Cerebral Aneurysms

AB-14505-99
Human Arachnoid Villi Response to Subarachnoid Hemorrhage: Possible Relationship to Chronic Hydrocephalus—Massicotte EM, Del Bigio MR (Dept of Pathology, Univ of Manitoba, D212-770 Bannatyne Ave, Winnipeg, Manitoba, MB R3E 0W3, Canada)—J Neurosurg. 1999;91:80–84.

Object. The origin of chronic communicating hydrocephalus following subarachnoid hemorrhage (SAH) is not well understood. Fibrosis of the arachnoid villi has been suggested as the cause for obstruction of cerebrospinal fluid (CSF) flow, but this is not well supported in the literature. The goal of this study was to determine the relationship between blood, inflammation, and cellular proliferation in arachnoid villi after SAH.

Methods. Arachnoid villi from 50 adult patients were sampled at autopsy. All specimens were subjected to a variety of histochemical and immunohistochemical stains. The 23 cases of SAH consisted of patients in whom an autopsy was performed 12 hours to 34 years post-SAH. Fifteen cases were identified as moderate-to-severe SAH, with varying degrees of hydrocephalus. In comparison with 27 age-matched non-SAH controls, the authors observed blood and inflammation within the arachnoid villi during the 1st week after SAH. Greater mitotic activity was also noted among arachnoid cap cells. The patient with chronic SAH presented with ventriculomegaly 2 months post-SAH and exhibited remarkable arachnoid cap cell accumulation.

Conclusions. The authors postulate that proliferation of arachnoidal cells, triggered by the inflammatory reaction or blood clotting products, could result in obstruction of CSF flow through arachnoid villi into the venous sinuses. This does not exclude the possibility that SAH causes generalized fibrosis in the subarachnoid space.

AB-14506-99

Objective: To evaluate the clinical course of aneurysms developed during extracranial internal carotid artery (ICA) dissection. Background: Aneurysms developed during extracranial ICA dissection are detected angiographically in 5 to 40% of cervical artery dissections. The clinical and radiologic course of these aneurysms is not known, and it is not known how they should be treated. Methods: Fifty-eight consecutive patients with extracranial ICA dissection were reviewed, and those with radiographically detectable dissecting aneurysm at the acute stage or during early follow-up were included in this study. All patients had regular clinical and MR angiography examinations. Sixteen patients (27.5%) with a total of 20 ICA dissecting aneurysms were followed for a mean period of 36.9±21 months (range, 10 to 93 months). Results: No clinical symptoms suggestive of aneurysmal rupture or embolization from the aneurysm were identified. Extracranial ICA aneurysms remained unchanged in 65% of patients, were resolved in 5% of patients, and decreased in size in 30% of patients. Conclusions: The clinical course of dissecting aneurysms was benign, although spontaneous radiologic resolution occurred rarely. Medical management with antiplatelet therapy alone (after early anticoagulation) is generally sufficient, and surgical management was seldom required.

Clinical

AB-14507-99

Purpose: To report abnormalities in the protein C pathway and other vascular occlusion risk factors in patients with retinal vascular occlusion.

Methods: In a study, we investigated 76 consecutive patients who had in-patient evaluation of venous or arterial retinal vascular occlusion. All patients underwent comprehensive tests for coagulation disorders including determinations of protein C, protein S, lupus anticoagulants, and resistance to activated protein C and were screened for vascular disease risk factors. Resistance to activated protein C was confirmed by a polymerase chain reaction method to detect the specific factor V R506Q mutation. For comparative purposes, we also screened 209 consecutive inpatients with deep vein thrombosis from the same geographic region for resistance to activated protein C as well as protein C and protein S deficiencies.

Results: Ten (29%) of 35 patients with central retinal vein occlusion (CRVO) had factor V R506Q mutation. The factor V R506Q mutation was detected in four (19%) of 21 patients with branch retinal vein occlusion. The higher frequency in factor V R506Q mutation compared with the expected 9% mutation prevalence in a white population was highly significant for the central retinal vein occlusion group but not for the branch retinal vein occlusion group. In all patients with resistance to activated protein C, the factor V R506Q mutation was detected; 16 were heterozygous, one homozygous. No cases of lupus anticoagulants, protein C, or protein S deficiencies were detected. Forty (19%) of 209 patients with deep vein thrombosis were carriers of the factor V R506Q mutation.

