Abstracts

AB-2457-76
Cerebral Form of High-Altitude Illness — Houston CS (University of Vermont College of Medicine, Burlington, Vermont), Dickinson J — Lancet 2:758–761 (Oct 18) 1975*

Twelve cases of severe altitude illness are reported in which the neurological signs and symptoms dominated the clinical picture. Pulmonary edema, retinal hemorrhage, thrombophlebitis and pulmonary embolism, bronchopneumonia, and coronary artery disease also were present in several of the patients but the primary problem seems to have been cerebral edema. Other published cases support this impression. Patients who were returned to low altitude early in the disease fared well; two patients died, and in both cases evacuation had been delayed. The most effective prevention lies in slow ascent, though in one case reported here the rate of climb was well within the recommended limit. Recommended management is rapid descent to low altitude at earliest indication of cerebral or pulmonary edema, intravenous dexamethasone or betamethasone in large doses, hydration, diuresis (frusemide has been most used), and perhaps other intravenous therapy with hyperosmolar materials such as mannitol, urea, 50% saline, or 50% sucrose. Prognosis is good if descent and treatment are started early, but permanent damage may be anticipated if the patient is unconscious for any prolonged period before descent.

AB-2458-76
Cerebrospinal Fluid γ-Aminobutyric Acid Levels in Migraine — Welch KMA, Chabi E, Bartosh K, Achar VS, Meyer JS (Department of Neurology, Baylor College of Medicine, Houston, Texas 77025) — Br Med J 3:516–517 (Aug 30) 1975*

γ-Aminobutyric acid (GABA) levels in cerebrospinal fluid were measured in seven patients with tension headache and 12 patients with migraine. GABA was detected only during the migraine attack. The results suggest disordered GABA metabolism in migraine.

AB-2459-76
Regulation of Local Tissue Po2 of the Brain Cortex at Different Arterial O2 Pressures — Leniger-Follert E (Max-Planck-Institut für Systemphysiologie, D-4600 Dortmund, Rheinlanddamm 201, Federal Republic of Germany), Lübbers DW, Wrabetz W — Pflügers Arch 359:81–95, 1975 (Springer-Verlag, publisher)*

Local tissue oxygen pressure (Po2) was recorded with a platinum multiwire surface electrode at adjacent sites of the cat cortex under steady-state conditions and with different arterial oxygen supply. Simultaneously Po2 in the sinus sagittalis was continuously recorded through the vascular wall in some experiments. Under normoxic and steady-state conditions local Po2 values varied between 0 torr and almost arterial levels of 90 torr. This was in accordance with the assumption of a diffusive transport of oxygen in tissue. With increased arterial oxygen supply local tissue Po2 reacted quite differently at adjacent sites. Linear increases in local tissue Po2 as compared to arterial Po2 as well as constant levels, very small increases and even small decreases were recorded. Constancy or small changes, respectively, of local Po2 (= local Po2 regulation) may be caused by changes in microflow, but changes in oxygen consumption cannot be excluded completely. The regulation of local Po2 could be abolished by adding CO2 to the gas mixture or by producing tissue anoxia. With severely reduced arterial oxygen supply local tissue Po2 dropped down to hypoxic or anoxic levels at all sites measured.

AB-2460-76

Dogs that had intact omentum placed on the surface of the brain prior to right middle cerebral artery occlusion withstood this deprivation of normal cerebral blood flow in a statistically significant manner when compared with dogs that had no omental protection or had omental placement simultaneous with middle cerebral artery occlusion.

AB-2461-76
Effect of Spatial Variations in Shear on Diffusion at the Wall of an Arterial Branch — Friedman MH, Ehrlich LW (Applied Physics Laboratory, The Johns Hopkins University, Laurel, Maryland 20810) — Circulation Research 37:446–454 (Oct) 1975*

The effect of spatially varying shear on transport to the wall of a two-dimensional branch was examined, using oxygen as the test solute and the results of earlier fluid mechanical calculations to provide the shear profiles in a region characterizing the aortic bifurcation. The numerical technique employed allowed both blood-phase and mural resistances to solute uptake to be treated simultaneously and self-consistently. The calculated profiles of wall concentration and mural flux were significantly different from those which would have obtained if the shear had been uniform. The calculations suggest that, even when solute is rapidly taken up from the blood, the occasional high-shear and flow-development sites encountered along the arterial tree prevent the diffusion boundary layer adjacent to the wall from thickening to the point at which nutrition is compromised. The indirect effect of arterial geometry on transport, consequent to its direct effect on the magnitude and the distribution of the relevant hemodynamic variables, was illustrated using the branch area ratio as the geometric parameter. The shapes of the flux and interfacial concentration profiles along the branch wall were markedly dependent on the extent to which wall shear affected intimal permeability.
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AB-2462-76

Local cerebral blood flow was measured continuously in conscious rabbits (thermoclearance technique), and PaO₂ and PaCO₂ were recorded by mass spectrometry. Though inhalation of CO₂ increased flow in caudate nucleus and lateral geniculate body, catecholamines only had effect on caudate nucleus where isoproterenol enhanced and epinephrine and norepinephrine reduced flow. Reduction by electrical stimulation of the neck sympathetic trunk was particularly evident in the caudate. Blood flow increased markedly in both regions after preganglionic conduction blockade. The effects were correlated with a significantly lower degree of sympathetic arteriolar innervation (fluorescence histochemistry) in the lateral geniculate body compared with the caudate nucleus.

AB-2463-76
A T-Shaped Carotid Shunt — Brener BJ (Newark Beth Israel Medical Center, Newark, New Jersey 07112), Brief DK, Alpert J, Parsonnet V — Arch Surg 110:1249-1250 (Oct) 1975*

A T-shaped intraluminal shunt has been utilized during carotid endarterectomy. It is convenient, allows confirmation of shunt patency and flow, and permits monitoring of systemic and internal carotid "stump" pressure without puncturing the arteries.

AB-2464-76
The Hypertensive Diseases. Evidence that Systemic Hypertension Is a Greater Risk Factor to the Development of Other Cardiovascular Diseases than Previously Suspected — Roberts WC (NIH, Building 10A, Room 3E30, Bethesda, Maryland 20014) — Am J Med 59:523-532 (Oct) 1975*

Systemic hypertension acts as a major risk factor in the development of cardiovascular disease by increasing the deposition of atherosclerotic plaques and by weakening the media of certain arteries causing aneurysms. In association with hyperlipidemia, hypertension clearly accelerates atherosclerosis and its developing consequences.

AB-2465-76
Adrenergic β-Receptor Blockade in Essential Hypertension: A Comparison Between Pindolol (Visken®) and Propranolol (Inderal®) — Bjerle P (Department of Clinical Physiology, University of Umeå, S-901 85 Umeå, Sweden), Jacobsson K-A, Agert G — Curr Ther Res 18:387-394 (Sep) 1975*

Thirty-eight patients with essential hypertension in WHO stage 1, with diastolic blood pressure 100 to 129 mm Hg, were treated with β-blockers in a double-blind randomized study without cross-over. Twenty patients were treated with pindolol and 18 with propranolol for 14 weeks after an initial placebo period of four weeks' duration.

The heart frequency was lower on propranolol than on pindolol (the difference was highly significant). The blood pressure was somewhat lower on pindolol than on propranolol although this difference was not statistically significant.

The results suggest that pindolol on a weight-for-weight basis is approximately ten times more potent than propranolol in decreasing blood pressure when given in three divided doses a day and may be more than 20 times more potent when given twice daily.

AB-2466-76
A Randomized Double-Blind Study of Furosemide-Reserpine in Essential Hypertension — Velasco M (Department of Pharmacology, Vargas Medical School, Central University of Venezuela, Venezuela, South America), Arbona J, Guevara J, Torres J — Curr Ther Res 18:395-399 (Sep) 1975*

Forty patients with confirmed essential hypertension were studied on an outpatient service under a randomized double-blind design. Four treatments — (a) placebo, (b) furosemide, 15 mg, (c) reserpine, 0.1 mg, and (d) furosemide, 15 mg, plus reserpine, 0.1 mg — were administered three times daily by the oral route during a period of two months. Placebo or furosemide did not modify blood pressure significantly. There was a synergism on blood pressure reduction when furosemide was combined with reserpine. Low incidence in side effects and no alterations in serum electrolytes occurred during the administration of furosemide plus reserpine.

AB-2467-76
Clonidine in Treatment of Hypertension — Fragachan F, Monsalve P, Tremainias A, Perez L, Sanabria A (Medical Service B, Department of Medicine, Central University of Venezuela, Caracas, Venezuela, South America) — Curr Ther Res 18:400-409 (Sep) 1975*

A double-blind study of 13 adult hypertensive outpatients showed that a significant reduction in blood pressure resulted from administration of a new imidazoline derivative, 2-(2,6-dichlorophenylamino)-2-imidazoline hydrochloride (clonidine, St 155).

Our provisional conclusions concerning clonidine are that: (1) It is a potent hypotensive agent. In particular, it lowers recumbent blood pressure as effectively as it lowers the standing pressure. (2) The drug has negligible side effects and no toxic effects. (3) Clonidine causes no orthostatic symptoms.

