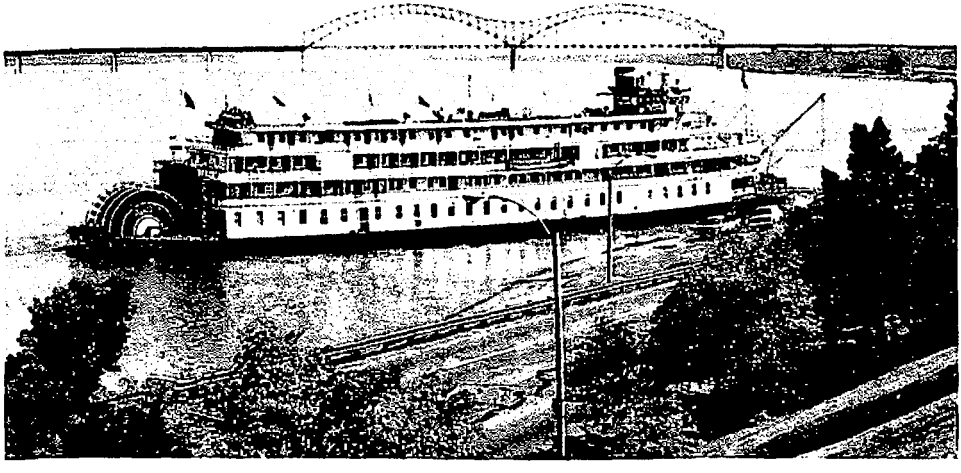
American Academy of Neurological Surgery

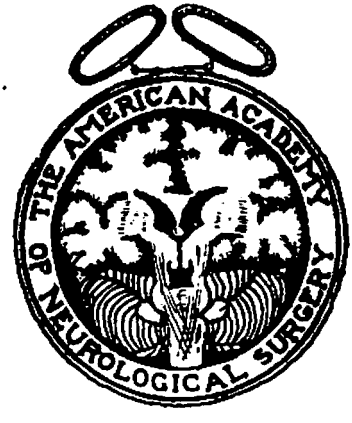
ANNUAL MEETING

Memphis, Tennessee

November 7-10, 1979



ANNUAL MEETING 1979



Hyatt Regency Memphis

Memphis, Tennessee

November 7-10, 1979

THE AMERICAN ACADEMY OF NEUROLOGICAL SURGERY

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Local Hosts

Dr. and Mrs. James T. Robertson
Dr. and Mrs. James C. H. Simmons
Dr. and Mrs. Richard L. DeSaussure

PROGRAM 1979

REGISTRATION: GALLERY

Wednesday, November 7	4:00-6:30 P.M.
Thursday, November 8	8:00-10:00 A.M.
	2:00-4:00 P.M.
Friday, November 9	8:00-10:00 A.M.

WEDNESDAY, NOVEMBER 7

6:30-9:30 P.M. . . . . Welcoming Cocktail-Buffet-Ridgeway B

THURSDAY, NOVEMBER 8

7:00 A.M. . . . . Breakfast and Business Meeting-Ridgeway B (Members Only)
Breakfast - Director's Room (Guests)
8:20-10:30 A.M. . . . . Scientific Session-Ridgeway A
10:30-10:50 A.M. . . . . Coffee Break-Foyer
10:50-12:00 noon . . . . . Scientific Session-Ridgeway A
12:00-1:00 P.M. . . . . Luncheon-Ridgeway B
1:00-3:00 P.M. . . . . Scientific Session-Ridgeway A
3:00-3:20 P.M. . . . . Coffee Break-Foyer
3:20-4:00 P.M. . . . . Scientific Session-Ridgeway A
5:30 P.M. . . . . Board Buses for Riverboat Trip
6:00-10:00 P.M. . . . . Riverboat Trip-Cocktails and Dinner

FRIDAY, NOVEMBER 9

7:00 A.M. . . . . Breakfast and Business Meeting-Ridgeway B (Members Only)
Breakfast-Parlor 108 and 109 (Guests)
8:30-9:50 A.M. . . . . Scientific Session-Ridgeway A
9:50-10:10 A.M. . . . . Coffee Break-Foyer
10:10-12:00 noon . . . . . Scientific Session-Ridgeway A
12:30 P.M. . . . . Luncheon-Memphis Country CLub
1:30 P.M. . . . . Golf, Tennis-Memphis Country Club
Tour of Chucalissa Indian Village
7:00 P.M. . . . . Cocktails, Shiloh Room
8:00 P.M.-Midnight . . . . . Banquet and Dancing Ridgeway B.
After Dinner Speaker: John J. Thomason

SATURDAY, NOVEMBER 10

8:00-9:00 A.M. . . . . Breakfast and Business Meeting-Hugos (Members Only)
Breakfast-Parlor 104 and 105 (Guests)
9:00-10:20 A.M. . . . . Scientific Session-Ridgeway A
10:20-10:50 A.M. . . . . Coffee Break-Foyer
10:50-12:00 noon . . . . . Scientific Session-Ridgeway A

LADIES PROGRAM

WEDNESDAY, NOVEMBER 7

6:30-9:30 P.M. . . . . Welcoming Cocktail-Buffet-Ridgeway B

THURSDAY, NOVEMBER 8

8:00 A.M. . . . . Hospitality Room, Continental Breakfast Parlor 112 and 113
9:00 A.M. . . . . Depart for Breakfast at Carriage House. Tour of Surrounding Homes in Victorian Village-The Fontaine House and Mallory House. Brief Bus Tour of Memphis including the Medical Center.
2:00-4:00 P.M. . . . . Tour of Dixon Gallery and Gardens
5:30 P.M. . . . . Board Buses for Riverboat Trip
6:00-10:00 P.M. . . . . Riverboat Trip-Cocktails and Dinner

FRIDAY, NOVEMBER 9

8:00 A.M. . . . . Hospitality Room, Continental Breakfast Parlor 112 and 113
9:00 A.M. . . . . Depart for Coffee and Doghnuts Served at Woman's Exchange. Shopping to Follow.
12:30 P.M. . . . . Luncheon-Memphis Country Club
1:30 P.M. . . . . Golf, Tennis-Memphis Country Club
Tour of Chucalissa Indian Village
7:00 P.M. . . . . Cocktails, Shiloh Room
8:00 P.M.-Midnight . . . . . Banquet and Dancing-Ridgeway B
After Dinner Speaker: John J. Thomason

SATURDAY, NOVEMBER 10

8:00 A.M. . . . . Hospitality Room, Continental Breakfast Parlor 112 and 113
9:00 A.M. . . . . Workshop and Demonstration of Silk Flowers
Facials by Mary Kay Beauty Consultant

SCIENTIFIC PROGRAM
THE AMERICAN ACADEMY OF NEUROLOGICAL SURGERY
Memphis, Tennessee
November 7-10, 1979

MODERATOR: Leonard I. Malis

THURSDAY, November 8
8:20 a.m.
Welcoming Remarks and Announcements

8:30 a.m.