Conclusions: The prevalence of the factor V R506Q mutation is similar in patients with central retinal vein occlusion and patients with deep vein thrombosis and represents a relevant risk factor. Screening for this mutation is therefore recommended in all patients with central retinal vein occlusion.

AB-14508-99

At a young age, ischemic stroke is an uncommon event in which prothrombotic factors are likely to play an important role. In 202 referred cases, 105 men and 97 women, median age 39 years (range, 3 to 50), with a history of ischemic stroke and in 1036 age frequency-matched apparently healthy individuals from the same ethnic background, we have investigated whether inherited prothrombotic conditions increase the risk of ischemic stroke. Neither abnormal plasma levels of natural anticoagulants and fibrinogen nor significant increase of the prothrombin A20210 allele was found in stroke cases compared with controls. Hyper-tension (odds ratio [OR], 22.61), male sex (OR, 2.30), smoking (OR, 2.78) and alcohol habits (OR, 0.14), a personal history of venous thromboembolism (OR, 4.53), a family history of stroke (OR, 1.93), high circulating levels of fibrinogen (P=0.0190), and total cholesterol...
Abstracts of Literature

AB-14509-99

Indiana emergency medicine physicians and neurologists were presented with 6 brief cases of patients presenting with acute ischemic stroke and asked whether they would administer tissue plasminogen activator (t-PA) in each case; 25% responded in concordance with published American Heart Association guidelines in all cases. Only 19% gave the appropriate exclusion in the 4 cases with definite exclusion criteria. Administering t-PA to a patient with elevated blood pressure was the most common deviation from the guidelines. More neurologists reported that they would have given t-PA in the exclusion-free scenario (85% v 49%; P<0.001). Physicians likely to treat acute stroke patients do not consistently follow published guidelines on the use of intravenous t-PA in acute ischemic stroke. Neurologists were more likely to report that they would use t-PA in an exclusion-free scenario. Continued physician education about thrombolytic use in acute ischemic stroke is needed.

AB-14510-99

Objective: To compare the baseline National Institutes of Health Stroke Scale (NIHSS) score and the Trial of Org 10172 in Acute Stroke Treatment (TOAST) subtype as predictors of outcomes at 7 days and 3 months after ischemic stroke. Methods: Using data collected from 1,281 patients enrolled in a clinical trial, subtype of stroke was categorized using the TOAST classification, and neurologic impairment at baseline was quantified using the NIHSS. Outcomes were assessed at 7 days and 3 months using the Barthel Index (BI) and the Glasgow Outcome Scale (GOS). An outcome was rated as excellent if the GOS score was 1 and the BI was 19 or 20 (scale of 0 to 20). Analyses were adjusted for age, sex, race, and history of previous stroke. Results: The baseline NIHSS score strongly predicted outcome, with one additional point on the NIHSS decreasing the likelihood of excellent outcomes at 7 days by 24% and at 3 months by 17%. At 3 months, excellent outcomes were noted in 46% of patients with NIHSS scores of 7 to 10 and in 23% of patients with scores of 11 to 15. After multivariate adjustment, lacunar stroke had an odds ratio of 3.1 (95% CI, 1.5 to 6.4) for an excellent outcome at 3 months. Conclusions: The NIHSS score strongly predicts the likelihood of a patient’s recovery after stroke. A score of ≥16 forecasts a high probability of death or severe disability whereas a score of ≤6 forecasts a good recovery. Only the TOAST subtype of lacunar stroke predicts outcomes independent of the NIHSS score.

Epidemiology

AB-14511-99

Context Next to Alzheimer disease, vascular dementia is the second most common form of dementia in the elderly, yet few specific risk factors have been identified.

Objective To investigate the relationship of plasma lipids and lipoproteins to dementia with stroke.


Participants A total of 1111 nondemented participants (mean [SD] age, 75.0 [5.9] years) were followed up for an average of 2.1 years (range, 1–7.8 years).

Main Outcome Measure Incident dementia with stroke according to standardized criteria, by baseline levels of total plasma cholesterol and triglycerides, low-density lipoprotein (LDL) cholesterol, LDL levels corrected for lipoprotein(a), high-density lipoprotein cholesterol, lipoprotein(a), and apolipoprotein E genotype.