AB-2468-76
Experimental and Clinical Data Indicating a Potential Use of Trazodone in Acute Stroke — Allori L, Cioli V, Silvestrini B (F. Angelini Research Institute, and Ospedale Civile di Zona, Palestrina, Rome, Italy) — Curr Ther Res 18:410-416 (Sep) 1975*

A pilot study is described, suggesting that trazodone may be beneficial in acute stroke. In rats, trazodone reduces cerebrospinal fluid pressure at the dose of 0.1 mg/kg intravenously and inhibits serotonin-induced paw edema at the dose of 0.15 mg/kg intravenously. Twenty-one patients with

*Authors' abstract.
acutely stroke due to thrombosis or embolism were treated with trazodone and compared with a similar group treated with dexamethasone, mannitol and papaverine. The dose of trazodone was 10 mg intravenously twice daily for seven days.

Trazodone had a significant effect on the following items: orientation, recent recall, motor function and aphasia. Moreover, in the group treated with trazodone the period of hospitalization was reduced. There was no significant difference in the mortality rate in the two groups of patients.

**AB-2469-76**


Acute hypertension, experimentally induced by intravenous injection of metaraminol in adult rabbits, rapidly induced damage of the blood-brain barrier in the cerebral cortex, as visualized by Evans-blue-conjugated albumin and horseradish peroxidase. Extravasation of these two exogenous tracers was demonstrated to occur in arterioles, in capillaries and, rarely, in venules. Peroxidase passed the endothelial cell into the nervous tissue in either of three different ways, i.e., through channels, often sigmoid-shaped, in the cytoplasm, and transendothelial pinocytosis. The third pathway could, although rarely, be demonstrated between adjacent endothelial cells after cleavage of junctional complexes. The tracer peroxidase was further spread along the blood vessel within the basement membrane and in the extracellular space of the brain. Damaged endothelial cells with diffuse cytoplasmic peroxidase activity and large vesicles were occasionally observed within the areas with blood-brain barrier injury. There were also signs of increased pinocytotic activity in endothelial cells outside the barrier damaged cortical areas. Nerve cells and neuroglial cells could show either a diffuse cytoplasmic peroxidase activity or a vesicular location of the tracer, or sometimes both.

The observations are discussed in relation to previous studies on the mechanism of transendothelial passage of protein tracers at blood-brain barrier damage.

**AB-2470-76**

**Experimental Cerebral Ischemia in Mongolian Gerbils. I. Light Microscopic Observations** — Ito U, Spatz M, Walker JT Jr, Klatzo I (Laboratory of Neuropathology and Neuro-anatomical Sciences, NIH, Bethesda, Maryland 20014) — *Acta Neuropath (Berl)* 32:209-223, 1975 (Springer-Verlag, publisher)*

Light microscopic observations were carried out on Mongolian gerbils (*Meriones unguiculatus*) subjected to a partial cerebral ischemia by occlusion of the left common carotid artery at the neck. About 30% of the gerbils had an ischemic injury in the ipsilateral hemisphere and their brains revealed the following histopathologic features: (1) the changes were related to the intensity (duration) of the ischemic insult and to the time elapsed following release of the occlusion. The ischemic lesions appear to progress after re-establishment of the circulation and this presents one facet of a "maturation" phenomenon which seems to be a general principle applicable to various parameters of ischemic injury. The rate of "maturation" of the lesions is related to the intensity of the ischemic insult, a lesser intensity resulting in longer development of lesions. (2) The changes were either focal or diffuse in character. The former were assumed to be directly related to a vascular involvement; among the latter the topistic distribution of the hippocampal changes suggested a feature of selective vulnerability. (3) An indirect indication of neuronal recovery was surmised from observations on animals killed after different periods following occlusions of the same duration. Also capable of recovery was a "reactive change" observed in the H3 neurons of the hippocampus. This change was characterized by central chromatolysis and resembled the "primäre Reizung" of Nissl.

**AB-2471-76**

**Trials of Long-Term Anticoagulant Therapy in the Treatment of Small Stroke Associated With a Normal Carotid Arteriogram** — Bradshaw P, Brennan S (Department of Neurology, United Sheffield Hospitals, Sheffield, England) — *J Neurol Neurosurg Psychiat* 38:642-647 (Jul) 1975*

The clinical features of 49 patients who had small strokes in the internal carotid artery territory, who were normotensive and free from cardiac or other relevant disease, and who each had a normal appropriate single vessel angiogram are presented. These were randomized into two groups: group A, 25 patients, who received only supportive treatment, and group B, 24 patients, who were treated with anticoagulants for an average period of 18 months. There was a reduced incidence of neurological episodes during the administration of anticoagulant therapy but, after treatment was discontinued, there was no significant difference between the two groups. In view of the relatively benign prognosis for this syndrome, unless special facilities exist for the personal control of anticoagulant treatment, the dangers may outweigh the benefits.

**AB-2472-76**

**Cluster Headaches Associated With Vascular Malformations** — Herzberg L, Lenman JAR, Victoratos G, Fletcher F (Departments of Medicine and Radiology, University of Dundee, Dundee, Scotland) — *J Neurol Neurosurg Psychiat* 38:648-649 (Jul) 1975*

A vascular malformation was demonstrated in a migrainous female who had cluster headaches. The patient responded well to oral dihydroergotamine, 1 mg twice daily.

**AB-2473-76**

**Responses of Isolated Human Basilar Arteries to 5-Hydroxytryptamine, Noradrenaline, Serum, Platelets, and Erythrocytes** — Starling LM, Boullin DJ (MRC Unit and Department of Clinical Pharmacology, Radcliffe Infirmary, Woodstock Road, Oxford OX2 6HE, England), Graham-Smith DG, Adams CBT, Gye RS — *J Neurol Neurosurg Psychiat* 38:650-656 (Jul) 1975*

*Authors' abstract.*
The isolated human basilar artery suspended in Krebs' solution contracts to 5-hydroxytryptamine, noradrenaline, and histamine, which stimulate specific receptors. Normal human serum contains an unidentified contractile substance, and erythrocytes relax the artery. Serum and erythrocytes potentiate 5-HT contractions. This preparation is suitable for studying vasoactive substances released during vasospasm after subarachnoid hemorrhage.

**AB-2474-76**

Effects of Increased Arterial Pressure on Blood Flow in the Damaged Brain — Miller JD, Garibi J, North JB, Teasdale GM (University Department of Neurosurgery, Institute of Neurological Sciences, Southern General Hospital, Glasgow, Scotland) — J Neurol Neurosurg Psychiat 38:657-665 (Jul) 1975

The effect of induced arterial hypertension on cerebral blood flow and intracranial pressure was measured before and after the production of a standard cryogenic brain lesion in ten anesthetized, ventilated baboons. Before injury the animals were divided into a group with intact autoregulation, having more than 20% increase in cerebrovascular resistance during arterial hypertension, and a group with impaired autoregulation, in which the change in cerebrovascular resistance was much less. The cryogenic injury produced a rapid rise in intracranial pressure and a reduction of cerebral blood flow in the affected hemisphere. Despite this, there was an increase in cerebrovascular resistance during arterial hypertension in all animals after brain injury, accompanied by a further significant rise in intracranial pressure. It is suggested that this response is unlikely to represent normal physiological autoregulation and caution should be exercised in interpreting it as such in the course of studies of cerebral blood flow in patients with acute brain damage.

**AB-2475-76**

Orthostatic Hypotension Associated With Paroxysmal Ventricular Tachycardia — Nanda RN (University Department of Neurology, Institute of Neurological Sciences, Southern General Hospital, Glasgow, Scotland), Johnson RH — J Neurol Neurosurg Psychiat 38:698-702 (Jul) 1975

Two patients (age 46 and 49 years) are presented who gave a history of several years' duration of unsteadiness, dizziness, and syncopal attacks on standing. Both had orthostatic hypotension which was associated with the development of a unifocal paroxysmal ventricular tachycardia. There was no evidence of organic heart disease. In one of the patients the symptoms usually developed when standing after working in a crouched position. He responded to treatment with /3-adrenergic blockade. The other patient had her symptoms on standing, after exercise or other stress. The paroxysmal ventricular tachycardia, which occurred in the upright position only, was accompanied by a marked rise in plasma adrenaline. In this patient one contributory factor was a low blood volume and she responded to plasma expansion. We wish to draw attention to the common neurological symptoms with which paroxysmal ventricular tachycardia may present. We suggest that paroxysmal ventricular tachycardia may result from ventricular sensitivity to circulating adrenaline and is not due to aberrant innervation of the heart as has been suggested previously.

**AB-2476-76**

Residual Disability in Survivors of Stroke—The Framingham Study — Gresham GE (Rehabilitation Institute, Tufts-New England Medical Center, Boston, Massachusetts 02111), Fitzpatrick TE, Wolf PA, McNamara PM, Kannel WB, Dawber TR — New Engl J Med 293:954-956 (Nov 6) 1975 (with permission from authors)

Of 123 survivors of documented completed stroke from the Framingham Cohort, 119 received objective evaluations of functional status along with an equal number of controls matched for age and sex. Of the stroke survivors, 16% were institutionalized, 31% dependent in self-care, and 20% dependent in mobility. In addition, 71% had decreased vocational function, and 62% decreased socialization outside the home. Each of these frequencies was significantly greater than the corresponding rate in the control group.

