Abstracts of Literature

Cerebral Aneurysms

AB-14761-00

Functional Outcome and Quality of Life After Angiography and Operation For Unruptured Intracranial Aneurysms—Rajmakers TWM (Dept of Neurology, H2.128 Univ Hospital Utrecht, Heidelberglaan 100, 3584 CX Utrecht, Netherlands), on behalf of the MARS Study Group—Neuror Neurosurg Psychiatry. 2000;68:571–576.

Objectives—To assess outcome after elective treatment for unruptured intracranial aneurysms.

Methods—Of 193 consecutive patients with subarachnoid haemorrhage 626 first degree relatives (parents, siblings, children) were screened with magnetic resonance angiography. Subsequently, 18 relatives underwent elective angiography and operation. Outcome was assessed in terms of impairments (neurological examination), disabilities (Barthel index), handicaps (Rankin scale), and quality of life (sickness impact profile (SIP) and short form-36 (SF-36)) 3 months and 1 year after operation; it was compared with baseline measurements.

Results—Before angiography all patients had a normal neurological examination, optimal Barthel and Rankin scores, and a quality of life similar to that in a reference population. Three months postoperatively five patients (28%; 95% confidence interval (CI) 10–54%) had neurological impairments (one after angiography), two (11%; 95% CI 1–35%) had a decrease in Barthel index, and 15 (83%; 95% CI 59–96%) had suboptimal Rankin scores (none was dependent in daily living). Quality of life (SIP and SF-36) was reduced for most domains. After 1 year, five patients still had neurological impairments, all had an optimal Barthel index, and eight (47%; 95% CI 23–72%) had suboptimal Rankin scores. Quality of life returned to baseline levels for all SIP and most SF-36 domains.

Conclusions—Treatment of unruptured aneurysms has a considerable short term negative impact on functional health and quality of life in most patients, despite the low rate of impairments. Outcome improves markedly but not completely within 1 year after operation.

AB-14762-00

False Localization of Rupture Site in Patients With Multiple Cerebral Aneurysms and Subarachnoid Hemorrhage—Hino A (Dept of Neurosurgery, Saiseikai Shigaken Hospital, Ohashi 2-4-1, Ritto, Shiga 520-30, Japan), Fujimoto M, Iwamoto Y, Yamaki T, Katsumori T—Neurosurgery. 2000;46:825–830.

OBJECTIVE: Patients with subarachnoid hemorrhage and multiple intracranial aneurysms present a unique challenge to the neurosurgeon. Unless all aneurysms can be clipped through a single craniotomy, the surgeon must accurately determine which aneurysm has ruptured. Misjudgment may result in disastrous postoperative rebleeding from the untreated but true ruptured lesion. We assessed the risk of false localization of the rupture site and subsequent rebleeding and documented the problems in predicting the true rupture site when patients have multiple intracranial aneurysms.

METHOD: We reviewed the records of a consecutive series of 93 patients treated over a period of 12 years who presented with their first subarachnoid hemorrhage and who had multiple intracranial aneurysms. The rupture site was determined on the basis of computed tomographic and angiographic findings, and the supposed ruptured aneurysm was clipped within 2 days of hemorrhage in each patient. Additional aneurysms that could not be accessed in the same surgical session were operated on at a later stage. All patients’ records were reviewed, and all computed tomographic scans and angiograms, including repeat studies performed in some patients, were retrospectively reevaluated by the authors, who had no knowledge of the patients’ clinical information.

RESULTS: The location of the aneurysm that ruptured was verified at the time of surgery or during the autopsy in 76 patients (82%). The aneurysm that ruptured was the one predicted as ruptured by the surgeon before surgery in 69 patients (91%) and in retrospect in 72 patients (95%). Five of the 6 patients in whom the ruptured aneurysm was not correctly identified were thought to have only a single aneurysm. Four patients rebleed after surgery, and 2 patients died as a result of the rebleeding.

CONCLUSION: In the reported series, the most common cause of rebleeding soon after aneurysm surgery was failure to obliterate the ruptured aneurysm, usually because it was missed on the initial angiogram. The results support not only meticulous radiological investigation of all intracranial arteries before surgery but also thorough surgical inspection of the target aneurysm in all cases of subarachnoid hemorrhage even after one candidate lesion has been discovered.

