 and 4 504 respondents.

Results: More than 8 in 10 of respondents reported environmental tobacco smoke outside their homes, while the proportion remained stable within studied period (85.7%, 86.7% and 85.1% in 2002, 2007 and 2011, respectively). 8 in 10 current smokers buying cigarettes were not refused because of their age and the situation did not significantly changed through time (80.3%, 85.0% and 78.6% in 2002, 2007 and 2011, respectively). More than 9 in 10 respondents reported to see smoking actors in television (94.6%, 93.3% and 92.1% in 2002, 2007 and 2011, respectively). Reporting to see cigarette brands in television significantly decreased during studied period (78.0%, 66.4% and 59.8% in 2002, 2007 and 2011, respectively).

Conclusions: Situation in Slovakia is far from smoke-free environment and amendments of a relevant legislation have brought no significant effect. Similarly, enforcement of ban of tobacco sale for minors has been failing. Although indirect media advertisement is very frequent, findings show certain positive trend probably caused by factors other than legislation, because relevant acts have been remaining unchanged within the studied period.

TRENDS OF ADOLESCENTS' ATTITUDES TOWARDS CIGARETTE SMOKING IN SLOVAKIA FROM 2002 TO 2011

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Introduction: Analysis of adolescents' attitudes towards cigarette smoking is important to understand determinants of initiation and development of tobacco use in youngsters making possible to design effective preventive measures. The aim of the study was to analyze situation in Slovakia through Global Youth Tobacco Survey (GYTS) data.

Material and methods: The GYTS is a school-based survey of schoolchildren aged 13–15 years developed by the World Health Organization and the Centers for Disease Control and Prevention. Series of the questionnaire surveys were conducted in Slovak Republic in 2002, 2007 and 2011 on representative samples of 4,594, 4,696 and 4,504 respondents.

Results: In 2011, 47.3% of boys and 44.5% of girls think smoking can help being relaxed in parties and other social events. 48.6% of boys and 42.4 of girls think smoking can help to lose body weight. 22.9% of never smoking boys and 27.6% of never smoking girls are susceptible to initiate smoking within next year. 16.7% of boys and 11.1% of girls think that smoking boys are more attractive. 9.6% of boys and 7.0% of girls think that smoking girls are more attractive. Within studied period significantly increased proportion of boys thinking that smoking boys have more friends (from 20.6% in 2002 to 31.7% in 2011) and smoking girls have more friends (from 15.9% in 2002 to 21.9% in 2011).

Conclusions: In adolescents, smoking is considered predominantly as a social mediator, particularly among boys. Moreover, findings indicate increasing trend of such attitudes in some aspects. Popularly held belief that smoking can help losing body weight is a potential determinant of smoking initiation and should be kept in mind in preventive activities. About one quarter of never smokers susceptible to initiate smoking emphasizes importance of primary prevention in this age group.

Key words: adolescents, tobacco use, attitudes

DENTAL DISEASES PROPHYLAXIS PROGRAM FOR PRIMARY SCHOOL STUDENTS OF SCHOOL NO. 16 IN KIROV-CITY. PRELIMINARY STAGE

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Introduction: The successes, reached in the majority of the developed countries on decrease of disease by caries and periodontal illnesses, is due to introduction of **prophylaxis programs**, in which the attention to monitoring of the stomatological status is paid. Russian Dental Association give to the world The project of the Federal Government program of stomatological diseases primary prevention maintenance among the population of Russia. For it realization at local level is preliminary necessary to carry out the oral situation analysis and to formulate program goals.

Research methods: 1. Clinical survey. 2. Definition of intensity of carious process (index DMFT). 3. Definition of the hygienic status in an oral cavity (index PHP), 4. An estimation of intensity of an inflammation of a gum (papilla-margin-alveolar index), 5. Questionnaire developed by department of pediatric dentistry and prophylaxis of Tver state medical academy. 6. Methods of statistics. **Used means:** 1. Stomatologic toolkit and the equipment of an office of dentistry department Kirov state medical academy 2. Schiller's- – Pisarev's solution, aqueous solution of iodine. 3. Sol. Methylenum coeruleum 1 % (Methylene Blue) and liquid "Plaque Search", Curaden.