Results Two hundred eighty-six (25.7%) of the 1111 subjects developed dementia during follow-up; 61 (21.3%) were classified as having dementia with stroke and 225 (78.7%) as having probable Alzheimer disease. Levels of LDL cholesterol were significantly associated with an increased risk of dementia with stroke. Compared with the lowest quartile, the highest quartile of LDL cholesterol was associated with an approximately 3-fold increase in risk of dementia with stroke, adjusting for vascular risk factors and demographic variables (relative risk [RR], 3.1; 95% confidence interval [CI], 1.5–6.1). Levels of LDL corrected for lipoprotein(a) were an even stronger predictor of dementia with stroke in the adjusted multivariate analysis. Compared with the lowest quartile, the RR of dementia with stroke for the highest quartile of lipoprotein(a)–corrected LDL cholesterol was 4.1 (95% CI, 1.8–9.6) after adjusting for vascular factors and demographic variables. Lipid or lipoprotein levels were not associated with the development of Alzheimer disease in our cohort.

Conclusions Elevated levels of LDL cholesterol were associated with the risk of dementia with stroke in elderly patients. Further study is needed to determine whether treatment of elevated LDL cholesterol levels will reduce the risk of dementia with stroke.

AB-14512-99

Background—Atrial septal aneurysm (ASA) is a putative risk factor for cardioembolism. However, the frequency of ASA in the general population has not been adequately determined. Therefore, the frequency in patients with cerebral ischemic events, compared with the frequency in the general population, is poorly defined. We sought to determine the frequency of ASA in the general population and to compare the frequency of ASA in patients with cerebral ischemic events with the frequency in the general population.

Methods and Results—The frequency of ASA in the population was determined in 363 subjects, a sample of the participants in the Stroke Prevention: Assessment of Risk in a Community study (control subjects), and was compared with the frequency in 355 age- and sex-matched patients undergoing transesophageal echocardiography in search of a cardiac source of embolism after a focal cerebral ischemic event. The proportion with ASA was 7.9% in patients versus 2.2% in control subjects (P=0.002; odds ratio of ASA, 3.65; 95% CI, 1.64 to 8.13, in patients versus control subjects). Patent foramen ovale (PFO) was detected with contrast injections in 56% of subjects with ASA. The presence of ASA predicted the presence of PFO (odds ratio of PFO, 4.57; 95% CI, 2.18 to 9.57, in subjects with versus those without ASA). In 86% of subjects with ASA and cerebral ischemia, transesophageal echocardi-

We performed a case-control study to assess the relationship between primary intracerebral hemorrhage (ICH) and low serum cholesterol. Prospectively recruited, fully evaluated patients with ICH were compared to two independent control groups, one based in a primary care practice and one population-based. Low cholesterol was defined by the sex-specific lowest quintile of the primary care controls. The proportion of ICH cases with low cholesterol >3 months posthemorrhage was significantly greater than in controls (42 vs. 20% in either control group, p<0.01). Subgroup analysis showed an overrepresentation of low cholesterol in probable hypertensive hemorrhage (47%, p<0.05) but not in probable cerebral amyloid angiopathy (27%, p=0.5). Low cholesterol increased the odds for hemorrhage 2.25-fold (1.12–4.50) after adjustment for age and apolipoprotein E genotype. These data confirm an increased risk for primary ICH associated with low cholesterol, a relationship that may apply specifically to hemorrhages from hypertensive vasculopathy.

Low Cholesterol as a Risk Factor for Primary Intracerebral Hemorrhage—AB-14513-99


Background: The Honolulu Heart Program (HHP) is a prospective study of heart disease and stroke that has accumulated risk factor data on a cohort of 8,006 Japanese American men since the study began in 1965. A recent examination of the cohort identified all patients with vascular dementia (VaD) using the criteria of the California Alzheimer’s Disease Diagnostic and Treatment Center. Objective: To characterize patients with VaD by stroke subtype and to investigate risk factors for VaD in a cohort of Japanese American men, aged 71 to 93, living in Hawaii and participating in the HHP. Methods: Sixty-eight men with VaD were compared with 3,335 men without dementia or stroke (NSND). Men with VaD were also compared with 106 men with stroke who were not demented (SND). Candidate risk factors were measured prospectively. Results: Of the 68 men with VaD there were 34 (50%) whose VaD was attributed to small vessel infarcts, 16 (23%) whose VaD was related to large vessel infarcts, and 11 (16%) with both large and small vessel infarcts. The remainder could not be classified. In a multivariate logistic regression model for VaD compared with NSND containing variables found to be associated with VaD in a univariate analysis, age (odds ratio [OR] 1.19, 95% confidence interval [CI] 1.33 to 1.27), coronary heart disease (OR 2.50, 95% CI 1.35 to 4.62), and 1-hour postprandial glucose (OR 1.41, 95% CI 1.06 to 1.88) remained significantly predictive of VaD, whereas preference for a Western diet (OR 0.54, 95% CI 0.30 to 0.98) as opposed to an Oriental or mixed diet and use of supplementary vitamin E (OR 0.32, 95% CI 0.12 to 0.82) were protective. A similar model for the comparison of men with VaD and SND revealed age (OR 1.24, 95% CI 1.14 to 1.35) was predictive of VaD, whereas preference for a Western diet (OR 0.43, 95% CI 0.22 to 0.86) was protective. Conclusions: The most common stroke subtype associated with VaD was lacunar stroke. Age and traditional vascular risk factors are important contributors to the development of VaD in late life. The antioxidant vitamin E and presently unknown factors related to a Western diet as opposed to an Oriental diet may be protective against developing VaD.