AB-14763-00


OBJECTIVE: The outcome of subarachnoid hemorrhage associated with cocaine abuse is reportedly poor. However, no study in the literature has reported the use of a statistical model to analyze the variables that influence outcome.

METHODS: A review of admissions during a 6-year period revealed 14 patients with cocaine-related aneurysms. This group was compared with a control group of 135 patients with ruptured aneurysms and no history of cocaine abuse. Age at presentation, time of ictus after intoxication, Hunt and Hess grade of subarachnoid hemorrhage, size of the aneurysm, location of the aneurysm, and the Glasgow Outcome Scale score were assessed and compared.

RESULTS: The patients in the study group were significantly younger than the patients in the control group (P<0.002). In patients in the study group, all aneurysms were located in the anterior circulation. The majority of these aneurysms were smaller than those of the control group (8.6±6.08 mm versus 11.5±5.4 mm; P=0.05). The differences in mortality and morbidity between the two groups were not significant. Hunt and Hess grade (P<0.005) and age (P<0.007) were significant predictors of outcome for the patients with cocaine-related aneurysms.

CONCLUSION: Cocaine use predisposed aneurysmal rupture at a significantly earlier age and in much smaller aneurysms. Contrary to the published literature, this group did reasonably well with aggressive management.

AB-14764-00


OBJECTIVE: Evidence indicates that vasospasm after subarachnoid hemorrhage (SAH) is caused in part by a decrease in the vasodilator nitric oxide (NO), which is produced mainly in endothelial cells. This study tested whether intracisternal injection of adenovirus-expressing endothelial NO synthase (eNOS) would decrease vasospasm in dogs.
METHODS: In 12 dogs, baseline cerebral angiography was performed, and then SAH was produced by two injections of blood into the cisterna magna. The dogs were randomized (n=6/group) to intracerebral injection of adenovirus-expressing lacZ (Ad327β-Gal) or eNOS (AdCD8-NOS), administered immediately after the first blood injection. Angiography was repeated on Day 7, and then t-arginine (50 mg) was administered intracranially, and angiography was repeated. Cerebrospinal fluid aspirated from the cisterna magna on Days 2 and 7 was analyzed for levels of NO metabolites. The dogs were killed, and their basilar arteries were removed and studied pharmacologically. Four control dogs underwent angiography on Day 0, followed by virus injection (n=2/group). Angiography was repeated on Day 7, and the control dogs were killed. Transgene expression was detected in tissue removed on Day 7 by histochemical staining for lacZ, by polymerase chain reaction for β-galactosidase (β-Gal), and by in situ hybridization for eNOS. 

RESULTS: Angiography showed significant vasospasm in each group (Ad327β-Gal, 94±7% reduction in basilar artery diameter; AdCD8-NOS, 53±7%), with no significant difference between groups. Injection of t-arginine caused an insignificant increase in arterial diameter in each group. In dogs without SAH, Ad327β-Gal caused a reduction in basilar artery diameter (−13±10%, P=0.42; paired t test), whereas injection of AdCD8-NOS caused an increase in diameter (14±16%, P=0.77; paired t test). Histological examination and β-galactosidase staining of dogs given injections of Ad327β-Gal showed staining in inflammatory cells in the subarachnoid space, in the adventitia of the cerebral vessels, and in the liver and lungs. Messenger ribonucleic acid for eNOS was detected in the leptomeninges of dogs given injections of AdCD8-NOS. Under isometric tension, basilar arteries from each group demonstrated similar relaxation to l-arginine, but arteries exposed to eNOS demonstrated significantly greater relaxation to l-arginine plus tetrahydrobiopterin than arteries exposed to lacZ. Cerebrospinal fluid levels of NO and its metabolites were significantly higher in dogs treated with AdCD8-NOS than those treated with Ad327β-Gal 2 days after SAH.

CONCLUSION: These results demonstrate that adenovirus vectors can be used to transfer genes to cells in the subarachnoid space of dogs. Enough NO can be produced in the absence of SAH to dilate the basilar artery. After SAH, however, NO plus a cofactor can dilate arteries in vitro, but not enough NO is generated in the subarachnoid space to prevent vasospasm, perhaps owing to the scavenging of NO by hemoglobin.

