

## Proceedings of the Society of British Neurological Surgeons

The 73rd meeting of the Society of British Neurological Surgeons was held at Atkinson Morley's Hospital, Wimbledon, on 27-28 May 1966. The President, Mr. G. L. Alexander, was in the Chair. During the course of the meeting, the third Hugh Cairns Memorial Lecture was delivered by Professor Norman Dott.

### RESULTS OF TREATMENT OF THE CRANIOPHARYNGIOMAS

WYLIE MCKISSOCK and R. K. FORD (London) reported on a series of 143 patients with craniopharyngioma seen over a 27-year period, of whom 23 were lost in follow-up and a further 20 were excluded as being unverified having received radio-therapy alone or being untreated.

The remaining 100 patients fell into two groups, 55 being subjected to radical excision, or an attempt at this, with a mortality of 30%. Forty-five patients were treated by minor surgical procedure such as burr-hole aspiration of the cyst or aspiration at craniotomy with or without subsequent Torkildsen's operation according to whether evacuation of the cyst did, or did not, relieve third ventricular obstruction. These patients all subsequently received x-radiation treatment.

Of all the 55 subjected to major surgery, only 12 remained alive, well and working at periods of one to over 10 years compared with 33 of the 45 having minor surgery plus radiotherapy.

It was suggested that this latter form of treatment should be used initially and major operation reserved for those in whom there was either no cyst or the combined form of therapy had failed.

### RECORDINGS FROM THE THALAMUS AND THEIR VALUE IN STEREOTACTIC SURGERY

J. V. BATES (London) described his findings during depth recordings with micro-electrodes in the course of stereotactic operations on 70 Parkinson patients and five with other conditions. The electrodes were inserted through a frontal burr-hole along the coronal suture and 5 cm. from the midline and directed towards one of four points, 17/27 or 21/27 of the intercommissural length from the anterior commissure and 12 or 15 mm. from the midline. Negative recordings were encountered once in four times and each of the four possible tracks had an equal chance of a positive recording. Recordings were made over 15 mm. from a distance 10 above the intercommissural line, measured along the track.

Two main types of cellular activity were recorded. First, sensory cells firing in the sensory relay nucleus. These might be firing spontaneously or in phase with recordable tremor. They were identifiable as sensory cells by evoking bursts of activity in them from sensory stimuli. Cells firing from deep sensory structures con-

siderably outnumbered those firing from skin stimulation. Head areas were medial and leg areas lateral. He concluded that the deep sensory receptive area was located anteriorly and in close proximity to the motor controlling area of the ventrolateral nucleus. Guiot's work suggested that the skin receptive area was located posteriorly in the sensory relay nucleus.

Secondly, cells which fired phasically but were not provoked to activity by sensory stimulation; these outnumbered the sensory-provoked cells. They were generally situated at a higher level than the sensory cells and mostly lay above a line 4 mm. from the intercommissural plane. Their rate of firing was within the tremor range of 4 to 6 c/s but not usually in phase with observed or recorded tremor. Phasic firing occurred independently of recorded tremor.

He suggested that the afferent input to the area might have been partially destroyed by the disease process and this could result in slow potential oscillations building up and the units firing in phase.

He discussed the value of such recordings in stereotactic operations and concluded that whilst the site and extent of a lesion was usually determined by a combination of observing the effects of inserting an electrode, stimulation and clinical judgment, recordings could be helpful. A positive identification of a sensory provokable unit gave the most certain information that the electrode was in a well-known and recognized anatomical region of the thalamus.

### FURTHER OBSERVATIONS ON STEREOTACTIC TRACTOTOMY IN THE TREATMENT OF PSYCHONEUROSIS

GEOFFREY KNIGHT (London) discussed the treatment of psychoneurosis by bilateral lesions in the substantia innominata and the results in 130 patients. The lesions were produced by the stereotactic implantation of rods of radioactive Yttrium 90. The resulting lesion was a flat 'plate' 5 mm. thick, 1 cm. wide, and 2 cm. antero-posterior extent. The lesions were placed at a site where fibres passing to and from the cingulate gyri, amygdala, and posterior orbital cortex all converged. Radioactive dosage had now been fixed at 37,500 rads on the day of implantation. Lower dosage had resulted in less effective results.

There had been no mortality and only six patients had had a single epileptic fit, five in the post-operative phase and one eight months later. They had been no deleterious change in personality.