1. A New Non-suture Technique for Rapid Vascular Anastomosis

W. M. Lougheed and F. Gentili
Toronto, Ontario, Canada

Despite advances in microvascular techniques, problems in cerebrovascular reconstructive surgery remain, including that of providing an adequate blood volume to the brain and maintaining blood flow while the microscopic anastomosis is being created. We have developed a technique based on the use of a specially devised anastomotic clip and ring prosthesis which allows for rapid anastomosis of vessels without the need for placement of sutures. Twenty-five vascular anastomoses have been carried out in the dog using cartoid, femoral and brachial vessels ranging from 1 to 3 mm in diameter.

Time taken for actual anastomosis has averaged 10 to 12 minutes. The patency rate in animals followed from six weeks to six months with serial angiography has been 92%. Post-mortem histological and scanning electronmicroscopic studies have revealed excellent intima to intima junctional anastomosis with no evidence of thrombosis or stenosis. The high long-term patency rates appear to be related to the precise alignment and intima to intima relationship at the anastomotic site without the presence of foreign suture material.

These results demonstrate the technical feasibility of this technique which could easily be adapted for clinical use in man for the treatment of inaccessible intracranial regional stenotic lesions of the internal carotid, middle cerebral and vertebral arteries, as well as in dealing with large complex aneurysms.

Part of the presentation will include a short (5 to 6 minute) film to demonstrate this technique.

(Discussion)

8:50 a.m.

2. Elective Extracranial Intracranial Arterial Bypass in the Treatment of Giant Aneurysms

R. F. Speltzler, H. Schuster and F. E. Nulsen
Cleveland, Ohio

We are presenting a series of nine patients with large internal carotid artery aneurysms, treated by internal carotid artery ligation following the establishment of a patent extracranial intracranial arterial bypass. All aneurysms were deemed unsuitable for direct clipping by angiographic appearance or through direct exposure. Two patients presented with subarachnoid hemorrhage, and the remainder with evidence of intracranial mass lesion.

Operative Technique: The parietal or frontal branch of the superficial temporal artery is used to create a superficial temporal artery middle cerebral artery bypass. The internal carotid artery is then exposed in the neck and a Selverstone clamp placed around it and partially closed. Criteria for achieving 50% reduction in blood flow will be discussed.

On the second or third postoperative day, selective cerebral angiography is performed. The Selverstone clamp is closed completely when the bypass is proved patent.

Results: The bypass was patent in all patients. No patient experienced ischemic complications. The pre-op third nerve palsies disappeared over time and visual acuity improved in the visually compromised patients. No patient has had a subarachnoid hemorrhage in this relatively brief follow-up. Late angiography is planned for all patients - its present status will be presented.

Discussion: The rationale behind performing a bypass prior to internal carotid artery ligation is the obvious attempt to minimize ischemic complications. A more theoretical but seemingly plausible advantage is that the bypass would decrease the amount of collateral blood flow adjacent to the aneurysm with less turbulence at that site. Presumably, this could afford some protection to the aneurysm and enhance the chances for complete thrombosis.

We feel that the results of this admittedly small series suggest that whenever a carotid artery is to be ligated electively, an extracranial intracranial arterial bypass should be considered.

(Discussion)

9:10 a.m.

3. Strokes in Children - Their Relationship to Intrinsic Pathology of the Carotid Artery

Robert G. Fisher
Plainfield, New Jersey

Vascular insufficiency of the carotid artery may cause inadequate perfusion to a child's brain of such extent that not only temporary but permanent neurologic deficit may ensue.

Alterations to the carotid artery in this unique group of cases have included the following:

1. Tear in the innominate artery with secondary inadequate carotid flow.
2. Extracranial carotid aneurysm with secondary cerebral embolus.
3. Thrombosis of the carotid artery antegrade to an aneurysm.
4. Kinking of the carotid artery.
5. Bilateral carotid artery thrombosis.
6. Thrombosis of the carotid artery at the "siphon."

The etiology, therapy and results will be discussed. The recovery was poor in three cases.

(Discussion)

9:30 a.m.

4. Intracerebral Hemorrhage Following Carotid Endarterectomy

James W. Correll and Jack Stern
New York, New York

The risk of intracerebral hemorrhage following carotid endarterectomy, in the presence of acute infarction, is well recognized. However, this complication may occur even though intensive investigation has apparently failed to demonstrate evidence of preoperative infarction.

Of more than 1,000 endarterectomies performed by the senior author, we have had experience with intracerebral hemorrhage in 10 patients in whom there had been no evidence of acute infarction. Preoperative evaluation (including angiography, computerized

tomography and EEG), the clinical course and possible etiological factors will be discussed. In addition, the indication for craniotomy and evacuation of the hematoma will be reviewed.

(Discussion)

9:50 a.m.

5. Angiography in Vertebral Basilar Insufficiency and Brainstem Infarction

James I. Ausman, Suresh Patel
and Roushdy S. Boulos
Minneapolis, Minnesota

Because of the supposed risks of angiography in vertebral basilar insufficiency (VBI) and brainstem infarction (BSI) and the lack of any surgical alternative in these diseases, there has been little angiographic evaluation of vascular patients with VBI and BSI.

In this presentation, examples selected from our experience with VBI and BSI will demonstrate lesions in the vertebral artery from its origin to its junction at the basilar, in the basilar itself and in combination which produce VBI and BSI. The treatment approaches to these lesions, medical and surgical, will be outlined to indicate that a variety and combination of vascular lesions may produce VBI and BSI and should be investigated and appropriately managed.

