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Cerebrovascular diseases 1

P 1001

A classification tool for clinical differentiation between hemorrhagic and ischemic stroke

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Aim To develop a simple and reliable diagnostic tool for differentiation of cerebral infarction (CIF) from intracerebral haemorrhage (ICH) in order to facilitate therapeutic decisions when rapid access to computed tomography (CT) is lacking.

Patients and methods Thirty variables regarding each patient admitted with acute stroke were prospectively recorded. Multivariate analysis was performed using ICH as end point. CT scan confirmed the stroke type within 72 hours from admission. Three previous scores proposed for stroke differentiation were calculated and compared to the present score.

Results Among 235 patients (119 males) with a mean age of 70.6±11.2 years, 43 (18.3%) had ICH. Independent correlates of ICH were neurological deterioration within 3 hours from admission (OR 17.1 95% CI 5.2–48.2), vomiting (8.4, 2.1–27.4), white blood cells (WBC) >12000/ml (7.9, 2.4–19.5) and decreased level of consciousness (5.3, 3.3–34.1). On this basis, the following integer-based scoring system was derived for diagnosis of ICH: Number of points = 6*(neurological deterioration within 3 hours from admission) + 4*(vomiting) + 4*(WBC >12000) + 3*(decreased level of consciousness). When the cut-offs ≤3 points for CIF and ≥11 points for ICH were used, sensitivity, specificity, and positive and negative predictive values of the score were 95, 99, 97 and 99%, respectively, exceeding noticeably the three previously proposed systems.

Conclusions The proposed model provides an easy to use tool for sufficiently accurate differentiation between hemorrhagic and non-hemorrhagic stroke on the basis of information available to all physicians early after admission.

P 1002

Correlation between sPECAM-1 levels in serum and CSF of acute ischaemic stroke patients and the size of early brain CT hypodense areas

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Introduction Stroke-induced acute inflammatory reaction is believed to play an important role in secondary neuronal damage and infarct extension. Appearance of inflammatory cells in ischaemic cerebrovascular milieu requires prior endothelial-

leukocyte interactions that are at least partly enabled by cell adhesion molecules surface expression.

Platelet endothelial cell adhesion molecule-1 (PECAM-1) present at endothelial cell intercellular junctions is required for transendothelial migration of leukocytes. We have recently demonstrated that ischaemic stroke patients displayed increased soluble PECAM-1 isoform (sPECAM-1) levels in serum and cerebrospinal fluid (CSF) within the first 24 hours after the onset of neurological signs.

The aim of the present study was to investigate the relationship between the levels of sPECAM-1 and the size of early brain damage in ischaemic stroke patients.

Methods We have compared sPECAM-1 levels in serum and CSF samples obtained from 23 patients within the first 24 hours of first-ever completed hemispheric ischaemic stroke with the volume of relevant early brain computed tomography (CT) hypodense areas.

Results The mean sPECAM-1 levels in sera and CSF of ischaemic stroke patients was 99.0±38.6 ng/ml and 22.6±18.4 ng/ml, respectively. The average brain CT hypodense areas volume was 10.0±10.7 cm³. The significant positive correlation between sPECAM-1 levels both in sera and CSF of stroke patients and the volume of early brain CT hypodense areas have been shown (r=0.94; p<0.000001).

Conclusion The data indirectly suggest that PECAM-1 may be involved in inflammatory response-mediated promotion and extension of early brain damage in ischaemic stroke patients.

P 1003

First month prognosis in hypertensive intracerebral haemorrhage correlated with the adapted Hemphill-Bonovich score

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Background The purpose of this study was to compare the correlation between Hemphill-Bonovich score and Glasgow Coma Scale (GCS) in hypertensive cerebral haemorrhage patients, within the first month of outcome.

Methods 86 consecutive patients with CT confirmed hypertensive cerebral haemorrhage admitted in the first 24 hours from onset entered the study after appropriate investigations were done to rule out other causes of bleeding.

We assessed the patient's age, the Hemphill-Bonovich score, GCS score in the first and seventh day from onset, blood pressure on admission, the haemorrhage location and volume, the presence of intraventricular blood and mass effect on CT scans. Statistical analysis was done using the Pearson and Mantel-Haenszel correlation tests.

Results The GCS score varied with more than two points in 69.8% patients between the first and seventh day from onset and was correlated with haemorrhage volume (p=0.01), ventricular bleed (p=0.001) and the haemorrhage's mass effect (p=0.0003). The one-month survival was correlated with haemorrhage

volume ($p=0.005$), the mass effect ($p<0.0001$) and Hemphill-Bonovich score (78.8% survival for 0, 1 and 2 score, and 97.7% death for 4, 5 and 6 score, $p<0.0001$).

The leading cause of death in one month hospitalised patients was cerebral lesion (69.76%) followed by myocardial infarction and bronchopneumonia.

Conclusions The Hemphill-Bonovich score proved to be a reliable scale for clinical and prognosis evaluations of patients having cerebral hypertensive haemorrhage.

The unexpected extra cerebral causes of death and continuing bleeding could lead to lack of correlations between the first day score and further clinical evolution.

P 1004

Direction of flow in the posterior communicating artery on magnetic resonance angiography in patients with occipital lobe infarcts

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Introduction In some people the blood supply to the posterior cerebral artery is partly or even exclusively via the carotid system. In such cases, an embolus from a carotid stenosis might cause an occipital lobe infarct. We studied the direction of flow in the posterior communicating artery in patients with an occipital lobe infarct and in healthy controls.

Methods We prospectively studied 48 patients with an occipital lobe infarct after a 3–36 months interval and 50 young healthy controls by means of magnetic resonance angiography. Special emphasis was given to the presence of a posterior communicating artery and, if this was present, to the direction of flow.

Results Of all scanned hemi circles of Willis, significantly fewer patients than controls had an exclusive blood supply to the posterior cerebral artery via the carotid system, both in the affected (4%) and in the unaffected hemisphere (3% vs. 14%, 95% CI 8–23%). Also, patients had a patent PcoA with antero-posterior flow less often than controls (affected hemisphere 16%, unaffected hemisphere 24% vs. 35%, 95% CI 25–45%). Individually, significantly more patients showed no antero-posterior flow through the PcoA than controls (77% vs. 51%, 95% CI 41–61%).

Conclusions Supply of the posterior cerebral artery from the carotid system occurs less often in patients with an occipital lobe infarct than in healthy controls, especially when compared to the affected hemisphere. This difference may represent a causal factor (fewer collateral pathways after occlusion of the posterior cerebral artery, leading to infarction) or a consequence (redistribution of blood flow after infarction).

P 1005

Micro platelets and platelet aggregates in stroke and non-stroke patients with increased carotid intima-media thickness

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Background The relationship between the carotid intima-media thickness (IMT) and hyperactivity of platelets in stroke patients was evaluated in previous studies. The purpose of our investigation was to assess the correlation between increased IMT and platelets activity independently of stroke in patient history.

Material and methods Thirty-seven after stroke patients and 45 non-stroke controls aged 40–79 (mean 58.27 years) were examined. The IMT was estimated with B-Mode ultrasonography. The whole blood microplatelets and platelet aggregates were assessed with flow cytometry in the rest platelets and after 8 μ M TRAP activation. The results were assessed in 4 groups: non-stroke (A) and stroke (B) patients without increased IMT and non-stroke (C) and stroke (D) patients with increased IMT. The border IMT values differentiated groups were maximal common carotid artery IMT ≥ 1.5 mm and maximal bulb IMT ≥ 2.0 mm. The statistical evaluation was performed using non-parametric ANOVA tests.

Results The mean value of the rest micro particles fraction and the aggregates account after TRAP stimulation were significantly greater in the subgroups with increased IMT independently of the acute ischemic event (respectively $p=0.0001$ and $p=0.0451$). Similar tendency was found in the rest platelets aggregates fraction, but differences were statistically not significant. Differences between subgroups in mean micro platelets value after TRAP activation were not statistically significant.

Conclusions The platelets activity markers seem to be related to the increased IMT and are not depended on the ischemic event. Platelet activation is probably primary to stroke and acute ischemia only increases previous activity changes.

P 1006

The impact of the ageing index on stroke-related variables: stroke subtypes, case fatality and mortality.

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Introduction During the last three decades there have been important advances in the diagnosis and treatment of stroke with important decline in mortality in western countries. However, the longer expectations of life in elderly people may overturn these tendencies. The purpose of our work is to analyse the impact of a high ageing index on stroke-related variables such as vascular risk factors, stroke subtypes, fatality rates and mortality.

Methods We analysed the data of 1,850 consecutive patients with first-ever stroke retrieved from a prospective registry through a period of 8 years (from 1994 to 2001) in the province of Teruel, Spain. The mean age was 75.5 years and 62% were male. The variables taken into account were: vascular risk factors, stroke subtypes, fatality and mortality. Mortality rates were calculated from 1990 to 1999.

Results Arterial hypertension and atrial fibrillation remain as the most frequent risk factors. We observed an increasing frequency of cardioembolic stroke. The mean case fatality rate was 16.6% with no differences for sex. Crude mortality rates were higher than in Spain and ranged from 169 to 142/100,000 with higher rates for women. The age-adjusted mortality for the European population was 56.6 in the year 1999, somewhat lower than in Spain (61/100,000) and in other western countries.

Conclusions Whereas mortality by stroke declined and stabilised in our province and in Spain in the last decade, however fatality rates have significantly increased in our province due to the high proportion of elderly people, the severity of stroke and complications.

P 1007

Seasonal distribution of stroke occurrence in the Greek capital city; a hospital-based studyK. Spengos¹, K. N. Vemmos², G. Tsiygoulis², A. Synetos², V. Kotsis², V. P. Zis¹, D. Vassilopoulos¹¹Dept of Neurology, University of Athens Medical School, Athens, GREECE, ²Dept of Clinical Therapeutics, University of Athens Medical School, Athens, GREECE

Background A series of studies described in many different countries a temporal distribution of stroke throughout the year with a peak of stroke occurrence in the colder months of the year. We investigated the temporal pattern of stroke incidence in Greek stroke patients.

Methods A series of 1,299 stroke patients was admitted to our hospital between January 1993 and December 2000. Stroke was classified according to the criteria of "The Athens Stroke Registry". Assuming an equal distribution of stroke presentation over the whole year, we compared the observed number of stroke patients per month with the expected frequency using the "x² for goodness of fit" techniques, along with 95% confidence intervals.

Results January and March were the months with the highest stroke incidence (n=123). August was the month with the fewest stroke cases (n=73). There were significantly more strokes observed during the colder period of the year (October–March), than during the warm period between April and September (x²=14.03; df=1; p<0.001). The observed monthly distribution of stroke occurrence also differed significantly from the hypothetical equal one (x²=25.9; df=11; p<0.001).

Conclusions Our results suggest a significant higher stroke incidence during the autumn and winter months and are in accordance with findings from other European, American and Australian studies.

P 1008

Sex differences in ischemic stroke fatality outcome in CroatiaJ. Palic¹, D. Janculjak¹, V. Demarin², I. Lusic³, B. Barac¹, D. Vukasinovic¹, I. Bradvica¹¹Osijek University Hospital, Osijek, CROATIA, ²Hospital S. Milosrdnice, Zagreb, CROATIA, ³Split University Hospital, Split, CROATIA

Background Continental regions (Osijek and Zagreb) have higher incidence of ischemic stroke than the coastal region (Split).

Objective To examine the influence of gender on the lethal outcome of ischemic stroke patients treated in three regional stroke centres in Croatia.

Methods We analysed three cohorts of ischemic stroke patients hospitalised during one year (181 in Osijek, 204 in Split and 138 in Zagreb). More male patients were hospitalised in Osijek (53.6%) and Split (53.9%) than in Zagreb (41.3%).

Results The total case fatality rate of ischemic stroke was significantly higher in the continental centres (Osijek 39.8% and Zagreb 42.8%) than in the coastal centre (Split 26%). Male patients had a reliably higher lethal outcome than female patients in Osijek (48.5% vs. 29.8%) and in Zagreb (49.1% vs. 38.3%). In Split we observed the opposite situation: female patients had a relatively higher fatality rate than the male patients (28.7% vs. 23.6%), (not significant). Female patients in both Osijek and Split had nearly the same proportion of fatalities, unlike male patients. The relative death rate between the group of female

patients older than 65 years compared to those under 65 is higher in Split (7.4) than in Zagreb (3.6) or in Osijek (2.5).

Conclusion Male gender is associated to the higher fatality outcome of ischemic stroke within population with higher burden of risk factors (continental Croatia). The gender has not much influenced the outcome of stroke in the population with lower prevalence of risk factors for stroke (coastal Croatia).

P 1009

The population-based study of stroke incidence in Grodno, Belarus

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Introduction No population-based studies of stroke incidence have been performed yet in Belarus.

Methods All suspected strokes occurred among 307 122 residents of Grodno-city during a 12-month period of 2001 were identified and assessed for all age groups. Multiple overlapping sources of notification were used to ascertain cases, and standard criteria for stroke and case-fatality were used.

Results During the study period 907 cases of strokes among 889 persons were registered, with 676 being first-ever-in-a-lifetime strokes (FEL). The diagnosis and pathological type of FEL were confirmed by CT or autopsy in 35%, patient age ranged from 25 to 95 years (mean±SD age, 65.5±11.4 years). The crude incidence rate for FEL was 220.1 per 100 000 (95% confidence intervals [CI], 203.5 to 236.7), the rate standardized to the European population was 299.7 per 100 000 (CI, 280.3 to 319.1). FEL incidence rates rose steeply with age in both sexes and were higher in men in all age groups. Rate of hospitalisation was 87.7%; the 28-day case fatality rate was 28.3% (CI, 24.3% to 32.3%). Of the 676 FEL, 522 (77.2%) were cerebral infarction (161 definite and 361 probable), 93 (13.8%) were intracerebral haemorrhage (68 definite and 25 probable), 22 (3.2%) were definite subarachnoid haemorrhage and 39 (5.8%) were stroke of undetermined type.

Conclusions Stroke incidence and case-fatality rates in Grodno were found to be of highest among other studies. The increment of age-standardized incidence depended on high FEL rate in subjects aged 55 to 74 years.

P 1010

Occurrence of risk factors of spontaneous intracerebral and subarachnoid haemorrhages in the Olomouc region, Czech RepublicR. Herzig¹, I. Vlachova¹, K. Urbanek¹, B. Krupka¹, M. Gabrys², J. Mares¹, D. Sanak¹, P. Schneiderka³, S. Burval⁴¹Stroke Center, Clinic of Neurology, Faculty Hospital, Olomouc, CZECH REPUBLIC, ²Clinic of Neurosurgery, Faculty Hospital, Olomouc, CZECH REPUBLIC, ³Department of Clinical Biochemistry, Faculty Hospital, Olomouc, CZECH REPUBLIC, ⁴Clinic of Radiology, Faculty Hospital, Olomouc, CZECH REPUBLIC

Introduction Several risk factors (RFs) play a role in the aetiopathogenesis of spontaneous intracranial haemorrhages (SICHs). The aim of this prospective study was to evaluate the role of RFs, which can be influenced, in particular SICH subtypes.

Methods The authors evaluated a group of 105 patients with SICHs, of which 88 haemorrhages were intracerebral (ICH), and 17 were subarachnoid/intraventricular (SAH/IVH) in loca-

lization. The presence of the following RFs and their combinations was evaluated: arterial hypertension (AH), diabetes mellitus/impaired glucose tolerance (DM/IGT), obesity, dyslipidaemia, efficient oral anticoagulation and other coagulopathies, thrombocytopenia, salicylates and oral contraceptives therapy, drug abuse, smoking, acute and chronic alcohol intake. Chi-square tests were applied for the testing of statistical significance.

Results The occurrence of the following RFs was significantly higher in ICH than in SAH/IVH patients: AH in 64.8% versus 23.5% ($p=0.002$), DM/IGT in 36.4% versus 5.9% ($p=0.013$), hypercholesterolemia (HCH) in 72.7% versus 47.1% ($p=0.037$), and combinations of AH+DM/IGT in 26.1% versus 0% ($p=0.017$), AH+HCH in 51.1% versus 17.6% ($p=0.011$), DM/IGT+HCH in 23.9% versus 0% ($p=0.024$). On the contrary, the combination of chronic alcohol intake + active smoking was more frequent in SAH/IVH than in the ICH patients – in 31.2% versus 12.0% ($p=0.053$).

Conclusion AH, DM/IGT and HCH including their mutual combinations play the most important role in the aetiopathogenesis of spontaneous ICH, while the combination of chronic alcohol intake with active smoking plays an important role in the aetiopathogenesis of spontaneous SAH/IVH in our population.

P 1011

Time between stroke onset and admission to the hospital

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Introduction For the outcome of stroke the early diagnosis and therapy is very important. Every minute lost, from the onset of symptoms to the time of emergency contact, cuts into the limited window of opportunity for intervention. In our study we followed the time passed between the onset of stroke and the patients admission to the hospital.

Methods We performed a prospective epidemiological study, including all patients treated with acute stroke in the County Clinic of Mures between October 1, 1999 and September 30, 2000.

Results In the mentioned period we studied 261 patients with an acute stroke event. About 39% of patients arrived at hospital within 3 hours, 54% of stroke patients arrived within 6 hours. During the first 3 hours we admitted 50% of haemorrhages and 36% of ischaemic strokes. 74.5% of those who arrived within 3 hours had severe or moderate neurological deficit. Among the total of 203 ischaemic stroke patients 179 had less than 22 points on the National Institute of Health Stroke Scale (NIHSS) but only 35.8% of them arrived within 3 hours. Age, sex and marital status showed no significant influence on admission time.

Conclusions Patients with more severe onset of stroke ask for urgent transport more frequently. Early diagnosis and therapy will be possible after public education and training courses for general practitioners.

P 1012

Frequency, aetiology, and prevention of stroke in patients with systemic lupus erythematosus

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Introduction The main symptoms of CNS lupus can be diffuse (generalized seizures, psychosis) or focal (stroke, peripheral neuropathies). Neuropsychiatric symptoms often occur in the first year of SLE, but are rarely the presenting symptoms.

Patients and Methods We prospectively and retrospectively reviewed, from 1986 to 2001, the incidence aetiology and the prevention of stroke in 69 hospitalised patients with systemic lupus erythematosus (SLE).

Results Stroke occurred in 10 (14%) of our patients with documented SLE; six (60%) of the 10 had multiple cerebral infarcts. Factors associated with stroke were: systemic thrombosis, elevated partial thromboplastin time, age over 60 years, transient ischemic attacks, previous stroke, and cardiac valvular disease. The major period of risk for the first stroke was during the first 4.5 years of SLE. The most frequent aetiology was a cardiogenic embolus, with cerebral vasculitis occurring (one patient) only in association with infection. Because of the decreased fibrinolysis seen in patients with SLE, anticoagulant therapy may be the most effective preventive treatment currently available. Anticoagulant therapy seemed to prevent recurrent focal cerebral ischemia in our patients and was associated with relatively few and minor complications. Patients with a history of transient ischemic attacks or cardiac valvular lesions are at high (50% and 75%, respectively) risk of stroke. Patients who have had a stroke are at high (63%) risk for a recurrent stroke.

Conclusions Most CNS events in patients with SLE are transient, benign and we recommended for all of these patients anticoagulant therapy.

P 1013

Stroke risk factors in Tbilisi: An interim data analysis of the first population-based study in Georgia.