Clinical

AB-14765-00


A total of 17 patients with lacunar syndromes due to intracerebral hemorrhage or hemorrhagic lacunar stroke (pure motor hemiparesis 9, sensorimotor stroke 5, pure sensory stroke 3) are reported. Data from these patients were obtained from consecutive stroke patients included in the prospective Hospital Sagrat Cor-Alianca Stroke Registry. Hemorrhagic lacunar stroke accounted for 3.8% of all cases of lacunar syndrome (n=439) and 7.4% of all cases of intracerebral hemorrhage (n=229) entered in the database. Demographic, anamnestic, clinical and neuroimaging variables in patients with hemorrhagic lacunar stroke, non-lacunar intracerebral hemorrhage and non-hemorrhagic lacunar stroke were compared. Predictors of hemorrhagic lacunar stroke were assessed by logistic regression analysis. Hypertension, cigarette smoking and involvement of the internal capsule were significantly more frequent in patients with hemorrhagic lacunar stroke than in those with non-lacunar intracerebral hemorrhage, whereas nausea and vomiting, altered consciousness, speech disturbances, hemianopia, and ventricular hemorrhage were significantly less frequent. As compared with non-hemorrhagic lacunar stroke, patients with hemorrhagic lacunar stroke were more likely to have hypertension, sudden stroke onset (minutes), head injury, headache, and basal ganglia involvement and less likely to have diabetes, gradual stroke onset (hours), and dysarthria. After multivariate analysis, only headache (OR 10.14), sudden onset (OR 8.99), and dysarthria (OR 0.10) were independent predictors of hemorrhagic lacunar stroke. Accordingly, the presence of headache and sudden onset of symptoms and absence of dysarthria may be useful signs for distinguishing hemorrhagic lacunar stroke from other causes of lacunar stroke.

AB-14766-00


Cognitive impairment is common after stroke, but measurement is problematic. Six tests of mental ability, unaffected by loss of limb function, were administered to 49 subjects of mean age 74.2 years at a median of 4.3 years (range 0.1–16.8) after stroke together with a depression score and the IQCODE, an informant-rated scale of estimated cognitive decline. Over 90% of stroke patients were able to complete most tests. IQCODE correlated significantly with the HADS depression score (r=0.35, P=0.040), the 2-year Barthel score (r=−0.60, P=0.001) and with a general cognitive factor extracted from the mental ability test scores (r=−0.42, P=0.016). We conclude that informant-rated methods offer a promising approach to measuring cognitive decline after stroke.

Epidemiology

AB-14767-00


Background: The role of hyperinsulinemia as a cardiovascular risk factor is controversial. We studied whether hyperinsulinemia is independently associated with increased cardiovascular morbidity and mortality.

Methods: Fasting serum insulin level and other cardiovascular risk factors were determined in 1521 men in eastern Finland aged 42 to 60 years with neither cardiovascular disease nor diabetes at baseline. Forty-five cardiovascular deaths, 110 acute coronary events, 48 strokes, and 163 cardiovascular events occurred during an average follow-up of 9.5 years. A total of 163 cardiovascular events (45 cardiovascular deaths, 110 acute coronary events, and 48 strokes) occurred during an average follow-up of 9.5 years.

Results: In Cox regression analysis adjusting for age and examination years, fasting serum insulin level as a continuous variable was directly associated with the risk of cardiovascular death (P=0.006), acute coronary events (P=0.04), and stroke (P=0.02). Men with insulin levels of 52 to 66 pmol/L, 67 to 89 pmol/L and 90 pmol/L or more (3 highest quartiles) had 1.4-fold (95% confidence interval, 0.5–3.7), 1.4-fold (95% confidence interval, 0.5–3.7), and 2.5-fold (95% confidence interval, 1.0–5.9; P=.05) cardiovascular mortality, respectively, compared with men with insulin levels of less than 52 pmol/L (lowest quartile) (P=0.04 for linear trend). Adjustment for serum lipid levels, blood pressure, and obesity reduced the excess cardiovascular mortality in the highest insulin quartile by 7%, 33%, and 67%, respectively. There were no statistically significant differences in the incidence of acute coronary events and stroke between the insulin quartiles.

Conclusions: Hyperinsulinemia had a modest association with increased cardiovascular mortality in middle-aged men. This relationship was largely explained by obesity, hypertension, and dyslipidemia. Hyperinsulinemia had even weaker associations with the risk of acute coronary event and stroke.
AB-14768-00
Low Fasting Plasma Glucose Level as a Predictor of Cardiovascular Disease and All-Cause Mortality—Wei M (Cooper Institute, 12330 Preston Rd, Dallas, TX 75230), Gibbons I.W, Mitchell TL, Kampert JB, Stern MP, Blair SN—Circulation. 2000;101:2047–2052. Copyright © 2000 American Heart Association, Inc.