Results: There were 29 boys (50 %) and 29 girls (50 %) at the age from 10 till 11 years.

It is revealed that prevalence of caries of permanent teeth is about 87, 93 %. Thus the component of decayed teeth is 2.66 (73,82 %), and filled teeth– 1.07 (28,68 %). The complicated forms of caries (periodontitis) have 3 students– 5/17 %, and for one of them is necessary to extract a first permanent molar teeth on opposite sides on lower jaw.

Prevalence of periodontal diseases among the examined school students is 94,91 %, Among the surveyed children 9 (15,51 %) have orthodontic pathology and 5 children need consultation of the orthodontist, and only 8,62 % - are healthy.

Discussion: 1. It is necessary to organize the program of prevention of oral diseases at schools of Kirov. 2. The analysis of prevalence and intensity of caries showed necessity of earlier beginning of preventive actions. 3. To continue to support principles of planned sanitation at schools. 4. Regular occupations with school students lead to increase in theoretical knowledge, but aren't always supported with practical skills.

STUDY, IN FETUSES, OF THORACIC VAGUS NERVES: THEIR POSITION AND RELATION WITH GASTRIC ROTATION

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Introduction: Studies on vagus nerves and traditional literature associated their final position with the gastric rotation occurred between the 4th and 6th week of gestation.

The objective of this study was to observe vagus nerves in the thorax, specially, their position while passing the diaphragm, and determining the relation with the gastric rotation.

Materials and methods: We dissected vagus nerves from the inferior neck to the abdomen, in 30 fetuses with a crown-rump length of 64.4 to 186.18 (12 and 23 weeks of gestation). Most of them were male and only 4 were female. Cardiac and pulmonary branches were cut to continue dissecting the nerves around the esophagus. The diaphragm hiatus was opened and the gastric rotation determined.

Results: Vagus nerves entered the thorax laterally to the common carotid arteries and included in the same sheath. At this level it was a big nerve, nearly as wide as the carotid artery. After giving the recurrent nerve, the main branch addressed to the pulmonary pedicle and provided the cardiac and pulmonary branches. Under the tracheal division, vagus nerves remained as a thin branch (1/3 or 1/4) in relation to the neck, but its distribution and location is not as simple as usually described. The right nerve showed many variations under the pulmonary pedicle: dividing into anterior and posterior branches, lateral going backward or frontward, anterior or posterior to the esophagus while descending. The left nerve was laterally moving to the anterior wall of the esophagus (65%), or anterior, or branching into anterior and posterior. The 2 cases with unrotated stomach had a multiple divided right nerve and an anterior left nerve.

Conclusion: According to our observations, it does not seem so easy to associate vagus nerves location with the stomach rotation and it is evident that the vagus nerves anatomy in fetuses needs to be reviewed.

Key words: vagus nerves, fetus anatomy, mediastinum.

REMOTE ISCHEMIC PERCONDITIONING FOR HEPATOPROTECTION

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Introduction: Ischemic-reperfusion (IR) injury is a frequent sequel in surgery, caused by long-term liver exclusions. Perconditioning (IPer) - which means the application of brief IR cycles in a remote organ *parallel* with target organ ischemia – might be able to decrease IR injury. Hepatoprotective effects of this novel method were investigated in our experimental model.

Materials and Methods: Male Wistar rats (n=45) underwent normothermic, 60 minutes long ischemia on two-thirds of the liver. Groups: sham, IR and IPer (15 animals in each) were divided into three subgroups according to the length of reperfusion times: 1h, 6h, 24h (5 animals in each). 20 minutes after induction of liver ischemia, rats in IPer group received 5 min of lower limb ischemia and 5 min of reperfusion in 4 cycles, by infrarenal aortic clamping. Hepatic microcirculation was monitored by laser Doppler flowmeter during first hour of reperfusion. After reperfusion liver samples were taken for histologic and redox state assessment. Suzuki score was used for semi-quantitative histological analysis. Serum transaminase (ASAT, ALAT) levels were measured. We carried out further measurement for analysis of the changes in redox homeostasis.