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Background Although stroke is one of the major public health problems worldwide, data on risk factors and other epidemiological patterns of stroke in Georgia are still lacking.

Methods In the framework of the ongoing joint Swiss-Georgian prospective population-based project on stroke epidemiology in Tbilisi, capital of Georgia, we analysed interim data regarding stroke risk factors. For the data collected in a case-control manner, crude and adjusted odds ratios (OR) with 95% confidence intervals (CI) were calculated. Eighty-five consecutive patients with ischemic stroke (36 men and 49 women; mean age 66.4±9.5 years) and 85 age- and sex-matched controls (mean age 67.1±9.9 years) were studied.

Results In a multivariate logistic regression analysis of demographic, anamnestic and clinico-laboratory variables, stroke was significantly associated with higher Body Mass Index (OR 6.8,

95% CI 2.2 to 21.2), lower formal education level (OR 0.2, 95% CI 0.1 to 0.6), arterial hypertension (OR 6.0, 95% CI 2.3 to 15.1), atrial fibrillation (OR 4.8; 95% CI 1.6 to 14.1) and history of transient ischemic attacks (OR 10.2; 95% CI 1.41 to 74.4).

Conclusion The present study outlined significance of some risk factors of stroke in Georgian population. We failed to reveal association of ischemic stroke with other traditional risk factors such as smoking, alcohol consumption, diabetes mellitus and hypercholesterolemia, which may be explained by a different risk factors profile for a defined Georgian population caused by geographical and lifestyle variations.

P 1014

“Mixed Stroke” in Hallym stroke registry – prevalence and clinical patterns

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Background “Mixed stroke”, ischemic infarction combined with intracerebral haemorrhage, is not rarely appeared on brain imaging study of stroke patient, however, few studies addressed the prevalence or clinical characteristics of mixed stroke. We explored the incidence and clinical patterns of mixed stroke on large hospital-based stroke registry.

Methods We retrospectively collected the clinical data and MR imaging from Hallym Stroke Registry Data Bank between March 1993 and February 2001. We defined mixed stroke as ischemic stroke combined with MR evidence of coexisting old ICH or hemorrhagic stroke combined with MR evidence of coexisting old infarct. Two neuroradiologists independently assessed MR images without the knowledge of clinical findings. Vascular risk factors of mix stroke were compared with those of other ischemic stroke subtypes.

Result Of total 1,988 cases, 112 cases (6%) were mixed stroke. The clinical patterns of mixed stroke were as follows: large artery atherosclerosis with previous haemorrhage (35, 31%); small vessel occlusion with previous haemorrhage (32, 29%); hemorrhagic stroke with previous ischemic stroke (25, 22%); cardioembolism with previous haemorrhage (3, 3%); incomplete evaluation (12, 11%); two or more causes (5, 4%). The history of previous stroke and hypertension were more frequent in mixed stroke than other ischemic stroke subtypes.

Conclusion In our study, the prevalence of mixed stroke was 6%, which should not be neglected. We speculated that mixed stroke may share some identical pathophysiology with ischemic stroke subtype, and may has the impact on the decision of antiplatelet or anticoagulant therapy in ischemic stroke for secondary stroke prevention.

P 1015

Late outcome and risk factors in ischemic stroke patients with early infarct sign

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Stroke is the 3rd most common cause of death. Early diagnosis is important both for prognosis and the treatment deciding. This study is designed to examine the prevalence and the diagnostic

value of short and long-term prognosis of patients and the coincidence of risk factors of stroke. Out of 326 acute stroke patients admitted to the emergency room, 110 cases with non-contrast CT within 12 hours of stroke onset have been included into the study. Early infarct signs could be diagnosed on 47 (%43.6) CT scans and not visualized on 63 (%56.4) CTs. Outcomes were followed and assessed with the Barthel scale. There was no relationship between the early infarct signs and the group of death or dependent survivors. Early infarct signs were less frequent in the group of good outcome. The subgroups of early infarct signs were observed as the following: %40.4 sulcal effacement, %31.9 loss of gray-white matter line, %29.8 hyperdense middle cerebral artery, %23.3 loss of internal capsule. There was no correlation between the risk factors as cigarette smoking, alcohol intake, OKS drugs, high triglyceride and cholesterol levels and diabetes. Hypertension was significantly more frequent with cases of early infarct signs. There was no significant relationship between the timing at which CT was performed and the presence of early infarct signs. If it is detected on CT scan, early infarct signs may provide a simple tool in evaluating the prognosis of patient and treatment selection by allowing the prediction of subsequent infarct location.

P 1016

Stenosis of the internal carotid artery and its association with ischemic stroke subtypes – ultrasonographic study

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Few papers have focused on associations of the different degrees of carotid stenosis with ischemic stroke subtypes. The aim of this case-control study was to determine the relationships between internal carotid artery stenosis of different degrees and ischemic stroke subtypes.

Fifty consecutive patients, 30 men and 20 women, with first-ever anterior circulation infarcts, aged 50–79 years, were enrolled in the study. All patients underwent physical examination, brain computed tomography, Duplex scan, electrocardiography and laboratory investigations. Control group was formed from 100 age- and sex-adjusted persons without cerebrovascular disease.

Significant relationships between carotid stenoses of different degrees and all subtypes of ischemic stroke were found. No significant associations of the carotid stenoses with cardioembolic and with lacunar infarcts were observed. Infarcts due to large-artery atherosclerosis were significantly related to all carotid stenoses (OR=3.71; 95% CI, 1.01–13.54). Infarcts of undetermined cause were found significantly associated with mild carotid stenosis (OR=4.10; 95% CI, 1.11–15.14), but not with moderate and severe one, suggesting that hemodynamic mechanism were not important in their occurrence. The non-cardioembolic infarcts, put together, were significantly related to mild (OR=4.59; 95% CI, 1.63–12.96), moderate and severe (OR=4.56; 95% CI, 1.09–19.12) and with all carotid stenoses (OR=4.59; 95% CI, 1.65–12.74).

In conclusion, Duplex scans may help clarify the pathogenesis of the different ischemic stroke subtypes.

P 1017

Acute phase reactants in peripheral blood and CSF in ischemic stroke as outcome predictors at 1 month

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Introduction The study aimed at defining the blood and CSF levels of cytokines: interleukin-1b (IL-1b), interleukin-6 (IL-6), tumour necrosis factor- α (TNF- α) in 48 hours of stroke onset and their relations toward the outcome at 1 month.

Methods 55 patients aged from 45 to 75, 32 female and 23 male, were investigated. Initial disorders assessed by NIHSS and GCS (Glasgow Coma Scale). Patients divided into 2 groups: I group—26 patients (GCS<9; NIHSS>15), II group—29 patients (GCS>9; NIHSS<15). Control comprised 22 healthy individuals. Outcomes evaluated by Barthel Index (BI) and Glasgow Outcome Scale (GOS). Cytokines measured by ELISA assay. Mean values compared by paired-t test. Correlation defined using the Pearson Correlation Coefficient.

Results In 48 hours of stroke onset the blood and CSF levels of IL-1, IL-6 and TNF- α were higher in stroke population compared to control (P0.5) and (34.14 \pm 4.25 versus 30.4 \pm 6.2 P>0.5), while the IL-6 and TNF- α blood and CSF levels were different between groups (58.8 \pm 12.4 versus 34.2 \pm 8.8 P<0.2) (80.4 \pm 12.55 versus 45.18 \pm 3.6 P<0.01) and (28.2 \pm 7.8 versus 21.28 \pm 4.4 P<0.5) (44 \pm 6.4 versus 39.4 \pm 7.8 P<0.5) respectively. Negative correlation was found between IL-6 blood and CSF initial levels and outcome of stroke at 1 month (R=-0.92; P<0.001)

Conclusion High blood and CSF initial level of IL-6 are the valid predictors of stroke outcome at 1 month.

P 1018

CXCL1 (GRO- α) is increased in the cerebrospinal fluid of patients with ischemic stroke

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Introduction Animal models of stroke revealed that cerebral ischemia results in an increased expression of several cytokines and chemokines that precede leukocyte infiltration into ischemic lesions. The infiltrated leukocytes contribute to tissue injury in stroke. CXCL1 (GRO- α) is a potent neutrophil chemo-attractant and activator belonging to CXC chemokines family acting through CXCR2 receptors. It may play an important role in neutrophil infiltration in stroke patients.

Methods GRO- α was determined in the CSF and sera of 23 ischemic stroke patients 24 hours after the onset of neurological symptoms. The diagnosis was based on clinical history and neurological examination and was confirmed by brain CT. 15 individuals with diagnosis of tension headache served as a control group. GRO- α levels in CSF and sera were quantified by ELISA (Quantikine R&D Systems, USA).

Results The CSF GRO- α level in ischemic stroke patients was 65.6 \pm 22.3 pg/mL and was significantly higher (p<0.0001) than that of the control group, in which the level was 43.8 \pm 2.3 pg/mL. Serum GRO- α level in stroke patients was 86.9 \pm 25.1 pg/mL and did not differ from control group: 85.5 \pm 31.8 pg/mL.

Conclusion The results suggest that GRO- α may play a role in the inflammatory reaction during the early phase of ischemic stroke making it a potential target for therapeutic intervention.

P 1019

Using artificial neural network in predicting the outcome in haemorrhagic stroke

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Background Artificial neural networks are an alternative to linear statistic methods in prediction. The three main characteristics are: the capacity to learn, to generalise and to synthesise. The **aim** of this study is to predict the outcome at hemorrhagic stroke patients.

Patients and method Prospective study on 104 patients with hemorrhagic stroke from Department of Neurology Brasov in the period 01.12.2000–31.12.2001. We used the following parameters (input data): the age, sex, blood pressure, site of haemorrhage, dimensions, GSC, risk factors. The design of neural network was with 8 artificial neurons (input) and 2 neurons as output (death or survival). There were 2 groups: A—survivals and B—deaths.

Results In group A there are 76 (73.07%) patients and in group B 28 (26.93%). The mean arterial pressure in group A was 110.25 \pm 26.25 and in group B 138.53 \pm 30.15 mmHg. GSC was 11.4 \pm 3.9 in group A and 6.3 \pm 2.1 in group B. The input data were computed in Neural Network software with backpropagation algorithm. With each circle the bias was lower. The learning rates were different 0.1, 0.3 and 0.5 and the convergence was obtained for 0.1. We can predict correctly with this method 73.5% of deaths and 77.6% of survivals.

Conclusions Applying artificial neural network gives a prognosis value, as quick as we obtain convergence value we minimize the errors and case discrimination is faster.

P 1020

Clinical diagnosis of acute non-hemorrhagic stroke

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Purpose Reliability evaluation of the score system based on the eight simple clinical variables, to predict the diagnosis of acute stroke in our patient sample.

Methods In our department we made prospective evaluations of the 500 consecutive patients with symptoms of acute neurological signs of vascular origin.

A competent neurologist filled the variables for the score calculations into the special electronic form, in blinded manner on admission. Analysed group had 107 patients who satisfied the inclusion criteria: 1) hospitalised within 48h from the onset of symptoms; 2) without history of previous stroke; 3) without any anticoagulant therapy; 4) supratentorial clinical signs; 5) symptoms lasting more than 24h; 6) performed cranial computed tomography (CT) between 2–21 days from the onset of symptoms; 7) diagnosis of definitive stroke.

Score results were tested for validity: sensitivity, specificity, positive and negative predictive values, and overall accuracy. Confidence intervals (CI) were calculated for $\alpha=0.05$.

Results The prevalence of non-hemorrhagic stroke was 64.49% (CI 54.65%–73.5%). Scores results were “uncertain” in 74.77% (CI 64.45%–82.67%) cases. Sensitivity and positive predictive values for non-hemorrhagic stroke were 0.40 (CI 0.28–0.52) and 1 (CI 0.91–1). Overall accuracy was 0.62 (CI 0.52–0.71).

According to these data, of 1000 patients with acute stroke, 252 would be correctly and 0 wrongly diagnosed as “non-hemorrhagic” while for 748 patients the score results will be “uncertain”.
Conclusions Clinical diagnosis of non-hemorrhagic stroke could be made using the simple clinical scoring system within limited numbers of patients, with significant predictive value.

P 1021

Multiple approaches for detecting “blind sight” in occipital ischaemic lesions

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Background Patients with occipital lesions may still be able to detect certain events within the “blind” field – the blind sight phenomenon.

Patients and method We explored residual vision in a patient (CS) with an ischaemic occipital lesion, in the Vision Research Laboratories, University of Aberdeen.

We used a multiple approach: psychophysical investigation – detection of gratings of varying spatial and temporal frequencies, pupillometry – using a ASL 5000 pupillometer and motion discrimination of a circular target.

Results CS’ performance in detecting temporally modulated spatial gratings is well above chance for spatial frequencies below 3.5c/s. For an abrupt onset, awareness is considerably higher for 10 Hz modulated than for static stimuli; both detection and awareness dropped significantly for static stimuli of slow onset. Direction discrimination and reported awareness improved with increasing stimulus speed, with a peak sensitivity of 10 deg/s. Blind-field pupillary responses have low-pass properties and extend to higher spatial frequencies.

Conclusions This study emphasises the importance of multiple approach for the documentation of blind-sight. The experimental paradigm, the spatial frequency and the temporal modulation of the stimulus influence target detection. Pupillometry proved to be an efficient objective method that reveals residual capacities within the blind field.

We hope that studies on blind-sight might help future designing of rehabilitation strategies for patients with visual field deficits.

P 1022

Ultrastructural analysis of dermis and sural nerve biopsies in Cadasil

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Introduction CADASIL was identified as a disease that predominantly affects the small cerebral arterial vessels. This study reviews the main clinical and histopathological considerations of two recently discovered cases in Serbia.

Methods In order to establish the diagnosis, clinical evaluation, laboratory findings and imaging procedures were obtained. As the analyses suggested CADASIL, dermal and sural nerve biopsy was performed. The tissue specimens were processed for the light and transmission electron microscopy.

Results The first case, MD, was a 51-year-old male who had two stroke-like episodes at the age of 46 and 48. Investigations revealed high blood pressure and deficit of factor XII. He had spastic dihemiparesis. The other patient, LR, a 49-year-old

male, suffered from migraine without aura for the last 37 years, without other vascular risk factors. His father, uncle and son also suffered from migraine. His father had a stroke. Neurological examination showed left hemiparesis and depression. In both patients MRI suggested CADASIL.

The morphological study showed marked disruption of smooth muscle cells in affected blood vessels. These cells appear to be separated from the endothelial layer of the arteriole. Adjacent to smooth muscle cells the accumulations of granular osmiophilic material (GOM) were identified. The biopsy of the sural nerve showed signs of axonal atrophy, shrunken myelin sheath with myelin loop at the level of Schmidt-Lanterman incisure and degenerating endoneurial fibroblasts.

Conclusions Considering the described clinical and histological features of the patients involved, we concluded that two new cases of CADASIL could be registered in Serbia.

P 1023

Cerebral blood SPECT imaging in vascular left hemisphere-damaged patients with aphasia

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Background Left hemisphere is crucial in most right-handed individuals for language functions. However, the relationship of portions of the perisylvian cortex to different components of the language-processing system remains the subject of controversy.

Methods The aim of this study was to measure rCBF in 20 right-handed left hemisphere-damaged acute stroke patients using single photon emission-computed tomography (SPECT). Presence of a single left-sided vascular brain lesion was confirmed on CT and/or MRI.

Language disorders, assessed with a battery of the Boston Diagnostic Aphasia Examination and the Boston Naming Test, were divided into 2 groups: I – non-fluent aphasia, II – fluent aphasia.

Results Non-fluent aphasics compared to fluent aphasics had more extensive hypoperfusion in the left frontal cortex and in the left basal ganglia and the left thalamus. The overall severity of aphasia positively correlated with index of hypoperfusion in the left basal ganglia and to the lesser degree in the left thalamus.

Conclusions CBF SPECT imaging may provide a reliable description of the brain pathology associated with aphasia. CBF SPECT imaging is useful in elucidating aphasic syndromes and their differential diagnosis. Results emphasise the role of the left subcortical structures in language processing.

P 1024

Is it an embolism? Discrepancy between magnetic resonance angiography (MRA) and follow-up conventional angiography

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Background We question the possibility of direct embolic occlusion of the internal carotid artery (ICA) at the cervical segment with complete resolution in a few days.

Case A 37-year-old man presented left hemiparesis with sensory impairment. One day ago, he experienced three episodes of transient left hemiparesis persisted for a few minutes.

Three days after admission, FLAIR and diffusion-weighted magnetic resonance (MR) images and angiography of brain were performed. MR images showed a subcortical increased signal intensity in the right middle cerebral artery (MCA) region. MR angiography showed drop-out signal of the right ICA 3cm cranial to the bulb, decreased signal of right intracranial ICA and middle cerebral artery.

Four days later, conventional cerebral angiography was performed. It showed fully patent findings of the right ICA and the right MCA through the entire portion.

Conclusions In most cases of embolic occlusion of ICA, angiography shows occlusion of ICA in its supraclinoid portion with retrograde clot extension giving tailing off appearance to the column of contrast material in the more proximal artery. In our case, conversely, MR angiography showed a filling defect in proximal portion implying the proximal ICA lesion.

Despite diagnostic efforts, the aetiology of cerebral ischemic accidents in this patient remains unclear. Although it is a very unusual site for lodgement of emboli and the source was not found, the clinical and radiological findings favour the impaction of an embolism to the proximal portion of the ICA. We think that the embolus has come from the heart or great vessels.

P 1025

Carotid intima-media thickness in young patients with newly diagnosed hypertension – detection by colour duplex ultrasound

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Background and objective Hypertension is an important risk factor for the development of arteriosclerosis and prevalence of stroke. Early stages of vascular changes can be reliably recognized by measuring the thickness intima and media complex /IMT/. The aim of this study was to examine carotid arteries and occurrence of other risk factors in patients below 50 years of age, with newly diagnosed hypertension /interval since diagnosis \leq 1 year/.

Material and methods Examined population consisted of 16 patients /12 men and 4 women/. Colour duplex ultrasound of carotid arteries was performed, including far-wall IMT measurements and evaluation of occurrence of plaques and flow velocities abnormalities. Obtained laboratory data were level of glucose and blood lipids.

Results Greater than normal IMT \geq 1 mm/ was measured in 2 patients /12.5%/. Mean CCA IMT was 0.76 mm. In 1 patient occurrence of plaques in distal CCA and proximal ECA was detected, with increased blood flow velocities and local turbulences. In examined population level of glucose was within normal range, elevated level of total cholesterol, LDL and triglycerides we obtained respectively in 9 /56%/, 4 /25%/ and 2 /12.5%/ patients, including patients with IMT thickening and plaques. There were 2 /12.5%/ smokers in examined group.

Conclusions Colour duplex ultrasound is useful method for detecting arteriosclerotic lesions. In patients with early stage of hypertension both type of vessel changes, subclinical or advanced, are observed. Blood lipids abnormalities are often accompanying risk factors for those patients.