Characterization of Risk Factors for Vascular Dementia—AB-14514-99

Experimental Pathology

AB-14515-99


Object. Recently, several studies have demonstrated that hypothermia has a beneficial effect on clinical outcome; however, it is difficult to determine the appropriate rewarming conditions in clinical use. The purpose of the present study was to examine the influence of rewarming conditions in gerbils with transient forebrain ischemia.

Methods. Ischemia was induced in the gerbils by a 5-minute bilateral common carotid artery occlusion, after which the animals were immediately subjected to moderate or deep hypothermia. After moderate hypothermia (30.5°C for 4 hours) the animals were warmed over standard, fast, or slow time periods. After deep hypothermia (24°C for 2 hours) the animals were warmed in a standard, fast, slow, or stepwise manner. Cerebral blood flow (CBF), extracellular glutamate, and lactate were monitored. Hippocampal CA1 cell damage was assessed 7 days after induction of ischemia.

In animals treated with moderate hypothermia, the rewarming rate had no influence on the number of surviving neurons. However, fast rewarming from deep hypothermia (to 37°C for 30 minutes) failed to provide the neuroprotective effect of hypothermia. Furthermore, this group showed a poor recovery of CBF (p<0.01) and, consequently, an increase in extracellular glutamate (p<0.01) and lactate (p<0.01) in the hippocampus.

Conclusions. The results of this study indicate a transient uncoupling of CBF and cerebral metabolism during fast rewarming from deep hypothermia, whereas slow and stepwise rewarming periods were found to be useful for protection against uncoupling of CBF and cerebral metabolism during rewarming.


The activation of poly(ADP-ribose) polymerase (PARP) by free radical-damaged DNA plays a pivotal role in mediating ischemia–reperfusion injury. The purpose of the present study was to examine the neuroprotective effects of a PARP inhibitor, 3-aminobenzamide (3-ABA), which was administered either prior to or following reperfusion, to determine the importance of PARP inhibition prior to reperfusion. 3-ABA was injected i.p. either 15 min before or 15 min following reperfusion in a transient focal ischemia model in the rat. Treatment prior to the reperfusion led to a significant decrease in the volume of damaged tissue at 24 h (118.7±18.8 mm³, mean±s.d., p<0.01), compared with the control (176.1±22.8 mm³). However, treatment after the reperfusion failed to produce a reduction in the damaged volume (171.9±27.6 mm³). These findings suggest that PARP activation sufficient to produce cellular damage occurs immediately after the reperfusion following cerebral ischemia.

The Effect of Rewarming on Neuroprotection—AB-14516-99

Noninvasive 3-D Ultrasound of Atherosclerotic Plaques in the Wattanabe Rabbit—Allott CP (Zeneca Pharmaceuticals, Mereside, Alderley Park, Macclesfield, Cheshire, UK)—Abstracts of Literature 997.
AB-14520-99

Background and Purpose: Diminished vasoreactivity (VR) has been evidenced in patients with hemispheric small vessel disease, however, there is no data regarding vertebrobasilar (VB) territory VR changes in patients with subcortical vascular encephalopathy located in the brainstem. Therefore, we compared the cerebral blood flow velocity (CBFV) responses of the VB system during different vasoregulatory challenges in healthy volunteers to those in patients with brainstem lacunar infarcts.