**AB-2477-76**


Eleven patients with vascular malformations of the cervical spinal cord have been operated upon at the University of Zürich (Switzerland). Total microsurgical excision was achieved in all. One patient had a lesion which was entirely intramedullary. Nine patients had combined lesions, intramedullary and extramedullary. Only one patient had a lesion which was entirely extramedullary. There was one operative death from meningitis. Another patient improved slightly postoperatively, but eventually died of urological complications. One patient had the operation immediately following his only subarachnoid hemorrhage, and has thus been protected from neurological damage. One patient has had postoperative reversal of his progressive neurological deterioration and severe pain. Six patients severely impaired preoperatively improved dramatically. One patient who was quadriplegic preoperatively has regained function in her upper extremities. The treatment of choice in lesions such as these is complete microsurgical excision.

**AB-2478-76**

Cerebral Aneurysms of Traumatic Origin — Fleischer AS (Division of Neurosurgery, Grady Memorial Hospital, Atlanta, Georgia 30303), Patton JM, Tindall GT — Surg Neurol 4:233-239 (Aug) 1975

This report reviews 41 cases of traumatic cerebral aneurysms, including four cases of our own which are presented in detail. They may follow penetrating or closed head injury, and are usually associated with significant additional intracranial damage. Almost half of the patients presented with a delayed subarachnoid hemorrhage within three weeks of the initial head injury, defining an important neurological syndrome. Those patients whose post-
traumatic aneurysms have been surgically obliterated have an associated mortality which is half that of patients treated by nonsurgical methods.

**AB-2479-76**

Subarachnoid Hemorrhage Due to Lateral Ventricular Meningiomas — Smith VR (Section of Publications, Mayo Clinic, Rochester, Minnesota 55901), Stein PS, MacCarty CS — *Surg Neurol* 4:241-243 (Aug) 1975*

A patient experienced spontaneous subarachnoid hemorrhage caused by a meningioma of the left lateral ventricle. A review of previously published case reports reveals that hemorrhage with these tumors is not uncommon.

**AB-2480-76**

Scanning Electron Microscopic Observations of Common Carotid Artery Endothelium in the Rat. I. Crater Artifacts — Gregorius FK, Rand RW (Division of Neurosurgery, UCLA School of Medicine, Los Angeles, California 90024) — *Surg Neurol* 4:252-257 (Aug) 1975*

Changes in the endothelial surface of the common carotid artery of the Sprague-Dawley rat were observed by scanning electron microscopy after vessels were removed prior to sacrifice or after glutaraldehyde cardiac perfusion. Rats were classified according to whether the vessel was (1) untouched prior to removal, (2) dissected and observed for a period of time, or (3) clamped and observed. Changes consisted of small 1 to 6 μ craters as well as smooth or cross-striped endothelial ridges or folds. Clamped arteries appeared to exhibit more frequent craters. In contrast, vessels removed prior to death and briefly washed with saline exhibited craters different morphologically from those vessels perfused with glutaraldehyde. Background endothelial folds also differed from the glutaraldehyde-perfused group, exhibiting a cobblestoned or beaded appearance with distorted endothelial bridges. This supports the suggestion of Nelson that premortem perfusion of heart and ascending aorta with glutaraldehyde is necessary to reduce artifact in arterial endothelial structures.

**AB-2481-76**

Scanning Electron Microscopic Observations of Common Carotid Artery Endothelium in the Rat. II. Sutured Arteries — Gregorius FK, Rand RW (Division of Neurosurgery, UCLA School of Medicine, Los Angeles, California 90024) — *Surg Neurol* 4:258-264 (Aug) 1975*

Scanning electron microscopic findings in 26 rats with sutured 1 to 1.2 mm segments of carotid artery indicate a difference in morphological changes beneath clamped areas and areas 2 to 3 mm adjacent to the suture line. Craters similar to those observed in control specimens were seen beneath clamped sites without significant platelet aggregation or platelet adherence to the endothelial wall. In contrast, areas adjacent to the suture line exhibited a pattern of fibrin and platelet adherence to the vessel endothelial wall. The changes appeared to be consistent after one to four hours of observation in most animals. Sutures, although actuating some platelets, did not exhibit platelet and fibrin adherence as marked as that of the adjacent endothelial wall.

**AB-2482-76**

Electrical Stimulation of the Brain. II. Effects on the Blood-Brain Barrier — Pudenz RH (Huntington Institute of Applied Medical Research, Pasadena, California 91105), Bullara IA, Dru D, Talalla A — *Surg Neurol* 4:265-270 (Aug) 1975*

Acute and chronic studies of the effects of electrical stimulation on the blood-brain barrier (BBB) of the cat cerebral cortex are reported. The findings emphasize the importance of avoiding direct-coupled, monophasic waveforms in stimulating nervous tissue. Biphasic waveforms with balanced charges in each half-wave of the stimulating pulse can be used for up to 36 hours of continuous stimulation if the charge per phase (Q/ph) does not exceed 0.45 microcoulombs. Charge density (QD) is also an important parameter. When stimulating in the bipolar mode, BBB breakdown will occur first beneath the smaller electrode of the pair. Following electrical injury, the BBB will be partially restored within one week, and, with rare exceptions, be completely intact after one month.

**AB-2483-76**

The Moyamoya Syndrome and the Neurosurgeon — Krayenbühl HA (Neurosurgical Department, University of Zürich, Kantonsspital, Zürich, Switzerland) — *Surg Neurol* 4:353-360 (Oct) 1975*

Three cases (two children, one adult) presenting the angiographical features of the moyamoya syndrome are reported, and the variety of the arterial collateral system is described. If there is a progressive neurological deterioration as a consequence of an inadequate collateral circulation, the creation of a new collateral vascular channel by way of anastomosis between the superficial temporal artery and a branch of the middle cerebral artery is proposed.

**AB-2484-76**

Regional Cerebral Blood Flow on Cerebrovascular “Moyamoya” Disease — Study by 133Xe Clearance Method and Cerebral Angiography — Uemura K (Division of Radiology, Research Institute of Brain and Blood Vessels, Akita, Japan), Yamaguchi K, Kojima S, Sakurai Y, Ito Z, Kawakami H, Kutsuzawa T — *Brain and Nerve* 27:385-393 (Apr) 1975*

Cerebrovascular “moyamoya” disease (spontaneous occlusion of the circle of Willis) was first reported by a Japanese neurosurgeon. Recently, attention has been drawn to this disease by physicians of other countries, but the observation of regional cerebral blood flow of the disease has not been reported.

We studied the regional cerebral hemodynamics on six patients with the disease by 133Xe clearance method using six-channel detector and serial cerebral angiography.

Three cases of juvenile patients and three adult cases were examined. In all cases, characteristic bilateral occlusions or stenosis of the carotid forks with prominent vascular networks in the base of the brain were observed. Neuro-
logical symptom was more prominent in the juvenile group.

Decrease of hemispheric CBF was observed in four out of six cases. Abnormal regional cerebral perfusion was proved in the patients with decreased hemispheric CBF. Reduced response to hypercapnia was found chiefly in the juvenile patients. Disturbance of CO₂ response of the cerebral vessels was thought to be maximal dilatation of peripheral vessels and increased vascular resistance of main trunks of the cerebral vessels. The leptomeningeal anastomoses between the PCA and the MCA were proved as important collateral paths on the disease. In spite of the angiographical visualization of prominent vascular network in the base of the brain and early opacification of the draining veins (three out of seven cases), increase of rCBF at the corresponding region could not be detected.

It was supposed that some of the blood flow in the abnormal vascular networks at the base of the brain might be non-effective to the cerebral metabolism.

AB-2485-76
A Study on Regional Cerebral Blood Flow and Metabolism in the Patients With Vegetative State — Kanaya H (Department of Neurosurgery, Faculty of Medicine, Iwate Medical University, Morioka, Japan), Ohuchi T, Oikawa T, Endo H, Oyama T, Oana K — Brain and Nerve 27:839-846 (Aug) 1975*

Seven patients in a vegetative state were studied for regional cerebral blood flow (rCBF) and cerebral metabolism. rCBF in such patients was low compared to that of comatose cases, but 45.7 ± 13.9 (ml/100 gm per minute) in somnolent cases. CBF were 20.6 (ml/100 gm per minute) in a comatose case and 0.268 ± 0.015 in alert patients. Only by continuous ventricular drainage and external decompression, decrease of VC index and improvement of level of consciousness were obtained simultaneously.

Cerebral blood flow (CBF) measurements were performed in 14 cases without intracerebral hematoma. The values of CBF were 20.6 (ml/100 gm per minute) in a comatose case but 45.7 ± 13.9 (ml/100 gm per minute) in somnolent patients.

AB-2486-76
Factors Related to Level of Consciousness in the Acute Stage of Ruptured Intracranial Aneurysms — Ito Z (Division of Surgical Neurology, Research Institute of Brain and Blood Vessels, Akita, Japan), Matsuoka S, Moriyama T, Hen R, Nakajima K — Brain and Nerve 27:895-901 (Aug) 1975*

Factors complicating disturbance of consciousness were analyzed and some neurosurgical procedures were carried out to improve level of consciousness in 58 patients with subarachnoid hemorrhage (SAH) due to ruptured intracranial aneurysms admitted within three days after bleeding from January, 1972, to December, 1973.

The sites of ruptured aneurysm of this series were internal carotid artery in 21 cases, anterior communicating artery or A1 portion of anterior cerebral artery (ACA) in 18, middle cerebral artery in 13, A2 portion of ACA in two and territory of vertebral artery in four cases.