Background—Although medical textbooks usually classify fasting plasma glucose <70 or 80 mg/dL (<3.89 or 4.44 mmol/L) as abnormal, the prognosis for patients with low fasting plasma glucose is unclear.

Methods and Results—We conducted prospective cohort studies among 40,069 men and women to investigate the association between fasting plasma glucose levels and cardiovascular disease and all-cause mortality. We documented a U-shaped relation between fasting plasma glucose and mortality. In addition to diabetes and impaired fasting glucose levels, low fasting plasma glucose levels were also associated with high mortality. After multivariate adjustment for age, sex, study population, ethnicity, current smoking status, high blood pressure, total cholesterol, body mass index, triglycerides, history of cardiovascular disease and cancer, and a family history of cardiovascular disease, patients with fasting plasma glucose <70 mg/dL (<3.89 mmol/L) had a 3.3-fold increased risk of cardiovascular disease mortality, and patients with fasting plasma glucose 70 to 79 mg/dL (3.89 to 4.43 mmol/L) had a 2.4-fold increased risk compared with the risk in patients with fasting plasma glucose 80 to 109 mg/dL (4.44 to 6.05 mmol/L) (tests for trend P<0.0001). Participants with low fasting plasma glucose levels also had increased risk of all-cause mortality (test for trend P<0.0001).

Conclusions—Participants with low fasting plasma glucose levels had a high risk of cardiovascular disease and all-cause mortality.

Experimental Pathology
AB-14769-00

Background. Investigations have shown an increase of leukocyte-endothelium-interaction in a variety of organs following an ischaemic insult. To elucidate the role of leukocyte-endothelium-interaction following global, cerebral ischaemia the present study was performed.

Methods. Global, cerebral ischaemia was induced for twenty minutes by four-vessel-occlusion (PULSINELLI). Leukocyte-endothelium-interaction was studied in the cerebral microcirculation using a rat closed cranial window and intravital microscopy. Leukocytes were stained intravenously using rhodamine 6G. Diameters of pial vessels, leukocyte centrel ine velocity and number of rolling or adhering leukocytes were determined off-line up to 2 h following global cerebral ischaemia. To confirm these results immunohistochemistry of the brain was performed.

Findings. Four-vessel-occlusion induced an iso-electric EEG, venular stasis and minimal rest flow in arterioles. Reperfusion yielded a significant increase of the arteriolar (<P<0.001) and a smaller increase of the venular diameters (P<0.001). Up to 2 h after ischaemia no significant increase of the number of rolling or adhering leukocytes was measured which was confirmed by immunohistochemistry.

Interpretation. In contrast to other studies, in particular regarding focal cerebral ischaemia, an increase of leukocyte-endothelium-interaction in rat brain following 20 min of global cerebral ischaemia was not observed despite histological evidence of ischaemic damage. Thus in our model leukocytes seem not to contribute to the brain damage following global ischaemia.

AB-14770-00
Antithrombotic Effects of Abciximab—Hayes R, Chesebro JH, Fuster V, Dangas G, Fallon JT, Sharma SK, Coller BS, Badimon L, Marmur JD, Badimon JJ (Cardiovascular Biology Research Laboratory, Zena and Michael A. Wiener Cardiovascular Institute, Mount Sinai School of Medicine, New York, NY 10029—Am J Cardiol. 2000;85:1167–1172. Copyright © 2000 by Excerpta Medica, Inc.