P 1026

Non-invasive imaging of vasoconstriction of internal carotid arteries in a stroke patient

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We report a 21-year-old female case referred for a progressive motor aphasia and right hemiplegia. Cranial magnetic resonance imaging (MRI) was normal other than a parenchymal chronic lacunar infarct. Physical examination and blood tests were normal except slight anaemia. Duplex ultrasonography (USG) on the 48th hours of admission revealed a very low waveform on the proximal part of the left internal carotid artery (ICA) and the left ICA couldn't be visualized on cranial magnetic resonance angiography (MRA). A control MRI on the 3rd day revealed acute ischaemic lesions in the left caudate nucleus and left frontal white matter. A full screen test battery for vasculitis has been completed, which was negative. Despite the initial negative physical and laboratory findings, vasculitis was thought to be the most probable diagnosis. Methylprednisolone 1gr/day, IV was administered. On the third day of treatment, normal waveform in the left ICA by duplex USG and a nearly normal visualization of both ICAs by MRA were reported. Repeated tests for vasculitis was positive for ANA, anticardiolipin antibody Ig M and G.

Attacks of vasoconstriction of internal carotid arteries that had been shown by duplex USG as well as by MR angiography, which reply very well to steroids in a few days, is not a very common presentation of vasculitis. The prognosis and unusual imaging of this case presumed to be interesting. Non-invasive, quick and inexpensive techniques, like duplex USG and cranial MRA, may be preferable with the highest priority.

P 1027

In vitro blood flow and cross section indexes measured using transcranial Doppler ultrasound

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Background The aim of this study was to assess the accuracy of blood flow and cross-section indexes measured with transcranial Doppler (TCD) in vitro.

Methods The study was carried out using a closed-loop system with a roller pump Windkessel function to flatten small ripples in the flow. This contained heparinized whole blood with a hematocrit value of approx. 30%. Measurements were made by insonating silicone tubes of 2, 3 and 4 mm diameters and a wall thickness of 1 mm. Flow was changed in these tubes as follows: 320, 240, 150 and 320 ml/min. The tubes were insonated at an angle of 45°C with TCD instrumentation (DWL) using a 2 MHz probe, 10 mm sample volume, 59 mm depth and peak repetition frequency of 6 KHz. Frequency-weighted first moment calculations of Doppler power were made using specially designed software (BR02) and these arbitrary values were calibrated off-set for 0 flow. Cross-section area indexes were calculated by dividing the flow indexes by the maximum velocities. Reference flow index values were measured to ensure that back-scattering from the circulating blood remained constant throughout the studies. This was carried out by insonating a rectangular Plexiglas tube (10x5x1 mm) throughout the studies with a fixed 2MHz probe and constant settings.

Results The relative flow index values showed a very good correlation with changes of the known flow values using the three different tube diameters: tube diameter 2 mm r (correlation coefficient)=0.994, $p<0.01$; 3 mm, $r=0.999$, $p<0.01$; 4 mm, $r=0.999$, $p=0.001$). The calculated cross-section index values for the 4 flow measurements varied for 2 mm diameter by a SD value of 0.85% for 3 mm diameter: 2.08%, and for 4 mm diameter: 2.53%.

Conclusion This in vitro study has shown that relative flow and cross-section indexes may be measured using TCD instrumentation. Methods to overcome beam distortion due to the temporal bone should now be developed so that this method may be adapted for in vivo transcranial use.

P 1028

Stroke in after war period

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Cerebrovascular diseases (CVD) belong to the group of leading massive chronic non-contagious diseases. They are one of the most common diseases of modern humans. They take third place by frequency and mortality, and first place by invalidity. We were observing the frequency of stroke for the territory of Banja Luka in two time periods (two years before and two years after the war). In our study we included all the patients treated in Neurology Clinic Banja Luka in 1988, 1989, 1997 and 1998, and all necessary data were taken from their histories of disease. We included these data in an earlier made stroke register. The results prove that our beginning suppositions were correct. There is a significant increase of patient number and of incidence and prevalence of stroke patients in war and after war periods. In two years before the war there were 650 registered patients (1988–354, 1989–296), and in the period after the war there were 1098 patients (1997–558, 1998–540).

Conclusion In this region we noticed an increase of stroke patients in the after war period, and we proved it by patient analysis. It confirms that once appeared pathophysiologic process caused by stress doesn't stop with official end of crisis in some region, but it continues its existence. Once again it has proved a great significance of stress as a risk factor for CVD, in this region probably the most important risk factor beside the other "standard factors" such as hypertension, heart diseases, smoking etc.

P 1029

Secular mortality trends of cerebrovascular diseases in Croatia: 1958-1997

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Neuroepidemiological studies of cerebrovascular diseases (CVD) are very important for correct programming and planning of health service and its specific organization. Especially significant are the studies that show secular changes in the mortality from a disease during a long period of years or decades. This research comprised all deaths from CVD in Croatia between 35 and 74 years of age over the period 1958–1997. The number of deaths from CVD for the investigated population in that period increased by 40%. At the same time, the rates stan-

dardized by age and sex increased by 62%. Proportional mortality rate from this disease increased from 7.1% in the year 1958 to 14.8% in 1997 (increase of 39.48%). The specific mortality rates over 5-year period have shown a trend of increase in all male age groups and stagnation or decrease in females. Standardized mortality rates for CVD in continental communities (Osijek, Varazdin) are much higher (twice or even threefold) than those in coastal communities (Split, Rijeka). A cohort data analysis has shown that although mortality trends of CVD stagnated or even declined in some communities during the recent years, the secular trend for the entire country had a tendency of constant rise over the whole period of research. Therefore, the short-term prognosis predicts further increase of both the number and rates of deaths from CVD in our country.

P 1030

Peculiarities of demographic characteristics, risk factors and the outcome of cerebral infarction (ci) in patients with diabetes mellitus (DM)

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Introduction The aim of the study was to ascertain the outcome of CI among patients with DM, taking into account the peculiarities of other risk factors and demographic characteristics.

Methods and patients Study was performed at the Neuroangiological Centre observing the data of 3013 patients, among them 530 (17.6%) patients had DM and 2483 patients were included in the control group. All the patients underwent CT and/or MR of the brain.

Results The location of CI did not differ in the two groups. 83.4% and 82.6% of CI were located in the carotid system, respectively. The size of magistral CI differed slightly in both groups: accordingly 71% and 69% of CI were of small or moderate size, but the proportion of lacunar CIs was more frequent among patients with DM, by 4%. The mortality in the patient group with DM only by 2% exceed the mortality in the control group and was equal to 25%, showing no significant difference depending on other risk factors as arterial hypertension and hypercholesterolemia. Inability to walk even with assistance was by 14.1% higher in the patient group with DM than in the control group and in 30.2% of cases disability corresponded to 4th and 5th degree of Rankin score. Arterial hypertension and hypercholesterolemia did not significantly influence the degree of disability in patients with DM.

Conclusions Mortality was only by 2% higher in the patient group with DM whereas significantly higher was the proportion of patients which need permanent care and attention.

P 1031

Relationship between mortality from spontaneous intracranial haemorrhages and the size, site, behaviour of the haemorrhage and the patients' age

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Introduction Mortality from spontaneous intracranial haemorrhages (SICHs) is influenced by several factors. The objective of this retrospective study was to evaluate the relationship between the mortality from SICH and the size, site, behaviour of the haemorrhage, and the patients' age.

Methods The authors evaluated a group of 202 patients with SICHs, of which 137 haemorrhages were intracerebral (ICH), and 65 were subarachnoid/intraventricular (SAH/IVH) in localization. The site, the size (according to the longest axis) of the haemorrhage and the midline-shift were evaluated by computed tomography. The author investigated the relationship between 30-day mortality, the above-mentioned factors and the patients' age. Chi-square tests were applied for the testing of statistical significance.

Results The mortality from both ICH, and SAH/IVH increased significantly with the patients' age ($p=0.00002$ and $p=0.0009$ resp.). The mortality from supratentorial ICH both with, and without the IV component increased significantly in relation to the size of the haemorrhage ($p=0.05$ and $p=0.04$ resp.). The authors also provided evidence of a close correlation between the increase in mortality from SICH and the midline-shift ($p=0.00002$).

Conclusion The mortality from SICH increases significantly in relation to the patients' age and the midline-shift associated with the haemorrhage. The mortality from spontaneous supratentorial ICH increases significantly in relation to the size of the haemorrhage and intraventricular penetration of blood. The evaluation of the above factors can be used for prediction of the condition development of patients with those haemorrhages.

P 1032

Influence of stress coping and personality on the genesis of atherosclerosis

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Introduction Aim of this study was to investigate the influence of stress coping and personality on the expression of lipid values in regard to the genesis of atherosclerosis.

Method 756 high-risk patients participated at an interdisciplinary prevention program. A multiplicity of physiological and psychological risk factors concerning heart attack and stroke, including a stress coping questionnaire and a personality inventory, has been collected. Differences in coping and personality between groups with / without risk factors have been calculated by means of ANCOVA.

Results Men with elevated lipid values demonstrated higher scores in the coping styles situation control attempts, continued thoughts, minimising and lower values in tendency to flee. Women with elevated lipid values showed higher scores in downplaying, minimising and tendency to flee.

Men characterised by pathological HDL-C values demonstrated personality traits like performance orientation, aggression, lower satisfaction in life and less social orientation. Women with pathological LDL-C showed more neuroticism, excitement and health worries.

Discussion Pathological parameters in lipid metabolism seem to be in conjunction with repressive, passive coping styles and type A behaviour. A psychological stress induction, mediated by the named coping styles could be a co-producing agent of dyslipidemia and atherosclerosis by means of influence on the neuroendocrine response mechanism.

P 1033

Homocysteine as a risk factor in cerebrovascular dementia. Can it predict cognitive impairment?

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Introduction Homocysteine has been proven to be an independent risk factor for cerebrovascular disease. The objective of this study is to investigate whether homocysteine plasma levels are associated with cerebrovascular dementia; furthermore if these levels can predict cognitive impairment in the future.

Methods Three groups of patients (group A, B and C) age 60–87 years were selected to be studied for a period of one year. These consisted of: group A (24 patients) with cerebrovascular dementia, group B (24 patients) with stroke without cognitive dysfunction and group C (24 subjects) as control. Patients with renal failure, coronary heart disease and states accompanied by cobalamin or folic acid deficiency were excluded.

Homocysteine plasma levels were measured after twelve hours of fasting by immunoassay method (MICRO ELISA).

Cognitive status appraisal of all groups was carried out by the Mini Mental State Examination, clock test and Geriatric Depression Scale.

The Wilcoxon and Mann-Whitney U tests were used in statistical result analysis.

Results Homocysteine plasma levels were elevated in both groups (A and B) with cerebrovascular disease, significantly more so in the vascular dementia group. Concerning cognitive impairment the results indicate that higher homocysteine plasma levels are related to decline of cognitive functions.

Conclusions Homocysteine seems to be associated with cerebrovascular dementia and furthermore with the degree of cognitive dysfunction.

P 1034

Association of meteorological factors and season of the year with stroke incidence

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Introduction Previous studies, also as every day clinical practice implicate that association of weather with stroke incidence exists. The aim of this study was to analyse the seasonal distribution of stroke and to correlate stroke incidence (ischemic (ISH), hemorrhagic (ICH) and subarachnoidal haemorrhage (SAH)) with changes in meteorological factors: outside temperature, air pressure and air humidity.

Methods We analysed the data of all stroke patients admitted to Neurology Department University Hospital "Sestre milosrdnice" from January 1st, 2001 till December 31st, 2001. Meteorological data for day before and day of incident were analysed.

Results This study involved 1059 stroke patients, 124 SAH, 845 ISH and 90 ICH. We observed significant increase of SAH during May, June and December. The highest incidence of ICH events was in November, July and August. ISH most frequently occurred during July, June and during January and March.

According to meteorological changes we observed the higher incidence of ISH during increase in air humidity (51.4%) and air pressure drop (38.2%). 52.5% of all ICH occurred also during air humidity increase and 40% during air pressure drop. Incidence of SAH was higher on days with air pressure and humidity drop (46.9% and 48.7%, respectively). All three stroke types were more frequent on days when rapid increase of outside temperature occurred.

Conclusions We observed that the incidence of all three strokes types is higher during summer and winter months when temperature excess is present. Significant correlation between air pressure drop and air humidity increase and stroke occurrence was found.

P 1035

The incidence and aetiology of intracerebral haemorrhage in adult population of central region from Republic of Moldova

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Background and purpose Intracerebral haemorrhage (ICH) accounts for 31% of all strokes in Moldova and is associated with high rates of mortality and disability. Goals were evaluation of etiologic factors in ICH patients hospitalised and treated in Stroke Unit in 2001.

Materials and methods A group of 150 ICH patients underwent clinical, CT, laboratory examinations.

Results ICH aetiological factors were: in 58% – hypertension (HT), in 17.3% – HT associated with atherosclerosis, in 4.66% – HT with heart diseases (valvulopathies, rheumatism, heart surgery), in 4.66% – HT with diabetes mellitus, in 4% – HT with alcoholism, in 3.33% – ruptured aneurysm, in 2% – HT with hepatic cirrroses, and in 0.66% – cerebral vasculitis. We couldn't find a clear cause of ICH in 5.3%. Affected age groups were: >40 years – 5 patients, 41–50 years – 31; 51–60 years – 38; 61–70 years – 45; <70 years – 25 patients. Fatal outcome counted 48.88%: during first day – 25 cases, day II – 13, after day III – 29. Contributing factors were: volume and localization of ICH, ventricular and subarachnoidal eruption, age, GCS degree at hospital arrival, other conditions.

Conclusions ICH is a neurological emergency and needs specialised assistance, appropriate treatment and care approaches in first hours. The most frequent cause of ICH in Moldova is HT or HT associated with other pathologies. Most affected are adults of working age. High mortality and disability rate causes major economic prejudices. Adequate control of HT could be an effective preventive measure of ICH.

P 1036

Significance of clinically evident stroke in patients with cerebral white matter lesions

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P 1037

A model for early prognosis of spontaneous intracerebral haemorrhage

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P 1038

Intracranial haemorrhage - role of risk factors

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P 1039

Diagnostic problems in minor hemorrhagic stroke

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P 1040

Assessment of temporal bone beam distortion when using multifrequency Doppler to differentiate cerebral microemboli

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P 1041

Differences and similarities among patients with stroke depending on sex

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Cerebrovascular diseases 2

P 2001

Extreme hyperlipidemia is associated with increased intima-media thickness of the common carotid artery in patients below 55 years of age

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Background Contradictory results have been reported on the role of serum cholesterol and triglyceride in carotid atherosclerosis. As one of the reasons of the conflicting conclusions could have been the inclusion of mild and borderline cases, we measured intima-media thickness (IMT), a marker of atherosclerosis in patients with marked hyperlipidemia.

Patients and methods 29 patients with markedly increased serum cholesterol or triglyceride values in their history and 32 controls were compared. Blood samples for serum triglyceride, cholesterol, and homocysteine were taken after an overnight fast. Bilateral IMT measurements were performed in the common carotid arteries. Frozen enlarged images were used for online and offline evaluation. ANOVA was used for statistical analysis.

Results Patients with pure hypercholesterolemia (n=8) as well as patients with hypercholesterolemia and associated hypertriglyceridemia (n=21) had significantly higher serum cholesterol than controls (9.5±1.8, 9.2±3.0 and 5.0±0.7 mmol/L). There was no significant difference in serum homocysteine among the groups. Common carotid artery IMT was significantly larger in the hyperlipidemic groups than in controls (controls: 0.72±0.10 mm, pure hypercholesterolemia: 1.05±0.32 mm, combined hypercholesterolemia and hypertriglyceridemia: 0.97±0.17 mm; p<0.001).

Discussion Severe hypercholesterolemia is associated with increased IMT of the common carotid artery. The combination of hypertriglyceridemia with hypercholesterolemia does not result in an additional increase of IMT. Increased IMT in marked hypercholesterolemia cannot be attributed to increased homocysteine levels.

P 2002

Arterial blood pressure changes during acute and subacute stroke

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Introduction Elevated blood pressure (BP) values during acute stroke are widely reported. Aim of this study was to examine possible BP changes during the acute and subacute stroke stages for the different etiopathogenic stroke subtypes by means of 24 hour BP monitoring.

Methods 24 hour BP monitoring was performed during the 1st, 7th and 90th day after symptom onset in 69 first-ever stroke patients (12 cases with atherosclerotic large vessel disease, 8 cardioembolic strokes, 17 patients with small vessel disease (SVD), 17 cases of intracerebral haemorrhage (ICH) and 15 cases of unidentified cause). These findings were statistically compared with the data of 26 control persons (hypertensives without stroke) using One-Way-ANOVA and t-test.

Results When initially (1st day) compared with control, patients of all stroke subtypes showed significantly higher BP (p<0.001). A significant reduction (p<0.01) of the mean systolic BP between 1st and 7th day was described in all stroke subgroups, whereas a further significant decline (p<0.05) between 7th and 90th day was only seen among patients with ICH. The differences between corresponding recordings in the control group were not statistically significant. Patients with SVD presented in all 3 BP-recordings higher BP values than the control persons.

Conclusions During the acute stage, all stroke subtypes show elevated BP values, which seem to decline during the first week after stroke onset in all stroke subgroups. 3 months a further BP decrease is only observed in patients with ICH, whereas only patients with SVD show constantly higher BP values than control persons.

P 2003

Significance of peripheral blood nitric oxide initial data in acute ischemic stroke

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Introduction Accumulated evidences suggest that transducing mechanisms of NO-generation not only adapted to cytotoxicity, but also refer to cell protection.

Objective to define the nitric oxide levels in peripheral blood during 48 hours of ischemic stroke onset and to establish their correlation toward the outcome of disease at 1 month.

Methods 85 patients, aged 45 to 75, 38 male, 47 female have been investigated. NIHSS and Glasgow Coma Scale (GCS) assessed basic neurological impairments. Patients were divided into 3 groups according to severity of disease. I–group – 36 patients (NIHSS>15, GCS (9), II–group – 21 patients (NIHSS=10–15, GCS>9), III–group – (NIHSS<10, GCS=15). Barthel Index (BI), and Glasgow Outcome Scale (GOS) scored outcomes at 1 month. Controls consisted of 32 healthy individuals, aged from 40 to 70. NO levels were measured applying the electron paramagnet resonance (EPR) and spectrophotometer methods. The mean values computed by paired t-tests. The strength of association between the normally distributed variables defined using the Pearson Product-Moment Correlation Coefficient.

Results Peripheral blood NO levels during first 48 hours of acute phase were significantly lower in severe stroke patients compared to controls (62.7 versus 105.5 (15.9)) and correlated with poor outcome (R=+0.796 P<0.02), while the II and III

groups showed the elevated levels of NO (146.5 (3.93) 159 (31.4 respectively $P < 0.01$)) correlating with better functional outcome.

Conclusion The long-lasting NO generation in peripheral blood during critical stage of ischemic stroke is directed toward the activation of endogenous protective mechanisms.

P 2004

Evaluation of leukoaraiosis in stroke patients

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Introduction Pathogenesis of leukoaraiosis (LA) is not clearly understood. LA can be observed in patients with stroke. Significance of LA in patients with stroke remains undetermined.

Methods In Neurology Department of Ankara Hospital, Computed Tomography (CT) examination of brain was performed for various reasons in 288 patients from January 2000 to January 2001. LA was detected in 178 patients by the use of CT of brain. These patients were compared with the non-LA group. Student's *t* test and Pearson's χ^2 analysis were used for statistical analysis.