(Discussion)

10:10 a.m.

6. Status Report - The Cooperative EC/IC Bypass Study

S. J. Peerless
London, Ontario, Canada

10:30 a.m.
Coffee Break

10:50 a.m.

7. The Use of Steroids in Laminectomies A Clinical and Laboratory Evaluation

David L. Cunningham, J. T. Robertson
John Dusseau, Stanley Patterson, Peter Boehm
and John Wilson
Memphis, Tennessee

For the past several decades, laminectomy for the purpose of disc removal has been performed without significant change from the original technique. It is the opinion of the authors that topical application of a long-acting steroid to the nerve root at the time of surgery offers definite short-term advantages over the conventional methods with little or no risk of serious side effects. A clinical review of 400 consecutive laminectomy patients substantiates the reduced length of hospital stay and marked decrease in initial post-op pain. The additional advantage of early ambulation may help prevent post-op complication of pulmonary and urinary origin.

In addition, laboratory studies on rabbits, utilizing Gelfoam, Gelfoam soaked in vehicle only, Gelfoam soaked in DepoMedrol (Methyl prednisolone, 21 Acetate) and no Gelfoam or other agent have been carried out. The laboratory studies revealed a decrease in the nerve root edema and adjacent tissue reaction (both soft and osseous) when using DepoMedrol. Photomicrographs will be shown to demonstrate these findings.

(Discussion)

11:10 a.m.

8. Foreign Medical Graduate Legislation and its Effect on the United States' Role in International Medical Education

Joseph P. Evans
Chicago, Illinois

It is important that Program Directors concerned over the role of the United States in international postgraduate education have a clear understanding of the present restrictive legislation affecting foreign medical graduates.

It is important also to realize the impact of the legislation on our international relations.

A brief summary of the current situation and a report of the activity of the Task Force on Foreign Medical Graduate Legislation and International Relations will be presented. Discussion will be welcomed in the effort to achieve consensus.

(Discussion)

11:30 a.m.

9. ACADEMY AWARD

Relation Between Intrafusal and Extrafusal Activity in Triceps Surae Muscles of the Decerebrate Cat; Evidence for Beta Action

Elisabeth M. Post
Syracuse, New York

12:00 noon
Lunch

1:00 p.m. MODERATOR: John T. Garner

10. Initial Experience with Dimethyl Sulfoxide for Postoperative Vasospasm

Sean Mullan, Jafar Jafar and Frederick Brown

Dimethyl sulfoxide, a water soluble organic solvent (in a class with glycerol, n prophyl alcohol, ethanol, methanol, and others), has in common a strong affinity for water and unique ability to penetrate membranes. It belongs also to the lists of cryoprotective and radiation protective drugs. It reduces or dissipates swelling, as in a swollen ankle. These properties have led us to consider a possible role in the management of a swollen brain. In the laboratory, it has been shown to be effective in reducing mortality and morbidity in experimental head injury (gun shot and balloon), spinal cord injury and in middle cerebral artery occlusion. This paper will summarize these results.

We have additionally embarked upon the earliest of an F.D.A. controlled study in which the primary objectives are (a) safety of the drug, (b) effective dose, (c) possible therapeutic indications. This antedates the standard type of clinical trial. We have now treated two patients with head injury, 11 with subarachnoid hemorrhage and one with spinal paralysis. At the moment, it would appear that the safety of the drug has been established. In exploring its range of effectiveness, its clinical appraisal might best be summarized as one of cautious optimism. These observations will be presented.

(Discussion)

1:20 p.m.

11. Preoperative Evaluation of Cerebral Autoregulation and Systemic Tolerance of Induced Hypotension

Duke S. Samson, Chester Beyer
Richard M. Hodosh and Kemp Clark

Dallas, Texas

The use of interoperative induced hypotension has markedly facilitated the development of modern microvascular surgical technique in the treatment of intracranial vascular lesions, such as arterial aneurysms and arteriovenous malformations. Clinical experience indicates that the majority of patients undergoing intracranial procedures tolerate the moderate reduction of mean arterial pressure (MABP = 70 mm Hg) with a low instance of neurological and systemic side effects. Unfortunately, more profound levels of hypotension for protracted time intervals, especially in patients with impaired or altered autoregulatory capacity, may be expected to produce a higher incidence of intolerance as manifested by interoperative and postoperative neurologic and systemic dysfunction.

Learning of Mullan's initial work, we began in 1978 to evaluate, in the immediate preoperative period, the response to induced hypotension in patients planned to undergo surgery for ruptured intracranial aneurysms and arteriovenous malformations. This evaluation is done in the operating suite immediately prior to the induction of anesthesia, the mean arterial pressure being lowered into the 50-60 mm Hg range while the patient's cardiac, neurologic, and systemic responses are closely observed. Hypotension is induced by intravenous infusion of graduated doses of sodium nitroprusside or nitroglycerine. Arterial pressure is continuously monitored via an indwelling radial artery catheter. Ninety-eight (98) patients have been evaluated using this procedure to date, and 16 have been shown to be intolerant to these levels of hypotension; in 11 neurologic symptoms appeared or worsened; in 4 patients cardiac dysfunction became manifest, and one patient developed cyanide toxicity. Fifteen (15) of these 16 patients ultimately underwent a successful surgical procedure following modification of the timing of operation and the degree of interoperative induced hypotension; one patient who on two occasions demonstrated marked cardiac sensitivity to even the slightest degrees of hypotension was treated non-surgically. Of greater interest is that the incidence of symptomatic cerebral vasospasm was found to be significantly higher in those patients

found intolerant to preoperative induced hypotension. We believe that the preoperative testing of tolerance to induced hypotension offers important information in the interoperative and postoperative management of this group of patients. It may well serve as a predictor for the identification of those patients prone to develop postoperative symptomatic cerebral ischemia.

(Discussion)

1:40 p.m.

12. Unilateral Occlusion of the Circle of Willis for the Management of Certain Inoperable Cerebral Arteriovenous Malformations

Alfred J. Luessenhop and Patricio Mujica
Washington, D.C.

