

# POSTERS – NEUROLOGY

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## Antiphospholipid syndrome and multiple sclerosis: diagnostic and therapeutic dilemmas

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**Introduction:** The antiphospholipid syndrome (APS) is marked by the presence of circulating antiphospholipid antibodies. It results in arterial as well as venous thrombosis. The nervous system, among others, is frequently affected.

**Aim:** The aim of this report is to present the case of female patient diagnosed with primary APS, who showed some clinical and magnetic resonance imaging (MRI) signs of multiple sclerosis.

**Case report:** A 37 year old woman was admitted to the Clinic of Neurology for clinical examination because of recurrent vertigo accompanied with dizziness, weakness and pain in arms and legs especially in the left arm and left leg. 20 years ago, she suffered from recurrent left peripheral facial paralysis. She was taking no steroid antireumatics (NSAR) because of the pain. Neurological examination revealed pyramidal symptomatology as dominant with quadriparesis spastica predominantly hemiparesis cerebri lateris sinistri. Relevant diagnostic procedure such as MRI of the brain and cervical spine evoked cerebral potentials (ECP), lumbar puncture (L.P.) and analysis of cerebrospinal fluid (CSF), ophthalmology examination and laboratory findings including immunological and serological tests has been done. MRI showed multiple lesions highly suggestive of demyelinated lesions that are specific for encephalomyelitis disseminate but another etiology was not definitely excluded. CSF analysis included electrophoresis of the CSF proteins didn't reveal signs for intratecal synthesis of immunoglobulin. ECP finding was at borderline. Immunological tests showed antiphospholipid antibody IgM (aPL ab) and anti beta 2 glycoprotein IgM positivity. Then, she was examining by the rheumatologist. APL ab IgM and beta 2 glycoprotein IgM positivity was proven again, along with negative results of other immunological tests included antinuclear antibodies (ANA) and anti-dsDNA. The primary APS was diagnosed. Per oral anticoagulant therapy was administered.

**Conclusion:** This report showed that some clinical and magnetic resonance imaging signs in patient with APS imitate the course of MS. This situation makes differentiation of two conditions quite difficult. A careful medical history, laboratory findings and the response to anticoagulant therapy might be helpful in differential diagnosis.

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## Postinfective meningoencephalitis in differential diagnosis of multiple sclerosis: a case report

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**Background:** Postinfective meningoencephalitis represents acute demyelinating disorder as neurologic sequel of infective disease.

**Case report:** A 23 year old woman was admitted because of walking disturbances and weakness of leg which started 3 months ago. Investigation of CSF showed increase of IgG index, without dividing in fractions and oligoclonal zones. MRI was described as typical multiple sclerosis. She was treated with corticosteroids 5 days. After rehabilitation, worsening of cerebellar symptomatology occurred, and she started to take corticosteroids peroral. She felt better, but as stopped taking corticosteroids, worsening occurred and she was admitted again. She had atactic walk, horizontal nystagmus, tetraparesis, hyperactive tendon reflexes, positive Babinski sign and scanning dysarthria. MRI showed disseminated lesions almost exclusively infratentorially. Serologic investigation was positive for *Mycoplasma pneumoniae* and *Borrelia burgdorferi* in serum, while in CSL was negative. So our doubt of postinfective meningoencephalitis, after infection with *Borrelia* or *Mycoplasma*, was justified. We started treating with Ceftriaxon and Dexamethason. Cerebellar symptomatology was in regression and she was dismissed. Two months later she was admitted again. There was atactic walk, scanning dysarthria and no motor signs or lateralisation. Control MRI showed improvement, what proved that our diagnosis was correct. We recommended her low doses of corticosteroids, vitamins and physical therapy. Three months later control diagnostic examination showed complete regression of lesions and she felt subjective good.

**Conclusion:** This case proved that we have to hold on eligible algorithm in diagnosis of multiple sclerosis what means clinical picture, laboratory findings of cerebrospinal fluid and MRI interpretation.

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## Betaferon in treatment of multiple sclerosis

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**Introduction:** Multiple sclerosis (MS) has been defined in 1868 by Charcot, but since then, therapy still remains big challenge for experts. The aim of the study was to analyze usefulness and side effects of treatment of patients with relapsing-remitting form of MS (RRMS) with interferon beta 1B.

**Patients and Methods:** It was analyzed 32 RRMS patients treated at Department of Neurology University clinical center Tuzla, who have completed two-years therapy with interferon beta 1B or therapy is still on going. All patients have been admitted at the beginning of therapy or during the relapses. Every 6 months patients have been clinically evaluated and scored by Expanded Disability Status Scale (EDSS). Standard statistical test have been used: mean value and *t*-test. Value of *P* < 0.05 was considered to be significant.

**Results:** Average age of the patients was 30.78 ± 8.99. Average disease lasting until therapy has been started were 2.78 ± 2.33 years. Mostly, patients were Tuzla Canton residents (21; 65.6%), then eight (25%) were from Zenica-Doboj Canton and three (9.4%) from Una-Sana Canton. Two-year therapy completed 11 (34.3%) patients. Relapse has been verified in four (36.36%) patients. Average EDSS score at the beginning of therapy was 2.45 ± 1.03 and after 2 years 2.54 ± 0.98, what was not statistically significant. In two (6.25%) patients who are on therapy for 18 months, there were no relapse, and average EDSS is 1.75 ± 0.35 (at the beginning of therapy as well as after 18 months). One year on therapy is five (15.62%) patients. Average EDSS at the beginning of therapy was 1.6 ± 1.08 and year after it is 1.5 ± 0.70. One patient experienced relapse. Two patients are 6 months on therapy. They had no relapses with same EDSS after 6 months in order to beginning (2.0). At the beginning of 2008 another 12 patients have been started with therapy. Most frequent medication side effects were: raising body temperature, redness on spot of needle insertion and pain in muscles.

**Conclusion:** Results confirm that patients with RRMS after 2 years therapy with Interferon beta 1B has relative low number of relapses (36.36%), without significant worsening of EDSS. Medication side effects were temporarily and mild.

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##### **Horner syndrome as a CIS – case report**

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Clinically isolated syndrome (CIS) is the earliest clinical presentation of relapsing-remitting MS (RRMS). Clinical findings in combination with brain MRI and CSF analysis can be used in CIS patients to evaluate their risk to clinically definitive MS (CDMS). Neuroophthalmologic symptoms and signs: monocular loss of vision (optic neuritis /ON/), oscillopsia and diplopia (ophthalmoplegia internuclearis) frequently are the first MS manifestations. ON is the most frequent (20 %) type of CIS. Horner syndrome is very rare manifestation of MS. In May 2005 43 years old female patient came with a suddenly appeared Horner syndrome on the left eye, confirmed with 5% cocaine and 1% phenylephrine test (affection of peripheral III neuron -postganglion denervation). Two months later a sudden loss of vision occurred on the right eye (papillitis l. dex.). Three months later left hemiparesis and loss of hearing appears. Two months later urinary urgency and incontinence appeared.

**Paraclinical findings:** MRI of the brain: subcortical, periventricular and supraventricular zones of hyperintensity signals in T2, PD, FLAIR. The same findings are also seen in T1-zones of demyelination, cerebrospinal fluid (CSF): normal function of hematoencephalic barrier. Without oligoclonal bands; fundus: right PNO hyperemia, diminished vision; perimetria: central scotoma of the eye; VEP: low amplitude and prolonged latency on both eyes; BAEP: wave V has low amplitude and normal latency. Serological testing supposed an underlying viral infection: EBV, CMV and toxoplasmosis (+IgG antibody class).

Immunological testing: normal. We concluded this case as a CIS with low risk for progression to CDMS so the patient was treated with corticosteroid therapy with good response. She has mild clinical relapses and unchanged repeated brain MRI.

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##### **Multiple sclerosis and other autoimmune diseases**

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**Objective of the work:** Present association of Sclerosis Multiple with some other autoimmune diseases.

**Material and methods:** During the period January 2001–December 2005 were analyzed all newly discovered MS cases with the point to occurrence of other autoimmune conditions of affected, with history and neurological examination. Diagnostic criterion was brain and spine MRI together with the laboratory parameters (hormones of thyroid gland, rheumatism and immunology tests, sedimentation rate).

**Results:** During subject period were in total 147 new cases of MS, age 17–54 a year, mostly between 30 and 40 years of age (87 or 58,08%), male 36 and female 111. hyperthyroidism was registered in 31 patients (21.8%) and hypothyroidism in 17 patients (11.5%), rheumatoid arthritis had nine patients (6.1%).

**Conclusion:** MS as autoimmune disease is often associated with other autoimmune diseases–hyperthyroidism, hypothyroidism as well as rheumatoid arthritis. Affected by MS who have at the same time other autoimmune diseases (in particular in case of rheumatoid arthritis in our case) disease from the beginning shows progressive course with high level of disability towards EDSS.

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##### **Glioma in a patient with multiple sclerosis: a case report**

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**Introduction:** Glioma can mimic tumefactive type of demyelinating lesion. We report a young female who had coexistence of brain tumor and multiple sclerosis (MS).

**Case Report:** A 35-year-old female was admitted because of MS relapse. She had weakness of right extremities, facial paresis and motor aphasia. MS was diagnosed as she was 23, confirmed with laboratory and neuroimaging findings. She was taking betainterferon for last 6 years and treated with pulse corticosteroid therapy in relapses before. She had hypertension. As worsening appeared, MRI was done and revealed besides multiple demyelinating lesions a hyperintense inhomogeneous enhancement in left frontoparietal lobe, what was described as tumefactive type of demyelinating lesion. She was taking high doses of corticosteroids with minimal improvement. She was admitted to our Department again, and control MRI with paramagnetic contrast medium was done. It revealed expansive lesion with perifocal oedema and central necrosis which compressed ventricular system, what confirmed our suspicion on tumor. Neurosurgical operation was performed and pathohistological finding showed demyelinating plaque with elements of glioma gradus III. Postoperative she had right hemiplegia and motor dysphasia, 6 months after rehabilitation she felt better and had hemiparesis with moderate speech impairment.

**Conclusion:** Glioma is an uncommon coexisting finding in patients with MS. Atypical symptoms, such as aphasia in this case, as well as atypical MRI lesions should be carefully assessed and very often definitive diagnosis depends on pathohistological finding.

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### Music as an auditory stimulus in stroke patients

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**Background:** Auditory stimulation increases mean blood flow velocity (MBFV) in the middle cerebral artery (MCA) in healthy individuals. Our aim was to monitor such changes in the affected MCA of patients with acute ischemic stroke (AIS).

**Methods:** The study included 64 non-thrombolysed patients admitted to the hospital within 24 h of AIS onset. Affected MCA was insonated by means of transcranial Doppler (TCD). Fourteen were excluded due to insufficient temporal bone window. Patients (23 female and 27 male) were divided into groups according to NIHSS score at the time of admission. Group I consisted of patients with NIHSS score  $\leq 10$  ( $68 \pm 12.6$  years) and group II with NIHSS score  $\geq 11$  ( $71.5 \pm 12.9$  years). MCA MBFV were monitored during listening to Mozart's sonatas for 30 min. The first response of MBFV increase was measured as time (Tmax) and percentage of change in amplitude (Amax). An increase of 5% or more in amplitude was considered significant. Pearson Chi-Square test was used for statistical analysis.

**Results:** In 78.85% of patients there was a significant increase in MBFV compared to baseline values as a reaction to the music. Tmax in group I was  $15.83 \pm 7.20$  s and in group II was  $16.50 \pm 8.60$  s. Amax in group I was  $10.95 \pm 8.89\%$  and in group II was  $10.45 \pm 5.65\%$ . There was no statistically significant difference in Tmax ( $P=0.269$ ) or Amax ( $P=0.398$ ) between the two groups. However, a trend of longer Tmax was observed with every two NIHSS score increase.

**Conclusion:** Music is an auditory stimulus in stroke patients and can be measured by means of TCD as MCA MBFV increase. Although our study showed no statistically significant change of reaction time with the severity of stroke, still we have noticed a trend of reaction time increase.

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### Pain and ischemic symptoms in craniocervical artery dissection

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**Introduction:** Arterial dissections of craniocervical arteries are being increasingly identified due to growing awareness of clinical picture along with advances in imaging technologies.

**Patients and Methods:** During 1 year period we observed 20 patients with craniocervical artery dissection in the cerebrovascular laboratory. Clinical picture, localization of the dissection and follow up investigation were analyzed.

**Results:** There were 20 patients divided in four groups: In the first group all four patients with common carotid dissection with or without aortic dissection presented with pain. In the second group with internal carotid dissection presented with pain in five out of 11, ischemic symptoms in all patients, and in three with Horner syndrome or lower cranial nerve palsies. All four patients in the third group with dissecting plaque had no pain, but had ischemic symptoms. In the fourth group was only one patient with isolated vertebral artery dissection who had no pain but presented with stroke.

**Conclusion:** Pain was the most prominent symptom in patients with lower craniocervical artery dissection. Ultrasound enabled follow up of the dissection.

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### Lamotrigine in the epilepsy therapy at the Sarajevo Neurology Clinic

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**Introduction:** New antiepileptic drugs have opened a new era of therapy in the epilepsy treatment. The aim of this paper is to establish a therapeutic effect of the new antiepileptics (AE) as a supplement therapy in the treatment of those types of epilepsy which proved to be resistant to previously used therapy, with a special emphasis on lamotrigine.