Results Patients with LA had a higher incidence of hypertension history (70.8%) when compared with the non-LA group (57.3%; $p < 0.05$). There was no statistically significant difference in terms of sex, mean age, smoking, diabetes mellitus, history of cerebrovascular disease, cardiac failure, and ischemic cardiac disease between patients with and without LA. There was no statistically significant difference in the ratio of cerebrovascular disease severity and death between two groups.

Conclusion We showed that LA is related with hypertension but not related with age, diabetes mellitus and cardiac disease in our patient population.

P 2005

Microalbuminuria and hyperthermia independently predict long-term mortality in acute ischemic stroke patients.

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Introduction We designed this study to investigate the association between microalbuminuria (MA) and hyperthermia in acute ischemic stroke and to evaluate their significance as the predictors of long-term mortality after stroke.

Methods We studied 60 patients admitted within 24 hours after the onset of their first ischemic stroke. The Scandinavian Stroke Scale on admission and on day 1 assessed neurological deficit. Urinary albumin excretion was measured immunonephelometrically in 24-hour collection of urine performed on day 2. Body temperature was measured using infrared aural thermometer every four hours after admission on day 0, 1 and 2 and hyperthermia was defined as the body temperature $> 37.5^\circ\text{C}$. Outcome was assessed by 90-day and one-year mortality.

Results MA was found in 46.7% of patients. Hyperthermia was found in 18.3% patients on day 1 and in 25% patients on day 2. The correlation between albuminuria on day 2 and the body temperature on day 1 and on day 2 was found ($r = 0.45$, and $r = 0.30$, respectively; both $P < 0.05$). The mortality was higher in the group of patients with both MA and hyperthermia on day 2 (73% vs. 10% after 90 days; $P < 0.0001$ and 73% vs. 18% after one year, $P < 0.005$). In the logistic regression analysis, albuminuria ($P = 0.017$), hyperthermia on Day 1 ($P = 0.028$) and neu-

rological deficit on admission ($P = 0.044$) independently predicted one-year mortality after ischemic stroke.

Conclusion Daily albuminuria correlates with increased body temperature in acute stroke patients, but both these variables independently predict one-year mortality after ischemic stroke.

P 2006

Anterior ischemic optic neuropathy as first symptom in a patient with CADASIL

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CADASIL is a cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy, caused by Notch 3 mutation that lead to an abnormal accumulation of Notch 3 protein within the vasculature. Although CADASIL is considered a systemic arteriopathy prevalently affecting the central nervous system, pathologic changes consisting in granular osmophilic material (GOM) within the basement membrane of smooth muscle cells, have been shown on skin, muscle or nerve biopsy. An early involvement of both choroidal and retinal vasculature has recently been suggested also in asymptomatic CADASIL patients. We report on a 60 year old Italian man with subcortical dementia and family history of strokes, in whom clinical and molecular diagnosis of CADASIL was performed. The patient experienced at the age of 27 years an acute visual loss due to NAION. Diagnosis of CADASIL should be ruled out in young patients with acute ischemic optic neuropathy, absence of risk factors or associated conditions and family history of stroke.

P 2007

U-shaped relation of admission blood pressure values and early or late stroke mortality

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Aim Data on the prognostic significance of blood pressure (BP) levels following acute stroke are conflicting. We tried to evaluate a possible relation between admission systolic BP (SBP) or diastolic BP (DBP) and early or late mortality in the different groups of acute stroke patients.

Subjects and methods We studied a consecutive series of 1121 patients with first-ever acute stroke admitted to our hospital. Stroke was classified as ischemic and hemorrhagic stroke. Casual supine BP was measured at hospital admission. The mortality rate after 1 and 12 months was calculated in percentage and then analysed in relation to admission SBP, DBP and stroke type. Mortality rate was compared between the groups of SBP, DBP using the log-rank test. A two-tailed probability value of less than 0.05 was considered significant.

Results Distribution of stroke mortality 1 and 12 months after stroke in overall, ischemic and hemorrhagic stroke patients shows a typical U-shaped curve. However, the optimal SBP and DBP range for survival (U-point of the curve) for patients with ischemic stroke (SBP: 121–140 mmHg; DBP: 81–90 mmHg) was significantly lower ($p < 0.01$) than for patients with intra-cerebral haemorrhage (SBP: 141–160 mmHg; DBP: 101–110 mmHg).

Conclusions Our results suggest that BP-values at admission are of prognostic relevance. It seems that the optimal initial SBP and DBP values for patients with ischemic stroke are lower than those for patients with hemorrhagic stroke. If these findings get prospectively verified, this may lead to a differentiated therapeutic approach of BP in acute stroke patients, depending on the type of stroke.

P 2008

Apolipoprotein E genotypes and serum lipids and outcome after cerebral ischemia

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Apolipoprotein E (ApoE) polymorphism influences plasma lipids levels. Higher plasma cholesterol was associated with a better outcome after ischemic stroke (IS).

Aim and method To test the relationship between ApoE genotypes and serum lipids and outcome after IS, we examined ApoE genotypes (PCR RFLP method) in 169 IS patients.

Results Distribution of genotypes was: E3/3: 69.2%, E3/4: 14.8%, E2/3: 13.6%, E2/4: 2.4%. Patients carrying E2/3 genotype had lower plasma low-density lipoproteins (LDL) (121.4+/-28.6mg/dL), total cholesterol (TC) (183.6+/-25.8 mg/dL), and TC/high density lipoproteins (HDL) ratio (4.5+/-1.1mg/dL), as compared with E3/3 (LDL: 136.0+/-38.3mg/dL, p=0.04; TC: 202.0+/-46.5mg/dL, p=0.08; TC/HDL ratio: 5.2 +/-1.6 mg/dL, p=0.02), and E3/4 (LDL: 148.9+/-46.9mg/dL, p=0.03; TC: 217.3+/-60.3mg/dL, p=0.07; TC/HDL ratio: 5.7 +/-1.6mg/dL, p=0.009) genotypes carriers. As compared with "the lack of E2" genotype, allele E2 carriage was associated with decreased TC (p=0.03), LDL (p=0.01) and TC/HDL ratio (p=0.004). The allele E 4 carriers had not significantly different serum lipids as compared with "the lack of E4" genotype carriers.

We found no association between ApoE allele distribution and neurological outcome following stroke. However, ApoE epsilon 4-allele carriage was a risk factor for fatal outcome during 30-day period (OR=2.65, 95% CI 0.96-7.29, p=0.05).

Conclusion Genetic variation at the ApoE locus in Polish IS patient's population is a genetic factor that influences plasma lipid levels. However, ApoE genotype and plasma lipid levels do not correlate with stroke patient's neurological outcome. Apo E 4 allele carriage is associated with increased risk of death in the early phase after stroke.

P 2009

Correlation of soluble Fas/APO-1 level in cerebrospinal fluid and lesion volume in acute stroke patients – preliminary report

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Background and aim Cerebral ischemia studies in animal models have indicated that apoptosis-programmed cell death, might be a contributor to neuronal death. The aim of this study

was to correlate the level of soluble (s) Fas/APO-1 (apoptosis suppressing protein) in CSF, with lesion volume in acute ischemic stroke patients.

Methods Six male patients (mean age 63±10 years) with first acute ischemic stroke, verified by clinical examination and CT scan were included in the study. Patients with history of severe infection, congestive heart failure, autoimmune and malignant disease were not included.

Soluble Fas/APO-1 level in CSF was determined by ELISA on day 3 of disease onset. Volume of ischemic lesions on CT scans (performed on the same day) was measured by own software. Statistical analysis was performed by Kendall's tau test.

Results The CSF levels of sFas/APO-1 in acute stroke patients of the observed group, ranged from 0 to 1.8 U/ml. The volume of ischemic lesions on CT scans, ranged from 0.21 to 47.72 ml. There was statistically significant correlation between CSF level of sFas/APO-1 and volume of ischemic lesions on CT scans in stroke patients (correlation coefficient 0.6; p=0.045).

Conclusion The preliminary results demonstrate correlation between CSF level of sFas/APO-1 and volume of ischemic lesions on CT scans, suggesting possible pathophysiological contribution of apoptosis in acute stroke patients.

P 2010

Contralateral carotid occlusion in acute ischemic stroke influence on short-term outcome

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Background Concerning the relevance of an asymptomatic contralateral carotid artery occlusion (ACO) for the outcome of ischemic stroke patients few data are available. A decreased collateral flow and thrombotic or embolic events might lead to a worse outcome. The North American Symptomatic Carotid Endarterectomy Trial Collaborators (NASCET) study reported in 5% of cases the presence of a contralateral occlusion.

Methods Object of the study were 758 patients suffering from acute ischemic stroke consecutively included in the Perugia hospital based Stroke Registry from 1st January 2000 to 31st December 2001. Demographic data, risk factors, medical history, characteristics of stroke, outcome according to the Rankin scale (RS), Barthel index (BI) and Scandinavian Stroke Scale (SSS) were recorded. Diagnosis of carotid occlusion was performed according to duplex ultrasound findings performed at admission.

Results Twelve (1.58%) ACO were detected. All ACO patients suffered from a PACI subtype of stroke, due to large artery disease and presented a lower Barthel score at admission (33 vs. 45). Patients having ACO were more likely to have a severe disability and neurological deficit at admission (SSS admission 31 vs. 32; RS admission 3.8 vs. 3.2) and discharge (SSS discharge 35 vs. 37; RS discharge 3 vs. 2.3). Bivariate analysis showed a significant association (p=0.03) between ACO and the presence of a more severe disability at discharge.

Conclusion In our experience ACO, prevalence is comparable to that shown in the highly selected population of the NASCET study. Patients with ACO seem to suffer from more severe strokes having poorer outcome.

P 2011

Association of C-reactive protein and leukocyte count with carotid atherosclerosisR. Kazmierski, W. Kozubski, J. Dorszewska,
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Introduction A large number of current epidemiological studies have reported on association between low-grade inflammation and atherosclerosis.

Objective The aim of this study was to assess how the inflammatory markers, such as C-reactive Protein (CRP), fibrinogen and leukocyte count were associated with carotid atherosclerosis, in comparison with biochemical parameters, like serum lipids, homocysteine, vitamin B12, B6 and folic acid serum levels, or parameters of peripheral blood cells, such as red cell count, mean corpuscular volume, haematocrit and platelet count.

Method 128 subjects including 54 stroke patients were investigated. The mentioned above parameters were measured in a standard hospital laboratory and additionally for homocysteine and vitamins with the use of high-performance liquid chromatography. Intima-media thickness (IMT) a measure for atherosclerosis of common and internal carotid arteries was measured with the use of high resolution B-mode ultrasonography.

Results We found a strong correlation between carotid IMT and leukocyte count ($r=5.24$; $P<0.001$), CRP ($r=4.14$; $P<0.001$), and in a less degree between IMT and fibrinogen level ($r=3.06$; $P=0.003$). Adverse correlation between IMT and high-density lipoproteins ($r=-4.13$; $P<0.001$) and positive correlation for triglycerides ($r=3.49$; $P<0.001$) and homocysteine ($r=2.12$; $P=0.036$) was found. For the rest of the assessed parameters we did not find significant correlation.

Conclusion The inflammatory markers like leukocyte count and CRP were strongly associated with carotid atherosclerosis. They could be easy, quick and relatively cheap to perform in any hospital laboratory.

P 2012

Circadian variations in blood parameters of micro-circulation in patients with acute cerebral ischemic eventK. Akhvediani, T. Djandjgava, J. Burduladze, G. Lomidze,
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It is considered that circadian rhythms have an actual influence on the dynamics and pathogenesis of stroke occurrence, both in ischemic and hemorrhagic events, while affecting over their determiners such as blood pressure, parameters of microcirculation, blood fibrinolytic activity etc.

The goal of current study was to evaluate the tendency of formation of completed ischemic stroke during the nighttime in patients predicted with transient ischemic attacks (TIAs) in debut of the cerebral ischemic event.

We evaluated 20 patients with TIAs on admission. There were performed blood pressure monitoring, measurement of blood viscosity, haematocrit and erythrocyte aggregation index (EAI) in blood samples drawn by venepuncture on admission and during the night time (0, 2, 6 a.m.) at first in-hospital day. It was also picked up the time lag of ischemic attack with comparison of above-mentioned parameters.

We found that blood fibrinolytic activity was depressed and EAI was inverted during the nighttime at 65% and 88.2% of patients

respectively. All of those patients had a completed ischemic stroke clinically since next morning in consequence of TIAs in debut. Patients with TIAs without forthcoming stroke had ischemic events just at daytime and considerably lower rates of diurnal changes in blood microcirculation parameters.

Thus, we might conclude that severity of brain ischemic damage is affected by circadian variations in blood microcirculation parameters. The identification of periods of high risk for vascular events may have important practical implications.

P 2013

Isolated unilateral anterior cerebral artery infarction: clinical and magnetic resonance (MRI) features in a series of 7 patients

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Introduction Infarction of the anterior cerebral artery (ACA) accounts for about 1% of all territorial strokes. Despite some case series, most of the knowledge on isolated ACA-stroke is based on case reports.

Methods Our standard work-up for patients with acute ischemic stroke including MRI with diffusion-weighted imaging (DWI) was applied and MRI/DWI defined acute ACA-stroke. Patients with other acute or older significant lesions were excluded.

Results 7 consecutive patients were included. Mean age was 48 years (range 23–85); 4 were women, 3 men. Lesions were complete in 1 patient and incomplete in 6 with a predominance of the territory of branches of the pericallosal artery supplying the anterior cingulate gyrus (ACC). Lesion side was left in 6 and right in 1 patient. The presenting clinical signs were akinetic mutism (mostly transient), apathy, and vegetative trouble. Crural hemiparesis was only found in one case, the others had slight and transient hemiparesis of the proportional type. Involuntary movements were present in one patient. The aetiology did not differ significantly from other stroke types. Outcome in everyday life was generally good with 5 patients resuming their everyday activities.

Discussion In our series, the clinical presentation of ACA-stroke was mainly a neuropsychological or psychiatric one. This results from the definition by MRI permitting to visualize lesions, which usually escape detection by computed tomography. The diagnostic challenge consists in constant awareness of subtle neurological signs permitting a clinical diagnosis of a probably under recognized stroke syndrome.

P 2014

Vascular endothelial growth factor in patients with large vessel versus small vessel ischemic strokeS. M. A. Said, M. M. Hamdy, T. M. Mostafa, M. T. Afifi
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Objectives We aimed at studying the role of vascular endothelial growth factor (VEGF) in small and large vessel ischemic strokes.

Backgrounds Growth factors may play different roles in the cerebral ischemic events. They may play role in the healing process and functional reorganization neurons during ischemia. They may also have neuroprotective properties after brain injury or ischemia.

Designs and methods VEGF was measured in the sera of 40 patients with acute ischemic stroke within one week of onset. Patients were divided into 2 groups; group I included 20 patients with large vessel diseases and group II included 20

patients with small vessel diseases. VEGF was also measured in the sera of 20 healthy subjects as a control group.

Results The mean serum levels of VEGF were significantly higher in groups I (mean± std.error; 7.29±1.23 ng/ml) and II (4.63±0.99 ng/ml) than in the control group (2.13±0.32ng/ml) ($z=-3.61$, $p<0.0001$ & $z=-2.54$, $p<0.05$). However, there was no statistically significant difference between the mean serum levels of VEGF in-group I & II ($z=-1.72$, $p>0.05$).

Conclusions Our results indicate that VEGF may have an important role in both large and small vessel ischemic strokes.

P 2015

Circadian blood pressure pattern and occurrence of lacunar infarct

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Background Although the occurrence of lacunar infarction is closely related to arterial hypertension, the possible pathogenetic role of circadian blood pressure (BP) changes is controversial. This study was designed to evaluate the relationship between circadian BP changes and occurrence of lacunar infarct in the respect of possible risk factors.

Methods and Patients Patients, older than 50 years old who were admitted to our clinic were evaluated to detect the circadian BP pattern, occurrence of lacunar infarct and other risk factors. Twenty-nine patients with lacunar infarct and 29 controls were included into the study consecutively between 2000–2002 years. Detailed information and neurological examination were done. Ambulatory 24-hour BP measurements, laboratory examinations and radiological studies were performed. Variation in systolic and diastolic BP was defined as the difference between night and daytime.

Results Patients with lacunar infarct were significantly older and showed more often a history of arterial hypertension ($p:0.02$). Daytime and nighttime BP values were significantly greater than controls ($p<0.01$). A reduced circadian BP variation due to increased nighttime values was found different from controls. In the logistic regression analysis, a reduced systolic circadian BP variation ($p<0.01$, OR: 15.1 95% CI, 4.2–54.5), age ($p:0.03$ OR, 1.01; 95% CI, 1.01–1.19), history of hypertension ($p:0.001$ OR, 4.84; 95% CI, 1.47–15.97) and night time systolic BP values ($p<0.001$ OR, 1.11, 95% CI, 1.05–1.17) were found to be determinants of lacunar infarction.

Conclusion Reduced systolic circadian BP variation may be an important factor for the occurrence of lacunar infarction besides age and history of hypertension.

P 2016

Haemorrhagic cerebrovascular events and Marfan syndrome (MF)

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Background E.T a 29 years old, female recovered in Clinic of Neurology UHC of Tirana was diagnosed with cerebral arteriovenous malformation (AVM), other findings included: dolichostenomelia, dolichocephaly, arachnodactily, joint hypermotility, thinner retina, high arched and narrow palate, mitral valve prolapsed.

Clinical diagnosis performed by Genetics Clinic for this patient was Marfan syndrome, an autosomal dominant disorder of

connective tissue. According relations between symptomatic cerebral haemorrhage and Marfan syndrome was attempt to demonstrate.

Methods All the records of patients with intracerebral and subarachnoidal haemorrhage recovered in clinic of Neurology and Neurosurgery UHC of Tirana from January 1991–January 2002 were retrieved and observed for relation with MS. Total observed patients 547 (arteriovenous fistula 0.5, cavernoma 1%, angioma 3.10%, AVM 5.66%, aneurysm 13.34%).

Results Two patients with Marfan syndrome were recovered in Department of Neurology and Neurosurgery in this period. Only one patient with MS had symptomatic AVM. The other one was recovered for specific meningitis, unrelated with haemorrhagic cerebrovascular event.

Conclusion According to our results there does not exist a relation between a haemorrhagic cerebrovascular event and Marfan syndrome or vice versa.

P 2017

Effect of duration and type of diabetes mellitus on cerebral haemodynamics

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The aim of the study was to assess whether duration and type of diabetes mellitus influences cerebral haemodynamics. Mean blood flow velocity (MBFV) /TCD measurement/ in the Willis circle of diabetics and control group of healthy, 100 subjects aged 48–67 years. Diabetics were divided according to duration (L.T.5 and G.E.5 years), type and therapy for type I (insulin) and type II (peroral antidiabetic, diet). Patients with pathologic TCD distributed had their MBFV slowed down and were considered suspect of stenosis. Forty diabetics had their MBFV slowed down. In the control group, it was recorded in 11% of subjects, and in the diabetics group for G.E.5 years in 50% of patients. Suspect arterial stenosis was recorded in 15% of diabetics, 21.43% of those who had diabetes for G.E.5 years, and in none (0%) in the control group. In the type I, slowed down MBFV was recorded in 50% of patients, in those with type II in 34.88%, and in those with type, II treated with diet in 29.41% of patients. Suspect arterial stenosis was recorded in 22.5% of patients with type I, 11.63% with type II on peroral antidiabetic therapy, and in 5.88% with type II diabetes on diet alone. Proportion tests (p L.T. 0.05) indicated the duration and type of diabetes to influence cerebral haemodynamics, so that the patients with type I and diabetes duration of G.T.5 years had a much higher probability to have suspect stenosis and markedly slowed down MBFV in the circle of Willis.

