Abstracts

AB-2052-75

Internal carotid artery (ICA) back pressure correlates collateral cerebral blood flow, providing a critical pressure necessary for carotid endarterectomy without a shunt. The ICA back pressures were measured in 43 patients undergoing 50 endarterectomies under regional anesthesia. A four-minute ICA test occlusion was used to determine the need for shunting. Mean ICA back pressure was 69 ± 2 (SE) mm Hg in 22 procedures (group 1), 34 ± 2 mm Hg in 25 procedures (group 2), and 15 ± 3 mm Hg in three procedures (group 3). Differences between groups were significant (P < 0.05) without significant (P > 0.05) differences in systemic pressure. Group 3 patients did not tolerate temporary carotid occlusion, confirming 25 mm Hg as the lower limit of adequate collateral flow. Five patients developed neurological complications, three in group 1 and two in group 2. Embolization may have occurred in two patients. However, some patients require more than minimum collateral flow and consequently need ICA back pressures higher than 25 to 50 mm Hg.

AB-2053-75
The Effects of Brain Stem Compression on the Heart — Vander Ark GD (Denver General Hospital, Denver, Colorado 80204), Norton LW, Pomerantz M — Surg NeuroI 2:231-234 (July) 1974

Increased intracranial pressure and brain lesions adversely affect the heart. Using an experimental model, it is demonstrated that both the parasympathetic and sympathetic innervation of the heart must be blocked to prevent injury.

AB-2055-75
External Carotid Occlusive Disease as a Cause of Facial Pain — Herishanu Y (Neurology Unit, Shaare Zedek General Hospital, P.O. Box 293, Jerusalem, Israel), Bendheim P, Dobberg M — J Neurol Neurosurg Psychiat 37:963-965 (Aug) 1974

A 47-year-old man suffered an acute left hemiparesis after several weeks of right-sided facial pain. Right carotid angiography revealed internal carotid artery thrombosis and occlusion of external carotid branches supplying facial structures. An ischemic etiology for the facial pain is suggested.

AB-2057-75
Familial Occurrence of Intracranial Aneurysms — Sakai N (Second Department of Surgery, Gifu University School of Medicine, 40 Tsukasamachi, Gifu City, Japan), Sakata K, Yamada H, Yamamoto M, Aiba T, Takeda F — Surg Neurol 2:235-238 (July) 1974

An occurrence of intracranial aneurysms in three of four siblings of a family was experienced. Case 1: 43-year-old male. A left internal carotid-posterior communicating aneurysm was found and clipped at the neck successfully. Case 2: 47-year-old female (a sister of Case 1). An aneurysm at the trifurcation site of the right middle cerebral artery was found and clipped at the neck successfully. Case 3: 44-year-old female (a sister of Case 2). Two aneurysms of the right internal carotid artery and an aneurysm of the right middle cerebral artery were found by angiography, but operation was refused. A review of literature on familial occurrence of intracranial aneurysms revealed that 39 such families, including the present one, had been described. Relationship, age and sex incidences and location of aneurysms were analyzed in those cases. Age of onset of symptoms appears to be younger, incidence of anterior communicating aneurysms is lower (especially in females) and that of right internal carotid aneurysms is higher in familial cases as compared with "Cooperative Study" on general cases of intracranial aneurysms.

AB-2058-75
Coma Following Treatment of Very Severe Arterial Hypertension, With Improvement After Dexamethasone Therapy — Farrow LJ, Wood JB (County Stroke, Vol. 6, May-June 1975

*Authors' abstract.

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ABSTRACTS


We describe two patients with very severe arterial hypertension, who were treated vigorously and effectively with hypotensive drugs. Both promptly developed gross neurological abnormalities, yet recovered fully after treatment with dexamethasone. We have found no similar published reports. We believe that these cases illustrate an important risk of treatment of severe hypertension, and we suggest that cerebral edema developed, and was then relieved by dexamethasone.

AB-2059-75
Vasopressors. Case Report — Wernick S (Department of Neurosurgery, 912 South W. V. ood Street, Chicago, Illinois 60680), Sugar O — J Neurosurg 41:755-757 (Dec) 1974*

Postangiographic hemiplegia can be successfully treated with vaspressors. A case is presented and the method of treatment discussed and analyzed.

AB-2062-75
Sequential Morphological Changes at the Site of Carotid Endarterectomy — French BN, Renwick NB (Division of Neurophathology, University of Toronto, Banting Institute, Toronto 2, Canada) — J Neurosurg 41:745-754 (Dec) 1974*

Nineteen carotid arteries were examined postmortem after endarterectomy had been performed from one hour to 11 years previously. The sequential morphological changes at the endarterectomy site were divided into acute, reparative, and mature phases. All nine occluded arteries thrombosed during the acute phase postoperatively. The degree of medial necrosis, acute inflammation and adventitial exposure was more marked in these thrombosed acute phase arteries. By 30 days new intima covered the endarterectomy site and thereafter thrombosis was not seen. Avoidable technical errors led to thrombosis of three arteries. Anticoagulation after surgery may reduce the incidence of postoperative thrombosis. Recurrent symptomatic atheroma occurred in two cases at the original endarterectomy site 10 months and 11 years after operation.

AB-2063-75
Effect of Cerebral Angiography on Subsequent Brain Scintigraphy — Silberstein EB (Radioisotope Laboratory, Cincinnati General Hospital, Cincinnati, Ohio 45229), Ashare AB — J Neurosurg 41:689-690 (Dec) 1974*

The authors report examination of 27 brain scintigraphs performed one day following cerebral angiography, and 48 performed within two weeks. No artifactual areas of uptake were produced in the scintigraphs by the radiographical contrast medium.

AB-2064-75
Intraparenchymal Arteriovenous Malformations With Predominant External Carotid Artery Contribution — Dahl RE, Kline DG (Division of Neurosurgery, Louisiana State University Medical Center, New Orleans, Louisiana 70112) — J Neurosurg 41:681-687 (Dec) 1974*

Arteriovenous malformations located within cerebral parenchyma are usually supplied by intracranial vessels. An extracranial blood supply to these lesions is rare. The authors report their experience with two such cases and discuss the 21 comparable reports.

AB-2065-75
Surgical Treatment of Arterial Aneurysms of the Vertebrobasilar Circulation — Choi SN (Department of Neurosurgery, University of Minnesota Medical School, Minneapolis, Minnesota 55455), Ortiz-Suarez HJ — J Neurosurg 41:671-680 (Dec) 1974*

Twenty patients with basilar bifurcation aneurysms and subarachnoid hemorrhage were treated surgically as a consecutive series irrespective of preoperative grading. There were six fatalities; eight of the survivors have done well while six are in poor condition.

The authors also report a series of 13 surgical cases of posterior fossa aneurysm not located at the basilar bifurcation, three on the posterior cerebral artery, five on the basilar trunk, and five on the vertebral origin of the posterior
inferior cerebellar artery. There were two operative deaths and one late death due to pulmonary embolism. The other ten have had good results.

AB-2066-75
Experiences With Surgical Thrombosis of Intracranial Berry Aneurysms and Carotid Cavernous Fistulas — Mullan S (Division of Neurological Surgery, University of Chicago, Chicago, Illinois 60637) — J Neurosurg 41:657-670 (Dec) 1974*

The results of 61 cases of stereotaxic thrombosis of intracranial berry aneurysms indicate that the technique in selected cases is comparable to, but not necessarily superior to, standard surgical methods. The results of wire-induced thrombosis in 15 cases of intracranial aneurysm suggest that this method is effective in situations where clipping and encasement are inapplicable. The results of thrombosis in six cases of carotid cavernous fistula suggest that intracavernous wire thrombosis may prove to be the treatment of choice in that it seals the fistula without impairing carotid blood flow.

AB-2067-75

(1) The extent and severity of visual field loss has been compared in a series of 14 patients with occlusions of the posterior cerebral artery or its branches, all verified angiographically. Atheroma, embolism, and migraine were the commonest types of underlying vascular disease. (2) Occlusion of the main trunk of the artery was associated with severe and permanent field loss usually with some sparing of the central area and, in one case, of some field adjacent to the vertical meridian. It is suggested that this is due to collateral blood flow reaching the margins of the posterior cerebral territory from the adjacent middle cerebral territory via pial anastomoses. (3) Single or multiple occlusions of the main branches of the posterior cerebral artery gave variable amounts of field loss with considerable recovery in some cases. Collateral blood flow from the middle cerebral territory and from other branches of the posterior cerebral artery was demonstrated and the variation in some of these patients, cerebrovascular occlusion also may evolve independently.

AB-2070-75
Perceptual Problems in Hemiplegics — Cohen CA (Department of Physical Medicine and Rehabilitation, Medical College of Virginia, Richmond, Virginia 23219) — Southern Med J 67:1329-1332 (Nov) 1974*

It is universally agreed that a physical stimulus must be present and excite some sense receptor or receptors before perception occurs. A sense receptor may be stimulated without perception occurring but perception never occurs without prior stimulation of a sense receptor.