Approximately fifty percent of all cerebral arteriovenous malformations may be resected or obliterated by surgery. Another twenty-five percent can be managed by surgical embolization. This leaves approximately twenty-five percent of all the lesions untreatable at present. The majority of these reside in the territories of the penetrating arteries arising from the circle of Willis and the proximal branches of the major cerebral arteries. When these lesions are large, the distal circulations are adequately supplied by collateral circulation. It is possible to occlude all the major arteries around the circle of Willis without inducing a deficit. The authors will present a series of patients and in whom this was accomplished by a technique of controlled embolization and direct clipping. A follow-up period of over one year shows no incidence of recurrent hemorrhage or further progression of neurological deficits.

(Discussion)

2:00 p.m.

13. Proximal Arterial Alterations in Pressure and Flow Characteristics After Removal of Hemispheral Arteriovenous Malformations

H. D. Garretson
Louisville, Kentucky

Improvements in surgical technique now permit dissection and removal of arteriovenous malformations of the cerebral hemispheres without surgical trauma to immediately adjacent areas of critical function. These techniques, however, increase the liklihood of cerebrovascular congestion occurring in the immediately adjacent areas attendant on the occlusion of enlarged, high flow, low pressure arteriovenous shunts. Occlusion of these final feeding arteries at the margin of the AVM convert the physiologicc! situation of a high flow, low pressure intraluminal state to a slow flow, high pressure situation, with the adjacent arteries leaving the feeding arteries suddenly being subjected to a major increase in intraluminal pressure at the time of the distal occlusion. Particularly in the immediate vicinity of the AVM, these normal side collaterals have been functioning with a lower-than-normal intraluminal pressure with frequent clinical evidence of relative ischemia in their perfusion territory. The ability of these normal proximal branches and their parent vessel to compensate for the sudden increase in intraluminal pressure appears to be dependent on two factors. The first and most important appears to be the "age" of the artery, and secondly, the degree of dilitation or enlargement the artery has undergone. It is now well accepted and documented that the enlargement of these vessels is a passive phenomenon, concommitant to the low pressure sump with attendant high flow created by the arteriovenous malformation. Earlier surgical techniques which frequently included a fairly large block ressection of the lobe containing the AVM tended to minimize the problem of proximal vascular congestion through the removal of a greater portion of the proximal feeding artery, together with a fairly large quantity of cerebral tissue providing a significant internal decompression.

We have accumulated experience with 32 arteriovenous malformations of the cerebral hemispheres treated principally by direct excision under magnification along the immediate margin of the AVM with postoperative angiographic assessment of the surgical endeavor in each patient. This has given some insight into the changes in pressure/flow characteristics of th proximal feeding arteries to the excised AVM.

In spite of major enlargement of feeding arteries, prompt return to normal calibre with a short period of clinically significant cerebral swelling is seen in patients up through the second decade of life. Each subsequent decade shows a slower return to normal calibre of the large feeding vessels, with correspondingly longer clinical signs of cerebral vasotongestion and swelling around the area of removal. Several patients have been encountered in the sixth decade of life who have shown no significant reduction in size of the enlarged proximal vessels in question over an extended period of time postoperatively.

It is suggested that hyalinization and fibrotic changes in the walls of the feeding arteries with advancing age interferes with the prompt elastic return to normal calibre noted in young individuals. Allowance for this factor in the pre- and intraoperative management of the older patients may assist in reducing morbidity in this older age group. Early and late postoperative changes in intraluminal pressure in the proximal vessels have been suggested by angiographically documented changes in a proximally situated basilar bifurcation aneurysm in films taken pre-, early, and late postoperatively in a patient with a large posterior cerebral AVM. The changes noted appear consistent with the concept of a transient conversion of a low pressure, high flow state to a high pressure, low flow state in the early postoperative period. The inter-relationship of this concept with postoperative clinical course will be illustrated by appropriate angiographic studies and clinical synopses.

(Discussion)

2:20 p.m.

14. Blood Volume Expansion and Induced Hypotension in the Management of Progressive Neurological Deficit Secondary to Ischemia

S. J. Peerless, C. G. Drake
Q. J. Durward and N. F. Kassell
London, Ontario, Canada

Progressive neurological deterioration secondary to cerebral ischemia has been aggressively treated in patients with vasospasm following subarachnoid hemorrhage; in patients undergoing intentional ligation of intracranial vessels in the treatment of giant intracranial aneurysms and in patients following spontaneous thromboembolic occlusion of major cerebral arteries or secondary to angiography.

Thirty patients with ischemic complications secondary to these causes have been treated with a vigorous regimen to increase the cerebral perfusion by expanding the circulation blood volume, elevating the blood pressure and lowering the intracranial pressure. As well, steps to decrease blood viscosity and improve rheology and to a lesser extent, increase cerebral arterial calibre has been attempted.

These complex and aggressive management techniques have

resulted in remarkable, immediate and sustained clinical improvement in 23 patients. Five patients showed only a transient or minimal improvement and two deteriorated.

The technique of monitoring blood pressure, intracranial pressure, pulmonary-capillary wedge pressure and blood volume, as well as the treatment protocol and the pulmonary, cardiac and cerebral complications, will be described.

(Discussion)

2:40 p.m.

15. Second Intranational Workshop on Cerebral Vasospasm

Robert H. Wilkins
Durham, North Carolina

3:00 p.m.
Coffee Break

3:20 p.m.

16. High Dose BCNU with Autologous Bone Marrow Rescue For Recurrent Glioblastoma

Leroy Parker, Frederick Hochberg
Nicholas T. Zervas and George Cannelos
Boston, Massachusetts

The lipid soluble nitrosoureas represent the single, most widely accepted chemotherapeutic agents for the treatment of glioblastoma multiforme. In animal and human systems, there is a linear relationship between dose and response. In clinical trials, the major dose limiting toxicities are referable to delayed myelosuppression. Given every six weeks, BCNU treatment can be provided for approximately five courses to a median dose of 1200 mg/m2. We have investigated the use of autologous bone marrow reinfusion as a means of providing single doses of BCNU in excess of this cumulative dose level. Patients with recurrent glioblastoma (after surgery and irradiation) are harvested of iliac crest marrow under general anesthesia. Marrow is stored at 4°C until used. Split doses of BCNU are given four and eighteen hours after harvest. Two patients each have received BCNU

600, 800, 1000 mg/m2. The previously harvested autologous bone marrow (2.8 x 1010 nucleates cells) is reinfused 48 hours after harvest (24 hours after BCNU). A colony forming (CFU-c assay) has been used to evaluate the repopulation of bone marrow. High dose BCNU toxicity has been limited to nausea and vomiting. To date, there have been no associated pulmonary, liver or renal toxicity. Characteristically, patients show a white blood cell and platelet nadir 10-15 days after BCNU therapy. Following this, white blood cells, platelets and CFU-c rise until repopulation of both systemic and marrow sites is complete. This repletion of marrow occurs with a greater rapidity in higher dose patients. The clinical response to BCNU has been acceptable. At constant steroid doses all patients have shown clinical improvement. Four of six patients have shown amelioration of CT scan. High dose BCNU with autologous marrow rescue would appear to be an acceptable easily performed approach to the treatment of glioblastoma.