At admission, there were five deep comatose, six comatose, nine semicomatose, 11 stuporous, 16 somnolent and 11 alert patients. In the various states of consciousness, the relationships between disturbance of consciousness and some values of clinical examinations were analyzed statistically. The factors in clinical examinations were regional cerebral blood flow dynamics measured by 133Xe clearance method, cerebral circulation time, grade of ventricular enlargement and vasospasm by serial angiography, intracerebral hematoma and grade of SAH by autopsy or operation, and cerebrospinal fluid pressure by lumbar puncture. Out of those factors, intracerebral hematomas were revealed in 55% of deep comatose or semicomatose patients but in 13% of stuporous or alert patients. Mortality rates of patients with intracerebral hematoma were 100% in conservatively treated cases but 10% in surgically treated cases.

The values of ventriculocerebral (VC) index, which showed the size of the lateral ventricles, were 0.295 in comatose and 0.268 ± 0.015 in alert patients. Only by continuous ventricular drainage and external decompression, decrease of VC index and improvement of level of consciousness were obtained simultaneously.

AB-2487-76
Disturbed Consciousness and Intracranial Hypertension Following Ruptured Intracranial Aneurysms — Hayashi M (Department of Neurosurgery, University of Kanazawa School of Medicine, Kanazawa, Japan), Marukawa S, Fujii H, Kitano T, Yamamoto S — Brain and Nerve 27:1007-1015 (Sep) 1975*

Since the microtechnique has been introduced for intracranial aneurysmal surgery, the trend has been toward the operation for ruptured intracranial aneurysm very soon after the subarachnoid hemorrhage.

Continuous long-time records of intracranial pressure (ICP) and systemic arterial pressure were made in 17 patients admitted with subarachnoid hemorrhage due to a ruptured intracranial aneurysm. The period of recording was between one and seven days. Each of these patients showed disturbed consciousness and was unfit for immediate surgery. These patients were graded according to the
method of Hunt and Hess (1968). The relationship between ICP and grading system was assessed in this analysis. In patients graded III, the mean ICP level was between 200 and 500 mm H2O, and in patients graded IV, the mean ICP level was between 400 and 800 mm H2O. In Grade V patients, the mean ICP exceeded 1,000 mm H2O.

The relationship between vasospasm by arteriography and grading system showed little correlation.

Tracing of the ICP in Grade III and IV patients showed transient rises called “pressure waves,” and the waves are recurring increases in ICP to values of 200 to 300 mm H2O in Grade III and 400 to 500 mm H2O in Grade IV patients superimposed on an elevated level of the ICP. Analysis of the waves revealed two kinds of rhythmic variations related to periodic breathing of Cheyne-Stokes type (B-wave) and to the variations of the arterial blood pressure (C-wave). The patients became stuporous or comatose while at B-waves. These waves are of vasomotor origin indicating an instability of the cerebral vascular bed. It is remarkable that in our series of patients with ruptured intracranial aneurysms we never observed a plateau wave. Tracing of the ICP in Grade V patients showed only variations caused by the arterial pulse. This phenomenon suggests vasomotor paralysis.

The vasomotor irritability in patients graded III or IV and the vasomotor paralysis in patients graded V are the important phenomena as well as intracranial hypertension when considering the operation for ruptured intracranial aneurysms very soon after subarachnoid hemorrhage.

AB-2488-76
Autopsy Cases of Moyamoya Disease — Ohashi T (Department of Neurological Surgery, Okayama University Medical School, Okayama, Japan), Ueda K, Mizukawa N, Nishimoto A, Ikuta F — Brain and Nerve 27:1017-1026 (Sep) 1975*

Japanese moyamoya disease is characterized in the angiographic findings by bilateral stenoses of the distal portion of the carotid siphon and an abnormal retiform vessel in the base of the brain. This vascular disease is more frequent in Japanese children and adolescents than in persons of other countries. However, the etiology or pathogenesis of this disease is still unknown.

In this report pathological findings of two autopsy cases demonstrating bilateral characteristics of the carotid angiography are presented.

AB-2489-76

Adult rhesus monkeys were subjected to complete cerebral ischemia for one hour and subsequent recirculation for up to 24 hours. Animals with signs of functional recovery (e.g., spontaneous EEG activity) exhibited a partial replenishment of cellular energy sources (ATP, phosphocreatine) and a progressive normalization of cerebral lactate levels. Glucose and pyruvate concentrations showed a transient increase over control values during the early stages of postischemic recirculation. Monkeys without functional recovery lacked a significant resynthesis of energy-rich compounds; adenine nucleotides continued to decrease and lactate concentrations were higher than in animals subjected to ischemia without recirculation.

Cerebral polysome profiles remained unaltered during the ischemic period but in all animals a marked disaggregation of polyriboosomes with a concomitant increase in ribosomal subunits occurred after the onset of recirculation. In monkeys with indications of functional recovery these changes were reversible but a normal polysome profile was only observed after 24 hours of recirculation. The results obtained indicate a postischemic depression of protein synthesis due to an inhibition of peptide chain initiation.

After recirculation of the brain for three to six hours there was evidence for an induction of enzymes involved in polyamine synthesis (ornithine decarboxylase and S-adenosylmethionine decarboxylase). No changes in the activity of these enzymes were observed at the end of the ischemic period, indicating that during complete cerebral ischemia not only the synthesis but also the catabolism of proteins is inhibited.

AB-2490-76

Four to five months after exposure of the right occipital lobe of the monkey to 3,500 rads of X-irradiation there is a proliferative and degenerative lesion accompanied by a massive break in the blood-brain barrier. The resulting vasogenic edema causes gross swelling in the ipsilateral hemisphere, compression of the contralateral hemisphere with ventricular dilatation, and distortion of midline structures, which may result in herniation through the incisura and foramen magnum. The regional cerebral blood flow, determined by [14C]antipyrine method, at successive stages in the development and resolution of the delayed brain swelling shows a reduction of blood flow in white and gray matter, first regionally, then throughout the ipsilateral hemisphere and finally throughout the brain. This is accompanied by an increase in CSF pressure, CSF lactic dehydrogenase and total protein, and clinical signs of increased intracranial pressure. With resolution of CSF pressure, there is a return to baseline of CSF chemistry and partial resolution of the other parameters. The cerebral blood flow shows a greater recovery in gray than white matter, but there remains a diffuse depression suggesting a long-term impairment in cellular metabolism and/or blood flow regulatory mechanisms.

AB-2491-76
Stroke: Does Rehabilitation Affect Outcome? — Lehmann...
ABSTRACTS

AB-2492-76


Predictors of functional outcome were developed in a group of 114 stroke patients consecutively admitted to a tertiary rehabilitation center. These predictors included a pool of medical data, the age of the patient, psychological tests and the patient’s educational level. None of these predictor items showed a correlation with outcome high enough to allow precise prediction of individual outcome. They did, however, provide general indicators for those patients with severe functional impairment who are more likely to gain from a rehabilitation program. The group of medical predictors indicated that a patient with a more extensive, severe lesion, with signs of congestive heart failure, generalized arteriosclerosis, gross perceptual deficit, a lower level of education, and who is older, is less likely to improve in the rehabilitation program. Since a prediction on an individual basis was not possible, it was concluded that even the most severely involved patient should be provided with a therapeutic rehabilitation trial. There was no correlation between severity of the functional impairment at admission and the gains obtained in the rehabilitation program. The same predictors were used to predict whether the patient went home or to an institution. It was found that family income and involvement in support of the patient predicted this outcome, whereas medical data did not. Since family involvement can sometimes be changed by a therapeutic team, this predictor may also present a major target for therapeutic intervention.

AB-2493-76

Dynamic/Static Brain Scintigraphy: An Effective Screening Test for Subdural Hematoma — Brown R, Weber PM, dos Remedios LV (Division of Nuclear Medicine, Kaiser-Permanente Medical Center, Oakland, California 94611) — Radiology 117:355-360 (Nov) 1975*

Dynamic perfusion scintigraphy of the brain was coupled with the delayed static scan in 5,853 studies as a screening test for neurological disease. Of approximately 1,000 patients referred for investigation for possible subdural hematoma (SDH), 23 proved to have SDH at surgery. Their scintigraphic abnormalities were analyzed and classified. When neither study indicates abnormality, angiography is not required, as SDH is unlikely. When the scintigraphic appearance is characteristic of SDH, angiography or surgical exploration is mandatory, since SDH is probably present. When the scintigraphic findings are consistent with but not typical of SDH, the study remains useful as a screening procedure, but the decision to proceed with angiography is based primarily on the neurological course.

AB-2486-76

Cranial Computed Tomography: An Evaluation of Cost Effectiveness — Wortzman G (Department of Radiology, Toronto General Hospital, Toronto, Ontario, Canada), Holgate RC, Morgan PP — Radiology 117:75-77 (Oct) 1975*

The impact of cranial computed tomography (CCT) on the cost effectiveness of a neurodiagnostic workup was evaluated. With the use of CCT, 170 air studies and 171 angiographic procedures were made unnecessary in the 444 patients reviewed. Admission was not necessary in 58% of the outpatients examined and the hospital stay was shortened significantly for inpatients. Even considering the cost of the examination and the few extra investigations generated, a single CCT unit can effect savings of up to $2,000,000 per year.