AB-2071-75
Carotid Cavernous Fistula: Direct Repair With Preservation of Carotid — Parkinson D (Departments of Neurosurgery, Cardiovascular Surgery, and Anesthesia, Faculty of Medicine, University of Manitoba, Winnipeg, Manitoba, Canada), Downs AR, Whytehead LL, Syslak WB — Surgery 76:882-889 (Dec) 1974*

The standard treatment of carotid cavernous fistulas has been trapping or a combination of trapping and embolization. In either case the carotid is sacrificed and a certain percentage of fistulas persist in spite of complete trapping and embolization. Several years ago we began to devise a method of repairing the fistula and preserving the carotid. The first step involved finding the normal collateral vessels

ABSTRACTS

Rosenbaum AE, Tyler HR — Neurology 24:1103-1108 (Dec) 1974*

Resolution of unruptured cerebral mycotic aneurysms was shown by serial angiographies in two patients with infective endocarditis. Cerebral embolization occurred as prodromal manifestations in each case. The pathogenesis of cerebral mycotic aneurysms indicates that patients with endocarditis and cerebral emboli are at high risk for developing septic aneurysms. Cerebral angiography should be undertaken early in patients with these prodromata. If mycotic aneurysms are demonstrated, follow-up angiography provides a significant criterion for electing further medical or surgical therapy.
ABSTRACTS

serving these persistent fistulas of the carotid, which is classically drawn in the anatomy texts as a nonbranching artery traversing a trabeculated venous cavern. The second problem involved finding an anatomically safe approach past the cranial nerves to the cavernous carotid and its branches. The third problem involved provision of periods of complete circulatory arrest in order that such an approach might be used and a repair effected. The significant arterial, venous, and neural anatomical findings are illustrated. The techniques are described as used in 11 fistula repairs with preservation of the carotid utilizing hypothermia and circulatory arrest in increments up to 55 minutes. The operating microscope has greatly enhanced the technical feasibility.

AB-2072-75
Cerebral Circulation After Head Injury. Part 1: Cerebral Blood Flow and Its Regulation After Closed Head Injury With Emphasis on Clinical Correlations — Overgaard J, Tweed WA (Department of Anesthesia, Health Sciences Centre-General, Winnipeg, Canada) — J Neurosurg 41:531-541 (Nov) 1974*

Measurements of cerebral blood flow (CBF), mean intraventricular pressure (MIVP), CSF acid-base status, and tests of autoregulation and CO2 reactivity of 43 patients were made at varying times after severe closed head injury. There was a distinct hyperemia or "luxury perfusion" in the acute phase of one to 14 days, followed by recovery to normal or below normal values. Metabolic CSF acidosis was found with hyperemia and probably reflected severe, diffuse cortical injury. Distinct regional CBF abnormalities, either ischemic or hyperemic, were only observed in regions of focal pathology. Severe ischemia, hyperemia, persistent elevation of MIVP, or generalized "vasoparalysis" indicated an unfavorable prognosis. Autoregulation was impaired and CO2 reactivity was reduced after injury, but both had usually returned to normal by 14 days.

AB-2073-75
The Experimental Effect of Direct Electrical Current on Intracranial Arteries and the Blood-Brain Barrier — Fox JL (Department of Neurological Surgery, The Ohio State University Hospital, Columbus, Ohio 43210), Yasargil MG — J Neurosurg 41:582-589 (Nov) 1974*

Direct electrical current (DC) was applied to the basilar artery of 20 dogs and the circle of Willis of five monkeys. The artery was in contact with microsurgical forceps acting as the monopolar electrode. The DC currents from 0 to 1 mA were used at voltages of 0 to 3 V with observable effect noted at levels above 0.5 mA at 1 V. Neither negative (−) nor positive (+) DC caused vasoconstriction unless the initial and terminal current change occurred too rapidly causing a stimulus pulse. Both − and + DC caused focal vasodilatation of the artery made spastic by needle puncture or topical 10% barium chloride (BaCl2). This dilatation was more rapid (30 to 60 seconds) and more pronounced with −DC current. Angiography confirmed extreme focal dilatation lasting at least four days after −DC application. This appears to be secondary to the known production of hydroxyl (OH-) ions at the cathode and possibly hydrogen (H+ or H2O+) ions at the anode during electrolysis. We hypothesize that smooth muscle protein bonds are affected. The effects of DC on the systemic arteries also are described.

Also studied were the effects of similar DC on brain cortical microvasculature of ten dogs and on the systemic arteries of 50 rats. It was discovered that not only did + DC cause the well-known local coagulation phenomena but also both − and + DC caused formation of micro-emboli with resulting occlusion of arterioles. These phenomena, which could be seen only under the operating microscope, occurred after a decomposition potential of about 1 V was reached. We theorize this was due to the formation of denatured protein and alkali-hematin at the − pole secondary to the formation of OH- ions during electrolytic reduction and due to formation of denatured protein and acid-hematin at the + pole secondary to the formation of H+ ions during electrolytic oxidation. For reasons not yet clear there was an acute breakdown in the blood-brain barrier to fluorescein around the negative pole but not around the positive pole.

AB-2074-75
Dynamic Pressure-Flow Relationships of Brain Blood Flow in the Monkey — Early CB, Dewey RC, Pieper HP, Hunt WE (Division of Neurological Surgery, The Ohio State University Hospital, Columbus, Ohio 43210) — J Neurosurg 41:590-596 (Nov) 1974*

Pressure-flow data are presented for the brain vascular bed in the rhesus monkey. These data are obtained at fixed levels of vasomotor tone. Resultant flow curves are called the "dynamic pressure-flow relationships" (DPFR). In the experimental model, arterial pressures are oscillated with a sinusoidal pump at frequencies exceeding the vasomotor response lag time. The resultant DPFR curves are discussed. A model is presented to show that changes in vasomotor tone cause a vertical shift of the DPFR. Changes in vascular bed resistance cause a change in the slope of the DPFR (ΔP/ΔF).

AB-2075-75
Experimental Cerebral Hemodynamics. Vasomotor Tone, Critical Closing Pressure, and Vascular Bed Resistance — Dewey RC, Pieper HP, Hunt WE (Division of Neurological Surgery, The Ohio State University Hospital, Columbus, Ohio 43210) — J Neurosurg 41:597-606 (Nov) 1974*

Application of Burton's concept of the critical closing pressure to experimental data on brain-blood flow in the monkey suggests that perfusion pressure, not vascular bed resistance, is the primary variable affecting cerebral blood flow. Perfusion pressure for the cerebral circulation is the mean arterial pressure minus the critical closing pressure (MAP − CCP). Vasomotor tone and intracranial pressure are the major determinants of the critical closing pressure. Changes in either of these variables, therefore, affect perfusion pressure and flow. Data on brain-blood flow at fixed vasomotor tone obtained over wide pressure ranges show little change in vascular bed resistance despite significant changes in flow. The diameter of resistance vessels probably does not change significantly throughout the normal physiological range of cerebral blood flow. The limits of the critical closing pressure in the anesthetized monkey are from 10 to 95 mm Hg. Using these limits, and beginning with the average values for MAP and CCP in 11 awake monkeys breathing room air, the authors present theoretical flow curves in response to changes in intracranial pressure and
Glycerol has been advocated to treat cerebral edema in man, but its effects on brain water and electrolyte distribution, acid-base balance, and renal function have not been well studied. Glycerol was infused intravenously into dogs such that plasma glycerol was maintained at either 12 or 34 mM for up to 12 hours. Studies were made of the CSF pressure and brain content of Na⁺, K⁺, and Cl⁻, osmoles, glycerol, and water. Additionally, changes in acid-base balance and electrolytes of plasma, CSF, and urine were evaluated, as well as the renal plasma flow (RPF) and GFR. After six hours with plasma glycerol of 12 mM, there was no important change in either brain water or any other variable evaluated. After 6 to 12 hours with plasma glycerol of 32 mM, there was a significant decrease in brain water content. During glycerol infusion, both RPF and GFR fell significantly (30% to 44%) after six hours, but were normal after 24 hours, while urinary loss of electrolytes (Na⁺, K⁺, Ca²⁺, Mg²⁺) was substantial. Glycerol is an effective cerebral dehydrating agent for short periods of time if plasma levels are maintained at 30 mM or greater, although there is a substantial loss of water and solute in the urine and a reversible decline in renal function.

**ABSTRACTS**

**AB-2076-75**

*Effects of Glycerol Infusions on Brain Water and Electrolytes* — Gisado R (Research and Medical Services and Department of Neurology, Veterans Administration Wadsworth Hospital Center, Los Angeles, California 90048), Arieff AI, Massry SG, Lazarowitz VC — *Amer J Physiol* 227:865-872 (Oct) 1974*.