**Material and methods:** The research was undertaken at the Sarajevo Neurology Clinic. It included 60 epileptic patients (30 patients with the old antiepileptic therapy, 30 with the new antiepileptics as add on). All patients had partial epileptic fits with secondary generalizations.

**Results:** The male female ratio in both groups was the same 16M:14F. 33% of patients were under 20, mean age was 27.2 years. The most frequent antiepileptic therapy was the combination of carbamazepine and lamotrigine in 67% of patients in the group with the new AE, while 90% of patients in the group with the old AE received carbamazepine.

**Conclusion:** New antiepileptics have proven to be efficient as a supplement therapy in the treatment of previously resistant epileptic fits. The frequency of fits was reduced in 66.7% of patients, and in 16.7% of patients the fits were alleviated. The new AE did not significantly influence the psychological traits of patients; in all patients an improved quality of life was noted after introducing the new lamotrigine to the therapy.

### Amplitudes of the N19 and P22 waves at the somatosensory evoked cerebral potentials in case of multiple sclerosis

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**Goal:** To compare the amplitudes of the N19 and P22 waves of somatosensory evoked cerebral potentials (SSEP) among healthy individuals and patients with multiple sclerosis (MS).

**Patients and methods:** The research is conducted as a prospective, experimental laboratory study. It gathered 50 patients with MS treated at the Neurology Clinic Sarajevo in the period from August 1st 2005 until August 1st 2007. In all cases we performed SSEO of the n. medianus and calculated waves amplitudes.

**Results:** In the tested sample there was no statistically significant difference according to gender between the control and experimental group. Mean age at the control group was 35.28 SD ± 10.49 and in experimental 34.9 years, SD ± 8.57. In case of patients with the MS amplitude of wave N19 in 88% of patients was within range 0–5 mV while in the control group was 94%. In the experimental group in 6% of patients there is an amplitude with values 0–1 mV. Shown results have statistically significant decrease in amplitude of N19 wave in the experimental compared to the control group. ( $X^2 = 6.198$ ,  $P < 0.05$ ). Amplitude of wave P22 among 14% of patients with MS was 0–1 mV, reduced number of patient with the amplitude 0–5mV in the experimental group by 12%, and by 3% reduced number of patient with the amplitude 5–10 mV compared to controls. These results show statistically significant difference of the lower amplitudes of wave P22 in the experimental group compared to the control one ( $X^2 = 109, 896$ ,  $P < 0.01$ ).

**Conclusion:** In our research values of the cortical waves amplitudes N19 and P22 was significantly lower among patients with MS compared to the healthy population. This measurement of the evoked response can beside extended latency be considered important as proof of the SSEP pathological waves in case of patients with multiple sclerosis.

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### Sex differences in the presence of the most common risk factors for ischemic stroke in young adults

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**Background:** Stroke takes the leading position in morbidity and mortality in Republic Croatia and presents a considerable public-healthly problem, specially because of, as newly studies in the world suggest, increase of prevalence in young adults. The aim of this study was to evaluate sex differences in the most common risk factors in adults younger than 45.

**Methods:** We analyzed retrospectively data of patients in the age between 19 and 45, who were admitted at Department of Neurology, University Hospital «Sestre milosrdnice», in the period between 1.1.2002. and 31.12.2006.

**Results:** 3193 patients with acute stroke were admitted during 5 years, 93 (2.88%) were younger than 45. Ischemic stroke was diagnosed in 51 patients (55.43%), 30 male (58.82%) and 21 female (41.18%). Among the most common risk factors in the group of male patients were hypertension (13; 43.33%), smoking cigarettes (14; 46.66%), hyperlipidemia (11; 36.66%), alcohol (7; 23.33%),

heart diseases including cardiomyopathy, arrhythmia, valvular abnormalities and myxoma (6; 20%), hematologic abnormalities as increase level of PAI-1 (2; 6.66%) and diabetes (1; 3.33%). In female group the most frequent risk factors were hyperlipidemia (9; 42.85%), hypertension (6; 28.57%), heart diseases and taking oral contraceptives (4; 19.04%), smoking (3; 14.28%), taking opiats (2, 9.52%) and alcohol consumption (1; 4.76%).

**Conclusion:** Risk factors for ischemic stroke in young adults have similar distribution as in older patients, except diabetes and heart diseases, in both male and female group. Hypertension, alcohol consumption and smoking cigarettes are more frequent in male group, while hyperlipidemia and heart diseases are equal presented in both. Considerable cause in female group is oral contraceptive pills. In a great number of patients we did not find any of the most common risk factors, so we have to look for less frequent causes as immunologic and hematologic disorders, and include such tests in the diagnostic algorithm for stroke in young adults.

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### Reduced vasoreactivity to music in stroke patients

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**Background:** Auditory stimulation increases mean blood flow velocity (MBFV) in the middle cerebral artery (MCA) in healthy individuals. Our aim was to monitor such changes in the affected MCA of patients with acute ischemic stroke (AIS) and to compare them with healthy individuals.

**Methods:** The study included 113 examinees (52 non thrombolysed patients admitted to the hospital within 24 h of AIS onset, and 61 healthy individuals). In stroke patients (group2) only the affected MCA was insonated by means of transcranial Doppler (TCD) while in healthy individuals (group1) both MCAs were recorded. MCA MBFV were monitored during listening to relaxing music for 2 min. Prior to this, a baseline MBFV value was recorded for each person. The first response of MBFV increase was measured as time (Tmax) and percentage of change in amplitude (Amax). An increase of 5% or more in amplitude was considered significant. Pearson Chi-Square test was used for statistical analysis.

**Results:** In both groups there was an increase in MBFV compared to baseline values as a reaction to the music. In group1 91.8% of individuals had a significant increase in Amax while in group2 such an increase was recorded in 78.85% of patients. Tmax in group2 (15.87 ± 7.72) was significantly longer ( $P < 0.01$ ) than Tmax in group1 (9.34 ± 6.16). There was no statistically significant difference in Amax between the two groups.

**Conclusion:** We have determined that music is an auditory stimulus in stroke patients which was measured by means of TCD as MCA MBFV increase. However, compared to healthy subjects, affected MCAs in stroke patients needed more time to react.

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### Arnold-Chiari type I malformation presenting as benign paroxysmal positional vertigo in an adult patient

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Chiari type I malformation (CMI) is a congenital disorder characterized by caudal displacement of the cerebellar tonsils

through the foramen magnum into the spinal canal. Of the several types of Chiari malformations, Chiari I is the most common. Three times more women than men are affected. The paper describes the case of B.E., the 48-year-old female patient, who was admitted for clinical tests because of vertigo accompanied by occipital headache. The neurological findings registered nystagmus, without other neurological occurrences. The MRI of the cranium and the neck part of spine showed displacement of the cerebellar tonsils through the foramen magnum into the spinal canal by approximately 10 mm. Neurosurgeon proscribed conservative treatment with clinical and radiographic monitoring of the patient (control MRI). Three months later, the patient, without subjective difficulties, has normal neurological findings.

**Conclusion:** Vertigo is an unpleasant disorder, which is in great number of cases possible to treat. It might be thought in a direction of differential diagnosis as well, with a team approach to such patient. If you have mild or no symptoms, monitoring by regular exam may be recommended. Treatment options vary depending on the severity of symptoms, the extent of herniation of tonsils, and the presence of associated conditions such as hydrocephalus, syringomyelia, and disorders of the skull and spine.

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### The contralateral carotid disease in patients with internal carotid artery occlusion

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Aim of the study was to investigate management and natural history of the contralateral internal carotid artery disease in patients with internal carotid artery occlusion (ICAO).

**Patients and methods:** During one year 296 patients with ICAO were investigated. Retrospective analysis of follow-up examinations was performed, and patients were divided into groups according to contralateral carotid disease. Data are presented as means and percentages.

**Results:** Out of 296 patients, in 90 patients with carotid occlusion only one investigation was performed. Thirty three patients were followed up due to postoperative ICAO. In 14 patients ICAO developed during ultrasonographic follow-up. Contralaterally in this group of patients, nine (64.3%) had unchanged findings, while in five (35.7%) disease progression was observed: in two patients from mild stenosis to occlusion, in one from mild to subtotal stenosis, in one from moderate stenosis to occlusion and in one from subtotal stenosis to occlusion. Out of 44 patients with ICAO and contralateral subtotal stenosis at initial investigation, 42 underwent carotid surgery. Postoperatively 32 had normal finding, six developed mild carotid stenosis, two moderate, and two had postoperative carotid occlusion. Two patients were followed up without intervention. Nine patients with bilateral ICAO were followed up during years. Hundred and six patients with ICAO and contralateral mild to moderate changes, were followed-up. The finding was unchanged in 68 patients. In 21 patients disease progressed to subtotal stenosis, 18 underwent carotid surgery.

**Conclusion:** In one third of patients with carotid occlusion contralateral carotid disease progression was observed. Further investigations should be conducted.

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### Outcome of the patients with epileptic seizures as the first symptom of acute stroke

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**Background and aims:** Early poststroke seizures result from cellular biochemical dysfunction leading to epileptic neuronal discharges. Whether seizures worsen the outcome of the stroke is uncertain. We compared the outcome of patients with epileptic seizures as the first symptom of acute stroke in comparison to patients with acute stroke without epileptic seizures.

**Methods:** We analyzed 2256 patients with acute stroke admitted to the University Hospital from year 2001 to 2005. In the study group there were 84 patients (3.7%), 46 (54.8%) women and 38 (45.2%) men, mean age  $74.6 \pm 11.8$  years with epileptic seizures as the first symptom of acute stroke. The control group comprised of 100 patients with acute stroke without epileptic seizures admitted during the same period, randomized, age and sex matched to the study group. We analyzed the outcome of the patients in both groups after 6 and 12 months follow-up.

**Results:** In the study group after 6 months follow-up 23/75 (30.6%) patients died. nine patients were not available. After 12 months follow-up 1/52 (1.9%) patient additionally died. In the control group 13/100 (13.0%) patients died after 6 and 32/100 (32.0%) after 12 months follow-up. We used Pearson Chi-Square test and found statistically significant difference in outcome between study and control group after 6 months follow-up in women ( $P = 0.005$ ). We found no difference in outcome after 6 months in men ( $P = 0.245$ ), and after 12 months follow-up in women ( $P = 0.175$ ) and men ( $P = 0.562$ ).

**Conclusion:** There is increased mortality during 6 months follow-up in women with epileptic seizures as the first symptom of acute stroke.

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### Usefulness of transcranial Doppler in brain death confirmation

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Some strokes may lead to brain death. Transcranial Doppler (TCD) can be used as a confirmatory test. Certain factors limit its usage, but noninvasiveness and bedside evaluation are a privilege. The aim of this study was to present the usefulness of TCD in the procedure of brain death confirmation. Forty four patients with severe brain lesions leading to brain death were treated during 4-years period. The appropriate confirmation test was chosen according to patient condition, appreciating the restrictions in accordance with the test protocol. The main restriction for the usage of TCD was craniotomy or skull defects, while severe instability was the main limitation for tests requiring transportation. Since the results of certain tests were inconclusive, some patients underwent repeated testing. Among 44 patients 19 patients had neurotrauma, 11 massive aneurismal subarachnoidal hemorrhages, one massive arteriovenous subarachnoidal and parenchymal hemorrhage, 12 hypertensive parenchymal hemorrhages, one ischemic stroke. As a primary test TCD was used in 30 patients, brain scintigraphy in two, multislice CT angiography (MSCTAG) in 10, cerebral angiography in two patients, and the diagnose was

confirmed in 26, 3, 9 and two patients, respectively. Due to inconclusive test results MSCT AG has to be repeated in five patients. Four patients, in whom TCD was applied, died during the observational period, and in one finding were inconclusive. Time to confirm the diagnosis with TCD was the shortest, mostly (61%) within 2 h from clinical diagnosis. TCD is a favorable confirmatory test for cerebral circulatory arrest.

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### Surveillance of Croatian pregnant women with epilepsy— neurodevelopmental and teratogenic effects of antiepileptic drugs exposure

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**Background:** The teratogenic effects of antiepileptic drugs (AED) exposure in pregnancy have been recognized but the relative risks of new antiepileptic drugs and its long-term neurodevelopmental effects remain poorly understood.

**Aim:** To follow up pregnancies exposed to AED and their offspring in order to assess teratogenic and neurodevelopmental effect of particular AED of newer generation.

**Results:** During 4.5 years we have surveyed 47 pregnancies and analysed it according to woman's age, duration of epilepsy, frequency of seizures, exposure to specific AED, pregnancy planning and periconceptional folic acid intake, complications during pregnancy/delivery and pregnancy outcome. About 80% of pregnancies (39/47) were exposed to monotherapy: 23 to LTG, 7 to CBZ, 1 to PHT, 1 to PB, 1 to GBP, 4 to VP and two to MPB. Six pregnancies were exposed to polytherapy: three to TMP/VP, one to CBZ/PB, one to TMP/CBZ/PHT and one to VPA/clonazepam. Two women with epilepsy were without AED.

**Conclusion:** We have surveyed pregnancies exposed to LTG, VP, PHT, PB, GBP, TMP, CBZ, MPB and clonazepam. Besides 4 spontaneous abortions, two stillbirths, two premature deliveries we have also noted one evidence of intrauterine AED effect (intrauterine growth retardation and craniofacial dysmorphism) and one premature live-birth with ASD, psychomotor delay and epilepsy. Further follow up of live-births till school age will be also provided in order to assess the potential neurodevelopmental effect of AED in the offspring.