AB-2495-76

Effects of Increased Intracranial Pressure on Cerebral Blood Volume, Blood Flow, and Oxygen Utilization in Monkeys — Grubb RL Jr (Department of Neurology and Neurological Surgery, Washington University School of Medicine, St. Louis, Missouri 63110), Raichle ME, Phelps ME, Ratcheson RA — J Neurosurg 43:385-398 (Oct) 1975*

The relationship of cerebral blood volume (CBV) to cerebral perfusion pressure (CPP), cerebral blood flow (CBF), and the cerebral metabolic rate for oxygen (CMRO₂) was examined in rhesus monkeys. In vivo tracer methods employing radioactive oxygen-15 were used to measure CBV, CBF, and CMRO₂. Cerebral perfusion pressure was decreased by raising the intracranial pressure (ICP) by infusion of artificial cerebrospinal fluid (CSF) into the cisterna magna. The production of progressive intracranial hypertension to an ICP of 70 torr (CPP of 40 torr) caused a rise in CBV accompanied by a steady CBF. With a further increase in ICP to 94 torr, CBV remained elevated without change while CBF declined significantly. Cerebral metabolic rate for oxygen did not change significantly during intracranial hypertension. For comparison, CPP was lowered by reducing mean arterial blood pressure in a second group of monkeys. Only CBF was measured in this group. In this second group of animals, the lower limit of CBF autoregulation was reached at a higher CPP
(CPP ~ 80 torr) than when an increase in ICP was employed (CPP ~ 30 torr).

**AB-2496-76**

**Intracranial Pressure, Blood Pressure, and Pulse Rate After Occlusion of a Middle Cerebral Artery in Cats** — Hayakawa T, Waltz AG (Department of Neurology, Pacific Medical Center, San Francisco, California 94120) — *J Neurosurg* 43:399-407 (Oct) 1975*

The left middle cerebral artery was occluded in 12 tranquilized but unanesthetized cats with use of a device implanted transorbitally five to seven days earlier. Bilateral epidural pressures, mean aortic blood pressure, and pulse rate were measured at intervals for up to 48 hours after occlusion. The relationships of these measurements to each other and to the extent and severity of cerebral infarcts is described.

**AB-2497-76**

**Chronic Cerebral Arterial Spasm. The Role of Intracranial Pressure** — Farrar JK Jr (Department of Biophysics, University of Western Ontario, London, Ontario, Canada) — *J Neurosurg* 43:408-417 (Oct) 1975*

The author isolated rabbit common carotid and femoral arteries perfused at a constant pressure of 90 mm Hg to examine the variation of flow (F) with transmural pressure (TMP). When the TMP was reduced below 50 to 60 mm Hg in arteries with normal smooth muscle tone, arterial resistance increased significantly causing a reduction in flow. It is suggested that the diffuse arterial narrowing that occurs in patients with severe intracranial hypertension may be the result of a similar reduction in TMP. In the presence of active vasoconstriction, any increase in extraluminal (intracranial) pressure (ICP) resulted in a substantial increase in arterial resistance and subsequent reduction of flow. This F-TMP relationship depended only on the initial degree of constriction and was independent of the vasoconstrictor used to achieve this constriction and of the artery in which this constriction was produced. A review of the literature suggests that human cerebral arteries normally exhibit only mild constrictions in response to subarachnoid blood during the chronic phase of spasm. In the present study, a mild constriction in the absence of increased ICP or a moderate increase in ICP (45 mm Hg) in the absence of constriction produced minor reductions in arterial diameter and an average flow reduction of only 5% to 10%. However, when ICP was increased to 45 mm Hg in the presence of a mild constriction, severe arterial narrowing resulted and flow was reduced by 50%. Therefore, it is suggested that chronic arterial spasm is the result of a mild constriction which is amplified by the simultaneous occurrence of increased ICP. Phenoxycbenzamine was found to be effective in reversing and preventing these contractions. The improvement in flow produced by phenoxycbenzamine decreased as the TMP was reduced below 60 mm Hg. The effects of both diffuse and local spasm on cerebral blood flow are discussed.

**AB-2498-76**

**Management of Ischemic Complications After Subarachnoid Hemorrhage** — Sundt TM Jr (Department of Neurologic Surgery, Mayo Clinic, Rochester, Minnesota 55901) — *J Neurosurg* 43:418-425 (Oct) 1975*

The author reviews a form of management for patients deteriorating preoperatively or postoperatively from apparent ischemia attributed to progressive vasospasm after a subarachnoid hemorrhage. The clinical picture and relative frequency of this complication are considered in relationship to the status (grade) of the patient, location of the aneurysm, and ultimate neurological recovery. Experience suggests that the drug regimen reported is useful when instituted early after the onset of symptoms and is safe with proper monitoring techniques. The data do not justify early operative intervention after a subarachnoid hemorrhage, operation when there is angiographic evidence of severe spasm, or expectation of a dramatic effect in patients with a profound deficit or a fixed deficit several hours old.

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**Authors’ abstract.**
Hemorrhage — Tedeschi G, Bernini FP, Cerillo A (Neurosurgical Clinic and Neuroradiological Service, Faculty of Medicine, University of Naples, Naples, Italy) — *J Neurosurg* 43:590–595 (Nov) 1975*

The authors report a series of 71 patients with intracerebral hemorrhage: 57 underwent surgery and 14, although suitable candidates for surgery, refused operation. The results are assessed in relation to the site of the hemorrhage, mode of onset, and interval between accident and operation.

**AB-2503-76**

Embolic Posterior Cerebral Artery Occlusion Secondary to Spondylitic Vertebral Artery Compression. Case Report — Sullivan HG (Division of Health Sciences, Division of Neurosurgery, Virginia Commonwealth University, Richmond, Virginia 23211), Harbison JW, Vines FS, Becker D — *J Neurosurg* 43:618–622 (Nov) 1975*

The authors report a case of isolated homonymous hemianopia secondary to embolic occlusion of the posterior cerebral artery. The cause of embolism was demonstrated to be spondylitic vertebral artery compression. The importance of arteriography is emphasized since the clinical syndrome may be nonspecific and myelographic or plain x-ray changes may be minimal. Surgical therapy is also discussed.

**AB-2504-76**

Intraoperative Use of Doppler to Detect Successful Obliteration of Carotid-Cavernous Fistulas. Technical Note — Matjasko MJ (Departments of Anesthesiology and Radiology, University of Maryland, Baltimore, Maryland 21201), Williams JP, Fontanilla M — *J Neurosurg* 43:634–646 (Nov) 1975*

The authors describe their use of a Doppler flow detector in the treatment of carotid-cavernous fistulas to monitor the ocular bruit, the clinical sign usually used to detect obliteration of the fistula. In seven procedures the Doppler ultrasonic flow detector has yielded satisfactory proof that the flow sounds were no longer audible, and that the surgery was successful.

**AB-2505-76**

Electrophysiologic Parameters in the Evaluation of Occipital Apoplexy — Feinsod M, Hoyt WF (Department of Neuro-ophthalmology, University of California School of Medicine, San Francisco, California 94143), Wilson WB, Spire J-P — *Europ Neurol* 13:451–460, 1975*

Visual evoked responses (VER) in four cases of occipital apoplexy supplemented perimetric diagnosis with new electrophysiologic parameters. These included diagnosis of (1) optic radiation involvement by delay in the initial VER component; (2) striate cortical involvement by obliteration of the initial and late VER components; (3) suprastriate involvement by selective loss of the late VER components; and (4) recovery at one or more of the above levels in the visual process by follow-up examination.

*Authors' abstract.*

**AB-2506-76**

Alpha-Coma. Electroencephalographic, Clinical, Pathologic, and Etiologic Correlations — Westmoreland BF (Mayo Clinic, Rochester, Minnesota 55901), Klass DW, Sharbrough FW, Reagan TJ — *Arch Neurol* 32:713–718 (Nov) 1975*

"Alpha-coma" denotes the conjunction of clinical coma with an electroencephalographic pattern resembling that of normal wakefulness and predominantly consisting of alpha activity. Clinical, EEG, and pathologic data from 13 patients with this syndrome were reviewed. The patients were divided into two groups, based on the pathogenesis of their conditions. The first group consisted of eight patients with brain stem strokes, and the second group consisted of five patients with diffuse hypoxic encephalopathy resulting from cardiac or pulmonary arrest. There were some differences between the EEGs of the two groups. In the first group, the alpha pattern was located more posteriorly, showed more variability and reactivity, and was more persistent in sequential recordings. In the second group, the alpha activity was transient and showed little reactivity. In both groups, this pattern indicated a poor prognosis for survival.

**AB-2507-76**

Positional Vertigo — Harrison MS, Ozsahinoglu C (Ataturk Cad, Kayahan Apt 2/12, Adana, Turkey) — *Arch Otolaryngol* 101:675–678 (Nov) 1975*

Different forms of positional nystagmus, particularly the continuous (type I) variety, were found in 86 consecutive patients admitted to general and neurological hospitals. This series is compared with 365 patients with paroxysmal (type II) and 23 patients with (type III) positional nystagmus. In this series 32 of the patients with continuous (type I) positional nystagmus (including 15 patients with head injury) and 18 of the patients with paroxysmal (type II) nystagmus were found to have central lesions.