All patients were cases of intractable psychoneurosis who had failed to respond to psychiatric treatment over a number of years. Chronic endogenous depression was especially favourably affected, and 70% had become free of medical care. Obsessional illness responded in half the cases but long-standing ritualism without agitation might require cingulectomy to complete a cure. In chronic anxiety states defects of personality affected the outcome of the operation. Patients with mixed anxiety, depression, and hysterical features were seldom much improved. The operation had little to offer in hysteria and was useless in the treatment of chronic pain or reactive depression to physical disability.

He stressed that there was a sharp division in function between the allocortex and transitional cortex, and the newer isocortex. Lesions of the latter resulted in intellectual loss and little emotional change whereas in the former, lesions produced tranquillity, relief of depression, anxiety, tension, and certain forms of obsessional behaviour. Lesions made for the relief of psychiatric illness should probably be confined to the connexions of the limbic lobe. The operation reported was of this type, and modified emotional reaction to an extent which was usually adequate for recovery. He also stressed that accurate bilateral lesions were essential for success and the usual reason for failure in open leucotomy was that it had not produced a lesion in the appropriate area.

#### THE SURGICAL TREATMENT OF MIDDLE CEREBRAL ANEURYSMS

R. D. WEEKS (Cardiff) presented a series of 26 patients with middle cerebral aneurysms. Those associated with other aneurysms or angiomas or dying before angiography or presenting more than two months after the haemorrhage were excluded from the assessment, leaving 17 surgical cases.

In the 13 patients who had recovered from the first haemorrhage there were no deaths; in the four considered to be in danger of death from the first haemorrhage there was one death. The overall mortality was 6%.

The patients were admitted to the Unit soon after the first haemorrhage (two-thirds within 72 hours), and deaths from recurrent haemorrhage in patients awaiting operation were included as operative deaths, so the results of operation in the subacute phase towards the end of the first week after haemorrhage seemed better than the results of surgery carried out in the very acute phase.

Cases with large intracerebral haematomas were included in the surgical results and some cases dealt with by removal of the clot urgently followed by attack on the aneurysm a day or two later.

The avoidance of serious bleeding from the sac and of any temporary occlusion of the proximal vessels were points thought to contribute towards a successful surgical result.

#### SOME EXPERIMENTAL STUDIES OF CEREBRAL COLLATERAL CIRCULATION

LINDSAY SYMON (London) described some comparative studies of the cerebral circulation in dogs and monkeys. He said that the flow responses in the carotid and vertebral circulation of the primate to occlusion of the major neck vessels seemed to bear a close similarity to those which had been recorded in the carotid circulation in man. The origin of these responses seemed to be on the basis of rapid changes in distal peripheral resistance rather than on the basis of metabolic demand. Using an experimental technique previously described, measurements of cerebral arterial pressure in small branches on the pial surface in dogs and monkeys were compared. The different collateral potential of the canine cerebral circulation was stressed. Together with these functional differences, the free communication between internal and external carotid circulations in the dog were shown to render interpretation of some flow studies difficult in this species.

The use of the method of intra-arterial pressure recording in the study of traumatic vascular spasm was described. The character of onset and the duration of this spasm was outlined. Possible relationship with the spasm of subarachnoid haemorrhage was discussed and the appearance of micro-emboli in the experimental cerebral circulation after trauma to the cerebral arteries described. The possible significance of this latter phenomenon in clinical subarachnoid haemorrhage was mentioned.

#### ORBITAL INJURY AND CAROTICO-CAVERNOUS FISTULAE

J. G. HAMILTON (Birmingham) described two cases of orbital injury followed by the development of carotico-cavernous fistulae. In one the injury was from a length of stout wire which did not damage the eye and was removed immediately by the patient. A carotico-cavernous fistula was first noticed five days later.

The second case was caused by an air-gun pellet which damaged the eye so that it subsequently had to be removed. The pellet remained in the anterior part of the cavernous sinus and symptoms of a fistula developed about two weeks after the injury. Both patients were treated by intracranial clipping and cervical ligation of the internal carotid artery. The first patient was cured by this procedure but in the second the fistula recurred to a less severe extent after some weeks. It was fed from the external carotid artery branches.

#### ORBITAL AND CONTRALATERAL CAVERNOUS SINUS INJURY

H. GOSSMAN (Plymouth) reported a case of unusual injury to the orbit and contralateral cavernous sinus. The patient, a man, had been injured by the ferrule of an umbrella which penetrated the left orbit and crossed the midline: the tip of the ferrule lay in the region of the right cavernous sinus. The patient was conscious, there was no rhinorrhoea of cerebrospinal fluid but a complete paralysis of the right fifth and sixth nerves. Plain radiographs showed the course of the foreign body and bilateral carotid angiograms showed that the right circu-

lation was intact but slow and that there was excellent cross-filling from left to right.