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### Transcranial sonography (TCS) in evaluation of pineal lesions

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**Background:** Transcranial sonography (TCS) was never used in evaluation of morphology of pineal gland. We initiated this study to evaluate the possibility of TCS to detect the region of pineal gland; its cystic morphology and correlation with MRI scan in assumption that TCS may serve as an alternative neuroimaging method in evaluation of pineal gland lesions.

**Patients:** The study included 14 patients with incidental pineal gland cyst detected by MRI. None of the patients had history of

symptoms specifically referable to the pineal gland and no surgical treatments for pineal cyst were performed.

**Methods:** Two independent physicians performed TCS blindly on results of MRI. Pineal cyst was detected as every hypoechogenic area within hyperechogenic gland matrix or hypoechoic lesion with/without septum surrounded by echoic wall. Maximal width in two lines was measured and matched with MRI scans. Pearson linear correlation was performed.

**Results:** Cyst size on TCS scan varied from  $3.5 \times 5$  to  $17 \times 10$  mm in diameter what significantly correlated with results of MRI (Pearson coefficient 0.96). On the T2-weighted images this lesion was identified as a high-intensity area with smooth margins and was homogeneous in nature which was shown on TCS scan as a hypoechogenic with echogenicity similar to those of the inside of the ventricle system, often surrounded with hyperechogenic gland tissue wall.

**Conclusion:** Our findings showed high sensitivity of TCS in detection of region of pineal gland. Assuming appropriate temporal bone windows findings of TCS also closely correlated with MRI scans and in evaluation of larger fluid consist lesions TCS revealed even better structural records.

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### Transcranial sonography in movement disorders

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**Background:** So far there is no reliable test that can clearly distinguish between various movement disorders and therefore the diagnosis is still based on the clinical examination. However, the misdiagnosis rates for the most common movement disorders; Parkinson's disease (PD) and Essential tremor (ET) in the early stages is as high as 20–30% for PD and in about one of three patients in ET. We initiated this study to assess the possibility of Transcranial sonography (TCS) to help differentiate PD from ET by measuring echogenicity of the substantia nigra (SN).

**Patients and Methods:** Our study included 60 patients with PD, 30 patients with ET and 60 healthy controls. The TCS recordings were done in axial plane by standardized protocol by two independent investigators. SN was displayed, encircled, and measured two times. Mean area was calculated. Mann Whitney U test for inter-group comparison was applied.

**Results:** Patients with ET and PD had mean SN size of  $0.15\text{cm}^2$  ( $\pm 0.04$ ) and  $0.27\text{cm}^2$  ( $\pm 0.06$ ), which showed significant difference ( $P < 0.001$ ). In the control group bilateral combined mean SN size was  $0.17\text{cm}^2$  ( $\pm 0.06$ ), which was significantly different from PD group ( $P < 0.001$ ), but not from ET group ( $P = 0.240$ ).

**Conclusion:** The measurement of SN by means of TCS is a valuable tool in the differentiation of movement disorders. Due to portability, lack of invasiveness and easiness of reproducibility, TCS might help in diagnosing PD or in differential diagnosis of doubtful clinical cases.

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### Quantitative-genetic analysis of vertebral artery hypoplasia in humans

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**Objective:** The aim of this study was to determine the mode of inheritance of VAH; to perform quantitative genetic analysis of

family pairs, and to perform qualitative analysis of VAH incidence in next of kin.

**Background:** VAH is an inborn condition with prevalence of 2.34% in general population. The prevalence of 16% within families indicates a strong familial predisposition for acquiring VAH. VAH is associated with many disorders such as migraine with aura, or posterior brain ischemia. Because of potentially lethal consequences in conditions associated to VAH, it is important to identify individuals at risk. By performing color Doppler flow imaging (CDFI) of vertebral arteries on several members of the same family we noticed an increased incidence of vertebral artery hypoplasia (VAH). This led us to believe in a possible genetic predisposition for acquiring VAH.

**Design/Methods:** Analysis of families with VAH, 96 parent-offspring pairs was performed. VAH was diagnosed by performing color Doppler flow imaging (CDFI). All measurements were obtained in the V2 segment of VA, between vertebrae C6-C5 using a linear 7.5 MHz probe on Aloka Prosound SSD-5500. Four different possible effect were tested and suggested: complete domination of hypoplastic allele (100%:0%); complete recessiveness of hypoplastic allele (0%:100%); co-domination with equal strength of both alleles (50%:50%); co-domination with weaker hypoplastic allele vs. healthy allele (40%:60%).

**Results:** Models which showed greatest compatibility were: autosomal co-dominant inheritance with equal strength of both alleles, as well as with weaker hypoplastic allele, X-linked co-dominant inheritance with hypoplastic vs. healthy allele 40%:60% and X-linked co-dominant inheritance with equal strength of both alleles.

**Conclusions/Relevance:** With this analysis we were not able to determine whether genetic determination is autosomal or X-linked. But, analysis of family data suggests complex etiology of this condition which is determined by alleles of incomplete penetration, but close to that of 50%.

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### **Morphologic and hemodynamic characteristics of vertebral arteries in patients with stroke**

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**Introduction:** Vertebral arteries are responsible for 1/3 of brain's blood supply, supplying primarily posterior parts of the brain. Considering the fact that about 15% of all strokes occur in rear parts of the brain it is important to keep in mind the significance of disorders which can cause hemodynamic changes in vertebral arteries. Morphology and hemodynamics of vertebral arteries in different populations have been investigated, but all standard values refer to healthy subjects. Some disorders of vertebral arteries, such as vertebral artery hypoplasia, are proven to be a possible cause of stroke in children and young adults. This certainly makes investigation of posterior circulation worthwhile.

**Aim:** To compare morphological and hemodynamic characteristics of vertebral arteries in patients with stroke and compare them to morphologic and hemodynamic findings in patients without stroke. We hope that investigated differences in studied parameters could help us identify individuals who are at higher risk of cerebrovascular incidents.

**Patients and Methods:** We analyzed morphologic and hemodynamic characteristics of 207 patients with CDFI of vertebral arteries. All measurements were obtained in the V2 segment of VA, between vertebrae C6-C5 using a linear 7.5 MHz probe on Aloka Prosound SSD-5500. The criteria for normal vertebral arteries were: lumen diameter of 2.5–4.5 mm, systolic mean blood flow velocity of

0.35–0.70 m/s, and normal resistance pattern. The criteria used for diagnosis of vertebral artery hypoplasia were: lumen diameter less than 2 mm, mean blood flow velocities under 0.35 m/s, and increased resistance pattern (diastolic velocities under 0.05 m/s or absent diastolies even though systolic values are high) Our results showed that out of 207 patients there were 68 patients with stroke (25 women and 43 men), 139 patients without stroke (92 women and 47 men). Parameters such as sex, age, diameters of left and right vertebral arteries, diameters of «narrower», both vertebral arteries and hypoplastic vertebral arteries, as well as hemodynamics and resistance patterns in right and left vertebral arteries were examined and compared between two groups.

**Discussion:** Because of their anatomic location and inconvenient access for surgical procedures vertebral arteries stayed neglected in research for a long time. Greater interest in vertebral arteries followed the introduction of noninvasive ultrasound methods to study of blood vessels. Our findings show that women had smaller diameters of right and left vertebral artery together, but when investigated separately left vertebral arteries showed same lumen diameters as were found in men, but diameters of right vertebral artery were significantly smaller. The parameters we examined showed significant differences in age and resistance patterns among two groups, patients with stroke are older than those without stroke and have higher resistance patterns. There was no difference in haemodynamics among subjects without stroke but differences were observed in subjects with stroke. Women with stroke had better hemodynamics than men in both vertebral arteries. There are no data until now on different ways of compensation of smaller diameters or slower mean blood flow velocities. This is an interesting area for investigation because our data indicate possible differences in hemodynamic behaviour of left and right vertebral artery as well as possible different ways of compensating smaller blood vessel diameters or mean blood flow velocities between sexes. Do women have better hemodynamics in vertebral arteries because of smaller lumen diameter? Or do men have wider vertebral arteries because of lower hemodynamics? We believe that answers to these questions lay under further investigations of a larger number of subjects.

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### **Presence of vertebral artery hypoplasia in patients with different neurological diseases**

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**Introduction:** Vertebral arteries are responsible for blood supply of posterior parts of the brain. Vertebral artery hypoplasia is an inborn condition with unknown incidence and etiology. It may be a cause of some neurological disorders such as migraine with aura, cerebellar ischemia, vertebral artery dissection or early atherosclerotic changes.

**Aim:** The aim of this study was to evaluate frequency of vertebral artery hypoplasia in various neurological diseases.

**Patients and Methods:** We analyzed the data of patients hospitalized at University Department of Sestre milosrdnice University Hospital during the year 2002 and had Doppler ultrasound diagnostic evaluation of vertebral arteries. Measurements were obtained in the V2 segment of VA, most commonly between vertebrae C6-C5 using a linear 10 MHz probe on Aloka Prosound SSD-5500. The criteria used for determining vertebral artery hypoplasia were: lumen diameter  $\leq 2$  mm in C6-C5 segment, blood flow velocity  $\leq 0.35$  m/s, and higher resistance pattern. The criteria for normal vertebral arteries were: normal VA

diameter of 2–4 mm, systolic mean blood flow velocity of 0.35–0.70 m/s, and normal resistance pattern. One hundred eighty-six patients had 29 neurological diagnoses on discharge; diagnoses were categorized in six groups: neurological symptoms and different vascular system states (excluding CVI), different kinds of CVI, epilepsy, headaches, different neurological disorders, and other diseases which are not strictly neurological.

**Results:** One hundred eighty-six patients with Doppler ultrasound diagnostic evaluation of VA during 2002: 78 patients (35 males and 43 females) with vertebral artery hypoplasia were identified following the criteria for vertebral artery hypoplasia, while 108 patients (45 males and 63 females) with normal VA in the control group. There were 62 patients with neurological symptoms and different vascular system states (excluding CVI), 68 patients with different kinds of CVI, 10 patients with epilepsy, 16 patients with headaches, 18 patients with different neurological disorders, and 33 patients with other diseases which are not strictly neurological.

**Conclusion:** Comparison of diagnostic groups made by *t*-test showed diversity in presence of separate diagnosis according to sex and the presence of vertebral artery hypoplasia. Chi-square made for all six groups showed no statistically significant differences in frequency of various neurological diseases between VA hypoplasia and control group, but some interesting tendencies showed up which need further investigation.

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### Role of transcranial Doppler ultrasound in differentiating ischemic and haemorrhagic strokes

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**Introduction:** Transcranial Doppler (TCD) is a very useful noninvasive method of intracranial circulation assessment. It obtains real time circulation information, painlessly at bedside. It is useful in locating the occluded or stenotic blood vessel, but can it also be used in assessment of cerebral circulation in haemorrhagic strokes?

**Aim:** The aim of this study is to assess TCD technique in differentiating ischemic stroke from hemorrhagic stroke.

**Patients and Methods:** We examined 101 stroke patient during a 6 month period at Department of neurology at University hospital «Sestre milosrdnice». All patients were examined using TCD technique in assessment of 11 cerebral blood vessels. Mean blood flow velocities (MBFV) were measured in carotid syphon (CS), medial cerebral artery (ACM), anterior cerebral artery (ACA), posterior cerebral artery (ACP) of both right and left hemisphere, right vertebral artery (RAV), left vertebral artery (LVA) and basilar artery (AB). For all patients risk factor assessment was made for hypertension, cholesterol levels, diabetes mellitus, smoking, acute myocardial infarction, atrial fibrillation, migraine, TIA.

**Results:** There were 101 patients, 53 men and 48 women. Seventy-three patients had ischemic stroke, 13 patients had haemorrhagic stroke, four had subarachnoid haemorrhage and 11 had transitory ischemic attacks. Mean age was 72 years. Thirty-six patients had a complete TCD report, 40 patients had values reported from one side of Willis' circle, and 54 patients had all values of vertebrobasilar system. For remaining patients all values were not obtained due to technical difficulties. Measured values showed statistically significant difference between haemorrhagic stroke and TIA, between haemorrhagic stroke and ischemic stroke, but ischemic stroke and TIA showed no statistically significant difference. Differences were observed in right ACM, and in all cases of haemorrhagic strokes right ACM showed lower MBFV than compared conditions.

**Conclusion:** TCD plays an important role in assessment of intracranial circulation. MBFV in right ACM were found to be lower in haemorrhagic stroke compared to TIA, and haemorrhagic stroke compared to ischemic stroke. Ischemic stroke compared to TIA showed no statistically significant difference. TCD can be helpful in prediction of stroke type.

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### In-hospital mortality rate of the stroke unit at the 'Sestre milosrdnice' university hospital, Zagreb: 1995–2006 experience

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**Aim:** To evaluate the effects of the first Croatian Stroke Unit (SU) by comparing the in-hospital mortality rate for stroke patients in the period before (1995–2000) and after (2001–2006) the implementation of SU.

**Patients and Methods:** The study was conducted in twelve-year period during which 10 901 stroke patients were admitted to hospital and 1818 of them died. The endpoint was in-hospital mortality rate.