Methods: In 20 patients with brainstem lacunar infarcts and in 10 healthy volunteers the VR of the VB system was measured by analyzing the CBFV changes during different stimulation paradigms (ventilation, tilting and acetazolamide tests). During transcranial Doppler registration the systemic blood pressure and the expiratory partial CO2 pressure were monitored. Results: During hypercapnia the VR was significantly higher in the control group than in the patient group (10.1 ± 4.9 vs. 3.4 ± 5.0 cm/s/kPa, p = 0.0025). In a subgroup of patients with mean baseline CBFV < 25 cm/s the VR was 1.5 ± 2.4 cm/s/kPa, while patients with mean baseline CBFV ≥ 25 cm/s showed a significantly higher value (7.8 ± 6.9 cm/s/kPa). Furthermore, in patients with mean baseline CBFV < 25 cm/s the pulsatility index was significantly higher than in patients with mean baseline CBFV ≥ 25 cm/s (1.1 ± 0.26 vs. 0.86 ± 0.10, p = 0.0325), reflecting significantly higher vascular resistance in the former group. Although CBFV measurements during tilting and acetazolamide tests tended to support these findings, they showed no significant differences between patients and controls. Conclusion: Patients with cerebral microangiopathy involving the brainstem showed impaired VR in the VB flow territory in association with baseline CBFV.

AB-14521-99

Objective: To determine the rate, clinical predictors, and cognitive consequences of MRI white matter hyperintensity evolution over 3 years.

Methods: In the setting of the Austrian Stroke Prevention Study, 1,5-T MRI was performed at baseline and at a 3-year follow-up in 273 community-dwelling elderly (mean age, 60 ± 6.1 years) without neuro psychiatric disease. At each visit individuals underwent a structured clinical interview and examination, EKG, echocardiography, extensive laboratory workup, and demanding neuropsychological testing. MR images were read by three independent raters, and the change of white matter hyperintensities from baseline was assessed by direct image comparison. The change was graded as absent, minor, or marked. Minor collapse of the inserted gas bubbles and the subsequent liquid jet formation were recorded with high-speed photography. Second, thrombi were formed using fresh human blood from healthy volunteers. The fibrinolysis induced by the liquid jet impact with urokinase was explored.

This was conducted under selected conditions based on the experiment using the gelatin. Fibrinolysis was calculated as the percentage of the weight loss of the thrombus. Fibrinolysis with urokinase alone and with a single liquid jet impact with urokinase was 1.9 ± 3.7% (n = 16) and 20.0 ± 9.0% (n = 35), respectively, for an incubation time of 60 min. Statistical differences were obtained between all groups (ANOVA).

These results suggest that liquid jet impact thrombolysis has the potential to be a rapid and effective therapeutic modality in recalination therapy for patients with cerebral embolism and other clinical conditions of intra-arterial thrombosis.

AB-14518-99

The predictive value of transcranial Doppler (TCD) cerebral blood flow velocity (CBFV) measurements for cerebral blood flow (CBF) calculations in humans is still controversial, and experimental correlative studies are lacking. The aim of the present study was to validate TCD signals of CBFV during focal cerebral ischemia. Therefore, CBFV determined in the middle cerebral artery (MCA) was compared with values of CBF obtained from autoradiograms of ischemic brain areas. To determine CBFV, a transcranial Doppler ultrasound probe (TCD) adapted to small sample volumes was used in 9 rabbits. CBFV was quantified after a final infusion of 14Cl-jodoantipyrine in the same animals. For focal cerebral ischemia induction, two threads were flushed upward simultaneously into the internal carotid artery, resulting in a flow reduction in the ipsilateral MCA. After thread occlusion, mean systolic CBFV in the MCA decreased from 49 ± 6 to 22 ± 3 cm/s. CBF in the caudate nucleus was reduced (19 ± 8 mL/100 g/min) compared to the contralateral nonischemic side (52 ± 18 mL/100 g/min). The decrease in hemispheric CBFV correlated well with the decrease in both mean systemic (r = 0.97) and diastolic (r = 0.94) CBFV in the MCA (p = 0.01). The decrease in CBFV determined by transcranial Doppler ultrasound in the MCA appears to reflect the reduction in CBF in the affected brain hemisphere and can be used as a quantitative in vivo parameter for tissue perfusion.
change was defined as a difference of no more than one to four punctate lesions between both scans. A change was considered to be marked if there was a difference of more than four abnormalities or a transition to early-confluent and confluent lesions. Results: Combined ratings indicated lesion progression in 49 individuals (17.9%). Lesion progression was minor in 27 participants (9.9%) and was marked in 22 (8.1%). Regression of white matter hyperintensities did not occur. Diastolic blood pressure (odds ratio, 1.07/mm Hg) and early-confluent or confluent white matter hyperintensities at baseline (odds ratio, 2.62) were the only significant predictors of white matter hyperintensity progression. Lesion progression had no influence on the course of neuropsychological test performance over the observational period. Conclusions: White matter hyperintensities progress in elderly normal subjects. Our data may be used as a reference for future observational and interventional studies on white matter hyperintensity progression in various CNS diseases. The lack of an association between lesion progression and cognitive functioning needs to be explored further.