The foreign body was removed and this was followed by brisk bleeding from the nostrils necessitating temporary occlusion of the right common carotid artery. The eye was enucleated and the wound track packed with gelfoam and peroxide gauze. No further bleeding ensued and the carotid occlusion was removed. The entry point was sutured and conjunctiva closed. The patient made an uneventful recovery and three months later plain radiographs of the skull were normal; there was still some hypoaesthesia in the right ophthalmic nerve distribution and a partial right sixth nerve paresis. Histological examination of the eye removed showed relatively little damage but its removal had seemed imperative in order to pack the wound track and control bleeding.

#### THREE CASES OF MASSIVE ACUTE INFARCTION OF A PITUITARY ADENOMA

B. H. DAWSON (Salford) described three cases of infarction in a pituitary adenoma presenting as a complication of the common cold.

The first case, a woman of 40 with signs of acromegaly, presented four days after a cold with severe headache, neck stiffness, high temperature, blurring of vision, and increasing confusion and drowsiness. Skull radiographs showed erosion of the posterior clinoid processes. Later a bilateral sixth nerve and left third nerve paralysis developed. Lumbar puncture produced yellow cerebrospinal fluid. A carotid angiogram did not show any abnormality. She was treated with cortisone and improved steadily, leaving hospital after two weeks. Following this episode there was spontaneous cure of acromegaly and recalcification of the posterior clinoids. Eight years later she was in good health.

The second case, a girl of 17 with primary amenorrhoea presented with severe headache, pyrexia, and a complete right ophthalmoplegia one week after the onset of a severe cold. Radiographs showed an enlarged sella. There was a protein level of 270 mg.% in the cerebrospinal fluid with 100 white cells, mainly polymorphic. She developed an acute circulatory collapse which was controlled by cortisone and then made a gradual recovery. There was no disturbance of visual fields. At follow-up one year later she was in good health but still had amenorrhoea.

In the third case, a man of 30, there was acute onset of headaches, vomiting, drowsiness, and ophthalmoplegia two weeks after a severe cold. Radiographs showed erosion of the posterior clinoids. The cerebrospinal fluid showed increased protein and polymorph white cells. Angiography showed elevation of the anterior cerebral arteries and unfolding of the carotids. Four days after admission vision failed in both eyes and a frontal craniotomy was carried out. This revealed a much swollen pituitary tumour consisting of a semi-solid mass of chocolate-coloured material, this was removed and steady recovery took place.

In discussing the literature on this subject he stated that the clinical picture was very variable and included confusion and sudden death, loss of vision, ophthal-

moplegia, and cerebral ischaemic episodes. Meningeal irritation from blood was common. A marked feature was the circulatory collapse, possibly related to failure of adreno-corticotrophic hormone or direct pressure on the hypothalamus. This variation was probably related to the size of the tumour and the direction of its spread. Precipitating factors were commonly absent but had included head injury and x-ray therapy and, in this series, the common cold.

In considering treatment he stressed the need to control circulatory collapse. Many patients recovered without operation but where there was acute visual failure or gross displacement of the anterior cerebral arteries on angiography operation was probably advisable. Radiotherapy was contraindicated.

#### SYRINGOMYELIA AS A MANIFESTATION OF DEFECTIVE FOURTH VENTRICULAR DRAINAGE

E. J. NEWTON (Stoke-on-Trent) described seven patients in whom a large cervical syrinx was associated with obstruction of the foramen of Magendie. Four of the patients were male and three female, and their ages ranged from 17 to 48 years when first seen. Five had some degree of Arnold-Chiari malformation; one had a fourth ventricular pouch protruding into the cisterna magna, and in one a low fourth ventricle was closed caudally by a flat membrane.

Six patients presented with clinical syringomyelia, while the seventh presented with raised intracranial pressure due to obstructed fourth ventricular outlet foramina, and three years later developed an acute syringomyelic clinical syndrome.

There were no gross malformations of the skull or cervical spine, but five patients had enlargement of the cervical spinal canal. Six patients had myelographic evidence of an expanded cervical cord, and ventricular dilatation was demonstrated in four.

The clear colourless liquid in the syrinx in each case resembled cerebrospinal fluid with a protein content varying from 5 to 50 mg./100 ml. It was assumed that the syringomyelic cavities had developed as diverticula of the central canal of the cord, due to an alteration of cerebrospinal fluid hydrodynamics produced by defective fourth ventricular drainage. This hydrodynamic theory of the pathogenesis of syringomyelia had evolved gradually during the previous 90 years.