In normothermic rhesus monkeys (*Macaca mulatta*) blood flow to the brain was completely interrupted for one hour, and then restored for different periods from 45 minutes to 24 hours. Neuronal function was monitored by the electrocorticogram (ECoG) and the pyramidal response (PR) to the electrical stimulation of the motor cortex. In addition, cerebral blood flow, intracranial pressure, epicortical pH, blood gases, blood glucose, hematocrit, coagulation times, and serum electrolytes were repeatedly measured.

During ischemia, the ECoG was suppressed within 15 seconds, and the pyramidal response within a few minutes. In 11 out of 19 animals the PR and — at survival times of more than 90 minutes — electrocortical activity returned upon recirculation. In eight animals recovery of neuronal function did not occur, presumably because of an impaired blood circulation of the brain. Reduction in post-ischemic blood flow resulted from the combined effect of post-ischemic brain swelling with consequent increase in intracranial pressure, microcirculatory disturbances, and post-ischemic hypotension. In one case the circulatory disturbance was restricted to circumscribed areas causing typical boundary zone lesions in the pallidum and parietal lobe.

**AB-2077-75**


In most experimental studies of the effects of ischemia in CNS electrical activity, the ischemia produced has been total. The present experiments, however, were designed to establish quantitatively the changes in electrical activity corresponding to different degrees of cerebral ischemia. The somatosensory evoked potential was measured at various sites on the exposed postcentral gyrus of the anesthetized baboon, and cortical blood flow was assessed in the region of the evoked potential electrode by the highly focal method of hydrogen clearance. The technique of middle cerebral artery occlusion was used to reduce blood flow over the hemisphere. Following occlusion of the artery, the amplitude of the evoked potential typically diminished steadily at a rate depending on the level of residual local blood flow. The rate of depression of the evoked potential amplitude (expressed in units of percent of control per minute) was highly and significantly correlated with the residual flow (*r* = -0.95, *P < 0.001), which indicated a linear relationship between these variables, the regression line intercepting the flow axis at 15.2 ml/100 gm per minute. The data also strongly suggested a threshold-type relationship between the amplitude of the evoked potential and the local blood flow: If the flow was greater than about 16 ml/100 gm per minute the evoked potential was not affected, but at flows less than about 12 ml/100 gm per minute the evoked potential was abolished.

**AB-2078-75**


The acute cerebral hemodynamic effects of modified ECT were monitored by electrical impedance plethysmography in four patients with schizophrenia and three with depression. A total of 20 recordings were made on these patients; of these, 19 involved the following segments, in sequence: a rest period of 25 to 115 minutes, a short period in which atropine, Brietal, and succinylcholine were given by injection, administration of the ECT, monitoring of post-ECT effects for ten minutes, and, finally, a recovery period of up to 120 minutes. An identical procedure, save for the omission of ECT in one of the patients, formed the twentieth experiment recorded.

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minutes immediately following it. These implied a surging increase in CBF and persisted during the recovery phase. No such changes occurred when ECT was omitted, and the results suggested that these cerebral circulatory changes formed part of the therapeutic action of ECT.

AB-2080-75

With the Kety-Schmidt technique in ten dogs anesthetized with 0.5% halothane, blood flow and oxidative metabolism of the brain were studied during stepwise lowering of CPP due to arterial hypotension at 71 and 41 torr. CBF remained constant (65.6 and 64.1 ml/100 gm per minute) when CPP dropped from 98 to 71 torr, but at a CPP of 41 torr CBF fell to 32.2 ml/100 gm per minute, i.e., to about 50% of the resting value. The CMR-oxygen did not change (4.20 and 4.38 ml/100 gm per minute) when CPP was reduced from about 100 to about 70 torr, but decreased to 2.90 ml/100 gm per minute, i.e., about 70% of the resting value in deep arterial hypotension.

The uptake of glucose changed from 4.62 to 6.19 mg/100 gm per minute as well as the output of CO2 and lactate (from 4.64 to 6.57 ml/100 gm per minute and from 0.33 to 1.62 mg/100 gm per minute) when CPP was decreased to 71 torr. It could be demonstrated that at this CPP range the oxidative metabolism was unchanged. It was assumed that the increased uptake of glucose was only to form lactate, and that this non-hypoxic lactate production was responsible for the elevated CO2 release. At a CPP range of 41 torr the metabolic rates of glucose and CO2 decreased to 3.33 mg/100 gm per minute and to 3.37 ml/100 gm per minute, respectively, while the output of lactate remained relatively high (1.41 mg/100 gm per minute). These findings support the assumption that at a CPP range of 41 torr the oxidative metabolism of the brain becomes insufficient. All findings demonstrate close interactions between cerebral blood flow and oxidative brain metabolism in arterial hypotension. In deep arterial hypotension respiratory acidosis has an effect on CBF. The increase of CBF is accompanied by an improvement of CMR-oxygen but not of CMR-glucose. Although CMR-lactate is reduced, the lactate/glucose index remains high.

AB-2081-75
Effects of Prostaglandins A1, E1, E2 and F2α on the Basilar Artery of Cats — Handa J, Yoneda S, Matsuda M, Handa H (Department of Neurosurgery, Kyoto University Hospital, 54 Shogoin-Kawahara-cho, Sakyouku, Kyoto 606, Japan) — Surg Neurol 2:225-255 (July) 1974*

Effects of prostaglandins (PG) A1, E1, E2 and F2α on the diameter of the exposed basilar artery were studied in cats. Topical application of PGA1, PGE1, PGE2, PGF2α, fresh autologous arterial blood and the mixture of prostaglandins and blood all caused vasoconstriction. When administered intravenously, PGF2α caused vasoconstriction, whereas PGA1, PGE1 and PGE2 caused vasodilatation.

AB-2082-75
Surgery of Anterior Communicating Aneurysms: Experience With Various Techniques and Evolution of a Modified Approach — Jain KK (Department of Neurosurgery, Lions Gate Hospital, North Vancouver, B.C., Canada) — Surg Neurol 2:31-33 (Jan) 1974*

The surgical treatment of 24 anterior communicating artery aneurysms is described. The first ten operations were done using various established techniques. The next 14 patients were treated by a modified approach incorporating some of the recent advances in aneurysm surgery. The attempt is made to deal with the aneurysms directly either by clipping or coating with acrylic or a combination of both. There were no major neurological complications and no deaths in these 12 patients.

AB-2083-75
Continuous Ventricular Drainage to Lessen Surgical Risk in Ruptured Intracranial Aneurysm — Suzuki J (Division of Neurosurgery, Institute of Brain Diseases, Tohoku University School of Medicine, S-13-1 Nagamachi, Sendai, 982, Japan), Yoshimoto T, Horii S — Surg Neurol 2:87-90 (Mar) 1974*

Intracranial surgery for an aneurysm in seriously ill patients generally results in high mortality and morbidity. In order to improve the patients' condition, we used continuous ventricular drainage in 13 patients with ruptured aneurysms who were thought not to be suitable for immediate intracranial intervention because of their poor condition. When ventricular fluid had been drained and the intracranial pressure lowered to normal levels, 11 of the patients improved. The results in these 11 patients were excellent or good in six, fair in one, poor in one, and there were three deaths. Continuous ventricular drainage is helpful in improving the patients' condition and in decreasing the risks of intracranial operations on the aneurysms.

AB-2084-75
Surgical Treatment of Carotid and Vertebral Artery Disease. An Updating to 1974 — Grindal AB, Toole JF (Department of Neurology, Bowman Gray School of Medicine of Wake Forest University, Winston-Salem, North Carolina) — Ann Int Med 81:647-649 (Nov) 1974*

With the recent advances in aortocranial angiography and surgical treatment of extracranial vascular disease, as well as the publication of sometimes conflicting reports concerning indications and results of treatment, we have compiled an updated assessment of the role of surgery in the treatment of cerebrovascular ischemia. Indications for the repair of asymptomatic carotid stenosis, kinks of the carotid artery, bilateral carotid stenosis, carotid occlusion and subclavian vertebral lesions are considered. New surgical techniques such as superficial temporal-middle cerebral artery anastomosis are discussed.