Neurosonology

**AB-14522-99**


Background and purpose—Monitoring of the basilar artery (BA) is difficult and has been sparsely performed. The aim of this study was to present physiological data of functional transcranial Doppler sonography (TCD) of the BA during caloric vestibular stimulation in healthy volunteers. Methods—TCD of the BA was performed in 26 healthy volunteers (14 women, 12 men, age 25.1±3 years) during caloric vestibular stimulation. Vertigo was documented using electronystagmography (ENG) and a subjective vertigo scale ranging from 0 to 10 points. Simultaneously, capnography was performed. Results—All subjects experienced vertigo, nausea and oozillation during vestibular irradiation. The average subjective vertigo was for a period of 106 s (±65.4); the average subjective estimated degree of vertigo was 6.7 points (±1.5). In all subjects, ENG demonstrated horizontal nystagm to the left non-irrigated side. In 14 subjects the subjective vertigo was rated by the individuals as extreme (point score ≥7) and in 12 subjects as low (point score <7). Mean flow velocity (MFV) in the BA increased significantly during vestibular irradiation, being more prominent in the initial irritation and vertigo phase (5.8±5.9%, P<0.05) than in the second vertigo phase (2.2±8.8%, P<0.05). The calculated pulsatility index (PI), which indicates the condition of the small resistance vessels, decreased significantly (−4.9±8.1%; −4.3±8.9%, P<0.05) during both phases of vestibular activation. Endtidal pCO2 did not change significantly (constant 5.4±0.4 Vol%), but respiration frequency was significantly increased during vestibular stimulation (12.3±3.8 min−1 to 14.6±3.3 min−1 and 16.3±4.8 min−1, P<0.05) probably as a vegetative sign of vertigo. The observed MFV- and PI-changes were more prominent, although not quite significant, in the subgroup of subjects who experienced extreme subjective vertigo than in the subgroup who experienced low subjective vertigo. Conclusion—These observations indicate that MFV increase in the posterior circulation is due to activation of the vestibulocerebellum. In addition, it is possible that the previously elaborated MFV increase in the MCA might contribute to MFV increase in the BA via the posterior communicating artery. The difference in the two subgroups (extreme vertigo vs low vertigo) may reflect the great 2 subgroups of anatomical and physiological conditions of the peripheral vestibular organ, the brainstem anatomy and the corresponding blood supply. For clinical purposes this TCD-test may contribute to the investigation of the vasomotor reserve of the posterior circulation, e.g. in patients with verteobasilar ischemia, bilateral vestibular loss or local neurodegenerative disease.

**AB-14524-99**


Background: Detection of microemboli signals (MES) in patients with artificial heart valves has been extensively described, but the underlying material remains unclear. We assumed that the detection of MES in the jugular vein of patients with prosthetic valves would clearly argue for gaseous embolic material, since formed emboli are unable to cross through the capillaries. Methods and Results: Twenty-five patients with artificial heart valves, 15 patients with asymptomatic carotid artery disease, and 25 normal controls were examined. Monitoring was performed simultaneously over the dominant jugular vein and the ipsilateral middle cerebral artery for 30 min per subject, using 2-MHz transducers of a color duplex scanner for the jugular vein and a pulsed-wave Doppler for the middle cerebral artery. Data were harvested in an eight-channel digital recorder and MES counts evaluated by two separate observers. MES-prevalence in the middle cerebral artery was 100; 13 and 0% in patients with artificial heart valves, asymptomatic carotid artery disease, and normal controls, respectively. No MES were detected in the jugular veins of patients with carotid artery disease or in normal controls, while 68% in patients with artificial heart valves. The interobserver agreement was satisfactory. Conclusion: Our results suggest that the embolic material of at least a part of MES in patients with artificial heart valves is gaseous.
Pharmacology / Therapeutics

AB-14525-99


Background: Oral anticoagulation with vitamin K antagonists increases the risk of intracranial hemorrhage; whether addition of aspirin to oral anticoagulation augments this risk is unclear. Methods: Meta-analysis of randomized clinical trials in which aspirin was added to oral anticoagulants. Results: Six randomized clinical trials were identified, including a total of 3,874 participants. Use of aspirin with oral anticoagulants was associated with more than double the frequency of intracranial hemorrhage (relative risk = 2.4, 95% CI 1.2–4.8, p = 0.02). Conclusion: We hypothesize that aspirin when added to oral vitamin K antagonists may increase the risk of intracranial hemorrhage, but this observation requires confirmation. The magnitude of this effect is uncertain, and the clinical importance is likely different for different patient populations.