**Results:** Before the SU period the in-hospital mortality rate was 20.1%, whereas afterwards it decreased to 12.8%. The RR was 1.57, while the estimate of the OR showed a 71% increase in chances of death in the pre-SU period.

**Conclusion:** We confirmed that the implementation of SU care is associated with a significant reduction of in-hospital mortality rate of acute stroke patients which strongly suggest that development of the SU network in Croatia should be given priority in the health management.

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### Subarachnoid hemorrhage following carotid endarterectomy - case report

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Carotid endarterectomy is a frequently performed vascular procedure. The most common major perioperative neurologic complication is ischemic stroke but intracerebral hemorrhage has been viewed rarely. We performed Medline database search of the English language literature using the words 'subarachnoid hemorrhage and carotid endarterectomy (or surgery)' and there is only one reported case of subarachnoid hemorrhage (SAH) 6 days after carotid endarterectomy (CEA) but without description. A 74-year old female patient was referred to our Stroke Unit due to sudden development of right side motor weakness. She has a medical history of transient ischemic attack, hypertension, dyslipidemia, pace maker. During diagnostic evaluation color doppler flow imaging showed occluded right cervical internal carotid artery and severe left cervical internal carotid artery stenosis. Thus 5 day earlier to admission in our Stroke Unit she underwent a left CEA. After regular postoperative course she was discharged from hospital and at home developed right hemiparesis. She denied head trauma. Laboratory test were normal besides elevated fibrinogen (8.1 g/l). A multi slice computed tomography (MSCT) scan showed a subarachnoid hemorrhage in sulci of both parietal lobes. Digital subtraction cerebral angiography (DSA) was performed but no aneurysmatic enlargement or vascular malformation was found. TCD showed no

signs of vasospasm. The course of illness was favorable and patient was dismissed with no neurological deficit. Etiology of SAH was not clarified and it remains unclear - was it a postoperative complication or did it occur independently?

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### Role of transcranial Doppler in assessment of stroke outcome

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**Introduction:** Transcranial Doppler (TCD) is a noninvasive, painless method which allows real time assessment of intracranial circulation at bedside. Its use has long been appreciated in locating intracranial stenosis or occlusion, but can TCD values measured at stroke onset be predictive of stroke outcome at patient demission?.

**Aim:** The aim of this study was to assess TCD values obtained at stroke onset in prediction of stroke outcome measured by Barthel Index and Rankin scale.

**Patients and Methods:** We examined 101 stroke patient during a 6 month period at Department of neurology at University hospital «Sestre milosrdnice». All patients were examined using TCD technique in assessment of 11 cerebral blood vessels. Mean blood flow velocities (MBFV) were measured in carotid syphon (CS), medial cerebral artery (ACM), anterior cerebral artery (ACA), posterior cerebral artery (ACP) of both right and left hemisphere, right vertebral artery (RAV), left vertebral artery (LVA) and basilar artery (AB). Barthel Index was assessed after stroke onset and before patient demission. Rankin scale was assessed before patient demission.

**Results:** There were 101 stroke patients, 53 men and 48 women. Seventy-three patients had ischemic stroke, 13 patients had haemorrhagic stroke, four had subarachnoid haemorrhage and 11 had transitory ischemic attacks. Mean age was 72 years. Thirty-six patients had a complete TCD report, 40 patients had values reported from one side of Willis' circle, and 54 patients had all values of vertebrobasilar system. For remaining patients all values were not obtained due to technical difficulties. Eighty-five percent of patients had a first ever stroke, and 15% had a recurrent stroke. At admission average Barthel Index was 92.83. Before demission average average Barthel Index was 64.3. Rankin scale before demission showed the following: no symptoms 7%, independant 28%, light disability 9%, moderate disability 9%, moderate to severe disability 23%, severe disability 18%, death 5%. Sixty percent of patients were demitted to home, 10% to another institution, 20% went to a rehabilitation center, and 11% were transferred to another ward.

**Conclusion:** Eventhough TCD is an extremely valuable method in assessment of cerebral blood flow we were not able to predict patient stroke outcome by assessment of TCD values at stroke onset.

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### The risk factors and outcome: differences between ischemic stroke and intracranial hemorrhage

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**Objective:** There are a number of well known risk factors associated with increased stroke incidence. The aim of this study

is to analyze the relationship of two major stroke type (intracranial hemorrhage (ICH) and ischemic stroke (ISH)) and risk factors for stroke, as well as differences between outcome.

**Methods:** We analyzed the data of 399 stroke patients hospitalized at University Hospital Department, Sestre milosrdnice Univ. Hospital, Zagreb, Croatia. For every patient were assessed the risk factors, NIH score a admission and outcome at the day of discharge. The data were analyzed using standard statistical programs for PC.

**Results:** The data of 399 stroke patients were analyzed, the study included 283 of them with acute lesion present on brain CT. 189 patients suffered ISH (76 male patients) and 94 ICH (50 male patients). Mean age was 75.7 years for ISH group and 73.5 years for ICH group. Significant difference was found between groups regarding hypertension therapy: untreated hypertension had 5% of ISH and 32% of ICH patients. Cardiac disorders was present more often in patients with ISH ( $P < 0.05$ ). Elevated serum lipid levels were found in both groups; statistical significance was present with lower HDL cholesterol levels in ISH group. Regarding outcome, Barthel index was significantly lower and mortality was higher in ICH patients ( $P < 0.05$ ).

**Conclusion:** The results of this study help in better understanding the differences between stroke subtypes, making opportunities for improvement of preventive action, diagnostic procedure and therapy.

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### Are serum lipids measured on stroke admission prognostic?

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**Background:** It has been hypothesized that serum lipids measured in early period of stroke are predictive of stroke severity and outcome. The optimal time for lipid measurement is not established. We explored whether lipid profile assesses within the first 24 h after stroke onset: i) differs from healthy individuals, ii) differs between stroke subtypes and iii) is predictive of stroke severity and outcome.

**Methods:** We prospectively enrolled 70 acute ischemic stroke patients who presented to the Stroke Unit within the 24 h of the onset of stroke symptoms, and 68 stroke-free controls.

**Results:** Triglycerides ( $P < 0.001$ ) and HDL cholesterol ( $P < 0.001$ ) were significantly lower in patients, than in controls, whereas Apo B/Apo A-I ratio was higher in patients ( $P = 0.019$ ). HDL cholesterol was different across stroke subtype classified according to TOAST scale ( $P = 0.035$ ). Patients with more severe stroke had higher serum triglycerides (OR 2.755;  $P = 0.030$ ).

**Conclusion:** Lipid profile is different between stroke patients and controls as well as between stroke subtypes. Higher serum concentration of triglycerides is associated with more severe stroke. Further work is required to examine the time dependent changes in lipid profile in acute ischemic stroke. If proven to have some predictive role on a larger patient cohort, blood profile may serve as useful aid in management of acute stroke patient care.

### Clinical characteristics of migraine and probable migraine in general population

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**Background:** Although migraine is a frequent primary headache, it is often under diagnosed. Probable migraine is even more a neglected condition due to lacking symptoms which masks the diagnosis. The aim of this study was to determine the clinical characteristics of strict migraine (SM) and probable migraine (PM) in general population.

**Methods:** The data were collected from a cross-sectional survey of an adult population sample. Randomly selected individuals (> 18 years of age) from the general population were asked to fulfill a self-completed questionnaire. The questionnaire was designed aiming to determine the clinical characteristics of the headache according to the ICHD-2 criteria for SM and PM.

**Results:** The study included 115 patients with SM and 174 patients with PM. Significant difference was observed in the presence of nausea (SM 53.0% vs. PM 40.2%,  $P = 0.007$ ), photophobia or phonophobia (SM 60.9% vs. 49.4%,  $P = 0.04$ ) and the aggravation by physical activity (SM 40.0% vs. PM 48.3%,  $P = 0.005$ ). There was no significant difference in reported unilateral headache (SM 62.6% vs. PM 64.4%), pulsating quality (SM 54.8% vs. PM 58.1%), intensity, duration of headache (SM 1.38 vs. PM 1.29, mean number of days with headache), frequency (SM 2.03 vs. PM 2.08, mean number of headache attacks per month), relation to menstruation and the presence of aura, all  $P > 0.05$ .

**Conclusions:** Patients with strict migraine more frequently report the presence of nausea and photophobia or phonophobia while patients with probable migraine report aggravation of headache with physical activity. Bringing to attention these clinical differences should help clinicians to diagnose each condition more accurately.

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#### Prevalence of chronic headache in Croatia

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**Background:** Chronic headache describes the presence of migraine and/or tension-type headache on  $\geq 15$  days per month on average for >3 months and fulfills the rest of the IHS criteria. The prevalence of chronic headache is within the range of 1.4–7.3 % worldwide. The aim of this study was to determine the 1-year prevalence of chronic headache in adult Croatian population.

**Methods:** The data were collected from a cross-sectional survey of an adult population sample. Randomly selected patients from the general population in four Croatian cities and their suburbs were asked to fulfill a self-completed questionnaire. The study population included adults > 18 years of age. The prevalence of chronic and daily headache was calculated in the sample representing 33 83769 Croatian adults.

**Results:** The total sample included 1542 responders among which 616 with headache. Among 616 responders, 4.9% had chronic headache. The 1-year prevalence of chronic headache was 1.9%. The prevalence of daily headache was 0.9%. According to these results, 64 291 adult inhabitants in Croatia suffer from chronic headache from which 30 454 from daily headache.

**Conclusions:** The prevalence of chronic headache in Croatia is comparable to other countries worldwide. Translated into absolute numbers, a significant number of patients suffer from chronic or daily headache. These patients require special attention and should be offered medical support.

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#### Breath holding index and evaluation of cognitive decline

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**Background:** The aim of the study was to evaluate role of breath holding index (BHI) in recognizing patients who are at risk for developing cognitive impairment of vascular type.

**Patients and Methods:** We included 20 volunteers who were examined at our Neurology Department. They were divided into two groups, in first group were healthy volunteers at age 35–45 and in the second group were volunteers at age 65–75. In first group we selected patients with BHI values  $1.7 \pm 2$  and in the second group with values  $1.1 \pm 0.5$ . Mini mental State Exam (MMSE) and Montreal Cognitive Assessment (MoCA) were performed as well as standard laboratory workup, CT scan, Color Doppler and Power Doppler of the main head and neck vessels and Transcranial Doppler. We excluded individuals with severe carotid stenosis.

**Results:** We excluded recent ischemic lesions in our population (CT scan), there was no statistically significant difference in conventional risk factors and gender between two groups. There was statistically significant difference between two groups in MoCA ( $29 \pm 1$  vs.  $24 \pm 1$ ), no statistically significant difference was found in MMSE ( $29 \pm 1$  vs.  $28 \pm 1$ ).

**Conclusion:** These results show that impaired cerebrovascular reactivity (decline in BHI) can be predictor of cognitive decline as a result of microvessel dysfunction.

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#### Insulinemic curve changes and conduction velocities of median and ulnar nerves: preliminary study

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Research goal of study is to examine whether changes of insulinemic curve (IC) in no-diabetic patients impact electroneurographic (ENG) parameters of median and ulnar nerves.

**Patients and Methods:** Study is made on Department of Neurophysiology, Primary Health Centre Tuzla, during January 2007–March 2008. Examined group consisted 35 patients (12 males), and average age of  $58.1 \pm 9.6$  years with changed shape of IC (normal values after 120 min: 2.0–25.0  $\mu$ U/ml). No one had previous diagnose of diabetes mellitus. The most frequent finding was slow and incomplete descendant part of IC 'observed in 22 patients'. Control group consisted 35 healthy volunteers (12 males) with average age of  $53.6 \pm 7.5$  years. In this group IC was not determined. Motor conduction velocities (MCV) in forearm and sensory conduction velocities (SCV) in palm of median and ulnar nerves on both sides were measured with bipolar electrodes for superficial stimulation and registration. Non parametric Mann–Whitney *U*-test was used in statistical analysis, and  $P < 0.05$  considered like significant.

**Results:** Median values of MCV in control group were: for right median nerve 57.8 m/s, for left median 57.1 m/s, right ulnar 54.6 m/s, and left ulnar nerve 54.6 m/s. In examined group

medians of MCVs were significantly slower: right median nerve 55.7 m/s ( $P = 0.0021$ ), left median 55.7 m/s ( $P = 0.0157$ ), right ulnar 51.9 m/s ( $P = 0.0074$ ), and left ulnar nerve 51.6 m/s ( $P = 0.0037$ ). Next median values of SCV were measured in control group: right median nerve 50 m/s, left median 50.8 m/s, right ulnar 46.2 m/s, and left ulnar nerve 47.8 m/s. In examined group SCVs were significantly slower: left median nerve 45.7 m/s ( $P < 0.0001$ ), right median 46.8 ( $P = 0.0013$ ), left ulnar 43.9 m/s ( $P = 0.0003$ ), and right ulnar nerve 42.9 m/s ( $P < 0.0001$ ).

**Conclusion:** Changes of IC worsen MCV and SCV of median and ulnar nerves, and might determine further therapeutic strategy.