AB-2085-75
Regional Cerebral Blood Flow, Cerebral Metabolic Rate of Oxygen, and Cerebrospinal Fluid Acid-Base Variables in Patients With Acute Meningitis and Acute Encephalitis — Paulson OB, Brodersen P, Hansen
Regional cerebral blood flow (rCBF), cerebral metabolic rate of oxygen (CMRO₂), jugular venous Po₂ and cerebrospinal fluid (CSF) acid-base variables have been studied in five patients with meningococcal meningitis, five with pneumococcal meningitis and six with encephalitis. The 133Xenon intra-arterial injection method was used for the rCBF measurements. The patients were hyperventilating spontaneously. The studies were performed during general anesthesia and artificial ventilation at a Paco₂ adjusted to the level measured during spontaneous respiration prior to the anesthesia. Average hemispheric CBF was normal and CMRO₂ slightly reduced in patients with meningococcal meningitis, whereas CBF and CMRO₂ were markedly reduced in pneumococcal meningitis and encephalitis. Jugular venous Po₂ was increased ("luxury perfusion") in meningococcal and pneumococcal meningitis but normal in encephalitis. CSF lactic acid was increased and CSF bicarbonate decreased in all meningitis patients and in some with encephalitis. Functional tests of the rCBF were performed by changing arterial BP and Paco₂. Autoregulation (rCBF is normally independent of the BP within wide limits) was frequently impaired, whereas the response to Paco₂ changes was preserved in most cases (rCBF normally increases with increased Paco₂). Focal rCBF abnormalities as disclosed in the control condition or during the functional tests were infrequent in meningitis but frequent in encephalitis. The results suggest that the brain of these patients is vulnerable to factors such as hypertension, hypercapnia and hypoxia. A more deliberate use of sedatives combined with artificial hyperventilation is advocated. Epileptic seizures should be counteracted by all available means.

ABSTRACTS

**AB-2086-75**

**Significance of Neuronal Alterations in Developing Cortical Infarction** — Little JR, Kerr FWL, Sundt TM Jr (Department of Neurologic Surgery, Mayo Clinic, Rochester, Minnesota 55901) — Mayo Clin Proc 49:827-837 (Nov) 1974*

During the evolution of experimentally induced ischemic infarcts, there were two patterns of neuronal degeneration: (1) shrinkage — characterized by angularity, cytoplasmic eosinophilia, and nuclear pyknosis on light microscopy and by an increase in electron density of the cytoplasmic and nucleoplasmic matrices on electron microscopy; and (2) swelling — characterized by rarefaction of the cytoplasmic and nucleoplasmic contents and early disruption. Neuronal shrinkage was by far the predominant response. The development of cytoplasmic eosinophilia in the shrunken neurons between three and six hours corresponded with the development of an electron-dense cytoplasmic matrix. These cytoplasmic alterations were thought to represent a stage of irreversible neuronal damage. Release of lysosomal contents into the neuropil after six hours may be of importance with regard to extension of the zone of infarction into the surrounding tissues. Axosomatic synapses appeared to be more vulnerable to ischemia than axodendritic synapses. Decrease in the number of synaptic vesicles was a late change but it suggested that some release of active neurotransmitter substances may be taking place. The pattern of perineuronal astrocytic alterations suggested that some form of interaction involving fluid and electrolyte transfer may exist between astrocytes and neurons. The results of previous metabolic, electroencephalographic, and blood flow studies appear to correlate with the morphologic findings presented.

**AB-2087-75**

**Shoulder Sling for Hemplegia: Friend or Foe?** — Hurd MM, Farrell KH, Waylonis GW (Department of Physical Medicine and Rehabilitation, Riverside Methodist Hospital, Columbus, Ohio 43214) — Arch Phys Med Rehab 55:519-522 (Nov) 1974*

The shoulder hemisling is commonly used to support the shoulder and arm of the hemiplegic patient with a flail upper extremity. During a nine-month period, all new hemiplegic patients referred to the Physical Medicine Department of Riverside Hospital were considered for inclusion in a clinical study on the value of the sling. Fourteen study patients were alternately placed in a treated or control group (no sling) but were treated identically in all other respects. No appreciable difference between the treated or control groups was observed using the parameters of shoulder range of motion, shoulder pain or subluxation, and there was no evidence of increased incidence of peripheral nerve or plexus injury. We conclude that the hemisling as traditionally designed need not be uniformly applied to all such patients following cerebrovascular accidents.

**AB-2088-75**


The cavernous angioma, although a common cause of nonhypertensive intracerebral hemorrhage, is angiographically silent. No example of the angiographical visualization of an intracranial cavernoma has been reported to date. Telangiectases rarely produce intracerebral hemorrhage but may be observed in angiography and may be associated with cavernous angiomas. A case with telangiectases, a cavernous angioma and hematoma of the brainstem, and a unique angiographical picture is presented with a review of the clinical, angiographical and pathological features of the uncommon vascular malformations.

**AB-2089-75**

**Bidirectional Flow of Contrast Material in Middle Cerebral Artery Branches** — Sindermann F (Section of Neuroradiology, University of Ulm, D-7900 Ulm, Steinhövelstrasse, Federal Republic of Germany), Giedke H, Kriebel J — Neuoradiology 8:113-117 (Oct 30) 1974*

In nine out of 24 patients with occlusion or stenosis of the middle cerebral artery, anterograde as well as retrograde flow of contrast material within the same vessel was demonstrated angiographically in one or several branches of the artery. Retrograde filling always occurred via leptomeningeal anastomoses which also contributed to anterograde flow in cases of middle cerebral artery branch
occlusion. In other cases with branch stenosis, delayed anterograde flow via the normal pathway, and retrograde flow via leptomeningeal anastomoses, met each other. The phenomenon of bidirectional flow in a cortical branch occurred, for instance, during recanalization and seems not to be correlated with an especially unfavorable prognosis for the dependent cerebral tissue. The angiographical criteria for cerebral arterial branch occlusion become questionable in view of the phenomenon of bidirectional flow of contrast material.

AB-2090-75
Zerebral Aneurysmen bei Aortenisthmusstenose und Hinweise auf andere neurologische Komplikationen dieser Erkrankung (Cerebral Aneurysms in Stenosis of the Aortic Isthmus and References to Other Neurological Complications of This Disease) — Scharfetter F (Neurochirurgische Klinik der Universität, A-6020 Innsbruck, Austria), Scharfetter H — München Med Wochr 116:1961-1966, 1974

The authors report on the observation of subarachnoid hemorrhage from an aneurysm of the middle cerebral artery as the first manifestation in a 16-year-old patient suffering from stenosis of the aortic isthmus. Reference is made to the coincidence of both diseases as multiple vascular deformities. Hemorrhage from a cerebral aneurysm is considered to be the fatal cause of stenosis of the aortic isthmus in 10% of cases. According to the concepts of the genesis of aneurysms, the chronically strongly increased blood pressure in the cerebral arteries of a patient with stenosis of the aortic isthmus promotes the development, enlargement and ultimately the rupture of such vascular deformity. Mention is made of other neurological sequelae of the disease as a result of the hypertensive cerebral circulation and disordered spinal blood flow, and some comments are made on the genesis of the deformities and on the development of cerebral aneurysms.

AB-2091-75

A controlled prospective survey to test the hypothesis that anovulants increase the incidence of thromboembolic disease is described. A significant negative correlation between anovulants and superficial venous thrombosis was demonstrated. Incidental findings include a negative correlation for weight gain and a positive correlation for average blood pressure. No evidence is presented demonstrating an association between the use of anovulants and the occurrence of deep-vein thrombosis or embolism.

AB-2092-75
Responsiveness to Potassium and Calcium Ions of Isolated Cerebral Arteries — Toda N (Department of Pharmacology, Kyoto University Faculty of Medicine, Kyoto, Japan) — Amer J Physiol 227:1206-1211 (Nov) 1974

Dog cerebral arteries (basilar, posterior cerebral, and middle cerebral arteries) with an outside diameter of 0.3 to 0.5 mm were helically cut into strips so that responses to K* and Ca** could be investigated. The addition of 5 mM K* produced a transient relaxation, which was related directly to the tension developed by prostaglandin F2α. Similar relaxation was induced in basilar arteries from humans. The K*-induced relaxation was dependent inversely on [K*], and directly on the temperature of bathing media. The relaxing effect of K* was attenuated by ouabain and abolished by substitution of LiCl for NaCl. Cerebral arterial strips when soaked for 60 minutes in Ca**-free media and treated with high concentrations of K* showed triphasic responses to Ca** (2.2 mM), rapid contraction, rapid relaxation, and slow, sustained contraction. When K* was not added prior to Ca**, only a rapid contraction followed by relaxation was induced. The relaxation was increased by treatment with EGTA in combination with exposure to Ca**-free media. Treatment with ouabain and substitution of LiCl for NaCl abolished the relaxation in response to Ca** in the K*-treated preparations and fused the rapid and slow contractions into one. It may be concluded that relaxation of cerebral arteries induced by K* in normal K* solutions is due to stimulation of the electrogenic Na+ pump and that relaxation following the rapid contraction induced by Ca** in the arteries exposed to Ca**-free media is associated either with a rapid uptake of Ca** by sarcoplasmic reticulum or with an active Ca++ extrusion mechanism.

AB-2093-75

A no-reflow phenomenon was observed in cats immediately after cerebral ischemia. When ischemia was followed by a normal recirculation of one hour’s duration, only minor perfusion defects and no intracranial hypertension was observed. If, however, ischemia was preceded by moderate hypoxia for several hours, extreme postischemic hyperemia was necessary to prevent the development of intracranial hypertension and a no-reflow phenomenon. Electron microscopic investigation revealed that capillary obstruction did not develop within the first hour after ischemia. Thus the no-reflow is not related to capillary lesions. The results support the view that the no-reflow phenomenon is produced by blood aggregates which obstruct vessels. This phenomenon is to some extent reversible. If, however, a slow-down of blood flow is induced by intracranial hypertension based on postischemic brain edema, the no-reflow is enhanced. There was no indication that arterial hypertension increases brain edema after ischemia.