(Discussion)

3:40 p.m.

17. The Role of the Ribosome in Malignant Glial Tumors

Wolff M. Kirsch, Kazuo Tabuchi
John Van Buskirk and Margaret Low
Denver, Colorado

In terms of potential therapeutic control points for malignant gliomas, the ribosome appears to be a critical subcellular target. Steadily accumulating evidence indicates that one of the earliest detectable biochemical changes in the transition from a resting to a proliferating cell is an increase in the rate of ribosome synthesis. There is a clear relationship between the growth rate of a cell and its RNA content. Our laboratory has been interested in ribosomal RNA maturation, with specific attention to certain drugs that specifically inhibit maturation of ribosomal RNA. Our interest has been prompted by a study of the drug, racemic sodium warfarin, and its effect upon the cell cycle of malignant glial tumors. Both in vitro and in vivo studies indicate that this drug, which has a structural resemblance to camplothecin, does alter ribosomal maturation. Current research is directed toward elucidating the effects of warfarin upon specific ribosomal proteins. The effect is inhibition of the vitamin K mediated gammacarboxylation of glutamic acid residues in selected ribosomal proteins. Our laboratory has demonstrated the ubiquity of an unusual amino acid, gammacarboxyglutamic acid, in the ribosomes of a

variety of tissues. The posttranslation modification of ribosomal proteins may provide important clues for further understanding of the biology and function of the ribosome, particularly for the necessary role of magnesium ion in protein biosynthesis. The central role of the ribosome in such critical events, such as viral transformation, will also be discussed.

(Discussion)

FRIDAY, November 9

MODERATOR: S. J. Peerless

8:30 a.m.

18. Controversies in the Management of Prolactin-Secreting Pituitary Adenomas

Charles B. Wilson and Robert Jaffe
San Francisco, California

Within the past five years, a new entity, the prolactin-secreting micro-adenoma, has evolved with a frequency that was unpredictable before sella polytomography and plasma prolactin determination were applied to the large population of young women with amenorrhea and galactorrhea. Based upon experience with 200 prolactinomas treated by transsphenoidal removal and a smaller number either treated by other means or not treated at all, my medical colleagues and I have reached certain conclusions concerning the management of micro- and macro-prolactinomas. Transsphenoidal surgery is recommended for patients with microadenomas who (1) desire pregnancy, or (2) have primary amenorrhea, or (3) male. Our views on the roles of bromocriptine, irradiation and no treatment are changing, and a current summary will be presented when the paper is delivered.

(Discussion)

8:50 a.m.

19. Transsphenoidal Microsurgery for Prolactinomas Causing the A/G Syndrome

George T. Tindall
Atlanta, Georgia

This report is based upon a total of 58 women with the amenorrhea-galactorrhea syndrome due to a prolacin secreting pituitary tumor (prolactinoma) who underwent transsphenoidal microsurgical removal of the tumor. The study extends over a period of six years (July 1973-June 1979).

Endocrinologic, neuroradiologic and clinical criteria for selection of patients with prolactinomas for transsphenoidal microsurgery will be reviewed and the results of treatment presented. Criteria for successful treatment will be reviewed.

As expected, successful therapy was more frequent in women with the enclosed microadenoma (Hardy-Vezina, grade I) and whose preoperative fasting prolactin value was < 200ng/ml. Seventy percent (70%) of 40 women with preoperative prolactin < 200 either resumed normal menses or had return of prolactin to normal values (< 25 ng) postoperatively. Unfortunately, only 40% of patients with preoperative prolactin > 200 ng/ml had successful results in terms of restoring normal menses or reducing prolactin values to normal.

The possible causes for persistent hyperprolactinemia postoperatively will be examined and followup study (up to six years) will be presented in 15 women with this laboratory finding. A common cause of postoperative hyperprolactinemia is persistent tumor but another mechanism to consider is stalk damage with interference with PIF transport.

(Discussion)

9:10 a.m.

20. CT Localization and Immunoperoxidase Staining of Small Pituitary Adenomas

Wolff M. Kirsch, John Stears
Bruce Jafek and Doris Gaskin
Denver Colorado

As our experience with transsphenoidal surgery for pituitary neoplasia has enlarged, we have found two diagnostic tests to be helpful in the diagnosis of small pituitary adenomas. These tests are refined CT scanning of the sella turcica and the application of immunoperoxidase staining for identification of hormones on frozen section. Angiography has never demonstrated a discrete or convincing "stain" and in the past we have relied on subtle pneumotomographic findings for indirect tumor localization ("stalk shift" eccentric diaphragm elevation). We now have 12 patients with CT demonstration of microadenomas, of which 3 have been confirmed in detail by transsphenoidal surgery.

(Discussion)

9:30 a.m.

21. The Pseudo-Diabetes Insipidus of Transsphenoidal Pituitary Gland Surgery

Clarence B. Watridge and James T. Robertson
Memphis, Tennessee

The transsphenoidal approach to pituitary tumors is a widely used technique with low morbidity and mortality. One sequela that occurs in approximately one-third of these patients is a postoperative diuresis. This has been referred to as a diabetes insipidus by some authors. We have analyzed the antidiuretic hormone levels of twelve consecutive patients undergoing transsphenoidal removal of pituitary tumors and have found that there is no deficit of antidiuretic hormone in these patients. The postoperative diuresis following transsphenoidal pituitary surgery is not a true diabetes insipidus. The syndrome of Pseudo-Diabetes Insipidus following transsphenoidal surgery for pituitary tumors is described.