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#### **Neurosyphilis in famous composer: Hugo Wolf – a patografy**

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Hugo Wolf was born in 1860, in mixed nationalities family in Austro-Hungarian Monarchy, the same year as his friend Gustav Mahler. As a son of leather trader he was supposed to learn a practical profession but he had a great talent for music so at 15 he attended The Vienna Conservatory. For his inadaptability and peculiarity it was uneasy for him to conform to very strict and rigid programs and rules in schools and colleges. He composed mostly songs but made his living by writing musical critics. He had a hot temper and composed in his enthusiastic periods between longer depressive states. Since 1896 he had hallucinations (mostly acoustic), slowly developing paranoid syndrome with other signs of psychosis. Signs of neurological impairment appeared soon (convulsive states, Argyll-Robertson's pupil, paralysis). Therefore he was hospitalized many times in Vienna psychiatric institutions, getting care of associates and medical staff. He died in 1903, at the age of 43, in total psychophysical infirmity, under diagnosis «Paralysis progressiva» - a very common illness at that. So has music lost again, way to early, another very talented composer. His creative work was stopped by his illness much before his 40th birthday.

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#### **Wallenberg syndrome with giant subarachnoid cyst**

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The aim of this report is to present a rare combination of medullar ischemic stroke and congenital malformation, also to discuss an importance of proper diagnostic and therapeutic approach to patient treatment.

**Case report:** A 43-year-old patient was admitted after the acute vertigo and ataxia associated with severe pain sensations in the neck and an alternal face and body hypoesthesia. For 7 years he was medicated for malign hypertension without adequate results even with three different medicals. Clinical picture showed a left horizontal nystagmus, left palatal palsy, left face hypoesthesia, right body hypoesthesia, left side Horner syndrome and the same side cerebellum hemisphere ataxia. Computed multi-slice tomography (MSCT) showed a giant ( $9 \times 7 \times 3$  cm) arachnoidal cysts, with left temporal lobe hypotrophy, and the temporal bone demodulation. Clinical picture presents a classical Wallenberg syndrome, so proper diagnostic procedures were used. A laboratory findings and a spinal fluid analyses were normal. The Magnetic Resonance imaging showed (same as MSCT) a giant subarachnoidal cysts, but also the ischemic stroke of the medulla oblongata left part. With a trans-cranial, color Doppler analysis, a dissection of the left vertebral artery has been found. A patient treatment was conservative, and neurosurgical advice is to follow up the cyst by MRI controls, for the possible surgical intervention in the future.

**Conclusion:** Present case shows again an importance of clinical findings even with modern diagnostic procedures. Also again the hypertension as a risk for the ischemic stroke.

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# POSTERS – PSYCHIATRY

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## Persistence vs. decline of Borna disease virus serum antibodies in psychiatric patients

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**Introduction/Objectives:** Borna disease virus (BDV) is known to cause chronic aseptic meningoencephalomyelitis with behavioural disturbances in a wide range of animal species. Serological studies reporting increased seropositivity rates in psychiatric patients sparked the hypothesis that BDV may play a role in the pathogenesis of human psychiatric disorders. However, data regarding a possible pathogenicity of human BDV infection is still inconclusive and it is unknown whether humans might become persistently infected or clear the virus infection. To gain additional insights into human BDV infection and its pathogenicity, we studied the long-term dynamics of anti-BDV antibody (ab) responses in psychiatric patients and associations of humoral responses with clinical conditions.

**Participants, Materials/Methods:** In this observational study, 94 psychiatric patients found to be seropositive for BDV-specific abs by indirect immunofluorescence test were repeatedly examined further for BDV-specific ab titers during hospital or outpatient treatment. Patients suffered from schizophrenia spectrum disorders ( $n = 46$ ), affective spectrum disorders ( $n = 19$ ) and other psychiatric disorders ( $n = 29$ ). Long-term analysis of BDV-specific humoral responses was done on the basis of data from 46 patients followed up for  $> 36$  months (median 83 months) the median number of titer analyses was five (range 4–19).

**Results:** Twenty-five out of these 46 patients (54.3%) showed persistent BDV-seropositivity, whereas decline from positive to negative was observed in 21 (45.7%) patients. Subgroup analyses showed that serum ab titers were significantly lower in schizophrenic patients aged  $\leq 30$  years and in the early course of disease ( $< 5$  years) compared to patients aged  $> 30$  years ( $P = 0.017$ ) or in the advanced course ( $P = 0.024$ ). Ab titers in patients with schizophrenic or affective disorders were higher during inpatient treatment than during outpatient treatment but differences were not statistically significant. However, readmission rates to our department were lower in patients with previous serum ab decline compared to patients with persistent seropositivity ( $P = 0.015$ ).

**Conclusion:** This study provides clear evidence from a larger group of psychiatric patients that BDV-specific humoral responses may persist for years, suggesting that chronic BDV-infection occurs in humans. Moreover, increasing BDV-specific ab responses in the course of schizophrenia and low hospital readmission rates in patients with serum ab decline but high readmission rate in persistent seropositives support the hypothesis of a possible pathogenetic contribution of BDV infection in psychiatric diseases.

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## Prevalence of mood dysfunction in epilepsy patients in Croatia

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**Purpose:** To determine prevalence of depressive symptoms in a tertiary epilepsy center in Croatia.

**Methods:** Fifty consecutive and consenting epilepsy patients from the Zagreb Epilepsy Center were examined for the presence of depressive symptoms using the Beck Depression Inventory (BDI). Clinical variables for age, gender, seizure factors and social and vocational factors were analyzed.

**Results:** Mean age of the patients was  $30.8 \pm 13.5$  years, and 60.4% were females. Majority of them were employed (72.9%) and single (62.5%), and 35.4% had a university degree. Most of the patients had complex partial seizures ( $n = 40$ , 80%), and six (12%) were diagnosed with idiopathic generalized epilepsy. The mean monthly seizure frequency was  $2.0 \pm 3.4$ . At the time of their office visit 31.3% were newly diagnosed patients, and of the remaining, 45.8% were on AED monotherapy, 18.8% on two, and 4.2% on three AEDs. Assessment with the BDI showed that 33.3% of patients had depressive symptoms: 6.3% had mild depressive symptoms, 8.4% moderate and 18.6% had severe depressive symptoms, with the total BDI score of  $\geq 24$ . Three patients (6.4%) attempted suicide in the past, two of them had current suicidal ideation, and all of them were severely depressed.

**Conclusions:** This is the first study assessing mood dysfunction in epilepsy patients in Croatia. Increased prevalence of depression in epilepsy patients suggests specific approach and need for early treatment.

**Acknowledgements:** This work was supported by the Epilepsy Foundation grant to HH.

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## Brainstem raphe lesion in depressed and suicidal patients recorded on transcranial sonography (TCS)

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**Introduction:** Numerous evidence from neuroimaging, biochemical and animal studies implicates basal limbic system involvement in the pathogenesis of the mood disorders. Recent TCS studies showed that disruption of echogenic midbrain line corresponding to nuclei raphe might represent functional marker for the development of depression. We initiated this study to replicate these findings in a group of unipolar depressed patients, suicidal patients and controls.

**Patients and Methods:** Thirty one patients with unipolar depression (DSM-IV) of whom 11 were suicidal and 30 controls were studied using TCS. Severity of the disease was measured according to Hamilton Depression Rating Scale (HDRS) Examination was performed by standardized semiquantitative protocol by two independent physicians.

**Results:** Reduced raphe echogenicity was found in 19 of 31 (63%) of the patients with unipolar depression but only in three (10%) controls. Furthermore, 9 of 11 (82%) suicidal patients exhibit same reduced echogenicity, what was also in negative correlation with the severity of the illness assessed by HDRS  $cc = -0.569$ ,  $P = 0.003$ . No correlation was found between raphe echogenicity and number of depressive episodes, age, gender or duration of the disease. ( $P > 0.05$ ). We also found significant interobserver reliability for this method.

**Discussion:** Our result showed that altered echogenicity of the mesencephalic midline, what corresponds to the nuclei raphe is frequent in patients with unipolar depression. Such finding is rare in healthy subjects; however, in suicidal patients that finding was even more pronounced. These data suggest that TCS might be a novel method for the detection of depressive disorders and differentiating suicidal patients within.

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### Anxiety and depression in patients with multiple sclerosis

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**Introduction:** Cognitive behavioral disorder, depression and anxiety are the three most frequent psychiatric disorders in patients with multiple sclerosis (MS).

**Aim:** The aim of this study was to analyze level of depression and anxiety in patients with MS.

**Methods:** It was analyzed 50 patients with relapsing remitting multiple sclerosis (RRMS) treated at Department of Neurology Tuzla in a period December 2005 through April 2007. Clinical stadium of the disease was assessed by the Expanded disability status scale (EDSS) (1). Disease duration was 1–5 years. Depression was evaluated by Beck's scale of depression (2), and anxiety by Hamilton's scale of anxiety (3). All patients were without or with mild cognitive disorder (Mini mental status scale-MMSE- examination was 24–30) (4).

**Results:** There were 40 women (80%) and 10 men (20%), mean age was 37.4 (SD  $\pm$  8.65) years. Disease duration was 1–3 in 64%, and 4–5 years in 36% of the patients. According to EDSS, MS patients have been divided in two groups; group 1: EDSS 0–5.0 (44 patients or 88%) and group 2: EDSS 5.5–10.0 (six patients or 12%). All patients had some level of anxiety. Mild anxiety experienced 32%, moderate and severe 68% of all patients. Most patients were in range of age 30–39 years (42%) and in this group, 76% of them had moderate to severe anxiety. Mild, moderate or severe anxiety is not related neither to disease duration ( $P = 0.87$ ) nor EDSS-score ( $P = 1.0$ ). Some kind of depression was registered in 86% of patients. Only 14% of patients have not been depressed in moment of testing. Mild depression had 34% as well as moderate to severe 52% of patients. Among the range of 30–39 years of age, 52.4% of patients had moderate to severe depression. Mild, moderate or severe depression is not related neither to disease duration ( $P = 0.93$ ) nor EDSS-score ( $P = 0.23$ ).

**Conclusion:** All patients with multiple sclerosis are anxious. Mild, moderate or severe depression is verified in 86%. Disease duration or clinical stage of disease does not have impact on anxiety or depression.

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### Duration of delirium in acute phase of stroke patients

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**Introduction:** Delirium conditions in patients with stroke are temporary and with fluctuant intensity. The majority of patients are recovered within 4 weeks or less.

**Objective:** To determinate delirium duration in patients with stroke in relation to the sex, age, type and localization of lesion.

**Patients and methods:** At the Department of Neurology, University Clinical Center Tuzla, in the period from November 1st 2005 to May 31st 2006, among 233 patients with acute stroke, the delirium was diagnosed in 59 patients (25.3%). Delirium was diagnosed using a Delirium Rating Scale and the Diagnostic and Statistical Manual for Mental Disorders-Fourth edition (1, 2).

**Results:** The women had longer duration of delirium ( $5.5 \pm 4.6$  vs.  $4.8 \pm 4.5$  days), as well as persons who were older than 65 years ( $5.6 \pm 4.7$  vs.  $4.3 \pm 4.0$  days). In the patients with ischemic stroke the average duration of delirium was 4 days, and 3 days in patients with hemorrhagic stroke (the range of 1–18 days). The period of delirium was longer in patients with right hemispheric lesions ( $5.0 \pm 5.0$  vs.  $4.6 \pm 3.4$  days). There was no statistically significant difference in delirium duration in relation to the sex, age, type and localization. From 59 patients who had delirium, 11 (18.6%) have died during hospitalization. In two thirds of patients the symptoms of delirium were completely withdrawn on medicament treatment, while the remaining one third of patients had certain symptoms of delirium at discharge (70.8% vs. 29.2%,  $P = 0.003$ ).

**Conclusion:** Delirium occurs as a temporary manifestation in two thirds of patients in acute phase of stroke. Sex and age of patients, as well as the type and stroke localization do not have influence on delirium duration.

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### Epidemiologic characteristics of suicide before and after war (1992–1995) in Mostar region, Bosnia and Herzegovina

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**Aim:** To analyze epidemiologic characteristics of suicide in Mostar region, in period before (1978–1985) and after war (1997–2004), through some of the most frequent suicide parameters: age, sex, the

way suicide was committed and data of earlier psychiatric treatment.

**Subjects and Methods:** The research included all cases of suicide committed ( $n = 102$ ) in a period before (January 1st, 1978 till December 31st, 1985) ( $n = 52$ ) and after war (January 1st, 1997 till December 31st, 2004) ( $n = 50$ ). Data were collected from the Ministry of internal affairs, Sector of criminality police and archive of Department of Psychiatry, Clinical hospital Mostar. Chi-square test was used for determining statistically significant difference.

**Results:** No statistically significant difference was found in total number of suicides before and after war but it was found in the age group between 50 and 60 years ( $n = 3$  vs.  $n = 13$ ,  $P = 0.005$ ). Before war, women out of total number ( $n = 52$ ) committed 18 and men 34 suicides, which is a statistically significant difference ( $P = 0.027$ ). In the period after war, from a total number of 50 suicides, women committed 19 and men 31, which is not a statistically significant difference ( $P = 0.090$ ). No statistically significant difference ( $P = 0.665$ ) was found in a number of persons with earlier psychiatric treatment before ( $n = 23$ ) comparing to the period after war ( $n = 20$ ). Statistically significant higher number of women ( $P = 0.012$ ) committed suicides by drowning after war ( $n = 12$ ) comparing to a period before war ( $n = 4$ ). After war there was statistically significant decrease in number of suicides committed by hanging ( $n = 5$ ) comparing to the period before war ( $n = 18$ ) ( $P = 0.002$ ), while there was statistically significant increase in number of suicides committed by firearm/explosive devices after, comparing to the period before war (before war  $n = 7$  vs.  $n = 19$  after war,  $P = 0.004$ ).