The observation that platelet-platelet interaction and thrombosis are ultimately regulated by the glycoprotein (GP) IIb/IIIa receptor complex, triggered the development of agents capable of interfering with this platelet receptor complex. Several large clinical trials have demonstrated the effectiveness of this class of agents. The first of these agents to show beneficial effects after coronary interventions was the mouse/human chimeric Fab fragment antibody c7E3 (abciximab; ReoPro). This study analyzes whether the addition of heparin to the GP IIb/IIIa antagonist abciximab would enhance the antithrombotic effect. Blood drawn directly from patients on aspirin who underwent interventional procedures perfused an ex vivo perfusion chamber containing a severely injured arterial wall at local rheologic conditions of a mildly stenosed coronary artery. Blood was perfused directly from patients at baseline and following administration of heparin, abciximab, or both. The antithrombotic effects of the 3 treatments were assessed by reduction of the thrombus formation on the perfused specimens. Thrombus formation at baseline was not significantly modified by the administration of heparin (13,897±1,316 vs 11,917±1,519 mm²). Abciximab produced a 58% reduction in thrombus formation (11,631±861 vs 4,925±585 mm²; p<0.0001). The addition of heparin to abciximab did not further reduce thrombus area versus abciximab alone (5,651±581 vs 4,925±585 mm²). Thus, our data show that abciximab dramatically decreases mural thrombus formation and that combining heparin with abciximab did not add any additional antithrombotic effect to abciximab alone.

AB-14771-00
Neuroprotection by the Stable Nitroxide Tempol During Reperfusion in a Rat Model of Transient Focal Ischemia—Rak R, Chao DL, Pluta RM, Mitchell JB, Oldfield EH (Surgical Neurology Branch, NINDS, National Institutes of Health, Bldg 10, Rm 5D37-1414, Bethesda, MD 20892), Watson Jc—J Neurosurg. 2000;92:646–651.

Object. The use of thrombolytic agents in the treatment of stroke has yielded surprisingly modest success, possibly because of reperfusion injury mediated by reactive oxygen species (ROS). Therefore, scavenging ROS may be of therapeutic value in the treatment of stroke. Nitroxides are low-weight superoxide dismutase mimic mimics, which allows them to act as cell-permeable antioxidants. In this study the nitroxide 4-hydroxy-2,2,6,6-tetramethylpiperidine-1-oxyl (Tempol) is investigated to determine its ability to reduce reperfusion injury.

Methods. Male Sprague–Dawley rats weighing between 280 g and 350 g underwent middle cerebral artery occlusion with an intraluminal suture for 60 minutes. Regional cerebral blood flow, blood pressure, cerebral temperature, and rectal temperature were monitored during the procedure. After reperfusion, the animals were randomized to groups receiving blinded intravenous administration of either Tempol (10 mg/kg; eight animals) or vehicle (eight animals) over the first 20 minutes of reperfusion (Study I). In a second study to determine dose dependency, animals were randomized to groups receiving Tempol (20 mg/kg; eight animals), low-dose Tempol (5 mg/kg; eight animals), or vehicle (eight animals; Study II). The rats were killed after 4 hours of reperfusion, and brain sections were stained with 2,3,5 triphenyl-tetrazolium chloride. Infarct volumes were measured using digital imaging.

Animals receiving Tempol had significantly reduced infarct volumes at doses of 20 mg/kg and 10 mg/kg compared with controls (49.01±18.22% reduction [P<0.003] and 47.47±34.57 [P=0.02], respectively). No significant differences in the physiological variables measured were observed between groups.

Conclusions. Tempol provides significant neuroprotection after reperfusion in a rat model of transient focal ischemia. These results support the importance of ROS in reperfusion injury and encourage further study of this molecule as a therapeutic agent following thrombolysis.

AB-14772-00
Usefulness of Postischemic Thrombolysis With or Without Neuroprotection in a Focal Embolic Model of Cerebral Ischemia—Yang Y
Object. Recent studies have shown that the use of thrombolysis in the setting of acute stroke is associated with an increased risk of cerebral hemorrhage. The time of onset of symptoms to initiation of medication and the dose levels of the thrombolytic agents are important determinants for the risk of cerebral hemorrhage. The authors evaluated the time course of thrombolysis-related hemorrhages in experimental settings and tested whether the addition of neuroprotective medication augments the efficacy of thrombolysis and reduces the incidence of hemorrhages.

Methods. Male Wistar rats were subjected to right middle cerebral artery embolization with an autologous thrombus and were then randomly assigned to one of the following groups: Group 1, saline-treated (2 hours after ischemic insult) animals as controls; Groups 2 to 4, high-dose urokinase (5000 U/kg) at 2, 3, and 6 hours after the insult; Group 5, low-dose urokinase (2500 U/kg) at 2 hours after the insult; Group 6, 20 mg/kg topiramate (TPM) at 2 hours after the insult; Group 7, a combination of 20 mg/kg TPM at 2 hours and low-dose urokinase (2500 U/kg) at 6 hours after the insult; and Group 8, 20 mg/kg TPM (20 mg/kg) at 2 hours and high-dose urokinase (5000 U/kg) at 2 hours after the insult. Neurological behavior and the infarct volume in the brain were assessed following cerebral embolism and the various treatments.