P 2018

Serum magnesium level in acute ischemic stroke

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Introduction A neuroprotective effect of magnesium in stroke has also been hypothesized. We planned to investigate the relationship between the clinical severity of acute ischemic stroke, infarct volume and the blood total magnesium levels.

Methods One hundred fifteen patients (mean age 62.7±11.0, between 29–83 years old, 61 male and 54 female) with acute ischemic stroke admitted to our clinic respectively and thirty healthy, age and sex matched subjects as controls (mean age

60.5±8.8 between 32–75 years old, 17 male and 13 female) were enrolled to our study. In the first 24 hours of stroke, venous blood samples were collected for total magnesium level detection with atomic absorption method. Clinical evaluation was made by NIHSS in the first day of illness. We created 3 subgroups according to NIHSS scores as follows; Group 1: 0–9, Group 2: 10–19, Group 3: 20–42. We also created 3 subgroups according to the infarct diameter seen in CT on the day five as follows: Group 1: <1 cm, Group 2: 1–3 cm, Group 3: >3 cm.

Results Mean total magnesium level of the patients was 17.7±3.57 mg/ml and that of controls was 17.9±3.52 mg/ml. Comparison of the means between groups revealed no statistical significance. It has been found no correlation between total magnesium levels and either clinical severity of acute ischemic stroke or infarct diameter.

Conclusions We did not find any supportive neuroprotective effect of endogenous total magnesium level during acute ischemic stroke.

P 2019

Content of FAS-receptors in acute period of the stroke

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Presently in pathogenesis of stroke is emphasized the role of mechanism of apoptosis that results in deferred neuron's death. In the focus of angiocerebral conflict along with accumulation of free radicals, deprivation of growth factors and inhibition of tissue antioxidant systems, immune inflammation with generation of antiinflammatory cytokines is of great importance. Evolving of cytokine cascade is accompanied by influx of lymphocyte cells in zone of damaged brain tissue and by expression of leukocyte adhesive complex. All this induces Fas-receptors, which serve as marker SD95 and result in hyper expression in conditions of apoptosis of neural cells.

The aim of study was to learn the content of Fas-receptors (SD95) during acute period of stroke in conditions of arterial hypertension.

In clinical conditions, 17 patients were investigated (10 female and 7 male). Their age varied from 43 to 77 years. Mean age – 63.4 years. 12 patients had ischemic and 5 hemorrhagic stroke. According to Glasgow scale, loss of consciousness of severe grade showed 8 (summary index – 6.75±1.28), middle grade – 7(10.3±0.95), mild grade – 2(14.5±0.5).

The study showed increasing number of lymphocytes in blood, which were typified by Fas-receptors that was equal to 19, 6±7.4%. Its level correlated with severity of stroke. In cases of the stroke of severe grade level of monoclonal antibodies was 26.4±3.0%, in cases of middle grade – 15.4±2.1%, in mild grade – 7±1.4% (p<0.001). Autoimmune process in brain results in neuron's death in the form of apoptosis, degrees of which correlates with stroke severity grade.

P 2020

Acute vascular spinal disturbances in Scheuermann disease

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Objective The neurological complications within Scheuermann disease (SD) are observed in 13–15% cases. The goal of the study was to establish the role of the degenerative vertebral process within SD in evolution of spinal stroke.

Material and methods 8 patients were examined (2 females and 6 males), aged from 19 to 46 years with spinal stroke on the baseline of existing SD. The patients underwent neuroimaging examinations by means of routine spondilography and spine magnetic resonance imaging (MRI).

Results In all cases stroke developed in the supply area of A. Adamkiewicz. The medullar vascular disturbances manifested as syndrome of complete transverse medullar lesion. The patients experienced an acute onset within minutes or several hours manifested by flask paraplegia, conductive sensory loss, and central sphincter disturbances. Radiological modifications presented as excessive thoracic kyphosis with apex localization at the Th9–Th10 level – in 6 cases, Th5–Th7 – in 2 cases, osteoporosis of the cuneiform vertebrae – in all the examined cases, reduced intervertebral disks height, associated with Schmorl hernias – in 6 patients. MRI revealed signs specific for medullar ischemia. In 2 cases a marked tumefaction with hyper intensity in T2w regime at the Th5–Th7 levels were established, with extension from Th9 to Th11 levels – in 5 cases and to Th12–L1 – in one case. Spinal channel stenosis at the thoracic level was detected in 4 patients.

Conclusion The degenerative spinal modifications within SD should be considered as etiological factor in spinal stroke in young persons.

P 2021

Relation between erythrocyte deformability and blood flow velocity in cerebral arteries in heavy alcohol drinkers in acute stage and after withdrawal

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Introduction Significantly, decreased blood flow velocity in cerebral arteries as well as decreased erythrocyte deformability in heavy alcohol drinkers was found (Gdovinova et al., 2002). The aim of the study was to determine if there is correlation between them.

Methods The study comprised of 47 patients, heavy alcohol drinkers (mean age 47 years). Mean flow velocity (V_{mean}) was determined by a 2 MHz pulsed Doppler probe. Erythrocyte membrane biophysical properties were estimated using the method of cation-osmotic haemolysis (COH) developed by Nicak and Mojzis (1992). The results were compared with results in 20 healthy volunteers of the same age. Differences between these two groups were tested with Student's t-test. Relation among blood flow velocity and cation-osmotic haemolysis (COH) was analysed by methods of regressive and correlative analysis.

Results V_{mean} was significantly decreased in all cerebral arteries. V_{mean} in MCA was 52±/–8.74 cm/s vs. 59.2±/–9.1 cm/s (p<0.001). COH was significantly decreased in the medium of low and high ionic strength (15.4 mmol/l NaCl) resp. (123.2–154 mmol/l NaCl) (p<0.01). Linear correlation between COH and V_{mean} was found by correlative analysis (V_{mean} =0.226 COH+40.55, correlation coefficient R=–0.56, p<0.01). After withdrawal, V_{mean} was increased while COH was not significantly changed.

Conclusion There is linear relation between V_{mean} in cerebral arteries and cation-osmotic haemolysis in acute stage in heavy alcohol drinkers. In conclusion, decreased ED could be the reason of decreased V_{mean} , which is the risk factor of stroke.

P 2022

Tinnitus and cerebrovascular disease

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Introduction The auditory and vestibular systems share the same end organ and cranial nerve, yet vestibular signs and symptoms are common with cerebrovascular disease, whereas hearing disturbances are much less frequent. The most hemispheric lesions produce subtle hearing dysfunctions that can only be detected with sophisticated psychoacoustics and electrophysiological testing. The aim of this study was to evaluate the occurrence of risk factors for cerebrovascular disease in patients suffering from cochlear tinnitus.

Methods We tested 48 persons with subjective, cochlear tinnitus (patients), 35 women and 13 men, aged 30–65 years. Our results were compared to the control group of 50 persons without tinnitus, 36 women and 14 men, aged 28–66 years.

All subjects had a complete neurootologic examination with medical history, standard blood testing, audiometry and vestibular testing. Colour Doppler Flow Imaging of carotid and vertebral arteries and Transcranial Doppler were also performed.

Results The risk factors for cerebrovascular disease, hypertension, diabetes, hyperlipidemia and smoking were significantly more often in patients than controls. Patients with tinnitus had significantly more often the vertebrobasilar insufficiency evaluating by Transcranial Doppler.

Conclusion These results show that identification of risk factors for cerebrovascular disease may lead to prevention or effective treatment of cochlear tinnitus.

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P 2023

Asymptomatic carotid stenosis in patients who have claudication

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Introduction Atherosclerosis is a generalized and progressive disease. Patients with symptomatic peripheral vascular disease often have symptomatic or asymptomatic disease elsewhere in the vascular system.

The aims of this study are to investigate the prevalence of asymptomatic carotid stenosis in patients who have claudication as the mildest form of peripheral vascular disease and to identify high/risk groups among these patients.

Methods Screening for internal carotid artery using duplex colour flow scan were performed on 102 patients with claudication and with no history of cerebrovascular symptoms or prior carotid endarterectomy. Patients with carotid stenosis were divided in four groups: mild, moderate and severe carotid stenosis, and total occlusion on at least one side. Associated atherosclerotic risk factor were assessed (patient age, sex, diabetes, hypertension, smoking history and lipid levels).

Results The prevalence of previously unknown mild carotid stenosis was 52.94%. The prevalence of moderate carotid stenosis was 33.33%. In 13.72% of patients, carotid examination produced severe carotid stenosis. There was no patient with total occlusion. Asymptomatic carotid stenosis was found to significantly correlate with male sex ($p=0.011$), smoking history ($p=0.000$) and advanced age ($p=0.000$).

Conclusion Routine duplex screening has benefit in all patients who seek medical attention with claudication to detect asymptomatic high-grade carotid stenosis.

P 2024

Epileptic seizures as a manifestation of stroke

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Introduction Epidemic studies have been accomplished showing a wide variation in frequency of epileptic seizures in different types of stroke.

Objective The objective was to compare the frequency of epileptic seizures in different type of stroke.

Methods We studied all the stroke patients admitted to our Hospital from January 2002 to April 2002. The patients were studied using a standard protocol including at least one CT scan within 7 days of the stroke and EEG.

Results 1050 patients with stroke were attended, 494 female and 556 male, age range 32 to 91. Among these stroke patients, 87 had experienced first epileptic seizures in onset of stroke. The following results of frequency of epileptic seizures were provided: in patients with single ischemia 27, with multiple ischemic brain lesions 29, with hemorrhagic ischemia 1, with SAH 2, with haemorrhage 5, in haemorrhage with seepage into the ventricular system 5 patients and in patients with cerebral atrophy 18. Frequency rates were established for different types of seizures as follows: 15 patients had simple focal, 12 complex focal, 13 secondarily generalized and 47 generalized seizures.

Conclusions Among the patients with stroke in our study the frequency of epileptic seizures was 8.3% with the highest frequency in the patients with cerebral atrophy (23.4%). The frequency was nearly similar in the ischemic (7.3%) and hemorrhagic (6.2%) stroke. The majority of the seizures that occur de novo in stroke patients were focal in onset with or without secondary generalization.

P 2025

Serum level of soluble thrombomodulin in acute ischemic stroke

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Background and Purpose The purpose of the present study was 1) to investigate sequential changes in soluble thrombomodulin (sTM) concentrations following acute ischemic stroke, 2) to reveal differences between large and small vessel diseases, and 3) to correlate sTM concentrations with the severity of stroke and functional outcome.

Methods Seventy-seven patients with acute ischemic stroke admitted within 48 hours from the onset were enrolled. Blood examinations were carried out at admission and 1 month after admission. We tested the Japan Stroke Scale at admission to evaluate the severity and the Functional Independence Measure (FIM) to evaluate the functional outcome of the patients 1 month after admission.

Results Serial examination revealed that sTM concentrations 1 month after the admission (median [25th–75th percentile], 3.5 ng/ml [3.0–4.6]) were significantly higher than those at admission (3.3 ng/ml [2.8–4.2]). sTM concentrations at admission were significantly lower in large vessel (3.1 ng/ml [2.7–3.5]) disease than in small vessel disease (3.6 ng/ml [3.1–4.6]), and showed significant inverse association with severity of stroke, and tended to be lower in patients with poor outcome (scoring <100 on FIM) than good outcome (scoring \geq 100 on FIM).

Conclusions Although sTM concentrations serve as useful markers for endothelial cell damage, surprisingly, they are rather decreased in acute ischemic stroke patients in proportion to the severity. The mechanism of this unique result is still uncertain, however, lower sTM concentrations may play some important role in disease progression or in the occurrence of vascular events following acute ischemic stroke.

P 2026

Cholesterol levels in patients with transient global amnesia

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Transient global amnesia (TGA) is a well-defined syndrome of unknown aetiology. Vascular risk factors epilepsy and migraine have been implicated. We studied the cholesterol levels, between other risk factors, in a group of consecutive TGA patients admitted in our hospital. These levels were compared with those of patients admitted with minor stroke and of healthy controls both matched for age and sex.

23 patients with TGA [mean age 61.2 (\pm 6.8), females 12 (52%)] were included in the study. 8 (35%) had arterial hypertension, 2 (9%) diabetes mellitus, 2 (9%) ischaemic heart disease. No relevant lesion was found in the brain imaging. EEG showed non-specific abnormalities in 4 (18%) patients. Carotid ultrasound showed mild atheromatosis in 5 (22%) patients, but significant stenosis only in one. Two patients had history of migraine.

In the group of patients with TGA the mean cholesterol level was 263.1 (\pm 47.4) compared with 236.9 (\pm 55.2) in the stroke group ($p=0.055$) and 209.8 (\pm 30.8) in controls ($p<0.0001$). However, female patients with TGA had significantly higher cholesterol levels compared with both stroke patients and healthy controls ($p=0.049$ and $p=0.002$ respectively). No statistical difference was found in the comparison of male TGA patients with the stroke patients.

Cholesterol levels in TGA patients are significantly higher compared with healthy controls, and tended to be higher compared with stroke patients matched for age and sex. Vascular risk factors may play an important role in the etiopathogenetic mechanism of transient global amnesia and are currently studied in a larger sample.

P 2027

Posterior cerebral artery infarction, aetiology, radiological findings and clinical outcome

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Aim Goal of our study was the evaluation of stroke aetiology, radiological findings, and outcome in patients with acute ischemic stroke involving the Posterior Cerebral Artery (PCA).

Subjects and Methods 1520 first-ever stroke patients were admitted to our hospital. A CT-scan was initially performed, while 58% of the patients had a second CT- or MRI-Scan during hospitalisation. Stroke was classified based on etiopathogenic mechanisms. Follow-up ranged from 1 month to 6 years. Survival was determined using Kaplan-Meier estimates.

Results Infarction in the vertebrobasilar territory was diagnosed in 327 patients (21.5%). Involvement of the PCA was identified in 100 cases (6.58%). 54 of them presented ischemic lesions restricted in the PCA-territory, while the rest (46%) showed also other single or multiple ischemic lesions (thalamic, cerebellar, pontine). In 70% of the cases, the lesion was visualized within the first 24 hours. Hemorrhagic transformation was noted in 21%. Cardioembolic stroke in the posterior circulation was the most common diagnosis (51%), followed by stroke of unknown cause (37%). Early mortality rate (1 month) was significantly lower (11%) among patients with isolated PCA-infarction than in patients with PCA-infarction and other ischemic lesions. Accumulative mortality after 47.2 months (median value) showed similar differences (40% vs. 56%).

Conclusions PCA involvement is manifest in 1/3 of all posterior infarcts and is mostly visible within 24 hours. Cardioembolism is the major cause of stroke in the posterior territory. Patients with PCA and other lesions have a significantly higher early and late mortality rate than patients with isolated PCA infarction.

P 2028

Association between blood pressure changes and outcome in acute stroke

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Introduction The aim of this study is to establish the association between blood pressure (BP) changes and outcome in acute stroke (ischemic (ISH) and intracerebral haemorrhage (ICH)).

Methods This prospective study included patients with severe stroke (ISH and ICH) admitted to intensive care unit within 6 hours after stroke onset. BP was measured every 2 hours during first 72 hours after stroke onset. Stroke severity and outcome was assessed using Scandinavian Stroke Scale at the time of admission (SSSa) and discharge (SSSd) from hospital.

Results This study included 114 stroke patients (85 ISH and 29 ICH), mean age 73.1 \pm 12.9 years.

Mean systolic BP at admission in ISH was 157 \pm 16.8mmHg, SSSa $>$ 16 had higher values. In ICH patients BP at admission was 163.4 \pm 19.3 mmHg, higher values were found in patients with SSSa $<$ 15.

Systolic BP during first 72 hours was higher in ICH than in ISH patients (162.6mmHg; 146.5mmHg, respectively). BP during first 72 hours in ICH group was continuously higher in patients who died and with SSSd<15 than in survivors with SSSd>16. Better outcome was observed in ISH patients with moderate higher BP during first 72 than in patients with lower BP. SSSa was higher in ISH than in ICH patients. In ICH group 29% of patients died, but survivors had better SSSd than survivors in ISH group.

Conclusions BP is important factor in prognosis of stroke course and outcome. Moderate higher BP in ISH is associated with better outcome. In ICH patients, the problem was serious hypertension, often resistant to therapy.

P 2029

Blood glucose and outcome in acute ischemic stroke: Differences between diabetic and non-diabetic patients

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Introduction Influence of hyperglycaemia on stroke outcome is known. We wanted to investigate the influence of blood glucose level on admission on stroke severity and outcome in diabetic (DM) and non-diabetic patients (non-DM).

Methods Prospective study included 106 patients with ischemic stroke admitted to intensive care within 6 hours after stroke onset. In all patients blood glucose level at admission and twice a day during first 72 hours after stroke onset was measured (mmol/l). Stroke severity on admission was assessed using Scandinavian stroke scale (SSSa) and outcome in survivors using Barthel index (BI).

Results Out of 106 patients 28 had diabetes. Mean glucose at admission was 9.3 mmol/l in DM and 6.9 mmol/l in non-DM. Mean SSSa didn't significantly differ between DM and non-DM. DM with glucose at admission >9.1 had significantly lower SSSa (mean=17.5) than DM with glucose <9.1 (mean=20). Similar was in non-DM group: in patients with glucose >9.1 mean SSSa was 20.4 and with glucose <9.1 SSSa was 13.3. During first 24–48 hours in DM group significant rise of glucose occurred. DM had worse outcome than non-DM regardless of glucose on admission. But in non-DM significant difference in outcome regarding glucose on admission was present: in patients with glucose <9.1 mean BI was 38.8 and with glucose >9.1 BI was 26.2.

Conclusions We found no certain evidences of diabetes mellitus influence on stroke severity, but it is evident that it is associated with slower recovery and poor outcome, especially if glucose level at admission is higher.

P 2030

Changes of body temperature during first 72 hours and outcome of ischemic stroke and intracerebral haemorrhage

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Introduction Experimental and clinical studies showed that hyperthermia early after stroke onset causes further brain damage and poor outcome. Some studies showed relation of low

temperature on admission and stroke severity. The aim of our study was to follow up the body temperature changes early after stroke onset and to compare the differences between patients with good and poor outcome.

Methods We enrolled stroke patients (ischemic stroke (ISH) and intracerebral haemorrhage (ICH)) admitted to intensive care unit within 6 hours after stroke onset. In all patients CT scan was done. Stroke severity on admission was assessed using Scandinavian stroke scale, and outcome using Barthel index (BI) approximately after 15–21 days. Temperature was measured with tympanic thermometers every two hours during first 72 hours after stroke onset.

Results In ICH patients with better outcome (BI>60) temperature on admission was lower than in patients with BI<60 or dead. Rapid rise of temperature occurred earlier in patients with BI<60 (after 12–18h) and dead (6–12h). In patients with BI>60 rise in temperature occurred after 48 hours, potentially of infectious origin. In ISH patients, better outcome had patients with higher temperature at admission. In these patients (BI>60) during first 72 hours, there were no significant changes in temperature. Patients with BI<60 and dead had lower temperature at admission, with early (6–12h) and rapid rise continuously during 72 hours, with low response to antipyretic drugs.