AB-2094-75
Radiological Differentiation of Extracerebral Haematomas — May BR (Wessex Neurological Centre, Southampton General Hospital, Tremena Road, Southampton, England) — Brit J Radiol 47:742-746 (Nov) 1974

A review is presented of the clinical and radiological findings in 111 proved extracerebral hematomas. Laterally placed physical signs and unilateral skull fracture were found to be useful indicators of the side of the collection if it were an-
The Effect of Ketamine on Regional Cerebral Blood Flow in Man — Hougaard K, Hansen A, Brodersen P (Departments of Neurology, Anesthesiology, and Clinical Physiology, Bispebjerg Hospital, DK 2400, Copenhagen NV, Denmark) — Anesthesiology 41:562-567 (Dec) 1974*

Total (CBF) and regional (rCBF) hemispheric cerebral blood flows were measured by the intra-arterial 100Xe method in five neurological patients before and two to four minutes after intravenous injection of ketamine. While the responses of CBF were variable, marked increases in rCBF were observed in the frontotemporal regions in four of four and in the parieto-occipital region in three of five patients. It is concluded that ketamine is probably not a direct cerebrovasodilator, but that it may affect rCBF secondary to drug-induced changes in regional neuronal activity.

Effects of Arterial Hypoxaemia, Hypercapnia, and Changes in Cerebral Perfusion Pressure on Mean Cerebospinal Fluid and Sagittal Sinus Pressure — Hamer J (Department of Neurosurgery, University of Heidelberg, Kirschstrasse 1, D-6900 Heidelberg, Federal Republic of Germany), Alberti E, Hoyer S — Acta Neurochir 30:167-179, 1974*

In 20 anesthetized, artificially ventilated dogs the influence of arterial hypoxemia, hypercapnia, and decreased systemic arterial blood pressure on mean cerebospinal fluid pressure (CSFP) and on the pressure in the superior sagittal sinus (SSP) was studied. Below a Paco2 of 40 torr and above a Paco2 of 70 torr, CSFP was significantly increased. The pressure rise in the torcular, however, was only moderate. Simultaneous CBF measurements showed marked cerebral hyperemia to be the essential cause of the increase in CSFP. In deep normovolemic arterial hypotension (MABP below 50 mm Hg), CSFP and SSP were significantly decreased. CBF fell sharply by about 50% compared to the resting values. In arterial normotension and under normocapnic-normoxic conditions, a pressure difference of about 3 mm Hg existed between CSFP and SSP. This pressure difference increased in hypoxia and hypercapnia and fell in arterial hypotension below the "opening-pressure" of the arachnoid villi. An artificially induced rise of CSFP in another five experimental animals was reflected to a minor degree in the torcular pressure. However, during rapid reduction of raised intracranial pressure, a transient but marked pressure rise occurred in the torcular, persisting as long as systemic arterial blood pressure was increased (Cushing response). This is explained by post-compression cerebral hyperemia and by the undamped transmission of the hypertensive arterial pressure to the dilated cerebral vessels. The origin of the rapid CSF pulse waves was studied in simultaneous recordings of intracranial CSF, cerebral venous, systemic arterial and central venous pressure, and it was shown that the height of CSFP is dependent on MABP, whereas the contour of the CSF pulse waves is shaped by rapid changes of cerebral blood volume in the post-capillary cerebral vascular bed.

Brain Death. Cerebral Appearance of Inhaled Hydrogen in the Diagnosis of Cerebral Circulatory Arrest — Jørgensen PB (Department of Neurosurgery, Rigshospitalet, 9 Blegdamsvej, DK-2100 Copenhagen Ø, Denmark) — Acta Neurochir 30:187-193, 1974*

One hundred and twenty-one qualitative registrations of the cerebral appearance of inhaled hydrogen were performed in 21 patients with fatal intracranial disease approaching brain death. A platinum electrode, designed for the present purpose and placed in the cerebral cortex, was used for the measurements. The aim was to determine the time of cerebral circulatory arrest, not to measure tissue perfusion quantitatively. The system was found inexpensive, electrotechnically simple, and safe to the patient, and registrations could be repeated with short intervals. Good correlation was found with the angiographical demonstration of circulatory arrest in the brain. It is stressed that the method, being locally applied, cannot by itself give conclusive information about global cessation of cerebral blood flow.


The rupture of a saccular aneurysm during a direct attack can lead to a disastrous result unless deep hypotension has been induced before the dissection. If the mean pressure recorded through a microcatheter introduced into the radial artery is at 30 mm Hg level or below, the rupture remains circumscribed and the operative field can be dried easily with adjustable suction wherever the situation of the rupture may be. This technique was used in 52 cases with the operating microscope, which enables a clear vision of the lesion and of its vicinity. The mortality was two, or 3.8%, in spite of 34 operative ruptures.

Magnetically Guided Devices for Vascular Exploration and Treatment. Laboratory and Clinical Investigations — Hilal SK (Department of Radiology, Neurological Institute, New York, New York 10032), Michelsen WJ, Driller J, Leonard E — Radiology 113:529-540 (Dec) 1974*

The authors review the significant recent advances in the technology of magnetic instrumentation relevant to intravascular guidance. "Segmental progression" of intravascular catheters under the effect of an alternating magnetic field is described and documented by high-speed cinematography. The magnetic catheter electrode was used

*Authors’ abstract.
in the laboratory and clinically for monitoring intracranial
electroencephalograms and for producing electrothrombosis
of inoperable arterial aneurysms. The most promising
application seems to be selective vascular occlusion for the
further treatment of vascular lesions by the deposition of a discrete
embolus or an intravascular adhesive.

AB-2100-75
Communications Between Vertebro-Basilar and
Carotid Arterial Circulations in the Gerbil — Levy DE
(Department of Neurology, New York Hospital-Cornell
Medical Center, New York, New York 10021), Brierley JB
— Exp Neurol 45:503-508 (Dec) 1974 (Academic Press,
publisher)*

The cerebrovascular anatomy of the gerbil was evaluated
to assess the existence and significance of arterial com-
munications at the base of the brain. Postmortem intra-
aortic dye injection in ten gerbils demonstrated communica-
tions between both anterior cerebral arteries and between the basilar and posterior cerebral arteries. Vessels of the carotid circulation filled with dye even when both common carotid arteries were occluded. Intravenous injec-
tion of carbon black in vivo produced cerebral staining in six of ten gerbils that were previously subjected to bilateral common carotid artery occlusion, thereby demonstrating that such occlusion does not invariably produce complete cerebral ischemia. Variability in ischemia, possibly related
to differences in the number and size of these commu-
nicating vessels, may influence the outcome and interpre-
tation of experiments utilizing carotid occlusion in the
gerbil.

AB-2101-75
Subarachnoid Hemorrhage in Hereditary
Hemorrhagic Telangiectasia. A Report of Two Cases
— Eto RT, Harley JD (Department of Radiology, Univer-
sity of Michigan Medical Center, Ann Arbor, Michigan 48104), Gabrielsen TO, Latchaw RE — Neuroradiology 8:127-130,
1974 (Springer-Verlag, publisher)*

Two patients with hereditary hemorrhagic telangiectasia,
who presented with subarachnoid hemorrhage and were in-
vestigated with cerebral angiography, are reported. Both
showed multiple vascular malformations, and one showed a
posterior communicating artery aneurysm which was
treated successfully surgically.

AB-2102-75
Vertebral Arterial Occlusions in Children —
Latchaw RE, Seeger JF (Department of Radiology, Univer-
sity of Michigan Medical Center, Ann Arbor, Michigan
48104), Gabrielsen TO — Neuroradiology 8:141-147, 1974
(Springer-Verlag, publisher)*

Three children with angiographically confirmed, sudden
thrombosis involving the vertebralbasilar arterial system are
presented. Ten previously reported cases are reviewed with
particular regard to possible etiologies. Vertebral artery
trauma at the atlantoaxial level is suspected as one impor-
tant cause.

AB-2103-75
Some Technique-Dependent Patterns of Collateral
Flow During Cerebral Angiography — Seeger JF

*Authors' abstract.
sion. Elongation and potential angulation of the carotid artery is common but usually coexists with other lesions. If the finding is postulated as the cause for neurologic morbidity, the surgeon must be assured that symptoms are clearly neurologic, that no other cause exists, that angulation reduces the carotid lumen significantly and reproduces symptoms, and that the risk of operation is less than the expected risk of stroke in untreated patients.