**AB-2508-76**

Cerebral Atherosclerosis. Intimal Proliferation and Atherosclerosis in the Cerebral Arteries — Stehbens WE (Department of Pathology, Wellington Clinical School, Wellington 2, New Zealand) — *Arch Path* 99:582–591 (Nov) 1975*

An ultrastructural study of the cerebral arteries obtained at autopsies on humans from infancy to old age was done. Intimal thickenings at bifurcations in infancy and childhood constantly showed various quantities of cellular debris that were seemingly derived from the cellular constituents of the wall, together with thickening, lamination, redundancy, and separation of basement membranes from the related cells. The extracellular lipid appeared to be derived from the transformation of cellular debris. Basement membrane changes indicated a serious disturbance in the relationship of mural cells to the connective tissues that was suggestive of interference with cohesion of the vessel wall. These morphological changes, hitherto overlooked, were more pronounced with age and in overt atherosclerosis, and were remarkably similar to those induced experimentally by hemodynamic stress.

**AB-2509-76**

Complications of Dermal Graft Protection of Carotid Artery
The efficacy of autogenous dermal grafts for carotid artery protection in head and neck surgery has been investigated experimentally and propounded clinically. A review of 194 dermal grafts from 1966 to 1972 at the otolaryngology service of Washington University Medical Center revealed two broad categories of complications that were unique to dermal graft protection of the carotid artery. Two cases of inclusion cysts that developed two years after implantation of the dermal graft were classified as a complication secondary to technical problems of taking the graft. The second category of complications arose as a result of epithelialization of the exposed dermal graft. While the overall incidence of complications that were attributable to the dermal graft was approximately 6%, autogenous dermis continues to provide an excellent method for carotid artery protection.

AB-2510-76
Carotid Endarterectomy for Nonhemispheric Transient Ischemic Attacks — Ford JJ Jr, Baker WH (Division of Thoracic-Cardiovascular Surgery, University Hospitals, Iowa City, Iowa 52242), Ehrenhaif JL — Arch Surg 110:1314-1317 (Nov) 1975*

Fifty carotid endarterectomies were performed in 46 patients with nonhemispheric transient ischemic attacks. There was no mortality. Three patients had temporary strokes postoperatively. Ninety-five percent of the patients were improved and remained so at follow-up examination. Clinical improvement was not related to the presence or absence of vertebral or subclavian stenosis. In retrospect, the two patients who were unimproved had been improperly selected.

AB-2511-76
Paroxysmal "Nightmares." Sequel of a Stroke Responsive to Diphenylhydantoin — Boller F (Neurobehavior Unit, Cleveland Veterans Administration Hospital, Cleveland, Ohio 44106), Wright DG, Cavalieri R, Mitsumoto H — Neurology 25:1026-1028 (Nov) 1975*

A 65-year-old man had nightmares a few weeks after a right temporal lobe infarction. Electroencephalography showed no epileptic activity. Therapy with diphenylhydantoin produced complete remission of his symptoms. On the bases of their acute onset, their association with sleep, their occasional occurrence while the patient was awake, the lack of effect of diazepam and flurazepam, and the good response to diphenylhydantoin, we propose that these episodes were partial seizures secondary to the right temporal lobe lesion.

AB-2512-76
Brain Extracellular Potassium Activity During Hypoxia in the Cat — Kirshner HS (Laboratory of Perinatal Physiology, National Institute of Neurological and Communicative Disorders and Stroke, Auburn Building, Room 106, Bethesda, Maryland 20014), Blank WF Jr, Myers RE — Neurology 25:1001-1005 (Nov) 1975*

Brain extracellular potassium activity, recorded by a potassium-selective microelectrode technique, was studied in 27 anesthetized, paralyzed cats during hypoxia. Potassium activity remained essentially constant until the arterial Po2 decreased to 20 to 23 mm Hg, provided that the mean arterial blood pressure remained above 100 to 110 mm Hg. If the blood pressure was allowed to decrease during hypoxia, even to the 70 to 100 mm Hg range, the associated increases in potassium activity were accentuated, often to levels > 20 mEq per liter. The electrocorticogram regularly became isoelectric by the time the potassium activity reached 6 to 10 mEq per liter. Elevations of the blood pressure with epinephrine injections reversed both the increases in potassium activity and the electrocorticogram flattening. Extracellular potassium homeostasis during hypoxia appears to depend on the maintenance of a normal arterial perfusion pressure.

AB-2513-76
Changes in Cerebral Blood Flow During a Migraine Attack — Norris JW (Department of Neurosciences, MacLachlan Stroke Unit, Sunnybrook Medical Centre, Toronto, Ontario, Canada), Hachinski VC, Cooper PW — Brit Med J 3:676-677 (Sep 20) 1975*

Regional cerebral blood flow studies during a typical prodromal phase of a migraine attack in a young woman showed a global decrease of cerebral blood flow in the carotid artery territory. These studies were repeated during the subsequent headache phase of the same attack and hemispheric blood flow increased considerably. Ergotamine tartrate was then administered intramuscularly which brought definite relief of symptoms but no change in cerebral blood flow. Carotid angiography performed immediately afterward showed retrograde filling of the proximal portion of the basilar artery, which suggested that the brain stem was the site of hyperperfusion. These findings illustrate certain features underlying both the pathophysiology of migraine itself and its response to ergotamine preparations.

AB-2514-76
Slower Turnover of Norepinephrine in the Brain Associated With an Acute Elevation in Blood Pressure of Rats — Ito A (Department of Medicine, Kyushu University Balneotherapeutic Institute, Beppu, 874 Japan), Tanaka K, Omae T — Jap Heart J 16:575-582 (Sep) 1975*

Acute responses of blood pressure and turnover of norepinephrine in the brain to intracranially injected guanethidine were studied in rats. Systolic blood pressure in guanethidine-treated rats showed a dose-relating rise for over nine hours, while norepinephrine contents in cortex-cerebellum, brain stem and heart were not affected.

The endogenous norepinephrine in brain samples, however, did not decrease against α-methyl-p-tyrosine to result in regression coefficients significantly different from those in the saline-treated group whereas norepinephrine in heart was reduced similarly in the two groups, indicating a slower turnover of norepinephrine selectively in the brain.
The results may indicate that the retarded norepinephrine turnover in the brain is causatively related with an acute elevation in blood pressure.

AB-2515-76
Alterations in Cerebral Blood Flow Produced by Hypotension: A Comparison of Methods — Gamache FW (Laboratory of Perinatal Physiology and Neural Control, National Institute of Neurological and Communicative Disorders and Stroke, Bethesda, Maryland 20014), Dold GM — J Neurol Neurosurg Psychiat 39:765-770 (Aug) 1975

Alterations in cerebral blood flow produced by controlled episodes of hypotension were studied in 12 juvenile monkeys using a thermocouple technique. The qualitative changes observed agreed closely with those obtained from an earlier study employing [14C] antipyrine autoradiographic methods. The present study extends the validity of the earlier antipyrine investigations by means of the continuous recording. The advantages and disadvantages of the thermocouple technique are examined.

AB-2516-76
Case Report of a Peculiar Intracranial Angiographic Pattern — Shimizu T (Department of Neurological Surgery, Neurological Institute, Tokyo Women's Medical College, Tokyo 162, Japan), Kubota S, Kobayashi N — Neuroradiology 10:61-64 (Oct 28) 1975

A 21-year-old man who complained of headache, vomiting and olfactory hallucinations had a peculiar angiographic pattern on the cerebral angiograms, which consisted of bilateral coil formation of the anterior, middle and posterior cerebral arteries, while the external carotid and verteobasilar arteries and the cerebral veins were not involved. The etiology of this case is discussed and is based mainly on the angiographic findings as we were unable to obtain a postmortem examination. Although the etiology is the subject of much speculation, it is considered probably to be due to degenerative vascular changes.

AB-2517-76
Aneurysm of the Upper Cervical Portion of the Internal Carotid Artery Due to Exogenous Focal Arteritis — Tomono T, Shirai S, Maki Y (Department of Neurological Surgery, School of Medicine, Chiba University, Chiba City, Japan) — Neuroradiology 10:55-58 (Oct 28) 1975

A 14-month-old child sustained an acute hemiparesis due to emboli from internal carotid arteritis in the upper cervical portion of the internal carotid artery secondary to otitis media. An aneurysm developed at the site of the focal arteritis and this aneurysm formation was followed by serial angiography over a relatively short interval of time.

AB-2518-76
Spontaneous Spinal Epidural Hematoma — Tsai FY (Department of Radiology, Albany Medical Center Hospital, Albany, New York 12208), Popp AJ, Waldman J — Neuroradiology 10:45-50 (Oct 28) 1975

Three cases of spontaneous epidural hematoma are presented with their clinical, anatomical and roentgenographic features and with a review of the literature consisting of 51 cases since the condition was first reported by R. Jackson in 1869. The authors emphasize the Brown-Sequard syndrome with epidural lesions and point out the possible etiology of this entity.

AB-2519-76
An Analysis of Brain Scan in Patients With Internal Carotid Arterial Occlusion — Iinuma T (Division of Cerebrovascular Diseases, Hanwa Hospital, Osaka, Japan), Taneda M, Minami T, Kohno T — Brain and Nerve 27:1177-1183 (Nov) 1975

After major vascular occlusion such as that of the internal carotid or the middle cerebral, radioisotope scans are not always positive. Nineteen patients with internal carotid occlusion underwent bilateral carotid angiography. Cross-circulation via the anterior communicating artery was studied. Several weeks after the stroke, brain scans were performed. Eleven of 13 patients with cross-circulation had positive brain scans, as did three patients with no cross-circulation. Several patients had occlusion of both the internal carotid and intracranial small branches of the middle cerebral artery. These cases gave brain scans of an unusual shape.