AB-14526-99


The CLASS study showed no significant difference between treatment groups for the neuroprotectant clomethiazole compared with placebo. However, a beneficial effect of the drug was seen in patients with total anterior circulation syndrome (TACS). These are patients with clinical symptoms suggesting a large stroke. Full results of this subgroup analysis are reported. Patients were classified before randomization using clinical symptoms into the stroke syndromes TACS, partial anterior circulation syndrome, and lacunar syndrome. Subgroup analyses of stroke syndromes were performed post hoc after detecting a treatment by severity interaction. The primary efficacy variable was relative functional independence defined as the proportion of patients scoring ≥60 on the Barthel Index at 90 days. TACS patients (n = 546, 40% of all CLASS patients) were more severe at baseline on the 58 point Scandinavian Stroke Scale compared with non-TACS patients (median difference 10 points, mean difference 10.9 points, SE = 0.6). Outcome for TACS patients treated with placebo was poor, with only 29.8% reaching relative functional independence. This was increased to 40.8% in the clomethiazole group, a 37% relative benefit, which is clinically significant (odds ratio = 1.62, 95% CI 1.13–2.31, nominal p = 0.008). There was little or no difference in the outcome of non-TACS patients treated with clomethiazole compared with placebo. The treatment effect in TACS patients was quite consistent across participating countries and the 3 parts of the study defined by the 2 interim analyses. The treatment effect seen in patients with clinical symptoms suggesting a large stroke (TACS) is biologically plausible but requires confirmation in a prospective study which is ongoing.

AB-14527-99

Intensity of Leg and Arm Training After Primary Middle-Cerebral-Artery Stroke: A Randomised Trial—Kwakkel G (Dept of Physical Therapy, Univ Hospital Vrije Universiteit, PO Box 7057, 1007 MB Amsterdam, Netherlands), Wagenaar RC, Twisk JWR, Lankhorst GJ, Koetsier JC—Lancet. 1999;354:191–196.

Background: We investigated the effects of different intensities of arm and leg rehabilitation training on the functional recovery of activities of daily living (ADL), walking ability, and dexterity of the paretic arm, in a single-blind randomised controlled trial.

Methods: Within 14 days after stroke onset, 101 severely disabled patients with a primary middle-cerebral-artery stroke were randomly assigned to: a rehabilitation programme with emphasis on arm training; a rehabilitation programme with emphasis on leg training; or a control programme in which the arm and leg were immobilised with an inflatable pressure splint. Each treatment regimen was applied for 30 min, 5 days a week during the first 20 weeks after stroke. In addition, all patients underwent a basic rehabilitation programme. The main outcome measures were ability in ADL (Barthel index), walking ability (functional ambulation categories), and dexterity of the paretic arm (Action Research arm test) at 6, 12, 20, and 26 weeks. Analyses were by intention to treat.

Findings: At week 20, the leg-training group (n = 31) had higher scores than the control group (n = 37) for ADL ability (median 19 [IQR 16–20] vs 16 [10–19], p < 0.05), walking ability (4 [3–5] vs 3 [1–4], p < 0.05), and dexterity (2 [0–5] vs 0 [0–2], p < 0.01). The arm-training group (n = 33) differed significantly from the control group only in dexterity (9 [0–39] vs 0 [0–2], p = 0.01). There were no significant differences in these endpoints at 20 weeks between the arm-training and leg-training groups.

Interpretation: Greater intensity of leg rehabilitation improves functional recovery and health-related functional status, whereas greater intensity of arm rehabilitation results in small improvements in dexterity, providing further evidence that exercise therapy primarily induces treatment effects on the abilities at which training is specifically aimed.