(Discussion)

9:50 a.m.
Coffee Break

10:00 a.m.

22. Updated Experience with Surgery for Pineal Tumors

Bennett M. Stein
Boston, Massachusetts

An up-to-date experience with twenty-four operations on pineal tumors using the posterior fossa route will be presented. Nine of these patients presented with benign tumors which were encapsulated and could be removed through this exposure. A wide variety of tumor types existed in all cases, and it was my opinion that histological diagnosis was useful in all. Current therapy dictates specific forms of therapy tailored for the type of tumor that exists in this region, e.g., the germinoma type of tumor known as an atypical teratoma is probably best treated by radiation to the entire nervous system as well as chemotherapeutic agents that have been used in the treatment of germinal tumors existing elsewhere in the body. My experience with this type of tumor in which conventional radiation

has been used solely to the tumor site has been discouraging.

The techniques of the operative procedure as well as operative morbidity and mortality will be discussed in detail.

(Discussion)

10:30 a.m.

23. A Parapetrosal Approach to Clival Tumors

Leonard I. Malis
New York, New York

Tumors of the petrous apex, clivus, and anterior tentorial margin have been a particularly difficult and dangerous group for surgical removal, even with microsurgical technique. Adequate exposure has been difficult to achieve, and ligation of the vein of Labbe has often been needed to permit sufficient elevation of the temporal lobe posteriorly. The lack of anastomosis of the "great anastomotic vein" has increased temporal lobe damage.

A combined posterior fossa and subtemporal approach with division of the lateral sinus and tentorial petrous attachment has been devised so that the vein of Labbe and the temporal venous drainage is spared. This procedure has now been used since 1972. Twenty tumors (thirteen clival meningiomas, three fifth nerve neuromas, and one each of cholesteatoma, craniopharyngioma, chordoma, and collicular astrocytoma) have been resected with total removal in eighteen. There was one death and one severe, but fortunately temporary, deficit to occur. This approach has greatly improved the results as compared to this author's prior experience with lesions of this region.

(Discussion)

10:50 a.m.

24. Surgical Management of Massive Glomus Jugulare

Theodore Kurze, James House and Fong Tsai
Pasadena, California

Extension of non-chromaffin paragangliomas to involve intracranial structures is a well-recognized clinical problem, but seldom experienced in neurosurgical practice. The value of radiation therapy remains controversial and highly questionable. Surgical mortality and morbidity in these massive lesions is formidable.

The authors present the surgical anatomical details of a highly satisfactory technique of embloc total removal with modest blood loss and no permanent morbidity.

The peri-surgical care including embolization will be included.

(Discussion)

11:10 a.m.

25. Microsurgical Removal of Primary Intra-Orbital Optic Nerve Meningiomas

Joseph C. Maroon and John Kennerdell
Pittsburgh, Pennsylvania

Recent advances in computerized tomography now permit the diagnosis and clear delineation of primary tumors of the optic nerve. Heretofore, the treatment of primary intra-orbital optic nerve meningiomas with standard operating techniques has almost uniformly resulted in increased visual impairment or blindness.

Over the last three years, we have refined a lateral microsurgical approach to intra-orbital tumors, and we have removed three consecutive optic nerve meningiomas with uniformly improved postoperative visual function. Besides an understanding of the pathology of such lesions, special instrumentation, including a new self-retaining intra-orbital retractor, are considered essential for the removal of such tumors.

Based on our preliminary experiences, we believe that primary optic nerve meningiomas no longer should be considered harbingers of inevitable progressive blindness. Exploration should be considered in the patient with progressive unilateral visual loss, proptosis, afferent pupillary light defect, and optic-ocililary shunting if there is radiographic and ultrasonic evidence of a primary optic nerve tumor. A surgical cure may now be possible.

(Discussion)

11:30 a.m.

PRESIDENTIAL ADDRESS
"PAIN AND TRYPTOPHAN"

Robert B. King

SATURDAY, November 10

MODERATOR: Phanor Perot

9:00 a.m.

26. Electrically Evoked Responses Recorded from the Dorsal Surface of the Human Spinal Cord During Spinal Cord Surgery

Blaine S. Nashold, Jr., Robert H. Wilkins
Bob Pearlstein and John B. Mullen
Durham, North Carolina

The cortical and spinal evoked somatosensory responses have been extensively used to evaluate certain cerebrospinal disorders. In the monkey, the CEP (cortical evoked potential) response may be mediated via the dorsal columns, a sensory pathway increasing in size and importance in the higher primates.

This is a preliminary clinical report of a technique for intraoperative recording of electrically evoked responses produced by direct electrical stimulation of the spinal cord and peripheral nerves. The direct spinal evoked responses (DSER) were recorded above and below spinal cord pathology during surgical intervention. The concept under study is the use of direct intraoperative direct spinal evoked recordings (DSER) to monitor spinal cord function. Direct stimulation and recording on the dorsal surface of the human spinal cord may give a more sensitive indicator of spinal transmission, since both conduction velocity via the dorsal columns, and the production of a complex wave form are easily recorded and analyzed in the operating room.

Three patients have been studied using this DSER technique. One man was suffering from progressive weakness of his legs plus intractable burning pain which had developed years after an open bilateral thoracic cordotomy. A second man had DSER recordings made before and after a thoracic commissurotomy for relief of pain due to generalized pelvic cancer. A third man who was experiencing weakness of the legs and bladder and sexual dysfunction caused by a spinal angioma at the level of the conus had direct spinal recordings carried out before and after the successful removal of the angioma. The results of direct spinal recording of evoked responses in the human will be discussed in the light of our current knowledge of spinal pathophysiology.

(Discussion)

9:20 a.m.