Results: In IPer group in comparison with IR group, serum transaminase levels were significantly ($p<0.05$) lower after 1, 24 h of reperfusion, but not after 6 h of reperfusion (1h ALAT: $p=0.042$ //24 h ASAT: $p=0.028$; ALAT: $p=0.014$). Severity of histologic damage was reduced in IPer group compared to IR group at every examined reperfusion period. Favorable effects have been observed on redox-homeostasis. Integral of the liver reperfusion curve (*RA*) and the plateau maximum average (*PM*) of flow graph showed a strongly significant ($p<0.01$) improvement (*RA*: IPer vs. IR; $p=0.007$ //*PM*: IPer vs. IR; $p=0.001$)

Conclusion: Perconditioning is a feasible method, with notable practical significance in those situations when we are forced to apply long-term liver exclusions.

MONITORING QUALITY OF LIFE IN CHRONIC REFRACTORY IMMUNE THROMBOCYTOPENIC PURPURA IN CHILDHOOD, COMPARING STANDARD THERAPY AND ROMIPILOSTIM TREATMENT

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Immune thrombocytopenic purpura (ITP) is the most common bleeding disorder in childhood. 10% of the ITP cases are chronic, refractory to conventional treatment. Children with low platelet count (< 10 G/L) have a high risk for life threatening bleeding.

Therefore, it became necessary to have another target as a tool of therapy, so a new generation of thrombopoetin-receptor stimulators were developed (romiplostim, eltrombopag). Both medications were already used successfully in adult patients, but only one pediatric study is known about romiplostim (Buchanan 2009).

Our aim was to analyze the quality of life in chronic refractory ITP in childhood, comparing the standard therapy and romiplostim treatment.

We introduced a means of grading hemorrhage by measuring signs and symptoms of bleeding on the basis of physical examination. We categorized the cases weekly from grade 0-5 based upon symptoms, then compared retrospectively with the period of standard therapy. For monitoring platelet count, quantitative blood count was checked every week. We registered also the children's and parents' experiences in connection with the treatment focused on quality of life.

We used Chi-square and Fisher-exact tests as statistic methods. In our study, 9 children were treated with romiplostim. The average age was 7.9 years (2.3-15 years). In four cases indication was acute ITP, two of them were transformed to the chronic ITP group. In five cases treatment indication was chronic ITP. Cases were registered 216 times in all during the standard therapy, and 264 times during romiplostim therapy. Comparing the two periods during romiplostim treatment grade1 ($p=0.0026$) and grade2 ($p=0.0133$) bleeding events were significantly less. There was no significant difference in cases of grade3 and grade4 bleeding events.

Our results confirm that romiplostim treatment reduces significantly the occurrence of moderate bleeding events in children with chronic refractory ITP, hereby improves the children's quality of life.

OXIDATIVE AND NITRATIVE STRES – IMPORTANT FACTORS IN MULTIPLE SCLEROSIS` DEVELOPMENT

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Multiple sclerosis (MS) is an inflammatory, demyelinating, autoimmune disease of the central nervous system with unknown aetiology. Recent studies suggest important role of the oxidative stress (OS) in pathogenesis of MS. The aim of our study was to detect total antioxidant plasma status (TAS), analyze the various markers of oxidative and nitrative damage, their cross correlations and correlations with the state of the blood-brain barrier (BBB). We also monitored level of uric acid (UA)-natural antioxidant.

58 samples of blood plasma from patients with MS were analysed and function of BBB was evaluated using QA index. The control group consisted of 43 healthy probands, matched on age to study group. TAS was analyzed by Trolox equivalent antioxidative capacity method and the rate of lipid peroxidation as concentration of lipoperoxides, both using spectrophotometrical methods. Impact of OS and nitrative stress on proteins were examined via levels of protein carbonyls and 3-nitrotyrosine by ELISA methods. Levels of uric acid were evaluated by HPLC method.

Our study confirmed previous results about decreased TAS and increased lipoperoxidation in MS patients. Correlation between lipoperoxidation and state of BBB can indicate significance of that process in deterioration of blood-brain barrier. Significant higher levels of protein carbonyls and 3-nitrotyrosine than in control group indicate pathological modification of plasma or axonal proteins. Concentration of UA in males and females was physiological and its negative correlation with protein carbonyls showed the role of UA as a protein protector against oxidative damage.

Based on these results, we can say that OS and NS are important factors in pathogenesis of MS and reduced antioxidant reserve is possibly an early pathogenic mechanism of inflammatory demyelisation in MS patients. Therefore it is necessary speculate about including reduction OS and NS in therapeutic intervention.