**Conclusion:** Number of suicides was not significantly different in period before and after war in Mostar region, Bosnia and Herzegovina. However, in the age group between 50 and 60 years, number of suicides by drowning and by firearm/explosive devices were significantly increased after, comparing to the period before war, while number of suicides committed by hanging was significantly lower after war. There was a significantly higher number of men who committed suicide than women in the period before war but there was not such significant difference after war. No statistically significant difference was found in a number of persons with earlier psychiatric treatment before comparing to the period after war.

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### Acute stress and depression 3 days after delivery

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**Introduction/Objectives:** Delivery of a child is often associated with feelings of being out of control and also can be a painful experience; therefore, it could be traumatic for some women. Reynolds JL concluded that women after childbirth could develop one form of PTSD (posttraumatic stress disorder). He named this variant of PTSD a 'traumatic birth experience.'(1). Aim of this study was to investigate influence of traumatizing complications on occurrence of the elements of acute stress and depressive symptoms 3 days after delivery.

**Participants, Materials/Methods:** We investigated the elements of acute stress and depressive symptoms 3 days after delivery using Impact of Events Scale revised (IES-r) (2) and Edinburgh Postnatal Depression Scale (3) (EPDS). 103 subjects, who signed informed consent and without previous medical history of psychiatric illness, were included in investigation. We assumed that following complications could be considered as factors of risk for acute stress reaction and symptoms of depression after delivery: long duration of delivery ( $\geq 14$  h), very painful delivery, complication and illness of mother during and after delivery as a consequence of

delivery, preterm delivery (before week 36) and/or illness of a child (as a consequence of delivery or congenital).

**Results:** Sixty-one out of 103 investigated mothers had one or more investigated complications. Statistically significant difference ( $P < 0.01$ ) was found in mean IES-R scores between control group ( $n = 42$ )  $4.67 \pm 5.43$  and group with complication ( $n = 61$ )  $13.50 \pm 14.12$ . Statistically significant difference ( $P < 0.01$ ) was also observed in mean EPDS scores between control group ( $n = 42$ )  $3.85 \pm 2.76$  and group with complication ( $n = 42$ )  $7.03 \pm 3.90$ .

**Conclusion:** One or more of the following complications: long duration of delivery ( $\geq 14$  h), very painful delivery, complication and illness of mother during and after delivery as a consequence of delivery, preterm delivery (before week 36) and/or illness of child (as a consequence of delivery or congenital) were related with occurrence of acute stress or depressive symptoms 3 days after delivery.

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### Prevention and correction strategies of burn-out syndrome among doctors-psychiatrists

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**Goal:** Study prevalence and causes of burn-out syndrome formation for prevention and correction.

**Materials and Methods:** Psychological test 'Method of diagnostics of level of emotional burnout' (V.V. Boiuko) and research program that includes questionnaire, unstructured interview, and participation in focus groups for people who work in the area of mental health. Questionnaire includes 39 questions researching socio-demographic, psychological factors that reflect psychoemotional status of medical workers, level of their psychological comfort and professional satisfaction. 223 psychiatrists from Eastern Ukraine participated in this research project.

**Results:** Seventy-nine percent psychiatrists had burn-out syndrome in different degree. Original preventive and correctional programs were proposed which include new educational technologies, psychocorrectional strategies, information and educational directions, psychotherapeutic methods of correction. Different preventive and correctional strategies were created (strategies that focus on correction of medical professional's personality, strategies that focus on therapeutic ideology and medical subculture, strategies that focus on interpersonal relationships at workplace, strategies that focus on particular factors involved in work with psychiatric patients). Psychotherapeutic techniques that prevent and correct development of burn-out syndrome (correction of professional communication techniques, supervision, balling groups, support groups, T-groups (training groups), debriefing, techniques that work with strengthening of personal happiness, techniques that focus on the correction of the future) were described as well.

**Conclusion:** All doctors-psychiatrists need prevention of burn-out syndrome. Risk group and persons with burn-out syndrome require correction programs.

**Cerebral hemodynamics, catecholamines and cortisol in chronic PTSD**Marinko Dikanović<sup>1</sup>, Dragutin Kadojić<sup>2</sup> & Vlatka Vuletić<sup>1</sup><sup>1</sup>*Department of Neurology General Hospital Josip Benčević, Slavonski Brod,* <sup>2</sup>*University Department of Neurology, University Hospital Osijek, Croatia*

Cerebral hemodynamics was studied by transcranial Doppler (TCD) in 50 patients with chronic, previously untreated post-traumatic stress disorder (PTSD), with simultaneous determination of catecholamines by 24-hour urine analysis of vanillylmandelic acid (VMA) as the end-product of catecholamine metabolism, and urine cortisol. The same analyses were performed in the patients following 3-week psychopharmacotherapy during their hospitalization at psychiatric ward, and in 50 healthy subjects as a control group. Vasospasm of the circle of Willis was observed in 68% and of vertebrobasilar basin in 22% of patients with chronic, previously untreated PTSD before therapy introduction. After 3-week psychopharmacotherapy, vasospasm of the circle of Willis and

vertebrobasilar basin persisted in 18% and 10% of the patients, respectively. In the control group, vasospasm was recorded in only 4% of subjects. Statistical analysis yielded a statistically significant difference in the presence of the circle of Willis and vertebrobasilar basin vasospasm in patients with chronic, untreated PTSD, pointing to the importance of the circle of Willis hemodynamics in this patient population. At the same time, increased levels of VMA were recorded in 58% and decreased levels of cortisol in 56% of these patients. Following 3-week pharmacotherapy, elevated VMA and decreased cortisol persisted in 10% and 14% of patients, respectively. None of the control subjects had elevated VMA or decreased cortisol levels. Coexistence of the circle of Willis vasospasm, elevated VMA and decreased cortisol was initially observed in 50% of patients with chronic, previously untreated PTSD and none of the control subjects. Post-therapeutically, the same pattern persisted in 14% of PTSD patients. Study results pointed to the role of simultaneous analysis of cerebral hemodynamics, and cortisol and catecholamine levels in patients with chronic PTSD.

# LATE BREAKING POSTERS – PSYCHIATRY

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## **Serum inflammatory factors in major depressive disorder, comparison with healthy volunteers**

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Aim of this research was to determine the differences in concentrations of inflammatory parameters in the serum: interleukin 6 (IL-6), C-reactive protein (CRP), and tumor necrosis factor alpha (TNF-alpha) in patients that suffer from major depressive disorder and healthy volunteers. Diagnosis of a major depressive disorder was made using ICD-10 criteria. None of the patients had co-morbid psychiatric or somatic disorder. Control group of subjects was made up of healthy volunteers without psychiatric or somatic illness, mainly hospital employees. Lumimunochemical method was used for detection of serum IL-6 and TNF-alpha levels while immunoturbidimetric method was used for detection of CRP. In our results we point out that patients with major depressive disorder have statistically significant higher concentrations of serum IL-6 as well as CRP. No statistically significant difference in serum concentrations of TNF-alpha was found. In conclusion we emphasize that significant discrepancies exist in the background of depressive disorder pathophysiology in psychoimmunological-inflammatory factors compared with healthy controls.

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## **Serum inflammatory factors in schizophrenia, comparison with healthy volunteers**

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Aim of this research was to determine differences in concentrations of inflammatory parameters in the serum: interleukin 6 (IL-6), C-reactive protein (CRP), and tumor necrosis factor alpha (TNF- $\alpha$ ) between patients that suffer from schizophrenia and healthy volunteers. Diagnosis of schizophrenia was made using ICD-10 criteria. None of the patients had a co-morbid psychiatric or somatic disorder. Control group of subjects was made up of healthy volunteers without psychiatric or somatic illness, mainly hospital employees. Serum IL-6 and TNF- $\alpha$  levels were determined using Lumimunochemical method while to determine levels of CRP immunoturbidimetric method was used. In our results we point out that patients with schizophrenia have statistically significantly higher concentrations of serum IL-6 as well as CRP. No statistically significant difference in serum concentrations of TNF- $\alpha$  was found between patients suffering from schizophrenia and the healthy control group. In conclusion we point out that in the background of schizophrenia pathophysiology exist significant discrepancies in psychoimmunological-inflammatory factors compared with healthy controls. Further research is needed to

determine the connection of these changes with the clinical picture and the course and outcome of schizophrenia.

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## **Serum IL-6, TNF- $\alpha$ and CRP in suicidal and non-suicidal patients with a major depressive disorder**

Ana Kovak-Mufić, Tanja Jagodić, Iva Ivančić, Dalibor Karlović, Danijel Crnković & Danijel Buljan  
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Aim of this research was to determine differences in concentrations of inflammatory parameters in the serum: interleukin 6 (IL-6), C-reactive protein (CRP), and tumor necrosis factor alpha (TNF- $\alpha$ ) between suicidal and non-suicidal patients suffering from major depressive disorder. Diagnosis of major depressive disorder was made using ICD-10 criteria. We determined whether or not the patient was suicidal by anamnesis data and also with a sufficient score on the suicidality item on Hamilton's depression scale. None of the patients had co-morbid psychiatric or somatic disorder. Control group of subjects was made up of healthy volunteers without psychiatric or somatic illness, mainly hospital employees. Serum IL-6 and TNF- $\alpha$  levels were determined using Lumimunochemical method while to determine levels of CRP immunoturbidimetric method was used.

In our results we point out that suicidal patients have statistically significantly higher concentrations of serum IL-6 than the group of patients with major depressive disorder who are not suicidal. No statistically significant difference in serum concentrations of CRP and TNF- $\alpha$  was found between suicidal and non-suicidal patients with major depressive disorder.

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## **Aggression in depressed inpatients**

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**Introduction:** Aggressive behavior is often seen in depressive patients and has an effect in the therapeutic relationship in clinical settings. The aim of this study is to explore subtypes of aggression and their relevance in depressed inpatients.

**Methods:** One hundred inpatients with depressive disorder were recruited. After giving their consent the patients completed four standardized self-report questionnaires (BDHI Buss Durkee Hostility Inventory, STAXI State Trait Anxiety Inventory, AFSE Aggression Scale of Saltz and Epstein, FAF Questionnaire for Aggressiveness Factors).

**Results:** Depressed inpatients tend to control their aggression more and score higher than the norming sample regarding resentment, self-aggression, suspicion, aggressive jealousy and state anger.

**Conclusion:** Aggression affects social contacts and the subjective well-being. Depressed inpatients show little openly aggressive behaviour, but to a greater extent resentment and jealousy. These

findings underscore the need for further research in evaluating aggressive behaviour in depressed inpatients.

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### **Aggression in psychiatric inpatients: a comparison of inpatients with borderline personality disorder, schizophrenia and anxiety disorder**

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**Introduction:** Aggressive behavior is a common problem among several psychiatric disorders. It has many negative consequences and has an affect in social and therapeutic relationships of patients. The aim of this study is to examine aggressive behavior and related emotions in Borderline Personality, Schizophrenia and Anxiety Disorder.

**Methods:** Twenty inpatients with DSM-IV diagnosed schizophrenia, 30 inpatients with anxiety disorder and 10 inpatients with borderline personality disorder completed self-report questionnaires. All inpatients consent in this study. We used standardized subscales for our investigation (BDHI Buss Durkee Hostility Inventory, STAXI State Trait Anxiety Inventory, AFSE Aggression Scale of 'Saltz and Epstein', FAF Questionnaire for Aggressiveness Factors).

**Results:** Borderline patients show significant differences in the STAXI subscales. They have higher scores in the scale of 'Anger In' in comparison to normal population or to anxiety and schizophrenic patients.

**Conclusion:** Borderline patients have higher scores of aggressive behavior. In psychotherapy and medical treatment it is a factor which has too less attention. In therapy we need more strategies to get along with aggressive patients. The aggressive tendency of borderline people often is a problem for the team in stationary treatment.

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### **Sexuality and partnership in depressed inpatients**

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**Introduction:** Sexuality and depression are in an interactive relationship. Depressive disorders influence partnership, sexuality and hence the quality of life. Additionally the body image and the self-concept can be negatively affected. Aim of the study is to explore changes in these fields.

**Methods:** One hundred inpatients with ICD-10 diagnosed depressive disorder completed six standardized self-report questionnaires (Tuebingen Scales for Sexual Therapy (TSST), List of problems (PL), Sexual functions, Relationship assessment scale (ZIP), Questionnaire on self-perception of the body (FBeK) and Partnership questionnaire (PFB) after agreeing to take part in the study.

**Results:** In comparison to the norming sample depressive patients showed significant more problems of sexual interaction, distribution of influence in the partnership, masturbation and communicative fears.

**Conclusion:** Depressive patients experience a strong impact of sexual intercourse and masturbation due to their illness. Various aspects of partnership and the body image are negatively affected as well. These results emphasize the importance of further research.

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### **Sexuality in psychiatric inpatients: a comparison of patients with borderline personality disorder, schizophrenia and anxiety disorder**

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**Introduction:** Sexuality is an important aspect of human personality. Sexual dysfunctions are a common problem among psychiatric patients and aren't limited to the acute phase of the illness. Self-esteem, subjective well-being, partnership and quality of life in general can be affected. Knowledge about this issue will provide the physician with an opportunity to improve medical treatment. The aim of this study is to examine sexual problems and their consequences for partnership among patients with the psychiatric diagnoses borderline personality disorder, anxiety disorder or schizophrenia.