27. Effect of Trauma Dose on Spinal Cord Edema

Franklin C. Wagner, Jr., William B. Stewart
and William F. Collins, Jr.
New Haven, Connecticut

Post-traumatic edema has been suggested as a complicating factor in spinal cord injury. Before the possible pathological effects of edema can be assessed, it would be helpful to know more regarding the factors responsible for its formation and distribution within the spinal cord. In the current investigation, forty cats were subjected to impact trauma of different magnitudes. The presence of edema was determined by either of two methods. The distribution of various flourescent tracers which were injected either prior to trauma or at different intervals after trauma was studied microscopically. In other animals, the difference between the wet and dry weight of spinal cord samples was measured. Attention was directed to ascertaining the portions of spinal cord maximally involved by edema and the duration of time after trauma that it may form. Longitudinal extension of edema as determined by both measures occurred in animals subjected to severe impact injury. Little spread rostral and caudal to the impact site was noted in animals subjected to moderate or mild trauma doses. When extension was observed in fluorescent studies, it was noted primarily in the mid-portion of the lateral, anterior, and posterior white matter where fibers are predominantly longitudinally directed. Fluorescent tracers injected at intervals greater than three hours after trauma were not readily apparent in tissue samples. The findings of the present study indicate that the spread of post-traumatic edema is directly related to the amount of the initial trauma, that the structural features of the spinal cord influence its spread, and that the extravasation of large molecules does not continue indefinitely.

(Discussion)

9:40 a.m.

28. Noradrenalin, Serotonin, and the Dorsal Horn

Charles J. Hodge, Jr., Charles I. Woods
and Jonathan Delatizky
Syracuse, New York

There are abundant anatomic, physiologic, and drug interaction studies indicating that noradrenalin (NA) and serotonin (5-HT) modify sensory processing at the segmental level. While the role of 5-HT as an inhibitory transmitter, used by the raphe-spinal system and linked to morphine - and stimulation produced - analgesia is quite firm, the function of the descending NA bulbo-spinal system is unclear. These systems were investigated by studying the effects of L-DOPA triggered release of 5-HT and NA on the responses of dorsal horn neurons to both innocuous mechanical and noxious thermal cutaneous stimulation. Using pretreatment with a variety of drugs, the availability of NA or 5-HT in axonal terminals was altered, thus allowing separation of the effects of these two systems. Dorsal horn cells were divided into two groups: Group 1 responded only to innocuous stimuli and Group 2 responded to either only noxious or innocuous and noxious stimuli. We found that 1) 5-HT release inhibits the response of Group 2 cells to both noxious and innocuous stimuli and that 5-HT has no apparent effect on Group 1 cells, 2) NA release increases the responsiveness of Group 1 and Group 2 cells to innocuous stimuli while mildly inhibiting the response of Group 2 cells to noxious stimuli.

The conclusion was reached that these two systems have different, and at times opposing, roles, depending on type of afferent input and dorsal horn cell being effected. While these two aminergic systems have been assigned the function of a "pain control mechanism", this seems too limited a concept of their action in view of the ubiquity of their connections and other physiologic processes that they can modify. Nonetheless, further understanding of their spinal actions and suprasegmental interactions may lead to non-operative and non-narcotic methods of controlling altered sensory states such as denervation syndromes and chronic pain.

(Discussion)

10:00 a.m.

29. Observations on the organization of human language cortex

George A. Ojemann and Catherine A. Mateer
Seattle, Washington

With the electrical stimulation mapping technique the localization of changes in object naming, reading, short-term verbal memory, the ability to mimic single and sequential oral facial movements and to identify phonemes was identified at each of 9-15 sites in periSylvian cortex of the dominant hemisphere in 5 patients,

and in nondominant hemisphere of 2 patients undergoing craniotomies under local anesthesia for resection of epileptic foci. The only one of these functions altered from any nondominant hemisphere periSylvian site was the ability to mimic single oral-facial movements from sites at the foot of rolandic cortex. On the other hand, the patterns of changes in these different functions in dominant hemisphere periSylvian cortex (with dominance having been established by preoperative intracarotid amytal testing) identify the sites of several different language subdivisions. At the foot of rolandic cortex and extending into inferior premotor cortex is an area where the ability to mimic single oral movements is disrupted along with an arrest of all types of speech output, regardless of how evoked. This seems to represent a final motor pathway for speech. Surrounding this in periSylvian cortex of both frontal, parietal and superior-temporal lobe is an area where the ability to mimic sequential, but not single oral-facial movements, was disrupted, and at these same sites and only these same sites the ability to identify phonemes was also altered. This seems to identify a motor discrimination system for speech, the system which provides the anatomic basis for the common features that have been identified in both expressive and receptive aphasias, and also the anatomic substrate behind the motor theory of speech perception. Surrounding the motor discrimination system frontally, parietally and temporally are sites where only short-term verbal memory is disrupted, with parietal and temporal sites showing alterations in memory when the current is applied during the input or storage phases of the task while frontal and occasional parietal sites when the current is applied during output phases of the task. Between the motor discrimination and short-term verbal memory systems are individual sites where the only disruption is in grammatical aspects of reading, identifying sites that seem to be related specifically to syntax. Although the exact location of the sites of each of these subsystems varied from patient to patient, the general relationships are the same in the dominant hemispheres of each of the 5 patients tested. Thus this study suggests that the major subdivisions of language cortex are not an anterior expressive, posterior receptive, but rather a periSylvian system common to sequential motor movements and phonemic discrimination surrounding a final motor pathway for speech and being surrounded by a cortical short-term verbal memory system.

(Discussion)

10:20 a.m.
Coffee Break

10:50 a.m.

30. Simultaneous Subacute Measurement of ICP and Brain 02 Availability

R. B. Morawetz, H. G. Mitchem
E. R. Strong, J. G. Galbraith and J. H. Halsey
Birmingham, Alabama

Simultaneous intracranial pressure (ICP) monitoring and brain oxygen availability (02a) measurements were carried out on a group of patients whose intracranial pressure was being monitored. A ventricular catheter was modified by addition of an array of bare platinum electrodes along its shaft so that while the tip of the catheter lay in the ventricle, the electrodes were in contact with brain tissue. A group of hydrocephalic children had catheters inserted when medically indicated for monitoring ICP and/or for ventricular drainage.

Relationship of ICP to brain 02a, and relationship of 02a to cerebral blood flow will be discussed. Response to changes in ICP, inspired 02 and inspired CO2 is documented. The increased intracranial compliance seen with ventricular drainage is significant. Inhalation of 100% 02 results in a significant rise in 02a at ICP in both normal and elevated levels. There is a marked drop in 02a with plateau waves, and no rise in 02a is seen before appearance of plateau waves despite the postulated increase in CBF as the initial event in production of A waves. The observations suggest that high concentration of 02 in inspired air may be of help in management of high ICP.