Conclusions Early rise of temperature can be related to poor outcome of stroke patients.

P 2031

Clinical parameters influencing the survival after stroke

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Background Trends of BP (1st week) and admission, glucose, blood cells, and urea values were analysed.

Methods Clinical data of ischemic stroke patients were retrospectively analysed. Follow-up times were counted from diagnosis to death or censored upon discharge. Other data included age, sex, daily blood pressure readings, laboratory results, pharmaceutical therapy, and laterality of stroke. Daily blood pressure readings were summarized in terms of intercept and slope of linear regression line against time. Univariate Cox regression models were fitted for all possible explanatory variables in their original and quadratic forms where applicable. Results were expressed as hazard ratios associated with clinically relevant changes. Multivariate Cox regression models were fitted using blood pressure and the subset of other variables either with significant hazard ratios or considerable influence on other coefficients.

Results 81 patients died before discharge and 84 survived. Univariate models revealed significantly worse survival associated with being male, having higher white blood cells, urea, glucose, and lower cholesterol. A minimum of the hazard ratio was observed at the potassium level of 4.8 mmol/l. The daily maximum systolic BP showed a quadratic association with survival in terms of both intercept and slope and also an interaction between the two, therefore it was chosen to be used in the final multivariate model. Factors with substantiated reason to be included in the model were sex, age, white blood cell count, and potassium. Being male, older, having a higher white blood count and a lower serum potassium level were associated with worse survival.

P 2032

Moyamoya disease

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Introduction Moyamoya is an uncommon cause of ischemic and hemorrhagic stroke in children and young adults, most prevalent in Asia. There is a progressive obliteration of Willis' circle major arteries, which are replaced by a fine meshwork of small vessels resembling a "puff of smoke", source of the name Moyamoya. Diagnostic evaluation includes cerebral magnetic resonance imaging (MRI), angiography and single photon emission computed tomography (SPECT). Treatment resembles the normal management of stroke with the addition of possible revascularisation procedures. Steroids have been successfully used in a few cases of Moyamoya disease with extrapyramidal symptomatology.

Methods We report a case of a 19 years old woman with a previous history of oral contraceptives intake since February 1999 and reversible right hemiparesis (RIND) in August 1999. On January 2002, the patient was hospitalised due to headache and progressive bradykinesia and bradyphrenia within the last year, with increased severity two weeks before admission, along with bilateral loss of vision, dysarthria and motor dysphasia. During hospitalisation, the patient developed global aphasia and right hemiparesis.

Results Cerebral MRI showed bilateral multiple lesions, in gray and white matter, in different stages. Angiography showed bilateral thrombosis of medial cerebral artery and multiple collateral small vessels were seen resembling a puff of smoke. Left cortical hypoperfusion, in temporo-parieto-occipital regions, was seen in cerebral SPECT.

Conclusion Treatment with acetylsalicylic acid and dexamethasone led to partial clinical improvement. We report this case that clinically and in imaging studies behave like Moyamoya disease due to its rareness and atypical presentation with extrapyramidal symptomatology.

P 2033

Subcortical ischemia, the gentle emerging outsider

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Purpose To describe subcortical vascular dementia (SVaD) regarding clinical presentation, risk factors, and prognosis.

Methods 185 vascular demented subjects studied during the last 7 years are divided into SVaD (n=85), and non-SVaD (n=100) groups. The latter met the ADDTC criteria, while SDaV patients were diagnosed of lacunar state (n=33), or met Bennet's criteria for Binswanger's disease (n=52). Hemorrhagic strokes, and mixed dementias are excluded. Univariate and multivariate analysis are performed.

Results Transient ischemic attacks appear before diagnosis of dementia in SVaD, while stroke associates with non-SDaV patients (p<0.05). There is a significantly greater prevalence of hypertension and dyslipimiamia in the SDaV patients. Rankin's modified scores are more benign in SDaV subjects at diagnosis. Non-SDaV patients present with <1 month of ischemic data before diagnosis of dementia (p<0.05), whereas SDaV show 1 to 24 months of progression before diagnosis (p<0.05). The

equation for the model is: $Z=3.7*(\text{Rankin score}=1 \text{ at diagnosis})+3.4*(\text{Rankin score}=2 \text{ at diagnosis})-3.0*(\text{Rankin score} \geq 3 \text{ at diagnosis})-1.7*(\text{ischemic stroke prior to diagnosis})-2.2*(\text{clinical data during } <1 \text{ month before diagnosis})-2.8$.

Conclusions SDaV shows an increasing incidence in our area. Transient ischemic attacks, dyslipimiamia, and hypertension feature SDaV. SDaV have milder Rankin scores at discharge. Ischemic strokes before diagnosis are more frequent in non-SDaV.

P 2034

Epileptic seizures after stroke

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The reported incidence of seizures after stroke varies from 4 to 15%, the incidence of epilepsy after stroke ranges from 4 to 9%. We present the first results of the Vienna Stroke Registry on the occurrence of single epileptic seizures and epilepsy in patients after ischemic or hemorrhagic stroke or TIA.

From 1969, 82 patients had one or more epileptic seizures in an observation period of three months after the event. This is an incidence of 4.2%. 55 patients had their first seizure within 24 hours. In another 22 patients, the first seizure occurred within 14 days after the stroke or TIA. This means that in total, 94% of the 82 patients had "early onset seizures". 5 patients had late onset seizures occurring at least 14 days after the event.

Out of these 82 patients, 67% had partial seizures with and without secondary generalisation and in 33% phenomenologically primarily generalised tonic-clonic seizures were documented.

In a multivariate analysis, patients with initially severe deficits had a significantly higher risk of suffering from seizures.

More than one epileptic seizure occurred in 12 of the patients, which is an incidence of 0.6% for epilepsy after stroke from the total pool of patients studied.

Compared with the literature the incidence of epilepsy occurring in our patients after stroke is too low. With follow-ups after one and two years, we should be able to give more detailed results concerning the incidence of late onset seizures and vascular epilepsy.

P 2035

Disorders of cardiac rhythm in stroke

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Some cardiac rhythm disorders may be risk factors for stroke. Atrial fibrillation is a good established risk factor for thromboembolic stroke. We examined all types of rhythm disorders and their potential importance for stroke appearance.

We investigated 92 patients (average 60,5 years, 49 men, 43 women) with stroke (that was proven by MRI or CT of the brain). They had been known as patients with cardiac dysrhythmias earlier. From them, 84.78% of patients had ischemic and 15.21% hemorrhagic stroke. We examined types and frequency of cardiac dysrhythmia and correlated them with control group (75 healthy persons).

There were 39.13% patients with dysrhythmias in investigation groups, and 9.33% in control groups. Cardiac rhythm disorders were statistically important risk factor of ischemic insults

($\chi^2=24.25$, $p<0.001$) and were not important for haemorrhages ($\chi^2=3.281$, $p>0.05$). The most important were: atrial flutter or fibrillation, absolute arrhythmia ($\chi^2=13.86$, $p<0.001$); the similar importance was for paroxysmal tachycardia and third degree cardiac block. We didn't find importance for tachycardia until 150/min, extrasystols and block of I i II degree. The mechanisms of atrial fibrillation (and the similar cardiac disorders) were in thromboembolism of cerebral arteries, but high degree cardiac block-III had hemodynamic mechanism. We concluded that cardiac dysrhythmias (atrial flutter or fibrillation, absolute arrhythmia, paroxysmal tachycardia and high degree cardiac block) were risk factors for ischemic stroke.

P 2036

Clinical and immune changes in the hemorrhagic stroke

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P 2037

Correlation of transient ischemic attacks symptoms with atrial fibrillation occurrence

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P 2038

The sequelae of stroke aphasia

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P 2039

Wallenberg syndrome masking with cerebellar hemispheric infarction

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P 2040

The lateral sinus thrombosis in woman with prothrombin gene variant (G20210A) and antiphospholipid antibody syndrome; a case report

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P 2041

Diastolic arterial blood pressure at venous discirculatory encephalopathy

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Posters, Tuesday, October 29

Cerebrovascular diseases 3

P 3001

Stroke prevention: Age differences in stress coping

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Introduction Aim of this study was to investigate age differences in stress coping within the scope of a stroke prevention program.

Method 1,177 persons participated in a medical-psychological stroke prevention program with examination of the most prominent risk factors and a stress coping questionnaire. Age differences have been explored between 4 age groups by means of H-test and MANOVA.

Results Findings for medical risk factors and sex differences showed accordance with international data. Concerning stress coping, men demonstrated more emotional dismay and distraction. Also, women who cope preferably by means of distraction or alternative reinforcement are of older age. Furthermore, there is a decrease in aggression by ascending age in women. Scores for reaction control attempts, resignation, self-pity and avoidance are also higher in older age.

Discussion A rise in defensive coping styles with increasing age has been observed. Age differences in stress coping are grounded on variations in the life process as well as social, psychological and physiological changes. A modification of the coping patterns especially in emotional dismay, distraction and alternative reinforcement could possibly contribute to a decrease in medical risk factors of stroke.

P 3002

Ximelagatran: a fixed-dose, oral direct thrombin inhibitor for the long-term prevention of stroke and systemic embolism in patients with nonvalvular atrial fibrillation

P. Petersen on behalf of SPORTIF II/IV investigators

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Ximelagatran is a novel, oral direct thrombin inhibitor with predictable dose-linear pharmacokinetics. SPORTIF IV is an open-label, 2-year follow-up of a 12-week, randomised, parallel-group study, SPORTIF II, ¹ in patients with nonvalvular atrial fibrillation (NVAF) with at least 1 additional stroke risk factor. Eligible patients received oral ximelagatran 36 mg bid or warfarin (aiming for INR 2–3). Since the start of SPORTIF II, 187 patients have received ximelagatran for the equivalent of 231 treatment years, and 67 patients have received warfarin for the equivalent of 76 treatment years. There have been 2 (0.9%) nonfatal ischaemic strokes in the ximelagatran group and 2

(2.6%) fatal haemorrhagic strokes in the warfarin group. TIAs have been observed in 1 (0.4%) and 2 (2.6%) patients in the ximelagatran and warfarin groups, respectively. Major bleeds have occurred in 2 (0.9%) ximelagatran-treated and 2 (2.6%) warfarin-treated patients. No routine coagulation monitoring has been performed or required with ximelagatran. Five patients have died, including the 2 warfarin-treated patients who had strokes, while 3 patients died in the ximelagatran group: 1 cardiac arrhythmia, 1 brain tumour, and 1 multiorgan failure due to old age. Asymptomatic S-alanine aminotransferase elevation was observed in a few ximelagatran-treated patients, but decreased spontaneously during continued treatment or discontinuation of therapy. These preliminary data suggest that fixed-dose ximelagatran (36 mg bid) shows promise as an effective and well-tolerated oral anticoagulant for the prevention of stroke and systemic embolism, with no need for routine coagulation monitoring.

Reference

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P 3003

The preventive measures of an embolic stroke with the oral form of the sulodexid

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Introduction Sulodexid has a high affinity to an endothelium of vessels and defends it from damage. The present research was attempted with the purpose to learn a capability of reduction of the arterio-arterial embolism after treatment with sulodexid.

Materials and methods The Doppler sonography of cerebral arteries with microembolus monitoring and after a carotid percussions and duplex scanning have been performed. Twenty-four patients with carotid sources of an embolism were inspected with the transcranial Dopplerography multiply – before and after treatment with sulodexid.

Results Before the treatment, the percussions of carotid arteries, usually carried out in the routine examination for an evaluation of collateral circulation, gave the opportunity to register microembolic signals at all of the patients. In all cases of microembolic signals detection, duplex scanning discovered morphological unstable plaques in the extracranial segment of that artery. We watched decreasing of the embolic signals for 16 patients after the 25-days of treatment (with 500 LSU per day). For 8 patients the embolic signals after treatment have vanished.

Conclusion The new protective properties of the sulodexid were demonstrated with the transcranial Dopplerography. For preventive measures of an embolic stroke can be advised the oral-form of the sulodexid.

P 3004

Flow reversal technique for prevention of embolic complications during carotid angioplastyH. Sievert¹, K. Rabe¹, W. Pfeil¹, C. Rubel¹,
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Background Reversal of blood flow in the internal carotid artery during stent implantation has been suggested to prevent embolisation of arteriosclerotic debris.

Patients: Carotid angioplasty/stenting under flow reversal was attempted in 42 patients. Diameter stenosis ranged from 60 to 96% (77±10), the length of the lesion ranged from 5 to 25 mm. At least two lesions contained fresh thrombus.

Methods Reversal of blood flow in the internal carotid artery was achieved by occlusion of both the common and the external carotid artery during the procedure using the Arteria™ device. During the procedure, the blood flowing back into the guiding catheter was re-transfused into the femoral vein via a filter.

Results The device could easily be introduced into the common carotid artery. Balloon occlusion of the common carotid artery as well as the external carotid artery was achieved in all patients. The occlusion time ranged between 6 and 37 min (16±10) and was tolerated reasonable in all patients except two, in whom the balloon had to be deflated repeatedly during the procedure. In all patients, angiographic success was achieved without immediate complications. In one patient, a TIA occurred several hours later. Macroscopic debris was found in the filter in 36/42 patients.

Conclusions Flow reversal in the carotid artery for protection of embolism during carotid angioplasty is feasible in the majority of patients. Atherosclerotic debris is kept back very efficiently. If the balloon occlusion is not tolerated, deflating the balloon intermittently can complete the procedure.

P 3005

Complications of long-term oral anticoagulation by phenprocoumon in a non-trial neurological environmentJ. G. Heckmann¹, J. Bogdanov¹, C. J. G. Lang¹, B. Neundörfer¹,
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Objective To determine the rate of anticoagulant-related haemorrhage seen in neurological non-trial patients treated with long-acting phenprocoumon.

Methods 104 consecutive patients, who were treated with phenprocoumon to prevent stroke recurrence, were reinvestigated regarding current treatment regimen and occurrence of complications and restroke.

Results 91 (29 women, 62 men; mean age 53.5±30.5 years) of the 104 patients could be reinvestigated. Indications for anticoagulation were atrial fibrillation in 46.2%, carotid artery disease in 25.2%, and paradox embolism in 13.2% and other reasons in 15.4%. The total number of follow-up years on phenprocoumon was 207 (mean 2±1 year per patient). In 16.5% of patients, phenprocoumon was discontinued for accompanying diseases or complications. 2 patients (2.2%) had major intracerebral bleeding, fatal in one patient (0.8%), and 2 patients (2.2%) had major gastrointestinal bleeding resulting in a 1.9% annual rate of bleeding and an implying 0.48% annual rate of fatal bleeding. In 8 patients a restroke occurred (3.9% annual rate of restroke). In 50.3% (±9.2%) of all anticoagulation tests

in the group of patients with continued anticoagulation and in 58.9% (±11.7%) in the group of patients with discontinued anticoagulation ($p<0.05$) the desired INR was not achieved leading to adjustment of dosage.

Conclusion The risk of major anticoagulation related bleeding in our cohort in a non-trial setting (1.9%) is not elevated compared to clinical placebo-controlled trials. However, the rate of discontinuation and rate of not achieved desired INR are higher necessitating more patient and practitioner information and more close meshed follow-up to improve anticoagulation treatment.

P 3006

Validation of the optimal heparin bolus dosage in acute ischemic strokeD. Kim, J. Koo, K. Chu, K. Kang, H. Park, K. Bae, K. Park,
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Introduction Neurologists may be reluctant to give initial loading of heparin for fear of hemorrhagic conversion in acute ischemic stroke, although it is recommended in acute myocardial infarction or deep vein thrombosis. We compared bolus dosages of heparin to improve the method of loading in acute ischemic stroke.

Methods Patients with acute ischemic stroke were grouped according to the bolus dosages; 20u/kg in-group I (n=50), 30u/kg in-group II (n=34), and 80u/kg in-group III (n=20). Maintenance dosage was the same (17.5u/kg/hr) in all groups. Activated partial thromboplastin time (aPTT) values at 2hr, 4hr, and 6hr after initial bolus were compared. Therapeutic range was defined to be equivalent to heparin level of 0.3–0.7u/ml by anti-Xa assay.

Results 2 hours after initial bolus injection, 60% of the patient's in-group I was in the subtherapeutic range, while all in-group III showed above the therapeutic values. In-group II, 26% had subtherapeutic aPTT values. Achievement rates of the therapeutic range were similar between groups I and II (36% versus 35%). At 4 hr after bolus, the differences between groups I and II were almost negligible. However, 80% of group III remained supratherapeutic. At 6 hr, 48% of group I and 41% of group II had aPTT values in the therapeutic range whereas 50% of group III were still supratherapeutic ($P<0.01$).

Conclusion Our results suggest that initial heparin bolus of 30u/kg is preferable to 20 or 80u/kg, to achieve earlier therapeutic range and to avoid the overshooting of aPTT values.

P 3007

Catheter closure of patent foramen ovale for prevention of recurrent embolic stroke with the CardioSEAL-STARFlex-Occluder: Acute results and follow-up in 83 consecutive patientsH. Sievert¹, K. Billinger¹, S. Ostermayer¹, U. Krumsdorf¹,
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Background Patients with a cryptogenic stroke or TIA and an associated patent foramen ovale are at risk for recurrent embolic events. The STARFlex occluder is a modified CardioSEAL double umbrella device with microsprings attached in alternating fashion between the opposing arms of the umbrella. The microsprings lead to a better apposition of the device arms to the septum.

Methods Since June 1999 catheter PFO closure was attempted with the STARFlex occluder in 83 patients (mean age 48 ± 13). The annual recurrence rate in this high-risk patient group was 21%. An atrial septal aneurysm was present in 27%. Follow-up was performed by transoesophageal echocardiography (TEE) after 1 and 6 months and clinically in 6 to 12 months intervals.

Results The implantation of the occluder was successful in all patients. During follow up routine 1 month TEE (63/79) revealed a thrombus on the device in 5 patients. In two patients, the thrombus was removed surgically together with the device. After 6 months, TEE showed complete closure of the defect in 50/52 patients (96%). No device arm fractures occurred. One minor stroke and no TIA occurred. The annual recurrence rate for stroke and/or TIA was reduced to 1.2%. No further complications occurred.

Conclusion The STARFlex-occluder is suitable for PFO closure, even in complex defects with associated septal aneurysm. PFO closure is effective in reducing the incidence of cryptogenic stroke in patients who do not have another source of their event.

P 3008

Effect of functional electrical stimulation in recovery of hemiplegic upper extremity in patients with unilateral neglect

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Purpose The goal of this research was to evaluate the effectiveness of the treatment program designed to increase functional use of the upper extremity (UE) in stroke patients with hemilateral neglect.

Method The study includes 24 patients (male+/-7 y.o. righthanders, 4–8 weeks after the stroke) with hemineglect syndrome (18–had right CVAs, 7–left CVAs). The patients were randomly assigned to experimental (n=14) and control (n=10) groups. Both groups received conventional therapy. The experimental group additionally received functional electrical stimulation (FES) of hemiplegic UE muscles (trapezius, deltoideus, triceps, extensors of the hand) 5 times a week with duration of 50–60 minutes (12 minutes in each position), for 3–4 weeks.

All subjects were measured, at admission and discharge, for hemineglect presence (verbal designation of the upper contralateral extremity, recognition of their own upper extremities, neglect while reading or writing, copying drawings), arm function, arm muscle tone, muscle electromyographic activity, range of motion in the arm joints and daily life activities.