AB-2520-76
Basilar Artery Migraine in Young Children — Golden GS (Rose F. Kennedy Center, Albert Einstein College of Medicine, Bronx, New York 10461), French JH — Pediatrics 56:722-726 (Nov) 1975

Six girls and two boys, ranging in age from seven months to eight years, had recurrent attacks of neurological dysfunction attributable to the brain stem and cerebellum. The dysfunction cleared between attacks. Ataxia, vertigo, hemiparesis, cranial nerve palsies, and drop attacks were the major symptoms. Three children definitely had headache. Seven of the eight children had strong family histories of migraine, predominantly on the maternal side. The one child who has been followed into adolescence has classic migraine. Metabolic diseases with similar presentation are pyruvate decarboxylase deficiency, ornithine transcarbamylase deficiency, homocystinuria, and Hartnup's disease. These can be ruled out by the appropriate tests. Basilar artery migraine in children is a benign disease.

AB-2521-76
Subarachnoid Hemorrhage: Association With Unusual Electrocardiographic Changes — Goldman MR, Rogers EL, Rogers MC (Department of Pediatrics, Ireland Army Hospital, Ireland Loop, Fort Knox, Kentucky 40121) — JAMA 234:957-958 (Dec 1) 1975

A 68-year-old hypertensive woman had a subarachnoid hemorrhage secondary to a large posterior inferior cerebellar artery aneurysm, which could not be approached surgically because it gave rise to brain stem vessels. On the second hospital day, she had sinus bradycardia with junctional escapes and a prolonged QT interval. After six days, her neurological condition deteriorated. She had three later
episodes of transient bradydardia. On the twenty-fifth hospital day, she had complete heart block with ST elevation, then second-degree atrioventricular block, which gradually returned to normal, as did the ST elevations. There were no Q waves. The patient died on Day 30 of overwhelming sepsis. The heart demonstrated moderate left ventricular hypertrophy. The coronary arteries and peri-cardium were normal, and there was no evidence of myocardial infarction.

**AB-2522-76**

Cilioretinal Arterial Circulation in Central Retinal Vein Occlusion — McLeod D (Moorfields Eye Hospital, City Road, London EC1V 2PD, England) — Br J Ophthalmol 59:486-492 (Sep) 1975

In 148 cases of retinal vein occlusion, 26 patients were found to have cilioretinal arteries. These cases were studied to determine the validity of the "combined occlusion" hypothesis that central retinal artery occlusion is necessary for hemorrhage after central vein occlusion — the anoxic endothelium being unable to maintain its integrity. Since the cilioretinal artery is not a tributary of the central retinal artery, and since it and the central retinal artery both drain into the central retinal vein, the "combined occlusion" hypothesis would suggest that there would be no hemorrhages in the cilioretinal arterial territory after central vein occlusion. In this series, however, there sometimes were. Intraluminal pressure changes would seem more important to hemorrhage formation than perfusion changes. While central retinal arterial occlusion may perhaps cause central vein occlusion, it is not the direct cause of the hemorrhages and edema.

**AB-2523-76**


Computerized axial tomography can be used to measure regional cerebral blood volume in man. The scan is performed, then repeated after an injection of Hypaque-25. The first scan is subtracted from the second by computer analysis. A venous blood sample is drawn before the injection and is scanned for density and compared with an average density of blood-plus-hypaque. Blood flow is calculated. In normal patients, mean blood volume is 3%. Relative regional blood volume can be compared in different areas. An area of edema surrounding a glioblastoma had a 40% reduction in blood volume.

**AB-2524-76**


Eight patients with dementia resulting from multiple cerebral infarctions were treated with hydergine, 1.5 mg three times a day. Three had a sinus bradycardia of 40 beats per minute, with deterioration of their general clinical condition. Within two days of stopping the drug, the pulse rate returned to normal. Hydergine is an alpha-blocker and may also be a beta-blocker.

**AB-2525-76**

Diseases of the Central Nervous System: Cerebral Atherosclerosis, Transient Ischaemic Attacks, Menière's Disease, and Disorders of Balance — Hood NA (Geriatric Unit, Stobhill General Hospital, Glasgow G21 3UW, Scotland) — Br Med J 4:398-400 (Nov 15) 1975

Treatment plans are outlined for four disorders considered together as primarily vascular lesions causing disability in old age. Cerebral atherosclerosis leading to multiple infarcts does not respond to vasodilators. The author suggests that cyclandelate, nafidrofuryl, and dihydroergotoxine mesylate may directly affect brain cell metabolism. Acute confusional states and dementia may be due to non-cerebral causes, such as drugs, depression, infection; cardiac, thyroid, or renal disease; B12 or folate deficiency, or hypokalemia. Familial surroundings are as useful as tranquilizers. Transient ischemic attacks can be treated by surgery, anticoagulation, or aspirin. Menière's disease is associated with labyrinthine hydrops. Medical treatment is with betahistine hydrochloride, which is a vasodilator, and diuretics. Surgical treatment is labyrinthectomy or destruction of the labyrinth by ultrasound. The acute attack may be treated with Dramamine or bed rest. Balance disorders have numerous causes. Some older people tend to stand leaning backward and can be helped by exercise on a tilt table or by raised heels. The brain stem mediates antagonism reflexes, and brain stem ischemia may result in drop attacks. Postural hypotension is another cause of falls. Slippery floors and absence of railings or lights at home may predispose to falls, as may sedative drugs.

**AB-2526-76**

Regional Cerebral Blood Flow in the Diagnosis of Vascular Headache — Mathew NT (Department of Neurology, Baylor College of Medicine, Houston, Texas 77030), Hrastnik F, Meyer JS — Headache 15:252-260 (Jan) 1976

Patients with headache were studied with intracarotid 133Xe to determine regional cerebral blood flow. In migraineurs, cerebral cortical blood flow was reduced in the prodrome and strikingly increased during the headache. In patients whose prodrome symptoms continued into the headache, there were patchy areas of hyperperfusion and hypoperfusion of the cortex. During prodromata of scintillating scotomata and paresthesias, the reduction of regional cerebral blood flow was diffuse, not limited to the occipital and parietal lobes. Non-migrainous patients with cerebrovascular insufficiency and headache showed a generalized reduction of regional cerebral blood flow, but this was no different from that seen in patients with cerebrovascular insufficiency without headache.

In patients with psychogenic and tension headache, regional cerebral blood flow was normal.

These results were obtained using intracarotid 133Xe, but now there is a noninvasive 133Xe inhalation technique for measuring blood flow, which might allow screening out patients safely.
ABSTRACTS

AB-2527-76
Evaluation of the Posterior Flow Study in Brain Scintigraphy — Martin TR (Veterans Administration Hospital, Minneapolis, Minnesota), Moore JS, Shafer RB — J Nucl Med 17:13-16 (Jan) 1976

A prospective study was undertaken of the usefulness of the posterior cerebral flow study in evaluating posterior brain disease. Of 32 adult patients with presumed posterior disease, the posterior flow studies demonstrated pathology in 17 that was not demonstrated by anterior studies. In children, the posterior study is useful for ease of positioning and because of the prevalence of posterior fossa tumors. Posterior flow study is useful also for demonstrating posterior arteriovenous malformations, posterior tumors, Paget's disease of the occiput, posterior cerebral infarcts, and sagittal sinus occlusions.

AB-2528-76
Vertebral Artery Fistula Detected by Radionuclide Angiography: Case Report — Rockett JF (Department of Radiology and Nuclear Medicine, Baptist Memorial Hospital, Memphis, Tennessee 38146), Robertson JT, Bernard SC — J Nucl Med 17:24-25 (Jan) 1976

A 52-year-old woman had “roaring” in the left ear after removal of a cervical disk by the posterior approach. Dynamic scintigraphy after an intravenous bolus injection of 99mTc-pertechnetate showed increased right-neck activity. Serial images were obtained every two seconds and showed that the extracranial activity persisted throughout the study. There seemed to be a vascular communication crossing the midline from right to left. A right vertebral angiogram showed multiple arteriovenous communications in the right neck. There was early opacification of the right jugular vein. Surgery disclosed a 1.5-mm fistula in the right vertebral artery, apparently from the disk surgery.

AB-2529-76

A study was conducted on 174 men and 164 women with xanthomatosis with respect to atherosclerotic vascular disease, which was diagnosed by the presence of coronary heart disease, intermittent claudication, or objective signs of neurological dysfunction not otherwise explained. Coronary heart disease was the most common initial manifestation. Angina pectoris was the first symptom in three-fourths of the patients of either sex. Myocardial infarction was the first symptom in 26% of the men and 9% of the women. Other manifestations were rare and late. The risk of sudden death was higher than in the normal population. Males died on an average ten years younger and females seven years younger. Ninety-one percent of the men with xanthomatosis died of cardiovascular events, as did 98% of the women. Deaths from cerebrovascular disease were less frequent than in the general population. Half of the males were dead within eight years of the appearance of xanthomas and eight years of the first atherosclerotic disease manifestation.