AB-14528-99


Objective: To examine the responses to early IV administration of an anticoagulant or placebo started within 24 hours of stroke among persons with an ipsilateral occlusion or severe stenosis of the internal carotid artery (ICA) identified by carotid duplex imaging. Background: Patients with ischemic stroke of the cerebral hemisphere secondary to an ipsilateral occlusion or severe stenosis of the ICA generally have a poor prognosis. Early, accurate identification of these patients might permit improved treatment. Methods: Exploratory analysis of outcomes at 7 days and 3 months was performed among patients enrolled in the Trial of Org 10172 in Acute Stroke Treatment (TOAST) who had an ischemic stroke in the cerebral hemisphere ipsilateral to an occlusion or a stenosis ≥50% of the ICA identified by carotid duplex imaging. Results: Regardless of treatment, patients with duplex evidence of an occlusion of the ICA had more severe strokes and poorer outcomes at 7 days and 3 months than patients who had a stenosis. Favorable outcomes at 7 days were noted in 64 of 119 patients given danaparoid (53.8%) and 41 of 108 patients treated with placebo (38.0%; p = 0.023). By 3 months, favorable outcomes were noted in 82 patients given danaparoid (68.3%) and 58 patients administered placebo (53.2%; p = 0.021). Conclusions: Early identification by duplex imaging of an occlusion or severe stenosis of the ICA ipsilateral to a hemispheric ischemic stroke might improve selection of patients who could be treated with emergent anticoagulation. Further testing of this approach is needed.

AB-14529-99

AB-14530-99


Purpose: The incidence of cardiac morbidity and mortality in patients who undergo carotid surgery ranges from 0.7% to 7.1%, but it still represents almost 50% of all perioperative complications. Because no data are available in literature about the impact of the anesthetic technique on such complications, a prospective randomized monocentric study was undertaken to evaluate the role of local anesthesia (LA) and general anesthesia (GA) on cardiac outcome.

Methods: From November 1995 to February 1998, 107 patients were classified by the cardiologist as cardiac patients (IHD; history of myocardial infarction, previous myocardial revascularization procedures, or myocardial ischemia documented by means of positive electrocardiogram [ECG] stress test results) or noncardiac patients (NIHD; no history of chest pain or negative results for an ECG stress test). The patients were operated on after the randomization for the type of anesthesia (general or local). Continuous computerized 12-lead ECG was performed during the operative procedure and 24 hours postoperatively. The end points of the study were ECG modifications (upsloping or downsloping more than 2 mm) of the sinus tachycardia (ST) segment.

Results: Fifty-five patients were classified as IHDM, and 52 were classified as NIHD. Twenty-seven of the 55 IHD patients (49%) and 24 of 52 NIHD patients (46%) were operated on under GA. Thirty-six episodes of myocardial ischemia occurred in 22 patients (20.5%). Episodes were slightly more frequent (58%) and longer in the postoperative period (intraoperative, 10±5 min; postoperative, 60±45 min; P<.001). As expected, the prevalence of myocardial ischemia was higher in the group of cardiac patients than in noncardiac group (15 of 55 patients [27%] vs 7 of 52 patients [13%]; P<.02). By comparing the two anesthetic techniques in the overall population, we found a similar prevalence of patients who had myocardial ischemia (GA, 12 of 52 [25%]; LA, 10 of 55 [18%]; P=not significant) and a similar number of ischemic episodes per patient (GA, 1.5±0.4; LA, 1.8±0.6; P=not significant). Episodes of myocardial ischemia were similarly distributed in intraoperative and postoperative periods in both groups. It is relevant that under GA, IHD patients represent most of the population who suffered myocardial ischemia (83%). On the contrary, in the group of patients operated on under LA, the prevalence was equally distributed in the two subpopulations.

Conclusion: The results confirm the different hemodynamic impact of the two anesthetic techniques. Patients who received LA had a rate of myocardial ischemia that was half that of patients who had GA. The small number of cardiac complications do not permit us to make any definitive conclusion on the impact of the two anesthetic techniques on early cardiac morbidity, but the relationship between perioperative ischemic burden and major cardiac events suggests that LA can be used safely, even in high-risk patients undergoing carotid endarterectomy.

Items of Interest


Abstracts of Literature
Askiel Bruno and Engin Y. Yilmaz

*Stroke*. 1999;30:2495-2501
doi: 10.1161/01.STR.30.11.2495

*Stroke* is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 1999 American Heart Association, Inc. All rights reserved.
Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://stroke.ahajournals.org/content/30/11/2495

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in *Stroke* can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to *Stroke* is online at:
http://stroke.ahajournals.org/subscriptions/