**AB-2106-75**

The Influence of Aspirin on Postoperative Platelet Kinetics and Venous Thrombosis — Clagett GP, Schneider P, Rosoff CB, Salzman EW (Department of Surgery, Harvard Medical School, Boston, Massachusetts 02115) — Surgery 77:61-74 (Jan) 1975*

Several parameters of platelet kinetics were followed in 105 middle-aged and elderly postoperative patients, half of whom were randomly allocated to receive aspirin. A significantly lower incidence of venous thrombosis, as detected by 125I-fibrinogen scanning, was found among patients receiving aspirin when compared with the control group. Platelet survival was shortened in the postoperative state, an effect that was inhibited by aspirin. The development of deep vein thrombosis did not shorten platelet survival, nor did fibrinogen survival discriminate patients with venous thrombosis. Treatment with aspirin reduced urinary excretion of 5-hydroxy indole acetic acid — presumably by inhibiting in vivo platelet release of serotonin, reduced postoperative consumption of platelets, and reduced the mean corpuscular volume of the platelet population. These studies suggest that platelet function is important in the pathogenesis of postoperative venous thrombosis.

**AB-2107-75**

Surgical Treatment of Vascular Lesions in the Brain Stem — Chou SN (Department of Neurosurgery, University of Minnesota Medical School, Minneapolis, Minnesota 55455), Erickson DL, Ortiz-Suarez HJ — J Neurosurg 42:23-31 (Jan) 1975*

The authors report the total surgical removal of five vascular lesions of the brain stem, three hemangioblastomas and two arteriovenous malformations. One patient died; among the others, the quality of survival is excellent. Factors favoring surgical removal of such lesions are discussed.

**AB-2108-75**

Chronic Subdural Hematoma in Adults. Influence of Patient’s Age on Symptoms, Signs, and Thickness of Hematoma — Fogelholm R (Department of Neurology, 29, Finland), Heiskanen O, Waltimo O — J Neurosurg 42:43-46 (Jan) 1975*

The relationship of age to clinical and pathological findings was analyzed in 109 adult patients operated on because of chronic subdural hematoma. A well-formed membrane on the inner and outer surface of the hematoma was used as the criterion for chronicity of the hematoma. Younger patients had more evidence of increased intracranial pressure; older patients had more evidence of mental deterioration and pyramidal tract lesions. The interval from trauma to operation was shorter in the young patients. The thickness of the hematoma as measured from angiograms increased with the age of the patient. The cause of this difference is discussed.

**AB-2109-75**

Electrothrombosis of Carotid-Cavernous Fistula — Hosobuchi Y (Department of Neurological Surgery, University of California School of Medicine, San Francisco, California 94122) — J Neurosurg 42:76-85 (Jan) 1975*

The author describes a technique for directly closing a carotid cavernous fistula with electrothrombosis while preserving the intracranial arterial circulation. Copper wires are introduced throughout the superior ophthalmic vein or a frontotemporal craniotomy, and thus directly into the portion of the sinus into which the fistula drains; if posterior, into the posterior segment of Parkinson’s triangle, if inferior, into the pterygoid plexus, and if anterior, through the sphenoparietal sinus and/or middle cerebral vein to the anterior-inferior portion of the sinus. A direct current is applied until a thrombus is confirmed angiographically and the wires are left in place. Four patients treated by this method are presented.

**AB-2110-75**

Transfemoral Embolization of an External Carotid-Cavernous Fistula. Case Report — Pugatch RD, Wolpert SM (Department of Radiology, Tufts-New England Medical Center Hospital, Boston, Massachusetts 02111) — J Neurosurg 42:94-97 (Jan) 1975*

The authors report a case of spontaneous carotid-cavernous fistula in which transfemoral arterial embolization under fluoroscopic control resulted in immediate occlusion of the fistula and dramatic resolution of the patient’s signs and symptoms.

**AB-2111-75**

Chronic Subdural Hematoma Simulating Transient Cerebral Ischemic Attacks. Case Report — Melamed E (Department of Neurology, Hadassah University Hospital, Jerusalem, Israel), Lavy S, Reches A, Sahar A — J Neurosurg 42:101-103 (Jan) 1975*

A patient is presented in whom chronic subdural hematoma simulated transient ischemic attacks. The neurological manifestations were those of recurrent, transient episodes of expressive dysphasia preceded by focal sensory deficit. Various pathophysiological mechanisms which could have caused the unusual clinical picture are briefly considered.

**AB-2112-75**


Seven cases of the “locked-in” syndrome are described. This is a disorder in which a conscious, mute patient is completely paralyzed apart from some form of eye movement, usually as a result of an infarct in the ventral pons. Such patients are often assumed to be in coma and as a result may be distressed by inappropriate conversation around the bedside.

*Authors’ abstract.
Thrombin on Platelet Aggregation and Fibrin Clotting

Concentration Effects of Platelets, Fibrinogen and Thrombin on Platelet Aggregation and Fibrin Clotting — Chao FC, Tullis JL, Kenney DM, Conneely GS, Doyle JR (Center for Blood Research, Department of Medicine, New England Deaconess Hospital and Harvard Medical School, Boston, Massachusetts) — **Thromb Diath Haemorrh** 32:216-231, 1974*

The effects of varying concentrations of platelets, fibrinogen and thrombin on platelet aggregation and on fibrin clotting were investigated. The results indicated that a threshold thrombin to platelet concentration ratio may be required to cause platelet activation. Above the threshold ratio, platelets exhibited properties which enhanced thrombin action in causing aggregation and fibrin clotting. At T/P ratios below the threshold level, the presence of platelets reduced thrombin activity, in other words, platelets exerted an antithrombin action. Fibrinogen at low concentrations (0.02 to 1.5 mg per milliliter) enhanced platelet aggregation induced by thrombin; whereas, at high concentrations of fibrinogen (2 to 4 mg per milliliter), aggregation was markedly inhibited. Continuous mixing of samples of platelets and fibrinogen at physiological concentrations with thrombin at low concentrations (< 2 U per milliliter) resulted in platelet aggregation. On the other hand, fibrin clots formed in samples without mixing or with high thrombin concentrations (≥ 5 U per milliliter). These results suggested that the quantitative relationships between platelets, fibrinogen and thrombin, and the presence or absence of cell contact may be important factors in determining the overall hemostasis.

**ABSTRACTS**

**AB-2113-75**

**Concentration Effects of Platelets, Fibrinogen and Thrombin on Platelet Aggregation and Fibrin Clotting** — Chao FC, Tullis JL, Kenney DM, Conneely GS, Doyle JR (Center for Blood Research, Department of Medicine, New England Deaconess Hospital and Harvard Medical School, Boston, Massachusetts) — **Thromb Diath Haemorrh** 32:216-231, 1974*

**AB-2114-75**

**Bilateral Dissecting Aneurysms of the Internal Carotid Arteries** — Adelman LS (Department of Pathology, New England Medical Center Hospital, Boston, Massachusetts 02111), Doo FD, Sarnat HB — **Acta Neuropath (Berl)** 29:93-97, 1974 (Springer-Verlag, publisher)*

We present clinical and pathologic data on a 14-year-old boy with bilateral dissecting aneurysms of the internal carotid and middle cerebral arteries. The case is unusual in that bilateral dissecting aneurysms of the intracranial vessels have not been described, and because the internal elastic lamina was focally absent in both intracranial and somatic arteries. This abnormality of the elastica has been described in association with internal carotid occlusion and telangiectasia of the basal ganglia, the Moyamoya syndrome. The relation between dissecting carotid aneurysms and Moyamoya is discussed.

**AB-2115-75**

**Predictive Factors in Stroke Rehabilitation** — Anderson TP (Department of Physical Medicine and Rehabilitation, University of Minnesota Medical School, Minneapolis, Minnesota 55455), Bourestom N, Greenberg FR, Hildyard VG — **Arch Phys Med Rehab** 55:545-553 (Dec) 1974*

A total of 233 patients with completed stroke were studied to determine characteristics present at admission for predicting long-term functional improvement in a rehabilita-

*Authors' abstract.

**AB-2116-75**

**Takayasu’s Arteritis. An Angiographic Study With Remarks on Ethnic Distribution in Israel** — Deutsch V (Department of Radiology, The Chaim Sheba Medical Center, Tel-Hashomer and Tel-Aviv University School of Medicine, Tel-Aviv, Israel), Wexler L, Deutsch H — **Amer J Roentgenol Rad Ther Nucl Med** 122:13-28 (Sept) 1974

The angiograms and clinical records of 22 patients with Takayasu’s arteritis who were seen at a major medical center in Israel were reviewed. Although about half the patient population at the Center were of Ashkenazi origin, all of the patients with Takayasu’s arteritis were from other Jewish ethnic backgrounds or were Arabs or Beduins. The sites of vascular involvement also seemed to vary with different ethnic groups. Ten of the patients were male.