**Methods:** Ten inpatients with DSM-IV diagnosed schizophrenia, 25 inpatients with anxiety disorder and 10 inpatients with borderline personality disorder completed standardized self-report questionnaires after being asked if they were willing to take part in this study.

**Results:** Patients with anxiety disorder, borderline personality disorder and schizophrenia show in comparison to the norming sample significant more problems in sexual interaction and masturbation. Patients in all of the three groups have noticeable more problems in the distribution of influence in partnership. Schizophrenic patients also score high on communicative fears.

**Conclusion:** The examined psychiatric disorders have severely negative effects on sexuality and partnership of the affected people. Further research would be needed to come up to the multifaceted etiology of sexual problems.

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### **Serum inflammatory factors in a major depressive disorder with regard to depression type**

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**Introduction:** The aim of this study was to investigate the levels of serum inflammatory factors: Interleukin 6 (IL6), C-reactive protein (CRP), and Tumor necrosis factor alpha (TNF- $\alpha$ ) in relation to the type of depression in patients affected by major depressive disorder (MDD) and in healthy volunteers.

**Subjects and methods:** The study included 57 participants. MDD was diagnosed according to the criteria of a Diagnostic and Statistical Manual, 4th revision (DSM IV) and by application of HAMD-17 questionnaire. Depression subtypes (melancholic,  $n = 24$ , and nonmelancholic,  $n = 17$ ) were determined using MINI questionnaire. None of the patients had co-morbid psychiatric or somatic illness. The control group ( $n = 16$ ) was made of healthy volunteers without psychiatric or somatic illness. Serum concentrations of IL6 and TNF- $\alpha$  were determined by lumimunochemical method. CRP concentration was determined by immunoturbidimetric method.

**Results:** Using one-way ANOVA we found statistically significant difference in serum level of IL6 ( $P = 0.007$ ) between groups, but no statistically significant differences was found in the analysis of serum CRP and TNF- $\alpha$  concentrations. Significantly lower level of

IL6 ( $P = 0.007$ ; Scheffe post hoc test) was found in healthy controls than in patients with melancholic type of depressive disorder. No statistically significant difference was found in the analysis of serum IL6 concentration between two types of MDD. **Conclusion:** Results of our investigation suggested psychoimmunological changes in pathophysiology of MDD, particularly in melancholic subtype, but serum concentrations of investigated inflammatory factors could not be used as biological markers to differentiate clinical subtypes of MDD.

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### **Case report: differential-diagnostics dilemmas of doubt about “pandas” syndrome**

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**Introduction:** At the end of 90's of last century, in etiologic researches of neuropsychiatric disorders, are appearing studies which disclose outstanding connection between Sydenham's chorea, movement disorders in childhood caused with rheumatic fever and obsessive-compulsive disorders. Accordingly, it is more spoken about possible autonomous mechanism of genesis and role of  $\beta$  hemolytic streptococcus in OCD etiopatogeny. In 1998 Swedo and fellows are documented poststreptococcus OCD cases and/or tics to children and adolescents, without symptoms Sydenham's chorea, called it as acronym PANDAS (the Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infection). Neuroimaging researches are discovering the striatum increasing to these patients. In the following researches, behind comparing with OCD signs, PANDAS is connecting with emotional liability, separation anxiety, conductive disorders, cognitive deficit, motorical hyperactivity and eating disorders.

In our research we are representing a development of polymorphous psychical disorders to 12-years-old girl, where in actual clinical presentation obtains restrictive type of anorexic phenomenology with compulsive symptoms.

**Methods:** Clinical investigation, which include psychiatric examination, laboratory, consultations of nutritionist and endocrinology tests.

**Results:** Reduction of psychopathology after the treatment GABHS infection.

**Conclusion:** Indicative influences of GABHS infections in genesis of the OCD.

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### **Mini mental state examination/MMSE-how can be helpful in order to evaluate the starting therapeutic effect in patients who are under psychiatric treatment**

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**Aim of the study:** The mini mental state examination is the most commonly used instrument for screening cognitive function. This examination is not suitable for making diagnosis but can be used to indicate the presence of cognitive impairment in dementia or head injury but also it is known that most of depressive patients have some cognitive disturbances. We investigated how useful can be MMSE in out-treated patients who start to use antidepressive drugs.

**Methodology:** This research was done as prospective study on the out-treated male and female patients in the University Department in the Clinical Hospital Osijek. The authors included 40 male and 40 female patients age between 18 and 60 who were starting treatment with antidepressive drugs.

They were under antidepressive treatment with: 10 male patient had taken sertraline, 10 male patients have taken escitalopram, 10 male patients have taken tianeptin and 10 male patients have taken fluvoksamin. The same procedures were for female patients. We are evaluating cognitive function using MMSE before treatment and three months after the beginning of the treatment. Also, they fulfilled DSM-IV criteria for depressive disorder and other mood disorders (major depression, dysthymia, anxiety disorders).

**Results:** The results showed us that most of the female and male out-treated patients have better scoring in MMSE after three months treatment with antidepressive drugs (70 % male and 75% female patients). Also male patients who had taken sertraline and tianeptin showed better scoring in MMSE, but female patients showed better scoring in MMSE after treatment with sertraline and escitalopram. Significant differences among all groups of patients and drugs did not found ( $P > 0.05$ ).

**Conclusions:** Treatment with antidepressive drugs increase cognitive functions in depressive patients according to the better scoring in MMSE during three months antidepressive treatment. MMSE is useful instrument in clinical practice for quickly screening of cognitive function.

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# LATEST BREAKING POSTERS - NEUROLOGY

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## Effect of benfotiamine on patients with diabetic dominantly sensitive polyneuropathy

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A widely accepted definition of diabetic peripheral neuropathy is the presence of symptoms and/or signs of peripheral nerve dysfunction in people with diabetes mellitus after exclusion of other causes. Pathogenesis peripheral nerve lesions included four pathophysiological mechanism: glucose-induced activation of protein kinase C (PKC) isoforms, increased formation of glucose-derived advanced glycation end products, increased glucose flux through the aldose reductase pathway and increased flux through the hexosamine pathway. The thiamine prodrug, benfotiamine, inhibits the formation of Advanced Glycation Endproducts (AGEs) in target tissues of diabetic microangiopathy. **Objective of study:** The objective study was six months follow up in patients with diabetic polyneuropathy in relation to the treatment – *benfotiamine*.

**Material and methods:** Our study included ten patients with distal, symmetrical, predominantly sensitive polyneuropathy who were treated at the Institute of Neurology, CCS, from September 2007 until 16th February 2008. Diabetic polyneuropathy was determined by evaluation of clinical examinations, laboratory analysis and electromyoneurography (EMG) results. The extent of neuropathic pain was defined by visual analogue scale (VAS) from 0 to 10 degrees. All patients were treated with befortiamin (1–3×100mg/day) during 45 days, depends of neuropathic pain intensity.

**Results:** There were six male and four female patients, mean age of 54.3 years. Type I of diabetes mellitus had eight patients and type II diabetes mellitus had two patients. All patients had neuropathic pain and paresthesias during 3 months to 5 years (mean – 2.1 years). Six patients were treated with 3×100 mg befortiamin and four patients treated with 1×100 mg benfotiamine. Before therapy, intensity of neuropathic pain (VAS) was 5.6, and after therapy intensity of pain was decreased to 4.5 degree. Painful paresthesias and numbness were decreased from 5.5 to 3.2. Also, we observed reduction of cramps. There were no side effect.

**Conclusion:** Benfotiamine decreased neuropathic pain, paresthesias and cramps in patients with sensory, diabetic polyneuropathy.

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## The role of computed tomography (CT) and magnetic resonance imaging (MRI) in a patient with adenocarcinoma – a case report

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**Introduction:** We are presenting 66-year-old man with acute headache, vertigo, nausea and vomiting. All symptoms begun few

hours before admitting at the Hospital. Patient underwent surgical operation of Adenocarcinoma colonis (PH verificata) in 2005.

**Materials and methods:** On admission we performed routine blood and liquor tests, EEG, chest X-ray, abdominal ultra sound (US), Tu-markers analysis. All results was normal. CT (GE 16-slice) and MRI (1.5T GE) exams was performed using routine protocol.

**Results:** Brain CT on admission showed intracerebral haemathoma in left occipitoparietal region, with no perifocal oedema and postcontrast enhancement. CT also showed multiple calcifications in both cerebral and right cerebellar hemisphere. MRI exam was performed using routine haemorrhage protocol which include T1W, T2W, FLAIR, DWI (diffusion) with ADC maps, and \*T2W (GRE) sequence for blood products. MRI showed multiple cavernous angiomas in right cerebellar hemisphaera and in left occipito-parietal region. There was also multiple ischemic lesions with chronic microbleeding. There was no post-Gd enhancement.

**Conclusion:** Brain metastasis origin from any adenocarcinoma usually are characterized as focal lesions with calcifications, blood product and ring-enhancement. Based on this, after CT exam, we performed MRI to exclude metastatic disease. CT findings in this case such as: haemathoma, calcifications, cavernoma can misunderstand as haemorrhagic metastasis. In such cases, MRI is superior method than CT for making correct diagnosis.

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## EEG-mapping in patients with Huntington's disease

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**Introduction:** The EEG in Huntington's disease (HD), a hereditary, devastating neurodegenerative disease leading to neurological and psychiatric dysfunction, has been reported to be abnormal in several previous studies. The aim of the present study was to investigate the role of EEG mapping as an objective and quantitative measure of daytime brain function in untreated and treated patients with Huntington's disease.

**Methods:** In 71 patients and 71 healthy controls a 3-min vigilance-controlled EEG (V-EEG) was recorded during midmorning hours. Thereafter, EEG results were compared with controls within the whole group and within the 25 drug-free patients.

**Results:** Statistical overall analysis by means of the omnibus significance test demonstrated significant EEG differences between HD patients and controls. Subsequent univariate analysis revealed a decrease of absolute total power and an increase in absolute and relative delta power as well as relative theta power nearly over the whole brain. Absolute and relative alpha and beta power were decreased also nearly all over the cortex. By widespread significance of the results frontotemporal areas have been the most affected. The power of the dominant frequency was significantly attenuated over the whole brain. HD patients showed slowed delta/theta, beta and

total power centroids as well as slowed centroid deviations of these bands. The alpha centroid and the centroid deviation of the alpha band were accelerated. These results could be found for both groups of our patients (all patients as well as drug-free patients) so that results seem to be independent of any medication.

**Conclusion:** In conclusion EEG mapping is a valuable instrument for measuring and visualizing impaired daytime brain function in Huntington's disease. The increase in delta power and the decrease of the power of all faster frequencies nearly all over the cortex with a main focus on frontotemporal areas reflect the known deterioration of the brain in HD. This is the largest study on EEG mapping in HD.

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### Risk factors in patients with stroke

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**Objective:** The aim of this study was to analyze some of stroke risk factors in the hospitalized patients with different types of first-ever stroke.

**Patients and Methods:** In the five-year period (2001–2005), 3864 patients with first-ever stroke were admitted at the Department of Neurology, Tuzla, Bosnia and Herzegovina. Using hospital protocol, we analyzed following stroke risk factors: age, sex, hypertension, heart diseases, atrial fibrillation, diabetes mellitus, smoking and alcohol abuse.

**Results:** Mean age of all stroke patients was  $68 \pm 10$  years in females and  $65 \pm 11$  years in males ( $P < 0.0001$ ). Women were overrepresented in all types of stroke (ischemic stroke – IS 52.4% vs. 47.6%; intracerebral haemorrhage – ICH 52% vs. 48%; subarachnoid haemorrhage – SAH 57% vs. 43%). The leading risk factors in the patients with ICH and IS were hypertension (84.9%; 73%), heart diseases (29.4%; 47.6%) and smoking (27.6%; 29%). Diabetes mellitus was on the third place in women with IS and ICH (33%; 17%), and smoking (43.6%) was on the second place in men with ICH. In the patients with SAH the leading risk factors were hypertension (82%) and smoking (36%) in women, however, smoking (63%) and hypertension (48%) in men.

**Conclusion:** Women are overrepresented in all types of first-ever stroke and they are older than men. Hypertension is the leading risk factor for all types of stroke, but certain sex differences in distribution of other vascular risk factors exist.

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### Effects of three-stage rehabilitation treatment on acute cerebrovascular diseases: a prospective randomized, controlled, multicenter study

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**Introduction/objectives:** To evaluate the effect of tertiary rehabilitation treatment on acute cerebrovascular diseases.