INCIDENCE OF ANTIMICROBIAL RESISTANCE OF PNEUMOCOCCAL STRAINS CAUSING SELECTED INFECTIONS IN PAEDIATRICS

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Objectives: To assess the incidence of antimicrobial resistance among pneumococcal strains isolated from children hospitalized at Paediatric Clinic of Trenčín Hospital in period of years 2000 – 2011.

Methods: The research focused on retrospective data analysis from electronic health documentation at the Paediatric Clinic of Trenčín Hospital. The study started in August 2010; data collection finished in January 2012. The ratio of pneumococcal infections and antimicrobial resistance of isolated pneumococcal strains amongst children hospitalized for *otitis media*, *pneumonia*, *meningitis* and *sepsis* was specified. The documentation included data about therapeutic prescription of antibiotics and about the number of children vaccinated by conjugated pneumococcal vaccines. The monitored group consisted of 706 patients of age from 0 to 18 years. Outpatients were not included in the selected group.

Results: The research showed 103 cases of pneumococcal infection, out of 706 patients in the selected group. 60 % of these patients were under the age of three. 13.59 % of these children had been vaccinated by conjugated pneumococcal vaccines. 49.33 % of isolated pneumococcal strains were resistant to erythromycin, 30.38 % to penicillin. The poly-resistant pneumococcal strains were isolated from 53.85 % of vaccinated children. The most widely used antibiotics in the therapy were: amoxicillin clavulanate (in 25.56 % of cases), cefuroxim (in 18.89 % of cases) and clarithromycin (in 11.11 % of cases).

Conclusion: High number of pneumococcal strains resistant to erythromycin (49.33%) and penicillin (30.38%) was identified. 53.85% of vaccinated patients were infected by poly-resistant pneumococcal strains. The increase of resistance can be explained by over-utilization of antibiotics, as well as by wrong selection of the first choice antibiotics in the therapy of monitored infections.

THE COMPARATIVE CHEMICAL WATER COMPOUND CHARACTERISTIC FROM THE BASIC SOURCES OF KIROV-CITY WATER SUPPLY AT VARIOUS STAGES OF ITS RECEIPT.

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Introduction: Water occupies significant place in the nature and plays important role in functioning of a human body. The chemical consumed water composition as 95-97 % macro - and the micro cells.. The deviation from maximum permissible indicators (both towards decrease, and towards increase) involves changes both in the whole organism, and in the fabrics directly depending the processes of a mineralization (bones and teeth).

Methods: The research work on water chemical composition was carried out in the laboratories of the State Centre of Hygiene and Epidemiology of Kirov Region from control points of the water. We used the method of the statistical analysis and comparison of the received indicators with the established standards.

Results: 1. Indicators of boron content (normative – 0,5 mg/l):

From the Vyatka River – 0,027 mg/l (18,5 times less than standard). From underground

sources – 1,53 mg/l (3,0 times more than the established standard **2.** Indicators of iodine

content (normative – 0,125 mg/l): From the river Vyatka and underground sources

indicators of the iodine coincide – 0,007 mg/l (in 17,8 times less than established

standard). **3.** We take a medium indicator of calcium – 75 mg/l From the Vyatka River -

32,55 mg/l (2,3 times less average standard), from underground sources – 37,99 mg/l (2

times less average standard) **4.** Indicators of the magnesium content (the standard – 50

mg/l): From the Vyatka River – 10,62 mg/l (4,7 times less than the established standard).

From underground sources – 19,81 mg/l (2,5 times less than the established normative)

5. We take low border of established normative – 0,8 mg/l. From the Vyatka River – 0,103

mg/l (7,8 times less than the established standart). From underground sources – 0,622

mg/l (1,3 times less than the established normative)

Discussion: 1. All indicators of the water studied elements from the Vyatka River below

the established standard **2.** The maintenance of all studied elements from underground

sources is higher, than in water from the Vyatka River. **3.** Indicators of the content of iodine

coincides - 0,007 mg/l. **4.** All mineral composition of water from underground sources are

better, than composition of water from the Vyatka River. **5.** This situation causes serious

fears for oral cavity health of the Kirov Region population.

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