All animals in the single therapy and low-dose combination groups survived surgery. Three of eight animals treated with high-dose urokinase alone at 6 hours and three of six animals in the combined high-dose urokinase and TPM group developed fatal intracerebral hemorrhages. There was a significantly better neurological outcome at 24 hours in the animals treated with either medication compared with controls. The volume of the infarct in the saline-treated group was 54.2 ± 9%. The use of TPM at 2 hours led to a decrease in the infarct to 20.1 ± 11.2% (p < 0.01). Treatment with urokinase at 6 hours after the occlusion showed a trend toward protection; the infarct volume was 31.9 ± 14.1% (p < 0.05). The addition of TPM to low- or high-dose urokinase achieved better neuroprotection (8.2 ± 6% and 11.9 ± 10.7%, respectively; both p < 0.01).

Conclusions. In this study the authors show that the volume of the infarct can be significantly decreased with 2 to 6-hour delayed intraarterial thrombolysis with urokinase and that the efficacy of thrombolysis may be enhanced by combining neuroprotective agents like TPM. It is also shown that low-dose combination therapy may decrease the likelihood of cerebral hemorrhage.

RESULTS: Mean deep white matter to superficial oxygen extraction fraction ratios (± 95% confidence limits) were 0.99 (± 0.07), 1.01 (± 0.06), and 1.02 (± 0.08) for ipsilateral, contralateral, and normal hemispheres, respectively. No statistically significant difference was found between ipsilateral and contralateral (P = 0.691) or normal hemispheres (P = 0.68), nor was any statistically significant difference found when the analysis was limited to patients with increased superficial oxygen extraction fraction (n = 9). Individual deep white matter:superficial ratios were within the normal range for all patients.

CONCLUSION: Normal deep white matter among patients with carotid occlusion is not subject to a greater degree of ischemia than is the overlying cortex. It is unlikely that deep white matter infarctions observed among patients with carotid occlusion are owing to chronic selective hemodynamic compromise occurring at an internal arterial border zone.

AB-14774-00
Validity and Reliability of a Quantitative Computed Tomography Score in Predicting Outcome of Hyperacute Stroke Before Thrombolytic Therapy—Barber PA, Demchuk AM, Zhang J, Buchan AM (Dept of Clinical Neurosciences, Rm 1162, Foothills Hospital, 1403 29th St NW, Calgary, Alberta, Canada T2N 2T9) for the ASPECTS Study Group—Lancet. 2000;355:1670–1674.

Background. Computed tomography (CT) must be done before thrombolytic treatment of hyperacute ischaemic stroke, but the significance of early ischaemic change on CT is unclear. We tested a quantitative CT score, the Alberta Stroke Programme Early CT Score (ASPECTS).

Methods. 203 consecutive patients with ischaemic stroke were treated with intravenous alteplase within 3 h of symptom onset in two North American teaching hospitals. All pretreatment CT scans were prospectively scored. The score divides the middle-cerebral-artery territory into ten regions of interests. Primary outcomes were symptomatic intracerebral haemorrhage and 3-month functional outcome. The sensitivity and specificity of ASPECTS for the primary outcomes were calculated. Logistic regression was used to test the association between the score on ASPECTS and the primary outcomes.

Findings. Ischaemic changes on the baseline CT were seen in 117 (75%) of 156 treated patients with anterior-circulation ischaemia included in the analysis (23 had ischaemia in the posterior circulation and 24 were treated outside the protocol). Baseline ASPECTS value correlated inversely with the severity of stroke on the National Institutes of Health Stroke Scale (r = −0.56, p < 0.001). Baseline ASPECTS value predicted functional outcome and symptomatic intracerebral haemorrhage (p < 0.001, p < 0.012, respectively). The sensitivity of ASPECTS for functional outcome was 0.78 and specificity 0.96; the values for symptomatic intracerebral haemorrhage were 0.90 and 0.62. Agreement between observers for ASPECTS, with knowledge of the affected hemisphere, was good (κ statistic 0.71–0.89).

Interpretation. This CT score is simple and reliable and identifies stroke patients unlikely to make an independent recovery despite thrombolytic treatment.