**Participants, Materials and methods:** Fifteen tertiary rehabilitation networks were set up throughout the country. 1078 patients with acute cerebrovascular diseases were randomly divided into two groups: rehabilitation group and control group, out of which 19 patients died, 157 dropped out, and seven successive evaluations were completed in 902 patients that. 439 of the remaining 902 patients in the rehabilitation group, 266 males and 173 females, aged  $61 \pm 11$ , 278 cases with cerebral infarction and 161 with cerebral hemorrhage, received routine treatment and early rehabilitation for 28 days in the ward of neurology, and then went home and received community rehabilitation for 6 months or

underwent specialized reinforcement training for 2 months and after that went home and received community rehabilitation for 4 months. The 463 patients in the control group, 281 males and 182 females, aged  $60 \pm 11$ , 291 of which with cerebral infarction and 172 with cerebral hemorrhage, received only routine treatment and early rehabilitation for 28 days in the ward of neurology, and then went home to conduct rehabilitation training by themselves or their family members for 6 months. Evaluation was conducted seven times, with National Institutes of Health Stroke Scale (NIHSS), Fugl–Meyer motor function scale, Barthel index, SF236 scale, Lowenstein occupational therapy cognitive assessment (LOTCA), Western aphasia battery, Hamilton depression scale, and modified Ashworth spasm scale, 1 week after the onset and by the ends of 1, 2, 3, 4, 5 and 6 months after the onset respectively.

**Results:** The scores of clinical neurological impairment, Fugl–Meyer scores, SF236 scores, incidence of PSD, and modified Ashworth scores (for upper and lower limbs) were lower, and LOTCA scores and Barthel indexes were higher at different time points in the rehabilitation group than in the control group and the differences were statistically significant since the second month after the onset. By the end of the sixth month, the patients of the rehabilitation group basically re-achieved the ability of self-care in daily activities with a Barthel index of  $84 \pm 33$ . The patients of the control group also recovered to a certain degree however, to a smaller extent in comparison with the rehabilitation group.

**Conclusions:** Tertiary rehabilitation treatment of cerebrovascular diseases is effective in improving motor function, ability of daily living activities, and quality of life and reducing the incidence rates of secondary complications.

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### Role of vanilloid receptors in thermal hyperalgesia induced by intraplantar endothelin-1 administration

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**Objective:** To assess the role of vanilloid receptor (VR) in thermal hyperalgesia induced by intraplantar endothelin-1 (ET-1) injections.

**Methods:** VR gene-knockout mice (KO group) and wild type C57BL/6J mice (WT group) in three subgroups were subjected to intraplantar administration of ET-1 at the doses of 3, 10 and 100 pmol (dissolved in 10  $\mu$ l of PBS, pH 7.4,  $n = 6$  in each group), respectively. The latency time of paw withdrawal (PWT) from heat irradiation stimulation was recorded before injection and 15, 30, 45 and 60 min after injection.

**Results:** ET-1 induced thermal hyperalgesia in both groups. The mice in WT group showed a more sharply shortened PWT than those in KO group. ET-1 decreased PWT as the dose administered increased in WT group, which was different from the responses of the KO mice. At the dose of 100 pmol of ET-1, no further decrement of latency time was observed in WT group, whereas such response occurred at 30 pmol in KO group.

**Conclusion:** Intraplantar injection of ET-1 induces thermal hyperalgesia mediated partially by VR.

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### The influence of verbotonal rehabilitation on visual evoked potentials in dyslexic children

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Evoked visual potentials testing with cortical cartography shows as useful diagnostic method for visualisation of functional changes in visual pathway in dyslexic children.

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The aim of this study was to investigate the changes in visual evoked potentials and cartographical characteristics in dyslexic children after 1 year of verbotonal rehabilitation.

Twenty dyslexic children aged 7–10 years were tested. Control group consisted of 20 healthy children, matched by age, gender and nonverbal status.

Complete diagnostic evaluation were performed included ophtalmological, otoneurological, logopedic and psychological evaluation. Subjects and controls were examined by checkerboard pattern reversal visual evoked potentials (VEP) according to the 2004. European standards. Cortical cartography was simultaneously performed by Neuroscan 32-electrode system using Scan 4.3 software for data analysis.

The results show significantly delayed latency of N 135 wave during monocular and binocular stimulation in dyslexic children. Twelve children show significant functional assymetry in monocular stimulation, ten of them show are decompensated in binocular analysis of visual information.

After 1 year of rehabilitation the significant shortening of wave N 135 latency has been recorded in all subjects. The functional asimetry during monocular activation has been less expressed in five children, and eight subjects have achieved the compensation during binocular activation.

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### **Natalizumab treatment for MS leads to changes in adhesion molecule expression**

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**Aim of the study:** Natalizumab (Tysabri<sup>TM</sup>) treatment is the first monoclonal antibody therapy approved for the treatment of multiple sclerosis (MS). Therapeutic mechanisms of the humanized monoclonal antibody natalizumab is the blockade of alpha4-integrin which leads to an inhibition of immune cell extravasation into the central nervous system. Understanding of effects on further components of the immune system may help to prevent potential side effects or to determine patients who are non-responders to natalizumab treatment early. In the present study we investigated changes in the expression of a panel of adhesion molecules as induced by natalizumab treatment in MS.

**Methods:** Quantitative expression levels of cell surface bound intercellular adhesion molecule-1, -2, -3 (ICAM-1, -2, -3), leukocyte function antigen-1 (LFA-1) and alpha4-integrin on mononuclear cells (CD3+ T-cells, CD 19+ B-cells, CD 14+ monocytes) were measured by two colour flow cytometry (Beckman Coulter).

**Materials:** Peripheral blood was drawn from ten MS patients right before the first and the fourth infusions of natalizumab.

**Results:** We found a significant decrease of unblocked alpha4-integrin cell surface expression on all investigated mononuclear subsets (B cells -62%,  $P < 0.0001$ ; T cells -54%,  $P < 0.0001$ ; monocytes -31%,  $P < 0.005$ ) in the blood of MS patients after 3 months of natalizumab treatment as compared to baseline levels. Moreover, we obtained a consistent decrease of the expression of LFA-1 on mononuclear cells (B cells -7%,  $P < 0.05$ ; T cells -15%,  $P < 0.0001$ ) after 3 months of natalizumab treatment.

**Conclusions:** We obtained impressively consistent results of a sustained decrease of unblocked alpha4-integrin expression not only in all patients but also in all investigated leukocyte

subgroups. These findings indicate that a significant blockade of cell surface bound alpha4-integrin can be found four weeks after the last natalizumab infusion. Moreover, our data indicate that natalizumab treatment in MS leads to further changes in the expression of cell surface bound AM, probably as a secondary effect.

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### **Spontaneous recanalisation of internal carotid artery occlusion: neurovascular evaluation our two cases**

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**Study objectives:** Although spontaneous recanalisation of occluded internal carotid arteries ACI/ has been previously observed and reported, the exact mechanisms including incidence were insufficiently studied. The reason for this is that diagnosis of recanalisation required a conventional catheter angiography, a “gold standard” as well as an invasive procedure for distinguishing total arterial occlusion from sub-occlusion. The exact timing of spontaneous recanalisation remains unclear, although it has most commonly occurred early after a stroke. In addition and although unclear, several mechanisms, including vasospasm, distal embolisation of occlusive clot, and spontaneous clot lysis, have been proposed to explain recanalisation

**Methods:** We present two cases of late spontaneous recanalisation of an acute occluded internal carotid artery, angiographically reported in the Department of Neurology, Clinical Hospital of Rijeka.

**Results:** Routine follow-up in both cases has shown spontaneous recanalisation of internal carotid artery after which we scheduled both patients for stenting.

**Conclusion:** These and other similar cases described in literature as well as limited usage of angiography in control diagnosis, raise the possibility that the recanalisation in ACI/ is more frequent than previously considered. Noninvasive ultrasound diagnostic is a safe and secure method to be used in proving significant carotid disease. Routine follow – up and serial monitoring of all patients with carotid occlusion is required, especially because of known progression of atherosclerosis in asymptomatic carotid arteries after contralateral endarterectomy intervention. During this time it is possible to determine which patient is to undergo a successful surgical or stenting procedure, and help determine true incidence of recanalisation, in despite of the ambiguity of the recanalisation mechanism. Although both of our patients were treated with low density heparin from the onset, it is not known which role, if any, the anti-platelet and anticoagulant therapy may have in the treatment process of recanalisation.

Diagnosing spontaneous recanalisation of occluded extracranial ACI seems to be more frequent than expected bur the mechanism of this phenomenon and an implication is still truly unknown.

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### **Avoidance coping and lymphocyte counts**

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Stress is the key psychological activator of the HPA axis and therefore an important risk factor for diminished immunocompetence. Our study was aimed at assessing the connection between strategies of coping with stress and lymphocyte counts in soldiers.

We present a study made on 60 members of Slovenian Army in whom we evaluated coping strategies using Coping Responses Inventory. In 33 soldiers we also assessed white blood cell counts with a detailed lymphocyte analysis using flow cytometry. Factor analysis identified two factors of coping – avoidance coping and approach coping. We found statistically significant negative correlations between avoidance strategies and monocyte, lymphocyte and lymphocyte T concentrations. Approach strategies, which are thought to be more adaptive, did not correlate with the measures of the immune system. These findings support the notion that each person's individual coping styles are reflected in their immune characteristics. We presume that avoidance coping might be an important mediating variable influencing the effects of stress on immune measures.

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### **Prevalence and characteristics of cerebrovascular atherosclerotic disease in patients with diabetes mellitus type 2**

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A great number of epidemiological studies confirms that diabetes is an independent risk factor for stroke. Some studies cause doubt that atherosclerotic changes are heavier in diabetics than in general population. In our study we analysed prevalence and characteristics of cerebrovascular atherosclerotic disease in patients with diabetes mellitus type 2.

The study included 60 persons of both gender with confirmed diabetes mellitus type 2. The control group consisted of 60 healthy subjects, similar age as persons with diabetes. The investigation included color dopler flow imaging (CDFI) of extracranial arteries and transcranial dopler (TCD) of intracranial cerebral arteries.

The analysis of frequency of atherosclerotic cerebrovascular disease showed statistically significant more prevalence in the group of examinees compared to the control group. In the group of examinees we found statistically significant more patologic findings ( $p < 0.01$ ) on carotid arteries and arteries of the circle of Willis. Atherosclerotic changes were statistically significant more severe ( $p < 0.05$ ) in the group of examinees compared to control group. Among examinees we found stronger degree of carotid stenoses and other signs of cerebral macroangiopathy, as well as signs of cerebral microangiopathy.

According to our results we concluded that diabetes mellitus leads to earlier and faster development of the atherosclerotic cerebrovascular disease, influences the cerebral hemodynamic and increases the risk of stroke.

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### **Expression of macrophage inflammatory protein 3-alpha and B-lymphocyte chemoattractant in serum in course of methylprednisolone treatment of multiple sclerosis relapses**

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In further studies to elucidate the mechanism of intravenous methylprednisolone /IVMP/ in symptomatic therapy of relapses

in multiple sclerosis /MS/ victims, we have evaluated the expression of chemokines: macrophage inflammatory protein 3-alpha (MIP3- $\alpha$  / CCL20) and B-lymphocyte chemoattractant (BLC/ CXCL13) before and after treatment. The data serving a further exploration of the MP mechanism of action in MS relapses may be helpful in establishing the treatment design, that would be specific both towards the individuals, and to the disease phase itself.

The mean levels of MIP 3- $\alpha$  in sera of MS patients showed higher values compared to control subjects. After a day 5-day treatment with IVMP, the serum MIP 3- $\alpha$  level happened to rise markedly, but the above described differences lacked statistical significance. The serum expression of BLC was significantly higher in the group of MS patients in comparison to healthy subjects. After therapy with IVMP the estimated level demonstrated an increase in relation to the initial values found in MS patients. Such a response has been seen also in responder but not in non-responder subgroup.

The enhancement of BLC expression after IVMP therapy in MS relapses may explain the lack of a long term effect of MP therapy in MS. The observed difference of BLC expression between responder and non-responder group of patients should be regarded as a step in the capacity of elucidation of the therapeutic effect of IVMP in MS relapses.

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### **Peripheral blood cell immunomarkers in the course of methylprednisolone treatment of multiple sclerosis relapses**

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Intravenous methylprednisolone /MP/ is the standard method in the treatment of acute relapses in multiple sclerosis /MS/ and is believed to effect various immunological processes, involved in the pathology of MS, including apoptosis and phagocytosis.

Peripheral blood was obtained from 50 patients, with clinically definite MS, fulfilling the revised criteria of Mc Donalds /2005/, a day before, after 5 days of MP treatment and two weeks after conclusion of the treatment. Intravenous administration of 1.0 g daily of MP was used to treat the new relapses at the disease. The control group comprised 20 healthy blood donors. The subset of lymphocytes CD<sub>3</sub>, CD<sub>4</sub>, CD<sub>8</sub>, CD<sub>16</sub>, CD<sub>19</sub>, CD95 /CD3 and CD95/ CD19 was studied using monoclonal antibodies by flow cytometry. Using flow cytometric test the phagocytosis and caspase activity of granulocytes and lymphocytes were tested.

In MS and in the course of MP treatment, both the absolute and relative count of lymphocytes was decreased, as well as the percentage of lymphocytes with antigen CD<sub>3</sub>, CD<sub>4</sub> and CD<sub>8</sub>. The relative amount of lymphocytes CD<sub>16</sub> and CD<sub>19</sub> was increased. The lymphocytes CD95 /CD3 and CD95/ CD19 being the markers of apoptotic activity were not significantly changed. The phagocytosis of peripheral granulocytes before and after IVMP was increased.

**Conclusion:** 1. The quantitative shift in the lymphocyte immunomarkers have the impact on the effect of methylprednisolone in course of MS relapses.

2. The increase in phagocytotic activity in MS is a generalized one and reflected in the peripheral blood granulocytes, but without marked changes after MP therapy.