AB-2530-76
Juvenile Temporal Arteritis: Biopsy Study of Four Cases — Lie JT (Department of Pathology, Baylor College of Medicine, Houston, Texas 77030), Gordon LP, Titus JL — JAMA 234:496-499 (Nov 3) 1975

Four systemically healthy young people, aged 7, 8, 21, and 22, presented with similar soft, painless, solitary nodules of the temporal region, from 0.5 to 1.5 cm in diameter. Each had his nodule removed for cosmetic reasons. Histopathology demonstrated arteritis of the temporal artery, differing from the adult disease in the absence of giant cells and the presence of perivascular angiolymphoid hyperplasia with eosinophils. All four patients refused to return for blood studies or follow-up. The authors discuss the possibility that these nodules might represent arteriovenous fistulas of the superficial temporal artery, isolated polyarteritis nodosa, subcutaneous angiolymphoid hyperplasia with eosinophilia (Kimura disease), or a new entity of juvenile temporal arteritis.

AB-2531-76
Angiography in Postrecanalized Cerebral Infarction — Irino T (Division of Cerebrovascular Diseases, Hanwa Hospital, Osaka, Japan), Taneda M, Minami T — Brain and Nerve 27:1089-1096 (Oct) 1975

Repeat angiography was performed on 34 patients with angiographically demonstrated occlusions of the internal cerebral artery or middle cerebral artery. In 14 cases, recanalization was demonstrated. The angiographical features after recanalization were: (1) arterial narrowing resembling vasospasm in six cases; (2) mass effect in eight cases, resembling intracerebral hematoma or tumor; (3) capillary blush in the territory of the recanalized artery in five cases, usually in the territory of the middle cerebral or lenticulostriate arteries; (4) missing brancher of the middle cerebral artery, demonstrated in half of the cases; (5) lengthened circulation time in two cases; and (6) short capillary phase in two cases.

AB-2532-76
Cerebrospinal-Fluid Acid-Base and Electrolyte Changes Resulting From Cerebral Anoxia in Man — Kalin EM (Department of Anaesthesia, University of Alberta Hospital, Edmonton, AB, Canada T6G 2B7), Tweed WA, Lee J, MacKeen WL — New Engl J Med 293:1013-1016 (Nov 13) 1975

Lumbar and cisternal cerebrospinal fluid was collected from 12 patients in whom cardiopulmonary resuscitation proved unavailing. Electrolytes and acid-base balance were measured in the fluid. Cisternal fluid was more acidic than lumbar fluid (pH 6.815 versus 6.953), and cisternal potassium was higher (6.7 versus 3.5 mEq per liter), showing that hydrogen ion and potassium had left brain cells during anoxia and had entered the CSF.

Cisternal and lumbar fluid were similarly collected from 15 comatose patients who had undergone successful cardiac resuscitation between two and 24 hours previously. Cisternal and lumbar fluid pH and acid-base balance were normal.
AB-2533-76
Putative Neurotransmitters and Cyclic Nucleotides in Prolonged Ischemia of the Cerebral Cortex — Lust WD (Section on Cellular Neurochemistry, Laboratory of Neuro-pathology and Neuroanatomical Sciences, National Institute of Neurological and Communicative Disorders and Stroke, National Institutes of Health, Bethesda, Maryland 20014), Mršulja BB, Mršulja BJ, Passonneau JV, Klatzo I — Brain Res 98:394-399 (Nov 14) 1975

In Mongolian gerbils with an undeveloped circle of Willis, unilateral carotid ligation resulted in unilateral hemispheric ischemia, accompanied by unilateral signs of infarction and by a reduction in high-energy phosphate compounds in the cerebral cortex. The other hemisphere acted as a control. Cyclic AMP, cyclic GMP, ATP, phosphocreatine, glutamate, citrate, GABA, norepinephrine, dopamine, and serotonin were measured in the cortex after variable periods (up to six hours) of carotid ligation. ATP and phosphocreatine dropped to less than 25% of control values by one hour and remained depressed as long as six hours. Citrate level underwent a transient drop. Glutamate was depressed at two and one-half hours, but returned to normal. The level of GABA increased 2.5-fold after one hour and continued to increase. Norepinephrine, dopamine, and serotonin decreased, perhaps because their synthesis stopped. Cyclic AMP increased for two hours, then decreased. Cyclic GMP increased, suggesting that the brain becomes less excitable during ischemia in order to conserve energy. The authors suggest that there is minimal cell death in this model, and that the energy metabolite levels may be reversible.

AB-2534-76
Spinal Cord Blood Flow Measured by a Hydrogen Clearance Technique — Griffiths IR (Department of Veterinary Surgery, University of Glasgow Veterinary School, Bearsden Road, Glasgow, G62 1QH Scotland), Rowan JO, Crawford RA — J Neurol Sci 26:529-544 (Dec) 1975

The hydrogen clearance technique was used to increase spinal cord blood flow (SCBF) in the thoracolumbar cords of 24 dogs and two baboons. Electrodes in both gray and white matter recorded clearances, and SCBF was computed. Pentobarbitone and a-chloralose were used for anesthesia. In the white matter, using pentobarbitone, SCBF was 13.7 ± 4.5 ml/100 gm per minute. In the gray matter, both monoexponential and biexponential clearances were recorded. The SCBF from both the monoexponential and slow components was 12.0 ± 4.5 ml/100 gm per minute. The SCBF from the fast component was 69 ± 11 ml/100 gm per minute using pentobarbitone and 97.5 ± 32.9 ml/100 gm per minute with chloralose. This rapid phase may represent clearance into pial vessels. The electrodes in gray matter, completely surrounded by white matter, probably measure average SCBF rather than that to the gray matter compartment.

AB-2535-76
Sodium Nitroprusside Treatment of Severe Arterial Hypertension in Children — Gordillo-Paniagua G (Department of Nephrology, Hospital Infantil de México, Calle Dr. Márquez 162, México 7, D.F.), Velásquez-Jones L, Martini R, Valdez-Bolaños E — J Pediat 87:799-802 (Nov) 1975

Twenty children, from 7 to 17 years of age, were admitted to the hospital with hypertensive crises of renal origin. All had a diastolic pressure greater than 110 mm Hg and most had a hypertensive encephalopathy. Treatment with an i.v. infusion of sodium nitroprusside at an average rate of 1.4 µg per kilogram per minute resulted in desirable levels of blood pressure being reached in all patients in 1 to 20 minutes. Cardiac failure improved dramatically. There was no deterioration in renal function. Neurological signs disappeared in 16 of the children within 24 to 48 hours. One child died of cerebral hemorrhage without any improvement. Several children were kept on the nitroprusside for protracted periods — one for 240 hours. Oral medications were substituted for the nitroprusside when the encephalopathy and cardiac failure were reversed.

AB-2536-76
Hemispheric Specialization in Normal Man Studied by Bilateral Measurements of the Regional Cerebral Blood Flow: A Study With the 133Xe Inhalation Technique — Risberg J, Halsey JH (Department of Neurology, University of Alabama School of Medicine, Birmingham, Alabama), Wills EL, Wilson EM — Brain 98:511-524, 1975

133Xenon inhalation was used to measure bilateral regional cerebral blood flow (rCBF) during verbal and spatial mental activity. Twenty-four normal right-handed male volunteers were tested at rest, during the Miller Analogy Test, and during the Street test of perceptual closure. To study the effects of increased motivation, half of the subjects were promised extra money for performance above a certain level. At rest, rCBF was bilaterally almost identical. During the verbal test, rCBF in the left hemisphere increased 16%, while that in the right hemisphere increased 13% in the highly motivated group, with the largest increase over the occipital and parietal regions. During the spatial test, left rCBF increased 7%, right 10% in the highly motivated group, with the largest differences (5%) over the frontal and parietal regions. The differences in the less well-motivated group shared the general trend but were not statistically significant. The technique is noninvasive and harmless.

ITEMS OF INTEREST


Changes of Epidural Pressures After Experimental Occlusion of One Middle Cerebral Artery in Cats — Hayakawa T, Waltz AG (Department of Neurology, Pacific Medical Center, San Francisco, California 94120) — J Neurol Sci 26:319-333, 1975
Symposium on Hypertension — Laragh JH (guest editor) — *Am J Cardiol* 36:651–721 (Oct 31) 1975


Four Cases of “Locked-In” Syndrome and Review of the Literature — Al-Wardi DAM, Adams AH, Hamilton AE (Veterans Administration Hospital, Long Beach, California) — *Bull L A Neurol Soc* 40:60–70 (Apr) 1975

Reviews this syndrome in which patients are tetraplegic and mute, yet fully alert and can communicate intelligently by their mesencephalic-controlled eye and lid movements.


Conditions requiring exclusion from flying status: It is recommended that flying status be suspended pending further review of the following: cerebral, cerebellar or brainstem infarction due to any cause; transient ischemic attack; amaurosis fugax; internal auditory or labyrinthine artery occlusion; internal carotid stenosis greater than 50% of lumen or with demonstrated ulceration (with or without symptoms); hypertensive encephalopathy; Meniere’s syndrome or other recurring episodes of vertigo; intracerebral or subarachnoid hemorrhage (from any cause); intracranial aneurysm; and arteriovenous malformation.

Oral Anticoagulant Therapy and Its Control: An International Survey — Lam-Po-Tang PR, Poller L (Prince of Wales Hospital, Randwick, N.S.W., Australia) — *Thromb Diath Haemorrh* 34:419–425, 1975

Because of great world-wide diversity in methods of testing, reporting and determining therapeutic effects, the authors urge a more uniform basis of anticoagulant therapy.


Stroke death rates for American Japanese men appear equivalent to figures for U.S. white men of the same age, but are significantly lower than in the Japan cohort for the 60 to 64-year-old age group. The international differences in mortality do not appear to be due to certification or other methodologic artifact.
Abstracts

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