**AB-2117-75**

**Cerebral Angiographic Findings in Disseminated Intravascular Coagulation** — Weidner WA (Department of Radiology, The Milton S. Hershey Medical Center, The Pennsylvania State University, Hershey, Pennsylvania 17033), Brennan RW — **Amer J Roentgenol Rad Ther Nucl Med** 122:477-484 (Nov) 1974

Clinical and cerebral angiographical data are presented regarding four patients with acute multifocal cerebral deficits associated with laboratory evidence of disseminated intravascular coagulation. The angiograms showed evidence of acute thromboembolic occlusions of large and medium-sized intracranial arteries, especially the middle cerebral vessels. At necropsy two patients were shown to have nonbacterial endocarditis. None of the patients had evidence of arteriosclerotic cerebral vascular disease or vasculitis. The characteristics of the angiographical findings in these patients are discussed.

**AB-2118-75**

**Cerebral Angiography in Momentary Cardiac Arrest and Systemic Hypotension in the Dog** — Lin S-R (Department of Radiology, University of Rochester School of Medicine, Rochester, New York) — **Amer J Roentgenol Rad Ther Nucl Med** 122:485-494 (Nov) 1974

Cerebral angiograms during transient cardiac arrest induced by acetylcholine and during systemic hypotension induced by trimethaphan (Arfonad) were compared to control studies in dogs. In the controls the entire angiogram lasted less than six seconds. During cardiac arrest the arterial phase was prolonged in both the intracranial and extracranial arteries. Only slight dilatation of the vessels was noted, unless large doses of acetylcholine were used. During
controlled hypotension with mean blood pressure of 30 mm Hg the arterial phase was prolonged, lasting about four to five seconds; whereas at 40 mm Hg there was no prolongation of the arterial phase. The degree of prolongation correlated well with the degree of hypotension below 40 mm Hg, both during cardiac arrest and during controlled hypotension without arrest.

**AB-2119-75**


Some clinical features of 25 patients with angiographical evidence of occipital lobe arteriovenous malformations included homonymous hemianopia (11 patients); seizures (nine, six of whom had visual auras); visual phenomena (13), e.g., flashes of light, dimming of vision, transient photopsias or scotomas; and headaches, typically frontal on the side of the lesion. Bruits were noted in five patients. Arterial supply to the lesions is variable and usually multiple, including distal branches of middle cerebral, posterior cerebral, external carotid, and pericallosal arteries. Proper angiographical evaluation is stressed.

**AB-2120-75**

Selective Temporal Arteriography and Biopsy in Giant Cell Arteritis: Polymyalgia Rheumatica — Mondaca R (Department of Radiology, Loyola University Medical Center, Stritch School of Medicine, Maywood, Illinois 60153), Baker D, Rubinstein H, Shah D, Love L — *Amer J Roentgenol Rad Ther Nucl Med* 122:580-585 (Nov) 1974

Of 20 patients with clinical evidence of polymyalgia rheumatica (but not of temporal arteritis) five had positive temporal arteriograms, one of whom also had a positive biopsy. The authors conclude that temporal arteriography is more sensitive in detecting cranial arteritis than is random temporal artery biopsy. An external marker over the lesion seen on the arteriogram is useful for selecting the appropriate biopsy site. There were no complications from the temporal arteriograms.

**AB-2121-75**

A Quick Method for Calculation of the Vascular Mean Transit Time — Phelps ME (Division of Radiation Sciences, Mallinckrodt Institute of Radiology, Washington University School of Medicine, St. Louis, Missouri 63110), Eichling JO — *J Nucl Med* 15:814-817 (Sept) 1974

A Hamilton extrapolation analysis of the clearance curve of a radioactive nondiffusible tracer injected into the internal carotid artery was shown to be an accurate measure of mean vascular transit time through the brain. Oxygen-15-labeled CO-hemoglobin was used as the tracer in experiments with rhesus monkeys and human subjects. The results were compared with the cerebral mean transit times calculated by the more tedious planimeter method.

**AB-2122-75**

Accuracy of Radionuclide Cerebral Angiograms in the Detection of Cerebral Arteriovenous Malformations — Tyson JW, Witherspoon LR, Wilkinson RH Jr, Goodrich JK (Division of Nuclear Medicine, Duke Univer-

sity Medical Center, Durham, North Carolina 27710) — *J Nucl Med* 15:953-958, 1974

In a series of 16 patients with histological or angiographical evidence of cerebral arteriovenous malformations, all had positive radionuclide cerebral angiograms. The radionuclide activity in these studies had a peak at the site of the AVM in the arterial phase and a rapid decline following the venous phase. A similar pattern is sometimes present with malignant gliomas and after cerebral infarcts ("hot stroke"). The overall previously reported success rate of radionuclide angiography in the detection of AVMs is 96%; the two lesions not detected were small (< 1 cm in one case).

**AB-2123-75**

Dissecting Aneurysm of Carotid and Vertebral Arteries. A Clinical and Angiographic Study of Early Diagnosis, Natural History, and Pathophysiology of Cerebral Lesions. A Study of Four Cases — Bladin PF (Austin Hospital, Department of Neurology, Studley Road, Heidelberg, Melbourne, Victoria, Australia) — *Vasc Surg* 8:203-223 (Sept-Oct) 1974

Dissecting aneurysms were demonstrated angiographically in four patients who had had the sudden onset of neurological deficits; two had internal carotid lesions and two had vertebral artery lesions. Cranial or cervical pain was an early symptom, preceding the onset of neurological symptoms by several days. Neurological deficits that resolved and then recurred with added dysfunction suggest that cerebral embolization and later, more proximal arterial occlusion may have occurred in these patients. The clinical data, angiographical findings, surgical results (two patients), and autopsy material (one patient) are presented and compared to previously reported cases. Early surgical therapy for the prevention of embolic and occlusive complications is discussed.

**AB-2124-75**

Internal Carotid Artery Stump Pressures During Regional Anesthesia — Sublett JW (Anesthesia and Operative Service, Walter Reed Army Medical Center, Washington, D.C. 20012), Seidenberg AB, Hobson RW II — *Anesthesiology* 41:505-508 (Nov) 1974

Regional anesthesia was used in 18 patients undergoing carotid endarterectomy. In the awake patient the blood pressure cephalad to the clamp (stump pressure) did not seem to be a reliable indicator of the need for an internal shunt during the period of occlusion (because the symptoms caused by cerebrovascular insufficiency seemed to be of varied etiology). Mild hypocarbia, slight increase in mean blood pressure, and the opportunity to clinically evaluate an awake patient's neurological state are all advantages offered by regional anesthesia.

**AB-2125-75**

Electrocardiographic Changes After Bilateral Carotid Endarterectomy — Baur HR, Pierach CA (Northwestern Hospital, Minneapolis, Minnesota 55407) — *New Eng J Med* 291:1121-1122 (Nov 21) 1974

Transient T-wave inversions were noted in the electrocardiograms of five consecutive patients after they had undergone staged, bilateral, standard-bifurcation carotid endarterectomies. None of the five had enzyme or clinical
evidence of myocardial infarction. A possible mechanism for these neurogenic electrocardiographical changes is discussed.

AB-2126-75
The Clinical Syndrome of Atrial Myxoma — Peters MN, Hall RJ (Texas Heart Institute, PO Box 20269, Houston, Texas77025), Cooley DA, Leachman RD, Garcia E — JAMA 230:695-701 (Nov 4) 1974

The clinical and laboratory findings in 17 patients with atrial myxomas are discussed; 15 of the 17 had left atrial myxomas. A common clinical course would include heart failure, fatigue, and weight loss over a short period (two years or less) in a middle-aged adult without a history of rheumatic fever. Also, syncope or paroxysmal dizziness occurred in nine of the 17 patients in this series. Fever, anemia, increased sedimentation rate, and increased immunoglobulins (especially IgG) are common findings. Systemic emboli are found in about 40% of patients with left atrial myxoma; these patients often have auscultatory signs of mitral valve disease and a characteristic echocardiogram. Angiography confirms the preoperative diagnosis. Surgical removal of the myxoma should be done promptly to avoid embolization. No recurrences in up to 15 years of follow-up were apparent in this series.

AB-2127-75

By measurements of the diameter of the carotid bifurcation region and the arterial blood pressure before and after carotid endarterectomy in 11 patients, it was shown that there was an overall increase in diameter and a decrease in distensibility. Electroneuromograms of sinus nerve activity (measured in nine patients) and systemic blood pressure reflected these changes. The sinus nerve and carotid baroreceptive region must be preserved to avoid postoperative hypertension. Postoperative hypotension can be treated with local anesthesia of the sinus region until the baroreceptors adapt.