Neurosonology

AB-14775-00

BACKGROUND AND PURPOSE: Doppler sonography of the carotid arteries is routinely performed before catheter angiography, and its results may bias the subsequent interpretation of angiograms. We attempt to establish that Doppler sonography may show an exaggerated degree of...
AB-14777-00
Prospective Cohort Study to Determine If Trial Efficacy of Anticoagulation for Stroke Prevention in Atrial Fibrillation Translates Into Clinical Effectiveness—Kalra L (Dept of Medicine, Guy’s, King’s, and St Thomas’s School of Medicine, London SE5 9PJ), Yu G, Perez I, Lakhani A, Donaldson N—BMJ. 2000;320:1236–1239.

Objective To determine whether trial efficacy of prophylaxis with warfarin for patients with atrial fibrillation at high risk of stroke translates into effectiveness in clinical practice.

Design Two year prospective cohort study.

Setting District general hospital.

Participants 167 patients with atrial fibrillation and at high stroke risk who were eligible for anticoagulation.

Interventions Long term anticoagulation with warfarin at adjusted doses to maintain an international normalised ratio of 2.0–3.0.

Main outcome measures Comparison of patient characteristics, comorbidity, anticoagulation control, stroke rate, and haemorrhagic complications with pooled data from five randomised controlled trials.

Results Patients in the study group were seven years older (95% confidence interval 4 to 10) and comprised 33% more women than patients in the pooled trials. The international normalised ratio was in the target range for 61% of the time (range 37%–85%), below for 26% of the time (range 8%–32%), and above for 13% of the time (range 6%–26%). The time that patients in the study group spent in the target range was significantly less than that in the pooled analysis. The incidence of stroke in the study group (2.0% per year, 0.7% to 4.4%) was comparable to that of patients receiving warfarin in pooled studies (1.4%, 0.8% to 2.3%). Per year the incidence of major (1.7% v 1.6%) and minor (5.4% v 9.2%) bleeding complications was also similar.

Conclusion Rates of stroke and major haemorrhage after anticoagulation in clinical practice were comparable to those obtained from pooled data from randomised controlled studies for patients with atrial fibrillation at high risk of stroke.
23% for the placebo group; \( P = .62 \), and the proportion of severely disabled patients was less in the ancrd group than in the placebo group (11.8% vs 19.8%; \( P = .01 \)). The favorable functional status observed with ancrd vs placebo was consistent in all subgroups defined for age, stroke severity, sex, prestroke disability, and time to treatment (\( \leq 3 \) or \( > 3 \) hours after stroke onset). There was a trend toward more symptomatic intracranial hemorrhages in the ancrd group vs placebo (5.2% vs 2.0%; \( P = .06 \)), as well as a significant increase in asymptomatic intracranial hemorrhages (19.0% vs 10.7%; \( P = .01 \)).

**Conclusion** In this study, ancrd had a favorable benefit-risk profile for patients with acute ischemic stroke.

**AB-14779-00**


**Background** Patients with acute ischemic stroke and atrial fibrillation have an increased risk of early stroke recurrence, and anticoagulant treatment with heparins has been widely advocated, despite missing data on the balance of risk and benefit.

**Methods** Heparin in Acute Embolic Stroke Trial (HAEST) was a multicentre, randomised, double-blind, and double-dummy trial on the effect of low-molecular-weight heparin (LMWH, dalteparin 100 IU/kg subcutaneously twice a day) or aspirin (160 mg every day) for the treatment of 449 patients with acute ischemic stroke and atrial fibrillation. The primary aim was to test whether treatment with LMWH, started within 30 h of stroke onset, is superior to aspirin for the prevention of recurrent stroke during the first 14 days.

**Findings** The frequency of recurrent ischemic stroke during the first 14 days was 19/244 (8.5%) in dalteparin-allocated patients versus 17/225 (7.5%) in aspirin-allocated patients (odds ratio = 1.13, 95% CI 0.57–2.24). The secondary events during the first 14 days also revealed no benefit of dalteparin compared with aspirin: symptomatic haemorrhage 6/244 versus 4/225; symptomatic and asymptomatic cerebral haemorrhage 24/224 versus 32/225; progression of symptoms within the first 48 hours 24/224 versus 17/225; and death 21/224 versus 16/225. There were no significant differences in functional outcome or death at 14 days or 3 months.