Results The results show that the FES group improved significantly more than subjects of the control group during the treatment period of four weeks according to visuo-perceptual, visuo-motor abilities, arm function and Barthel Index.

Conclusion We did not succeed in completely restoring the arm function and daily life activities in our experimental group, however, in the light of these results FES appears to be a useful treatment modality to improve motor recovery of hemiplegic UE in patients with unilateral neglect.

P 3009

Effects of neuropeptide Semax (ACTH 4–10) in acute ischemic stroke

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Introduction The new drug Semax (synthetic ACTH 4–10) is a neuropeptide with neurotrophic, immunomodulatory and anti-ischemic activity, without hormone effects.

Methods and results The double-blind placebo-controlled trial in 200 patients with carotid ischemic stroke (IS) confirmed safety profile of Semax in daily dose 150 mcg/kg for first 5 days after the event. A time-related analysis revealed acceleration of regress of neurological symptoms in Semax group (by the Orgogozo–OSS and the Scandinavian Scales $p < 0.01$ vs. Placebo). Evaluation of IS outcome found out a lower 30-days-mortality ($p < 0.05$) and a significantly higher proportion of patients with good recovery (by the Barthel index $p < 0.01$ vs. Placebo) in Semax group. Semax decreased CSF levels of IL-1b, IL-8 and CRP by d 3, while continuing elevation of these cytokines was detected in Placebo group ($p < 0.001$). Marked increase in IL-10, TNF α , TGF- β 1, BDNF and bcl-2 in CSF was registered in Semax group ($p < 0.01$ vs. Placebo). Significant correlations between the increase in CSF BDNF level and elevation of OSS score ($r = 0.52$, $p = 0.03$), as well as between the dynamics of CSF IL-10 level and OSS score ($r = 0.45$, $p = 0.04$) were revealed. Investigations of thiobarbituric-acid-reactive substances and SOD in CSF confirmed anti-oxidant effects of Semax.

Conclusion The trial demonstrated that Semax was safe and could exert positive clinical effects in patients with carotid area due to its neuroprotective properties.

P 3010

Thrombolytic therapy for ischemic stroke in a community-based setting; a retrospective analysis of the impact on an unselected stroke population

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Background and Purpose Thrombolytic therapy is approved in the U.S.A. for treatment of early onset ischemic stroke within three hours of ictus, but remains controversial in Europe. Approval in North America is based on the NINDS trial, but three other trials have cast doubt on the benefit of thrombolytic therapy. In the present study, we sought to investigate the possible impact of thrombolytic therapy in the setting of an unselected Danish stroke cohort.

Methods This retrospective study included 502 unselected stroke patients admitted from a well-defined catchment area over a period of eight months. Patients were admitted regardless of medical or social condition before stroke, hospital treatment and stay was free of charge, and no selection was made as for age, gender, or stroke severity. The most important criteria from the NINDS trial were applied retrospectively on the Danish cohort in a stepwise manner to identify patients that could be eligible for thrombolytic therapy. The percentage of patients who would benefit from thrombolytic therapy was estimated on the basis of the results from the NINDS trial.

Results 8% would be eligible for thrombolysis. 3% would die irrespective of treatment and 2% would achieve full recovery spontaneously. Five patients (1%) would benefit from thrombolytic therapy. In the ideal situation – all patients admitted in due time after stroke – a maximum of 5% of the whole population would have benefited from thrombolysis.

Conclusion This study suggests that only a very small fraction of all stroke patients may benefit from thrombolytic therapy.

P 3011

Efficacy of transvenous PFO-closure in patients with cerebrovascular events

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The role of the patent foramen ovale (PFO) in patients with cryptogenic cerebrovascular events is well documented. Diagnosis is made by transoesophageal echocardiography (TEE) and transcatheter closure being the widely used alternative treatment to drug therapy or surgery.

In 248 adult patients (aged 18 to 71 years) with at least one cryptogenic cerebrovascular event (64% stroke, 46% TIA or PRIND) transcatheter closure was performed.

TEE findings determined the type and size of the device used. For anticoagulation heparin was given for the procedure, antiplatelet therapy for the following 6 months. We successfully implanted 121 Amplatzer PFO occluders (APFO), 81 Cardio-seal (CS) and 46 CS-Starflex (CSStf) devices.

There were 3 early complications (device embolisation, early release, undetected perforation of the roof of LA with the guide wire lead to cardiac tamponade 6 hrs after successful implantation, 5 significant venous haematoma). As late complications, there was 1 LA-perforation by the left atrial disc of an APFO with the need of urgent surgery. Late arrhythmias occurred in 5%. Residual leaks and/or an additional lesion after 6 months were trivial in 3 APFO, 10 CS/CSSTF, 4 others have got a second device.

Transcatheter closure of a PFO is effective in terms of closure rate, is preferable to long-time anticoagulation or other drug therapy, its recurrence rate of neurological events is low. Problems may occur in long tunnel like PFOs with late dislocation after immediate correct positioning, or infolding of the device into the tunnel and incomplete contact with the septum.

P 3012

Early biochemical changes during hyperbaric or normobaric reoxygenation after hypoxic damage in cortical brain slices of Wistar rats

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Objective To determine early nucleotide changes after a hypoxic period with respect to whether hyperbaric oxygen compared to normobaric oxygen or room air (at 1 or 2.5 ATA) is used during reoxygenation of brain slices.

Methods After incubating 300µm brain slices from Wistar rats in a modified artificial cerebrospinal fluid (ACSF) at 37°C the specimens were frozen in liquid nitrogen. Purine and pyrimidine nucleotide levels were measured by anion-exchange HPLC of neutralized perchloric acid extracts of brain slice homogenates. After a 30 min preincubation in ACSF gassed with 100% O₂ brain slices were encountered either with 5 or 30 minutes of hypoxia via gassing the medium with 100% nitrogen followed by 60 min reoxygenation with 100% O₂ at 1 ATA (NBO) and 2.5 ATA (HBO) or with room air at 1 ATA (NBA) and 2.5 ATA (HBA; n=6–8 each).

Results After 5 min hypoxia, NBO and HBO over 60 min both lead to a recovery of all trinucleotides to control level, reoxygenation after a 30 min hypoxic period resulted only in partial recovery irrespective of the used oxygen pressure. Contrastingly administering room air during reoxygenation nucleotide content stayed at hypoxic level with a tendency of worse outcome of HBA compared to NBA.

Conclusion Reoxygenation (at 1 or 2.5 ATA) resulted in a recovery of the nucleotide status after 5 min but only partially after 30 min of hypoxia, whereas room air did not alter the early hypoxia-induced nucleotide decline in brain slices. HBO is not harmful under these conditions.

P 3013

Hyperbaric oxygen treatment in permanent focal cerebral ischemia – effect on infarct volume, microglia and astrocyte expansion

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Objective Hyperbaric oxygen (HBO) is known to increase oxygen supply to ischemic areas and to effect infarct size in focal cerebral ischemia. We investigated the role of single and repetitive HBO-treatment in a permanent ischemia model.

Methods We treated 32 spontaneously hypertensive rats (SHR) after permanent middle cerebral artery occlusion (MCAO) either with hyperbaric oxygen (2.5 atm abs, 100% oxygen, 90 min) or room air (control group, n=8) in a small animal HBO-chamber once starting at 90 min after MCAO (n=8), twice (3h after first treatment, n=8) or 4 times (3, 6 and 24h after first treatment, n=8). All rats were sacrificed at 7 days after MCAO and infarct volume was measured. TUNEL, microglia and astrocyte staining was performed by triple immunofluorescence labelling and evaluated by confocal laser scanning microscopy.

Results A single HBO treatment reduced the infarct volume by 16%, but repetitive HBO-exposure resulted in less pronounced effects (2 HBO-treatments –10%; 4 HBO-treatments +10%) compared to the control group. However, none of these effects was statistically significant. Likewise, there were no significant differences in the number of TUNEL-positive cells between HBO and control animals. However, we observed distinct patterns of microglia and astrocyte distribution in the penumbra zone but not in the infarct core.

Conclusions Repetitively administered HBO-treatment did not induce a significant effect on infarct size and number of apoptotic cells in the infarct core, but we observed striking differences in the spatial activation of microglia and astrocytes.

P 3014

Cerebral embolisation is reduced by performing coronary artery bypass surgery on; "The beating heart"D. Russell¹, C. Lund¹, R. Lundblad¹, K. Sundet¹, B. Tennoe¹, R. Brucher², E. Fosse¹, D. Russell¹¹Rikshospitalet, Oslo, NORWAY, ²University of Applied Sciences, Ulm, GERMANY

Background Coronary artery bypass surgery (CABG) using cardiopulmonary bypass (on-pump surgery) carries a substantial risk for cerebral injury due to cerebral embolisation. This is due to the whole-body inflammatory response, which is induced by the heart-lung-machine, and the fact that cannulation and cross clamping of the ascending aorta produces atheromatous embolisation. CABG performed without cardiopulmonary bypass (off-pump surgery) may therefore lead to a reduced risk of cerebral embolisation and subsequent cerebral injury. In this prospective, randomised study we have assessed the rate of cerebral embolization during off-pump compared to on-pump surgery.

Material and methods Transcranial Doppler (TCD) was used to determine the number of cerebral microemboli in the left middle cerebral artery during coronary artery bypass surgery in 52 patients, of which 29 were carried out off-pump. Clinical, neuroradiological and neuropsychological assessments were also performed one day prior to surgery and again three months later.

Results There was significantly fewer cerebral microemboli in the off-pump group compared to the on-pump group 16 (range 0–131) versus 66 (range 15–274, $p < 0.005$). One ischemic stroke occurred in the on-pump group. Neuropsychological impairment ($>20\%$ reduction in at least 2 tests) was found in 8 (35%) of the on-pump and 8 (29%) of the off-pump patients.

Conclusion This study has shown that carrying out CABG using the off-pump technique significantly reduces the number of perioperative cerebral microemboli. There was no significant difference, however, in the neuropsychological findings in the two groups which suggests that embolus composition may be as important as the total number of emboli with regard to cognitive outcome.

P 3015

Haemostasis and hydro-ion homeostasis in experimental cerebral ischemia with application of intravenous laser irradiation of blood

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Use of intravenous laser irradiation of blood (ILIB) is considered to be the most effective method of laser therapy in ischemic disturbances.

This study deals with the investigation of ILIB influence with semiconductor laser (SL) with 860 nm wavelengths to hydro-ion homeostasis and haemostasis in normal rabbits and after modelling of local ischemia of brain (LIB).

LIB was made by bilateral occlusion of common carotid arteries under thiopental anaesthesia for 3 hours. SL radiation power of light guide inserted in the otic vein was 2 or 8.5 mW. Rabbits underwent by one 10-min exposure for 5 days. The K^+ , Na^+ concentration in blood, brain parts and the level of brain water content were investigated after finishing a laser course. Coagulation tests (platelet count, activated partial thromboplastin time (APTT), prothrombin time, thrombin time (TT), fibrinogen) were studied after the 1st and 5th ILIB procedures.

ILIB with 2 mW provokes hypocoagulation effect and dehydration of brain structure alone with the K^+ , Na^+ concentration decreasing in the normal animals. The early postischemic period is characterized by hypercoagulation syndrome, ionic misbalance and oedema in ischemic brain region. ILIB application after modelling LIB contributes for normalizing of brain water content and haemostasis findings compared to the controls (significant APTT, TT increase ($p < 0.001$), fibrinogen decrease by 25% ($p < 0.01$)). SL radiation with 8.5 mW power results in marked haemostatic activation in all animals.

Thus, positive effect of ILIB by SL radiation manifests with narrow power diapason.

P 3016

Antioxidation of puerarin introductionQ. Chai¹, Z. Liu², A. Zhao², S. Chai²¹Center of Physiology and Pharmacology, Shandong Academy of Medical Sciences, Jinan, CHINA, ²Center of Physiology and Pharmacology, Shandong Academy of Medical Sciences, Jinan, CHINA

Puerarin is an isoflavone compound isolated from puerarin lobata (wild) ohwi, a Chinese materia medica. In our previous work it was shown that puerarin induced increases in cerebral blood flow and metabolism and relaxation of the cerebral artery and arterioles (1). In the People's Republic of China puerarin as a new treatment for cerebral ischemia has been widely used in clinic (2). We report the effect of puerarin on lipid peroxide (LPO) and superoxide dismutase (SOD) in animals in present study.

Method The antiperoxidation of puerarin was studied by using colorimetric estimation of LPO (mmol/L) and SOD activity (U/ml). Experiments were carried on mice and rabbits. In vitro the LPO of liver of mice and brain of rabbit were investigated under the influence of puerarin. In vivo the SOD activity of blood and brain of rabbit were studied after intravenous injection of puerarin.

Result The results in vitro showed that puerarin could inhibit significantly the content of LPO. The highest inhibition rates were found to be 86.8% and 90.2% in liver of mice and brain of rabbit respectively. The puerarin enhanced the SOD activity obviously. The highest increase of SOD activity in blood and brain of rabbit were found to be 42.3% and 82.1% respectively.

Conclusion The puerarin could reduce significantly the content of LPO in liver of mice and brain of rabbit and enhance the activity of SOD in blood and brain of rabbits.

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P 3017

The effects of cardiovascular risk factors on haemoreological parameters in patients with chronic cerebrovascular diseasesL. Szapary¹, M. Szots¹, B. Horvath², Zs. Marton², T. Alexy², G. Kesmarky², A. Klabuzai¹, I. Juricskay², J. Czopf¹, K. Toth²¹Department of Neurology, ²21st Department of Medicine, Division of Cardiology, ²Department of Neurology Medical School of Pecs, Pecs, HUNGARY

Haemoreological factors are of significance in the determination of the flow characteristics of blood and in the regulation of cerebral blood flow. In this study the changes of rheological factors; haematocrit (Hct), plasma fibrinogen concentration (cc.), whole blood (WBV) and plasma viscosity (PV), red blood cell aggregation (AI) and deformability and the relationship of car-

diovascular risk factors with these variables were investigated in 297 patients (173 males, 124 females, mean age 60 ± 11 years) with transient ischemic attack (TIA) or chronic phase (>3 months after onset) ischemic stroke (IS), and in 68 healthy volunteers (30 males, 38 females, mean age 36 ± 6 years). All examined rheological parameters were significantly impaired in the cerebrovascular group compared to controls ($p < 0.05 - 0.0001$). Patients with hypertension, hyperlipidemia, smoking habits and alcohol dependence exhibit increased Hct, plasma fibrinogen concentration, WBW, PV and AI compared to normal controls ($p < 0.05 - 0.0001$). In the cerebrovascular group patients with hyperlipidemia and smoking habits, have the most severe rheological disturbances.

In our study, we proved in chronic ischemic CP that haemorrhological abnormalities persist long after an acute stroke, and several parameters are impaired simultaneously. Significant correlation could be seen between blood rheological disturbances and cardiovascular risk factors.

P 3018

Coagulopathies as cause of ischaemic stroke in young adults

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Introduction Strokes before age of 45 have different causes comparing to those after 65 and refer to non-atherosclerotic vascular diseases, cardiogenic emboli and haematology abnormalities.

Objective The aim of the study is to investigate the relationship between coagulopathies and stroke in young patients.

Methods Last year we admitted in our department 137 patients with ischemic stroke aged under 45. Patients were questioned about hypertension, cardiac diseases, diabetes mellitus, previous stroke, cervical trauma, migraine attacks, oral contraception, alcohol, smoking and family history of stroke. After physical examination, patients performed:

- blood count, biochemical profile (lipid, immunological).
- Cerebral CT scan,
- electrocardiography, chest X-ray
- Doppler ultrasound
- angiography (if necessary)
- echocardiography
- in selected cases – antiphospholipid antibodies and natural anticoagulants (protein C, protein S, antithrombin III).

Results A group of 8 young patients (6%), with ischaemic stroke were found with coagulation abnormalities: 4 with protein S deficiencies, 2 with protein C deficiencies, 1 with protein C and antithrombin III deficiencies, 2 with resistance to the activate protein C.

Recurrent ischaemic stroke was present to 4 patients, although they have been treated with antiplatelet drugs.

6 patients had coagulopathies combined with other risk factors for ischaemic stroke: 3 with dislipidemia, 1 with high level of anticardiolipin antibodies, 1 with patent foramen ovale, 1 with diabetes mellitus, 3 with immunological abnormalities.

Conclusion Even a rare cause of ischaemic stroke, the coagulation abnormalities must be considered in young patients in order to prevent the stroke recurrence.

P 3019

Significance of embolic mechanism of cerebral ischemic events in the patients with carotid artery disease

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The **purpose** of study was estimation of significance of embolic mechanism of cerebral ischemic events (CIE) in the patients with carotid artery disease (CAD).

Methods We studied 65 special selected patients with CAD. We used transcranial Doppler sonography with detection of microembolic signals (MES) on the device "Sonomed-300" (Russia), and colour-coded carotid duplex on the device "Acuson 128XP" (USA). 37 patients had MES in the middle cerebral artery following ipsilateral carotid artery compression/percussion (evoked microembolism). They had unstable plaques in appropriate carotid artery without thrombosis. Other 28 patients had carotid stenosis (15%–100% of lumen) without evoked/spontaneous microembolism.

Results We detected spontaneous MES during transcranial Doppler monitoring only in 16.2% of the patients with evoked microembolism. All of them had ulcerated plaques. 45.9% of the patients with evoked embolism had the history of CIE. There was a correlation between CIE and MES ($r = 0.44$, $p < 0.001$). But there was no correlation between CIE and degree of stenosis. Antiplatelet therapy resulted in elimination MES only in un ulcerated plaques. In 28 patients with carotid artery stenosis without microembolism, correlation between CIE and occurring of stenosis was not detected, but there was a correlation between CIE and degree of stenosis ($r = 0.49$, $p < 0.001$).

Conclusions Artery-to-artery embolism is main mechanism of CIE in the patients with CAD. Carotid artery stenosis without microembolism can cause CIE only in conditions of high degree of stenosis. The patients with MES should be treated with antiplatelet agents. If the elimination of MES has not been reached, carotid endarterectomy should be executed.

P 3020

Affecting factors of hemorrhagic transformation in the middle cerebral artery infarctions

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Objective Hemorrhagic transformation (HT) affects treatment and prognosis in patients with acute ischemic stroke. The factors affecting hemorrhagic transformation in infarcts due to occlusion of middle cerebral artery (MCA) stem or branch were investigated.

Material and method Of 412 patients who were followed in our clinic between January 2001 and December 2001 with acute ischemic stroke, 86 patients with occlusion in MCA stem or branch were enrolled in this study. These patients were divided in two groups as with HT ($n = 35$) and without HT ($n = 51$). Age, sex, systemic arterial hypertension, diabetes mellitus, blood glucose level in acute period, renal and liver function tests, systolic and diastolic arterial blood pressure in the acute period, previous cerebrovascular disease, leukoaraiosis, modified Rankin Disability Score (mRDS), stroke subtype were evaluated.

Results High blood glucose level in acute period and presence of leukoaraiosis in cranial computerized (CCT) tomography were detected as risk factors in development of HT. HT was seen more frequently in MCA total infarction than branch infarction. mRDS have gone worse in the group with HT.