(Discussion)

11:10 a.m.

31. Hydrocephalus Diagnosis: CSF Pulse Pressure Index and Wave Form Analysis

Eldon L. Foltz and Cheryl Aines
Orange, California

In 1976, initial data on the "CSF pulse pressure index" characteristic of hydrocephalus (child and adult) was presented (AANS). Subsequent refinement of the concept of intracranial factors acting on the choroid plexus-generated CSF pulse pressure to produce a "damped" wave under normal conditions has been based on

the force, or power, formula applied to CSF as a moving fluid mass (m) traveling at a certain velocity (v) reduced to no movement during a certain time epoch (Δt): $P = mv2/2\Delta t$.

It has been postulated that the energy involved in this intracranial CSF phenomenon will be greatly enhanced when the normal pulsatile outflow of intracranial venous blood is lacking, converting a lower power system (volume vented with each CSF pulse wave) to a higher power system (no pulsatile volume venting). In the formula, this is accomplished by the very small Δt value. This equates to loss of intracranial compliance. This should be associated with progressing hydrocephalus if the power generated is critical in producing the ventriculomegaly of hydrocephalus.

The relationship of CSF pulsatility to mean CSF pressure has not been thoroughly investigated under these assumptions.

Therefore, as part of a broad and continuing investigation of hydrocephalus in CSF dynamics, our ongoing clinical study is reported. Measurements of CSF pressures in 110 patients with suspected hydrocephalus have included:

1. Mean CSF and CSF pulse pressures under homestatic (baseline) and jugular compression;
2. CSF ascending wave slopes and wave shapes at homeostatic (baseline) and during inspiration-expiration cycling.

The results give statistically significant correlation of CSF pulse amplitude with hydrocephalus as proved by clinical studies. The CSF wave form, as measured by ascending slope rate, correlates even better with no hydrocephalus, aqueduct stenosis hydrocephalus, communicating hydrocephalus, and to a lesser degree with arrested hydrocephalus.

Effective analysis of this simple recording can diagnose difficult hydrocephalus problems with reliability, including adult occult hydrocephalus.

(Discussion)

11:30 a.m.

32. Arnold-Chiari Malformation: Observations on Teratogenesis

Robert L. McLaurin, Josef Warkany
and Harold Kalter
Cincinnati, Ohio

The mechanism of development of the Arnold-Chiari malformation has been the subject of considerable investigation and speculation in the past. Theories have included: 1) traction from caudal tethering, 2) pressure from hydrocephalus, and 3) a primary dysgenesis of the brain stem.

The availability of a strain of mice in which spina bifida is carried as an autosomal recessive characteristic has permitted observations on the teratogenesis of the malformation. Mice with spina bifida have been serially sectioned and studied from the 11th gestational day to the 18th (full-term) day. Sagittal and frontal sections of 20 micra thickness have been studied.

Based on these observations, it is concluded that one of the primary events is stenosis or occlusion of the aqueduct. This results in hypoplasia of the posterior fossa, presumably as a result of pressure differential between the supra- and infratentorial compartments. The consequence is then crowding within the posterior fossa and subsequent herniation as the neural tissues undergo normal enlargement with maturation. There was evidence negating the theories of traction from below or pressure from above.

In addition to herniation of the medulla and cerebellum, other characteristics of the Arnold-Chiari deformity were studied. It appears that tectal beaking is the result of arrest of development or a primary dysgenesis rather than due to mechanical factors. The medullo-cervical fold was not observed, as it probably occurs in the post-natal period in mice. There was no evidence to support the theory of aqueduct occlusion resulting from hydrocephalus.

(Discussion)

ACADEMY AWARD

1979

ELISABETH M. POST, M.D.
State University of New York
Upstate Medical Center
Syracuse, New York

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DR. JAMES R. ATKINSON Phoenix, Arizona	(Active)	2/78	1970
DR. PERCIVAL BAILEY Evanston, Illinois	(Honorary)	8/10/73	1960
DR. WILLIAM F. BESWICK Buffalo, New York	(Active)	5/12/71	1949
DR. SPENCER BRADEN Cleveland, Ohio	(Active)	7/20/69	Founder
DR. F. KEITH BRADFORD Houston, Texas	(Active)	4/15/71	1938
DR. WINCHELL McK. CRAIG Rochester, Minnesota	(Honorary)	2/12/60	1942
DR. WESLEY A. GUSTAFSON Jensen Beach, Florida	(Senior)	7/16/75	1942
DR. HENRY L. HEYL Hanover, New Hampshire	(Senior)	3/1/75	1951
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MR. KENNETH G. JAMIESON Brisbane, Australia	(Corresponding)	1/28/76	1970

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DR. KENNETH G. McKENZIE Toronto, Ontario, Canada	(Honorary)	2/11/64	1960
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DR. W. JASON MIXTER Woods Hole, Massachusetts	(Honorary)	3/16/58	1951
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DR. DAVID REYNOLDS Tampa, Florida	(Active)	4/3/78	1964
DR. SAMUEL R. SNODGRASS Nashville, Indiana	(Senior)	8/8/75	1939
DR. C. WILLIAM STEWART Montreal, Quebec, Canada	(Corresponding)		1948
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AMERICAN ACADEMY OF NEUROLOGICAL SURGERY
1979 ANNUAL MEETING

EVALUATION

Please complete this evaluation form (omit sessions or events you did not attend) and return to the Secretary, Phanor Perot, at your earliest convenience.

(1) Was the general content of the scientific program:

_____Excellent
_____Good
_____Poor

(2) If you found it poor, was it because:

_____Too much review of old knowledge?
_____Too simple or elementary?
_____Too complex or abstruse?
_____Of little practical value?

(3) Did the speakers aim their talks:

_____Too low
_____Too high
_____Just about right

SCIENTIFIC PROGRAM

Thursday's Sessions Excellent _____ Good _____ Poor _____
Comments _____
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Friday's Sessions Excellent _____ Good _____ Poor _____
Comments: _____
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Comments: _____
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SOCIAL PROGRAM

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What changes would you like to see in future meetings? _____

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