**Interpretation** The present data do not provide any evidence that LMWH is superior to aspirin for the treatment of acute ischemic stroke in patients with atrial fibrillation. However, the study could not exclude the possibility of smaller, but still worthwhile, effects of either of the trial drugs.

**Surgery**

**AB-14780-00**


**Object.** Hereditary hemorrhagic telangiectasia (HHT) is a rare autosomal-dominant vascular dysplasia with a high prevalence of cerebrovascular malformations (CVMs), mostly manifested as arteriovenous malformations (AVMs). The natural history and bleeding risk of these AVMs is unknown. The authors investigated the risk of bleeding in conjunction with clinical and radiological features in patients with HHT and proven CMVs.

**Methods.** Intravenous digital subtraction (DS) angiography was used to screen 196 patients with HHT for the presence of CVMs. Patients with abnormal results on DS angiography were asked to undergo a conventional cerebral angiographic study. All patients with a proven CVM were assessed by a neuroradiologist. The bleeding risk was retrospectively and prospectively calculated for patients with AVMs only, as well as for the whole cohort of patients with CVMs.

Twenty-four patients (12.2%; 16 female and eight male), aged 14 to 66 years (mean 35.4 years) with one or more CVMs were identified. Fifteen patients (62.5%) had a CVM and a pulmonary AVM. Eleven patients (45.8%) exhibited no neurological signs of their CVM; six (25%) had headache or migraine; four (16.7%) had seizures; and three (12.5%) had an intracranial hemorrhage. Twenty-two patients had at least one AVM (with a total of 28 AVMs), whereas two patients only had telangiectases. Twenty-seven AVMs were small (96%), 36% were located in eloquent areas of the brain, and 82% had superficial venous drainage. One third of the patients had multiple CVMs. The bleeding risk for patients with at least one AVM ranged from 0.41 to 0.72% per year, and for the whole cohort the range was 0.38 to 0.69% per year. Calculation of the bleeding risk as determined by lesion-years ranged from 0.36 to 0.56% per year for patients with AVMs and from 0.27 to 0.46% per year for all patients with CVMs.

**Conclusions.** Patients with HHT have a high risk of harboring a CVM, especially in the presence of a pulmonary AVM. These CVMs are mostly low-grade AVMs (Spetzler–Martin Grade I or II), are frequently multiple, and have a lower risk of bleeding than that associated with sporadic AVMs. Female patients are more often affected than male patients. The inherent low sensitivity of DS angiography screening for CVMs may yield false negative results.

**AB-14781-00**


**BACKGROUND** Acute occlusion of the major cerebral arteries results in ischemic changes to the brain, without time for reperfusion by the collateral circulation. The subsequent cellular events lead to a breakdown of the blood-brain barrier, causing malignant cerebral edema manifested clinically by a rapid neurological deterioration. The aim of this study was to determine the value of surgical decompression in patients who present with acute cerebral infarction.

**METHODS** Retrospective review of patients with deteriorating consciousness level from massive cerebral ischemia and secondary edema, treated by decompressive craniectomy.

**RESULTS** There were 10 patients over a 2-year period from 1997–99, consisting of seven male and three female patients (mean age 47.56 years) with a mean preoperative Glasgow Coma Scale (GCS) score of 6/15. Three patients had dominant middle cerebral artery (MCA) infarction, four had nondominant MCA infarction, one had posterior cerebral artery infarction, and the remaining two had cerebellar infarction. At a mean follow-up period of 7 months, two patients had died (20% mortality), four patients (40%) were vegetative or severely disabled, and the remaining four patients (40%) had mild disability or good outcome. Favorable prognostic factors were younger age (less than 50 years) and good initial GCS score (14 or better).

**CONCLUSION** Decompressive craniectomy in the setting of acute brain swelling from cerebral infarction is a life-saving procedure and should be considered in younger patients who have a rapidly deteriorating neurologic status.

**Items of Interest**


**Posterior Cerebral Artery Territory Infarcts: Clinical Features, Infarct Topography, Causes and Outcome: Multicenter Results and a Review of the Literature—Brandt T (Neurologische Universitätsklinik, Im Neuenheimer Feld 400 D-69120 Heidelberg, Germany),...


Abstracts of Literature
Askiel Bruno and Engin Y. Yilmaz

Stroke. 2000;31:2280-2286
doi: 10.1161/01.STR.31.9.2280

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/31/9/2280

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/