#### OBSERVATIONS ON INTRACRANIAL PRESSURE IN MAN

A. HULME and R. COOPER (Bristol) presented some results of investigations in 24 patients during the past two years, using the technique for continuous monitoring of intracranial pressure previously described. Cortical available oxygen, electrical impedance (giving an indication of changes in brain volume), and blood flow were also monitored by means of thin subdural gold electrodes in addition to E.E.G., heart rate, and respiration. The report was primarily concerned with observations during sleep.

It had been found that the large 'plateau' waves described by Lundberg were closely related to certain stages of sleep, in particular to the phase of light sleep following

a period of deep sleep. This stage might be recognized by a change in the E.E.G. and the occurrence of rapid eye movements. The association with this stage of sleep might be related to the metabolic activity of the brain.

The size and frequency of pressure waves were roughly proportional to the mean resting pressure. Peak pressures of 1,500 mm. of water (110 mm.Hg) had been recorded. There appeared to be a compensatory mechanism which terminated a pressure wave. The tachycardia preceding the drop in pressure might be the significant factor. Each pressure wave was associated with an increase in brain volume due to vasodilatation, and a fall in local available oxygen and blood flow. It was suggested that recurring episodes of relative cerebral hypoxia occurred and that these might have a cumulative effect on neurones.

The value of continuous monitoring and graphic display of changes in intracranial pressure was stressed.

#### CERVICAL DISCOGRAPHY

PHILLIP HARRIS and A. A. DONALDSON (Edinburgh) discussed the place for cervical discography in the investigation and management of certain patients with degenerative disease of the cervical intervertebral discs. They based their remarks on an experience of a large number of patients seen over several years and in particular 140 patients who had required an anterior cervical decompression and fusion operation for neurological syndromes resulting from cervical disc protrusions or cervical spondylosis.

In a study of 87 discs in 31 patients, 41 discs were studied by percutaneous discography, and 46 by direct discography at operation. The contrast medium used was Conray 280 (meglumine iothalamate). Of the percutaneous series, 18 had radiographic appearances which showed severe degenerative disc disease, and at all levels the syndrome was evoked; in 16 the radiographic appearance was normal and at one level the pain was evoked, and in seven the appearance was inconclusive and at one level the syndrome was evoked. Of the operative series the radiological findings were abnormal in 27, normal in 12, and inconclusive in seven. No complications occurred.

It was found that cervical discography was of value if the clinical findings did not agree with the other radiological findings; if the clinical findings gave poor anatomical definition of disc disease; if other radiological features were negative or of doubtful value or if they showed abnormalities at several levels in the cervical spine but the clinical syndromes were more confined.

The anterior operation for cervical disc disease had been found to have many important advantages over a posterior approach, but the whole pathology was not seen when using the anterior approach, and for this additional reason cervical discography appeared to have a place as one of the pre-operative tests so that as accurate as possible a diagnosis could be made both pathologically and anatomically.

#### AN EXPERIMENTAL STUDY OF THE EFFECTS OF A PLASTIC ADHESIVE, METHYL 2 CYANOACRYLATE MONOMER (M.2.C-1) IN VARIOUS TISSUES

J. DUTTON (Manchester) reported an investigation into

the properties of a plastic adhesive, M.2 C-1 (clinical grade) and the feasibility of using this as a 'weld' between an aneurysmal sac and an investment. He said that there had been some confusion over terminology and he was referring to pure methyl 2 cyanoacrylate which had been sterilized and inhibited by sulphur dioxide so that its bonding time was slowed to 50 seconds. This was a clear mobile fluid which formed a strong bond when a thin film between two surfaces was lightly pressed. Its properties were investigated in adult cats using an aseptic technique.

M.2 C-1 was applied to the dura and surface of the brain of 13 cats; nine showed a brisk polymorph reaction and later granulomatous healing. The underlying brain showed little structural or functional change, and it appeared that the pia and arachnoid acted as a barrier to the effects of M.2 C-1. The controls were always unremarkable. In five cats M.2 C-1 was instilled into tracks made in the brain. Death of neurones and a marked glial response were noted.

Thirty saphenous nerves of the cat hind limbs were coated with M.2 C-1. Eight specimens showed perineural inflammation, and neurilemmal and axonal damage occurred in some cases.

Thirteen carotid and 20 saphenous arteries were coated with M.2 C-1; 11 of the former and 10 of the latter showed changes varying from total medial necrosis to death of smooth muscle confined to a sector nearest to the glue. Thrombosis occurred in only two arteries.