Discussion Development of HT in acute ischemic stroke is reported as 10–65%. High blood glucose level in acute period ($p=0.015$), leukoaraiosis ($p=0.015$) and size of infarction ($p=0.001$) in CCT were detected as important predictor in development of HT in our patients. Prognoses are worse in patients with HT than the other group ($p=0.014$).

P 3021

Role of monoclonal antibodies in pathogenesis of stroke caused by arterial hypertension

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Immune mechanisms are considered to be significant in pathogenesis of stroke caused by arterial hypertension. Stroke is accompanied by affection of neuroglial complex, which leads to neuroimmune failure. Along with necrosis in cerebral tissue neuron's apoptosis is starting. Apoptosis associated with expression of specific receptors Fas/Apo-1 (CD95) is induced by ischemia, proinflammatory cytokines, and neurotransmitters. In our study, level of CD95 in blood of patients in acute period of stroke was determined. 25 patients (mean age of 57.6 years) were examined with determination of amount of lymphocytes typed by FAS-receptors in blood. In all cases in the acute period increased level of lymphocytes with membrane receptors CD95 was found. It was $17.8 \pm 8.7\%$, compared to 1–2% in the norm.

In high severe cases the CD95 level made $26.4 \pm 2.97\%$, in medium severe cases it was $16.6 \pm 2.06\%$, and in mild $10.5 \pm 2.6\%$. The difference between these groups proved reliable.

Thus rising of lymphocytes FAS-receptors level and correlation between apoptotic change level and gravity of the patients condition were found. It suggests participation of monoclonal antigens CD95 in stroke pathogenesis under conditions of immune response development.

Through T-cell receptor FAS the mechanism of apoptosis is started with development of cell-mediated immune cytotoxicity. Apoptosis development leads to structural degradation of neural tissue in cases of cerebrovascular events. Consequently, determination of high CD95 level can serve as a diagnostic criterion of stroke severity.

P 3022

Ischemic stroke caused by tumour associated hypercoagulability

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Introduction Coagulation disorders like bleeding complications or thrombosis are well known tumour-associated complications. About 30% of all tumour patients die because of coagulation disorders. However, cerebral complications are less known. We report the case of a 60-year-old patient with tumour-associated hypercoagulability as well as thrombocytopenia.

Medical history A 60-year-old patient with an adenocarcinoma of the lung was admitted to our hospital with acute right-side hemiplegia. During the last two weeks, he complained about recurrent neurological deficits. The initial CCT showed a former posterior circulation infarct as well as a former lacunar media circulation and an acute media circulation infarct on the left side. Coagulation test revealed a thrombocytopenia (35 G/l), a decreased level for Fibrinogen (121 mg/dl) and highly increased cross-linked fibrinogen degradation products ($69.64 \mu\text{g/ml} - 0.49 \mu\text{g/ml}$). Antithrombin III and all other Vitamin-K-dependent coagulation factors showed normal levels. Anticoagulation with heparin was started with consequent decrease of cross-linked fibrinogen degradation products. Thrombocytes and fibrinogen increased respectively. However, on the fourth days the patient died of a massive intracerebral haemorrhage.

Discussion Two different mechanisms of tumour-associated procoagulatory mechanisms are known. Malignant cells produce physiological proteins like tissue plasminogen activator, which activate coagulation factor VII. Additionally tumour cells, especially those of adenocarcinomas, produce abnormal proteins with a procoagulatory effect and increase of factor X activity. Both mechanisms finally lead to thrombin activation.

Conclusion Tumour-associated coagulation disorders lead to a complicated imbalance between pro- and anticoagulation and might cause cerebrovascular complications. Therapy must be carefully decided in any case.

P 3023

Thrombophilic state as risk factor for stroke in young adults

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Background Thrombophilic state is presented as increased coagulability decreased of natural coagulation inhibitors and decreased fibrinolytic activity.

Methods and results We investigated 57 stroke patients, from 20 to 49 years old (average 42.02 years), 36 males and 21 females (proven by CT or MRI of brain). We measured platelet numbers, plasma levels of coagulation factors, platelet aggregation to adenosin diphosphate (ADP) or collagen, plasminogen activator inhibitor-1 (PAI-1), activated thromboplastin time (APTT), antithrombin III (AT III), protein C and activated protein C resistance (APCR).

The platelet numbers were normal in all of the patients (average value $a.v. 234 \times 10^9/L$). The plasma level of fibrinogen was elevated at 40.35% (a.v. 5.03 g/L, control group 2.7 g/L, $p < 0.01$), and coagulation factor II and V were elevated in two patients. The platelet aggregation was increased at 14.03% (a.v. 135%), and APTT was prolonged at 5.25% (a.v. 39.7 sec), suggested possibility of lupus anticoagulant positivity. PAI-1 was elevated at 26.31% of patients (a.v. 5.49 U/ml, at control group 2.67 ± 0.5 U/ml, $p < 0.01$) as signs of decreased fibrinolysis. AT-III was decreased in one patient (as well as in his father and his son), while protein C and APCR were normal in all patients. We concluded that increased coagulability (elevated level of fibrinogen) and decreased fibrinolysis (elevated level of PAI-1) were found in our young stroke patients; in significant number; decreased level of coagulation inhibitor (AT-III) was found in one patient; it is a rare disorder, as it was known. The other factors were not exchanged significantly.

P 3024

Modifiable stroke risk factors and options for secondary stroke prevention

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In the Republic of Moldova, stroke is the second most important cause of mortality and leading cause of severe disability. Improved detection of modifiable risk factors could reduce the rate of stroke and recurrent stroke.

The aim of our study was evaluation of modifiable stroke risk factors, and determination of effective directions for secondary stroke prevention.

Our study was performed on a group of 263 stroke patients treated in the Stroke Unit. The following risk factors were evaluated: Hypertension, atrial fibrillation (AF), diabetes mellitus (DM), cigarette smoking (CS), alcohol consumption (AC), obesity, previous stroke and acute myocardial infarction (AMI), rheumatic valvulopathy and vascular stenosis.

Data analysis suggest high rate of hypertension—36.8% and AF—26.9%, followed by AC—26.9%, obesity—25.3% and CS—20.6%. 19% of patients had history of previous stroke and AMI. Ratio for DM, vascular stenosis and rheumatic valvulopathy were much smaller 14.2%, 12.6% and 9.5% consecutively. One risk factor has been established in only 22.2% of the patients and 7.9% of the patients were not under any risk factors. The remained patients, 70%, have had an association of complex risk factors such as: HTA-AMI-AF, or HTA with FA, and HTA-obesity and AC.

The main risk factors for stroke are HTA with no other associated risk factors, or in combinations with AMI, AF, and obesity. Subjects with multiple risk factors should be targeted to reduce the overall risk for stroke. Antihypertensive drugs, life style improvement and diet should represent a good prevention in these cases.

P 3025

Neuropsychological findings in asymptomatic carotid artery stenosis

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Introduction Asymptomatic carotid artery stenosis (ACAS) means that one of or both internal carotid arteries are obstructed by plaques or arteriosclerotic lesions and no history of neurological symptoms (amaurosis fugax, transient ischaemic event and cerebral infarction) are presented. The aim of this study was to estimate the cognitive status in ACAS subjects.

Methods We studied 37 subjects with ACAS and 19 control subjects without present internal carotid stenosis, matched for age and education. A selected group of neuropsychological tests (tap attention, memory, language, visual organization ability, visual motor tracking and motor ability) was administered. The questionnaires for depression and anxiety were applied for the patients and controls.

Results The ACAS showed significant cognitive deficit on digit and visual span tasks of Wechsler memory scale revised and on word fluency tests. The ACAS group was significantly slower on motor performance tasks (finger tapping test, Purdue peg-board test) when they were compared with controls. The significant difficulties for subjects with ACAS were shown on visuo-motor tracking task (trail making test, form A and B). The increased anxiety symptoms are present in ACAS group in

comparison to control subjects according to the Hamilton anxiety rating scale measures.

Conclusions ACAS subjects showed selected cognitive motor and psychiatric deficits in comparison with control subjects. Although deficits were small, these findings suggest that ACAS may predispose to subclinical cognitive impairment. Longitudinal follow-up is required to determine whether subjects with ACAS were determined to develop overt cognitive decline or to distinguish those who are prone to.

P 3026

Positive and negative mood balance in post-stroke depression

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Introduction The relationship of positive and negative mood to each other and to the severity of depression in stroke patients diagnosed with major depressive disorder (MDD) was evaluated DSMIV diagnostic criteria consider only negative mood. Clark and Watson (1991) attributed both high negative mood (NM) and low positive mood (PM) to be associated with depression. NM, they conclude, is associated with various emotional disorders. It was expected that in PSD, PM would correlate with depression severity independent of NM.

Method Subjects were 12 stroke patients with PSD MDD (DSM IV criteria). The Hamilton depression scale (HAM-D) was used to evaluate severity. Mood was assessed with the positive and negative affect Scale (PANAS). A functional assessment of multiple sclerosis (FAMS) questionnaire containing six scales (contentment, emotional problems, mobility problems, pain, cognitive problems and fatigue) was used.

Results There were 7 females and 5 males. Means were: age 54.3 yrs., months since stroke: 5 months, HAM-D, 23.7 points. Correlation between PANAS-PM and HAM-D ($r=-.58$, $p<.05$) showed that greater depression severity is related with lower positive mood. PANAS-NM score was not correlated with HAM-D severity ($r=.33$, NS). Also, PANAS-PM and PANAS-NM score did not correlate ($r=-.16$, NS) suggesting independence. HAM-D correlated with FAMS variables of pain ($r=.60$, $p<.05$), cognition ($r=.59$, $P<.05$) and fatigue ($r=.61$, $p<.05$).

Conclusion PM is a factor in clinical depression, and it varied somewhat independently from negative mood.

P 3027

Infusion of PK-Merz (amantadine sulphate) in the acute phase of stroke

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Introduction Infusions of amantadine were used in stroke patients substantiated on the experimental and clinical studies of other authors that confirmed that the preparation acts as an antagonist to glutamate, reducing the disturbances of consciousness, increasing vigilance and modulating the glutamergic system.

Methods and patients Observations were performed at the Stroke Unit of the Latvian Neuroangiological Centre in 65 patients in the acute period of stroke, using Amantadine 500 ml, 55 drops per minute, intravenously, in addition to generally accepted therapy, excluding other neuroprotectors and stimulators. In the control group were 20 patients, receiving only basic therapy. All the patients had disturbances of consciousness and psychomotor inactivity. The criterion for excluding was psychomotor agitation.

Results The infusions of PK-Merz influenced the patients in the acute phase of ischemic and haemorrhagic stroke: more significantly and sooner than in the control group the level of disturbances of consciousness and inactivity, negativism, rigidity and oligokinesia were reduced, the concentration abilities were improved. In 25% of cases the preparation caused psychomotor anxiety of mild or moderate degree for 3–6 hours after the administration, more often only after the first administration. Other undesirable side effects were not observed.

Conclusion The infusion of PK-Merz may be indicated for stroke patients in the acute stage of stroke if decrease in psychomotor activity is present.

P 3028

Activity of piracetam in stroke patients with acute aphasia

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In this study, the effect prognosis of early high dose piracetam treatment in stroke patients with aphasia was evaluated. The study group included 30 patients, and the control group was 12. Piracetam was given to the study group 12 gr IV bolus, 12 gr per day IV for 1–2 weeks, 12 gr per day orally for 2–3 weeks and 4.8 gr per day orally for 4–8 weeks. Aphasia test was included 13 parameters. Neurological situation was evaluated with Orgozozo and Barthel scales. Scales were applied on the 1st, 4th, 8th, 15th day and 1st, 2nd, 3rd month. Both in study and control groups a significant improvement was seen in speaking fluency, understanding simple questions, responding true-false questions, matching test, and naming the objects and colours. The improvement began from the first month only in the study group. Understanding complex questions showed a significant improvement in both groups but a significant improvement was determined from the beginning of the fourth day, only in the study group. Reading fluency, reading and doing written orders, writing in order and calculating arithmetically showed a significant improvement only in the study group. Orgozozo score improvement, which was significant in both groups, was significant from the beginning of the 15th day only in the study group. Barthel score improvement was significant only in the study group from the beginning of the first month. As a result, number of cases was small however; the piracetam group showed an early significant improvement both in neurological and aphasia situation.

P 3029

Choice of preventive antithrombotic therapy regime in the patients with cardiac sources of cerebral embolism in dependence on emboli content

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The **purpose** of study was estimation of emboli content in the patients with cardiac sources of cerebral embolism for choice of preventive antithrombotic therapy regime.

Methods We studied 49 patients with mechanical prosthetic heart valves (MPHV), 13 patients with non-valvular atrial fibrillation (NVAF), 21 patients with infectious endocarditis (IE). We used transcranial Doppler sonography with detection

of microembolic signals (MES) on the device “Sonomed-300” (Russia), and transthoracic echocardiography on the device “Acuson 128XP” (USA).

Results Most of cerebral ischemic events in the patients with MPHV and NVAF happened in conditions of inadequate oral anticoagulation (66.7% and 100%, accordingly). There was no correlation between anticoagulation intensity and MES incidence/number. MES in the patients with NVAF were not detected. MES in the patients with IE were detected only in first two months of disease in conditions of friable valve vegetations. Additional antiplatelet therapy in the patients with MPHV and MES resulted in elimination/reduction microembolism in most cases (75%). The MES number was not reduced in 25%. There was no history of cerebral ischemic events in these patients.

Conclusions The embolic material is heterogeneous. There are red thromboemboli in the chamber sources (e.g. NVAF). There are platelet-dependent particles in the valve sources (e.g. IE). There are red and white thromboemboli, platelet aggregates, and gaseous microbubbles in the MPHV. MES have platelet and gaseous origin. The patients with MPHV and with chamber sources should be treated with oral anticoagulants, and the patients with MES—with antiplatelet agents additionally.

P 3030

Mannitol use and outcome in acute stroke: results from the Mures-Uzhgorod-Debrecen Study

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Background The role of mannitol therapy in acute stroke is controversial and clinical practice on its use varies.

Patients and methods We analysed hospital case fatality in a prospective study in stroke patients treated in three centres in the framework of the Mures-Uzhgorod-Debrecen project. In 2 of the centres, mannitol is regularly administered, whereas in one centre it is rarely used. We compared case fatality of mannitol treated and non-treated patients among age groups (0–54, 55–74, 75–95), groups based on the level of consciousness on admission, among major stroke subtypes, and among centres.

Result Data of 984 patients were analysed. Of these 61% were treated with mannitol. Case fatality was 22% and 9% in the mannitol treated and untreated groups ($P < 0.001$). We found association between mannitol treatment and fatal outcome in all age groups, in ischemic as well as in haemorrhagic strokes, in alert patients as well as in those with disturbed level of consciousness, and in all 3 centres. When age, disturbance of consciousness on admission and mannitol treatment status were entered together into a logistic regression model, all of them were significantly associated with a decreased probability of survival.

Conclusions This study does not prove that mannitol is harmful if given in acute stroke but emphasizes the need for properly designed randomised clinical trials to decide whether the current practice of routine use of mannitol in patients with acute stroke is justified, should be restricted to subgroups or should be stopped.

P 3031

Hypolipemiant treatment of stroke patientsS. S. Plotnicu¹, E. Zota¹State Medical and Pharmaceutical University, Chisinau, REPUBLIC OF MOLDOVA, ²City Emergency Hospital, Chishinau, REPUBLIC OF MOLDOVA

An actual problem is to create some therapeutic strategies that are able to show the essential changes of stroke: hyperlipidemias, lipid peroxide system, decreasing of the antioxidant protection, and rheological changes of the blood.

Purpose A good evaluation of the efficiency of hypolipemiant in complex treatment of stroke.

Methods The study was done on 78 patients with stroke, aged 28–68 years (44 women; 34 men). Control group – 32 persons. Stroke has occurred in 62 cases in the territory of carotid artery and in 16 cases in the vertebro-basilar territory.

48 patients from basic group have been treated along with hypolipemiant drug “Lipantor” – “Sanofi” product.

From the entire lipid system we have been depicted total lipids, total cholesterol, triglycerides, phospholipids, and low-density lipoproteins.

The laboratory investigations were initially made and repeated after 30 days from administration of “Lipantor”.

Results According to the results we have seen changes in the studies indices.

In the lipids system these changes were more noticed in case of total lipids, total cholesterol, and low-density lipoproteins, being increased with 25–28%.

The administration of “Lipantor” drug led to decrease of the mentioned indices to control group.

In case of lipid peroxidation system and antioxidant system there occurred essential changes in the activity of catalaza, SOD, the content of malonic dialdehyde and TAA.

Conclusions The dates of the study allow us to conclude that the administration of “Lipantor” in the complex treatment of stroke patients is efficient not only at the clinical level, but also at the pathogenetic one. Normalization of the lipid system changes can be mentioned as an important factor in stroke secondary prevention.

P 3032

Haemorheologic profile changes after intravenous gammaglobulin administration in neurological disorders

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The **purpose** of this study was to investigate the influence of intravenous gammaglobulin administration on haemorheologic properties changes. The haemorheologic properties have been considered to be a main factor influencing the blood flow in microcirculation.

The study was carried out in the group of 10 patients /seven with polyradiculoneuropathy and three others suffering from myasthenia/, who were treated routinely with intravenous gammaglobulin infusions /Sandoglobulin, Sandoz, 24 g a day in the course of 5 days therapy/. The following haemorheologic factors were estimated: relative blood viscosity, plasma viscosity, red cell deformability and erythrocytes aggregation. For rheological examination the microviscosimeter Low Shear 40 /Contraves/ was used. The level of fibrinogen was estimated by means of standard laboratory method. Each patient was examined three times: before treatment initiation, after the first day and at the end of therapy after five days.

At the comparison of first and last measurements a significant increase of plasma viscosity / $p < 0.05$ / and red cells aggregation / $p < 0.05$ / was found, whereas erythrocyte deformability was significantly improved / $p < 0.05$ /.

The **result** of this study indicates a potential negative role of gammaglobulin on the blood flow in microcirculation. In turn, the lack of blood viscosity alteration might suggest an existence of a protective feedback mechanism, which has been exemplified by the red cell elasticity improvement.

P 3033

Essential thrombocythemia as independent stroke risk factor – case report

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P 3034

Oxidative stress and intracerebral haematomasO. M. Gore^{1,2}, A.I. Bobulescu², C. Gore^{2,3}, R. Papacocea², T. Papacocea⁴¹Coltea Clinical Hospital, Bucharest, ROMANIA, ²Carol Davila University of Medicine and Pharmacology, Bucharest, ROMANIA, ³Floreasca Emergency Hospital, Bucharest, ROMANIA, ⁴Cerebrovascular Disease Institute, Bucharest, ROMANIA

P 3035

Neurological symptomatology and neuropsychological diagnostics of hypertensive encephalopathy

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P 3036

State of haemostasis system of acute ischemic stroke and chronic ischemic brain disease during semax therapy

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P 3037

Clinical characteristic of dizziness syndrome in vertebrobasilar insufficiency in women with menopause and efficacy of Betaserc

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P 3038

Dramatic recurrence of stroke in-patient with patent foramen ovale (POF) and no atrial septum aneurysm (ASA), considerations about anticoagulationE. Macian¹, D. Ulbricht², R. J. Metz²¹Centre Hospitalier Universitaire de Limoges, Limoges, FRANCE, ²Centre Hospitalier de Luxembourg, Luxembourg, LUXEMBOURG