AB-2128-75
Diagnostic Significance of CSF Spectrophotometry in Cerebrovascular Disease — Kjellin KG, Soderstrom CE (Department of Neurology, Karolinska Hospital, 10401 Stockholm 60, Sweden) — J Neurol Sci 23:359-369 (Nov) 1974

Of 1,000 diagnoses of varied cerebrovascular diseases, 200 were considered to be well verified, either clinically alone or with the aid of angiography, surgery, or necropsy. Of the 61 patients with strong evidence of CNS bleeding only about half had grossly visible xanthochromia on CSF examination, whereas in all but three of the cases CSF spectrophotometry detected “hemorrhagic fractions.” In those three cases the lumbar puncture was done very early or late in relation to the onset of symptoms (three to four hours, 18 days, and 60 days, respectively). The authors conclude that CSF spectrophotometry is a simple, fast and sensitive method for identifying xanthochromic compounds in the CSF. Difficulties in interpretation of the data, e.g., distinguishing CNS hematomas from hemorrhagic infarctions, are discussed.

AB-2129-75

Plasma renin, angiotensin II, sodium concentrations, urinary catecholamines, and blood pressure were analyzed before and after neurosurgical surgery in five patients with spontaneous subarachnoid hemorrhages. No correlation between level of consciousness and plasma renin and angiotensin II was found. The one patient with postoperative cerebral vasospasm (demonstrated angiographically) had an increased increase in plasma renin, angiotensin II, and urinary normetanephrine. The authors discuss a mechanism by which the renin-angiotensin II system may be activated in subarachnoid hemorrhage and may influence the sympathetic nervous system in the production of cerebral arterial spasm.

AB-2130-75

Excellent anticoagulant regulation was achieved with 195 outpatients when they were given a guidance card by which they were instructed to change their doses of coumarin in accordance with their prothrombin times. A second card was used by each patient to record his daily dose of anticoagulant plus his weekly prothrombin time result; this card was sent to a supervising physician for monthly evaluation.

AB-2131-75
Influence of Complete Ischemia on Glycolytic Metabolites, Citric Acid Cycle Intermediates, and Associated Amino Acids in the Rat Cerebral Cortex — Follbergrová J, Ljunggren B, Norberg K, Siesjö BK (Brain Research Laboratory, E-blocket, University Hospital, Lund, Sweden) — Brain Res 80:265-279 (Nov 15) 1974

The concentrations of citrate, α-ketoglutarate, succinate, fumarate, malate, glutamate, aspartate, GABA, alanine, glutamine, asparagine, and ammonia in the cerebral cortex of rats were measured in controls, after occlusion of the cerebral circulation for five minutes, and after occlusion and then 15 minutes of recirculation. After ischemia α-ketoglutarate and oxaloacetate were depleted; citrate, malate, and fumarate were decreased; glutamate, aspartate, glutamine, and asparagine were not significantly changed; and succinate, GABA, and alanine were increased. Citric acid cycle intermediates were increased (120% of normal), but after recirculation they returned toward normal, although the pool size remained increased. Alanine increased further, as did glutamine and asparagine; the GABA increase remained about the same; glutamate and aspartate decreased. The marked increase of succinate during ischemia suggests a reversal of the terminal reactions of the
citric acid cycle. Such anaerobic reactions do not seem to significantly contribute to the energy supply of the ischemic brain.

**AB-2132-75**

**Sympathetic innervation of the Circle of Willis in the Maraque Monkey** — Hernández-Pérez MJ (Division of Neurology, The Milton S. Hershey Medical Center, The Pennsylvania State University, Hershey, Pennsylvania, 17033), Stone HL — *Brain Res* 80:507-511, 1974

Unilateral superior cervical gangliectomies were performed on nine adult monkeys (*Macaca mulatta*). From 9 to 15 days later the animals were killed (three other monkeys were used as controls), and biogenic amines were identified by the histochemical fluorescence technique in the major cerebral arteries. In the three controls and on the nonsympathecctomized side of the nine other monkeys, a consistent pattern of postganglionic sympathetic fibers was noted. The anterior and middle cerebral arteries were more richly innervated than the vertebral and posterior cerebral arteries. A notable, but not complete, decrease of fluorescence was found on the sympathectomized side. The possible significance of these findings is discussed.

**AB-2133-75**

**Thrombocythemia and Myocardial Ischemia With Normal Coronary Angiogram** — Barr I, Cohen P, Berkien A, Lown B (665 Huntington Avenue, Boston, Massachusetts 02115) — *Arch Int Med* 134:528-533 (Sept) 1974

A 40-year-old (premenopausal) woman with severe nocturnal angina associated with ventricular arrhythmia and an electrocardiographical current of injury was found to have normal coronary vessels on angiography. Her platelet count ranged from 722,000 to 1,205,000/mm², and the platelet adhesiveness from 13% to 27.5%. The thrombocythemia and slightly increased RBC volume (31.3 ml per kilogram) suggested polycythemia vera. The authors discuss the relationship of myocardial ischemia and thrombocythemia in this patient in light of past reports.

**AB-2134-75**


A 25-year-old woman with a 14-year history of rheumatic heart disease and an asymptomatic heart murmur was admitted with left hemiparesis of sudden onset and fever. A left carotid angiogram on the second hospital day showed no filling of the frontoparietal branch of the middle cerebral artery. Another angiogram six weeks later showed an irregular, elongated, fusiform aneurysm with saccular outpouching in the proximal, previously occluded, frontoparietal artery. She improved clinically after four weeks of penicillin therapy. A third angiogram six weeks after the onset of symptoms showed the aneurysm to be slightly more irregular and smaller than at six weeks. These findings suggest that a mycotic aneurysm can develop from an intraluminal mycotic embolus. Other hypotheses regarding the development of mycotic aneurysms are discussed.

**AB-2135-75**

**Cerebral Atherosclerosis of Japanese** — Nakamura M (Research Institute of Angiocardiology, Kyushu University School of Medicine, Fukuoka, Japan), Torii S, Yamamoto H, Kikuchi Y, Yatsuki K — *Jap Heart J* 15:517-523 (Sept) 1974

Macroscopic grading of cerebral atherosclerosis was performed on 717 Japanese patients who had died suddenly and unexpectedly. Compared with a previous report on Caucasians the most frequent sites of severe cerebral atherosclerosis in the Japanese group were different; the peripheral middle cerebral, proximal posterior cerebral, and the vertebral arteries near the basilar were more frequently narrowed than the internal carotid or proximal middle cerebral arteries. Overall, the severity of cerebral atherosclerosis in terms of macroscopic grading and lipid content was slightly more than that reported for Caucasians.

**AB-2136-75**


The author reviews the anatomy of the spinal arteries, the techniques for best demonstrating these arteries, and the limitations of current methods. Illustrations of a normal spinal angiogram are included.

**AB-2137-75**


The authors review current surgical-treatment methods for spinal cord angiomas. Such treatment is largely prophylactic. Posterior cord angiomas are most amenable to surgery. Anterior angiomas are impossible to remove completely at present; microsurgical innovations may permit intramedullary angioma removal in the future as well as improved treatment of anterior angiomas. Embolization techniques have already shown promise in the treatment of large angiomas. The authors emphasize the need for careful spinal cord angiography in patients with spinal cord lesions of uncertain cause, especially those with a relapsing, progressive course.

**ITEMS OF INTEREST**

**Injury and Repair in Arterial Tissue: Proceedings of an International Colloquium Held at the Fourteenth Annual Meeting of the International College of Angiology** — Angiology 3:58-60 (Jan) 1975

**An Experimental Occlusion of the Middle Cerebral Artery by Transorbital Approach** — Albanese V (Istituto di Neurochirurgia, Policlinico Universitario, 98100 Messina, Italy), Tomassello F, Cioffi FA — *Surg Neurol* 3:58-60 (Jan) 1975

**Platelet Inhibition in the Management of Thrombosis** — Didisheim P (Section of Laboratory Hematology, Mayo Clinic, Rochester, Minnesota 55901), Kazmier FJ, Fuster V — *Thromb Diath Haemorrh* 32:21-34, 1974

Reviews aspirin, sulfinpyrazone, dextran, diprydiamole, and antiocoagulant therapy in transient ischemic attacks and other conditions.
ABSTRACTS

Clinical Implications of Warfarin Interactions With Five Sedatives — Udall JA (Department of Medicine, University of California, Irvine College of Medicine, Irvine, California 92664) — Amer J Cardiol 35:67-71 (Jan) 1975

The intensity, uniformity and time course of anticoagulant interference by several sedatives were systematically investigated in 16 patients receiving coumarin therapy; each subject received an individualized fixed daily dose of warfarin and served as his own presedative and postsedative treatment control. Anticoagulant inhibition was observed during the administration of phenobarbital, secobarbital and glutethimide (Doriden®); there was no significant change in prothrombin test results during the trials of chloral hydrate and methaqualone (Quaalude®). Barbiturates and glutethimide should not be administered to patients receiving coumarin drugs. Chloral hydrate and methaqualone interact pharmacologically with orally administered anticoagulant agents, but the effect is not clinically significant. It is concluded that chloral hydrate and methaqualone may be administered safely without additional caution in prothrombin test monitoring during oral anticoagulant therapy.
Abstracts

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