Almost all specimens showed a brisk inflammatory response to the glue, and in later specimens granulomatous reaction. For at least several weeks the material was surrounded by a lake of fibrin which rapidly separated the film of glue from the tissues. The strength of the union could not therefore remain greater than that of fibrin itself after an initial short interval.

One could not recommend therefore the use of M.2 C-1 as a glue for small blood vessels, or as a substance for ensheathing cerebral aneurysms. Loss of medial muscle and thereby arterial 'elastic' response might encourage further aneurysm formation.

The title 'physiological tissue adhesive' which was applied to M.2 C-1 glue, appeared to be somewhat misleading and inappropriate.

It was felt that the use of this material should be restricted in neurosurgery to the fixation of grafts, especially when closing dural and bony defects during the radical surgery of tumours.

#### TEGRETOL IN THE TREATMENT OF TRIGEMINAL NEURALGIA

JULIEN C. TAYLOR (Derby) reported on an extended trial with this drug in 131 patients. He stressed the importance of proper dosage, for there were wide variations in requirements as between patients and in the same patient at different times. There was little relation between dose and age, weight, length of history, and intensity of pain but a very real relationship between dosage and side effects. Tolerance to these was quickly acquired provided that the initial dose was small and increased only gradually to the point where symptoms were controlled.

The group was quite characteristic of trigeminal

neuralgia in age and sex incidence. Length of history varied from six months to more than 20 years. Ninety-seven patients were followed up for one to four years, and 34 patients, all early failures, for less than a year.

In 24 cases there were no side effects and in 61 they were mild. In 30 patients the side effects were moderate and persistent but thankfully accepted in return for control of pain. In 16 cases they were severe and treatment had to be stopped. In 13 of these there was a generalized skin reaction, usually within four to eight weeks of starting treatment but in two cases not for six and eight months. The incidence of this complication overall was 10%.

Apart from failure due to side effects there were 12 patients who had made no response at all to treatment and the remainder of the group of early failures were due

to acquired drug resistance. Twenty-four patients were late failures who had broken away from control after a good initial response. The period of control before drug resistance varied from six to 12 months to four years. It seemed clear that there was evidence of a tendency to acquire eventual resistance to Tegretol.

Seventy-nine patients (60%) were classed as successes, there being a very good response in 29, good in 35, and moderate in 15. Seventeen had entered a lasting remission whilst being treated but the remainder had been treated continuously, except for variable and limited remissions, for one to four years.

He felt, however, that this figure was misleading and one should not exclude from the successes many patients who had experienced many months or years of relief from pain before the drug became ineffective.

## The August 1966 Issue

### THE AUGUST 1966 ISSUE CONTAINS THE FOLLOWING PAPERS

Positive contrast cerebral ventriculography using water-soluble media R. F. HEIMBURGER, J. E. KALSBECK, R. L. CAMPBELL, and J. MEALEY, JR.

Biochemical changes after spontaneous subarachnoid haemorrhage. Part I *The biochemical problem* MONAMY BUCKELL. Part II *The patient on admission* MONAMY BUCKELL, ALAN RICHARDSON, and MARTIN SARNER

Effect of denervation on the red and white fibres of the pectoralis muscle of the pigeon K. M. CHERIAN, F. D. BOKDAWALA, N. V. VALLYATHAN, and J. C. GEORGE

Continuous muscle spasm in intramedullary tumours of the neuraxis P. J. O'CONNOR, C. B. WYNN PARRY, and R. DAVIES

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Surgical management of congenital spinal lesions associated with abnormalities of the cranio-spinal junction W. BRADFORD DELONG and RICHARD C. SCHNEIDER

Paroxysmal dysarthria and other transient neurological disturbances in disseminated sclerosis M. L. E. ESPIR, SYLVIA M. WATKINS, and HONOR V. SMITH

Chloroquine myopathy M. J. EADIE and T. M. FERRIER

Unusual type of benign X-linked muscular dystrophy ALAN H. EMERY and F. E. DREIFUSS

Augmentation bruit of the vertebral artery C. MILLER FISHER

The persistent hypoglossal artery J. G. BLAIN and J. LOGOTHETIS

Decerebrate rigidity with preservation of consciousness JAMES H. HALSEY and ALLAN W. DOWNIE

See-saw nystagmus DAVID A. DRACHMAN

Peripheral motor nerve conduction in elderly demented and non-demented psychiatric patients RAYMOND LEVY and ELMAN W. POOLE

Fluctuating and intermittent facial weakness following a local anaesthetic M. KINSBOURNE and GEOFFREY RUSHWORTH

Effect of L-phenylalanine on central nervous system elements in tissue culture L. LISS and H.-D. GRUMER

Book reviews

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