

# Proceedings of the 71st meeting of the Society of British Neurological Surgeons

The 71st Meeting of the Society of British Neurological Surgeons was held at the Royal Infirmary, Sheffield, on 21-22 May 1965. The President, Mr. G. L. Alexander, was in the Chair.

## AN ASSESSMENT OF THE TREATMENT OF INTRACRANIAL ANEURYSMS

J. HARDMAN (Sheffield) discussed a series of nearly 500 cases of intracranial aneurysms collected during the past 10 years. The material was divided into an old series and a new series, comprising about a third, treated during the past three years when a higher proportion of cases had been operated on and newer methods used. The overall operability rate had been 65-70%. He noted that age above 50 years, the presence of hypertension, atherosclerosis of cerebral and cardiac vessels, and abnormalities of the circle of Willis affected the risks of operation adversely, and there was differing mortality according to the site of an aneurysm.

In the old series mortality for the anterior cerebral complex was 48% for direct approach and 30% for ligation of one anterior cerebral. That for middle cerebral aneurysms was 27%, direct approach to posterior communicating lesions 36% (with a hemiplegia rate of 44%), and carotid ligation 13% (with hemiplegia rate of 15%). On analysis the cases were graded 1 for subarachnoid haemorrhage and lucid mentally, 2 for similar condition with hemiplegia or aphasia, and 3 for those comatose, confused, or deteriorating. The mortality of group 3 was 100% with or without operation.

There were 118 deaths, 51 operated on, 67 untreated. Eighty-nine were subjected to post-mortem examination. There was infarction in 95%, intraventricular haemorrhage in 42 (intracerebral in 50%), and marked atherosclerosis in 27%.

The radiographs were reviewed in 249 cases for evidence of spasm. This was present in 32% and in these cases the mortality and hemiplegic rates were doubled. Spasm increased after second and subsequent bleeds. The survival rates and mortality depended directly on the number of bleeds.

In the new series every effort was made to make a direct approach to the aneurysm using aids such as controlled respiration, dehydration, hypothermia, manual control of carotids, small lobectomies, and temporary clipping of main vessels for one to four minutes. There was a considerable improvement in results. Mortality in direct attack on anterior cerebral complex aneurysms was reduced to 23% and anterior cerebral clipping to 18%. Mortality in the middle cerebral group was slightly worse at 36%. In direct attack on posterior communicating aneurysms it fell to 6% with a hemiplegia rate of 33%.

He concluded that direct operation should be carried out as soon as possible and that the contraindications to operation were: akinetic mutism, severe widespread arterial spasm, more than 65 years of age, marked arteriosclerosis with history of coronary insufficiency, and high diastolic pressure.

## SUPRACALLOSAL ANTERIOR CEREBRAL ANEURYSMS

N. C. SPANOS (Romford) reviewed 17 cases of anterior cerebral aneurysm distal to the anterior communicating artery and said that incidences of 2.5 to 4.5% had been published. Half his cases had developmental anomalies of the anterior cerebral arteries. He discussed and illustrated the embryology and comparative anatomy of the anterior cerebral vessels. The commonest anomaly, (four cases), was fusion of the first part of both anterior cerebral vessels at the usual site of the anterior communicating artery into a single trunk which divided at the genu into two pericallosal arteries. The aneurysms were found at this bifurcation. In two cases there was also a single midline second part of the anterior cerebral dividing at the genu, where the aneurysms were found, but the first part of one anterior cerebral was deficient. In one case there was a communicating vessel between the pericallosal arteries near the genu from which an aneurysm arose. In the remaining eight cases the arterial arrangement was normal and the aneurysm arose from one or other anterior cerebral artery near a large branch, the calloso-marginal in seven, and the fronto-polar in one. There was one traumatic aneurysm arising from the pericallosal.

All the patients had had subarachnoid haemorrhage and two presented with symptoms and signs of raised intracranial pressure. Focal neurological disturbances were common and could be explained by the position of the aneurysm and subsequent clot or ischaemia. Pyramidal signs were common but usually slight. Adverse attacks occurred in two patients. Mental changes were common and usually resulted in a post-leucotomy-like state or dementia. This occurred in six patients. Sphincter disturbances occurred in five patients.

Operation was carried out in 14 patients, in half a small frontal lobectomy was used and in others the aneurysm exposed after division of the sagittal sinus and separation of the frontal lobes. It was possible to occlude the neck of the aneurysm in all but one case. There was one operative death. After operation four patients showed severe weakness of one or more limbs and this was

permanent in two. Three, intellectually intact before operation, showed mild but permanent intellectual change. Two patients with very large aneurysms who showed some dementia before operation were thought to be worse. Two had some permanent sphincter disturbance and one patient developed epilepsy.

#### BASILAR-VERTEBRAL ANEURYSMS

A. RICHARDSON (London) discussed the natural history of untreated basilar-vertebral aneurysms. His series comprised 60 cases which had suffered from proven subarachnoid haemorrhage and had either angiographic or post-mortem evidence of a single aneurysm of the basilar-vertebral system. These formed a 4% incidence in a series of 1,938 aneurysms. They were patients who had been treated conservatively and in whom there had been an adequate follow-up. Eight were in coma on admission and remained so until death. In a further eight cases recurrence of haemorrhage or clinical deterioration precluded investigation; all died. In the remaining four patients, none of whom appeared in immediate danger of death from the presenting ictus, the diagnosis was made angiographically.

In this latter group the death rate assessed at one year was 50% and there was a rather higher incidence of patients under 50 years of age. Females preponderated but they appeared to have a slightly better natural history. A mortality of 70% had followed coma producing haemorrhage even when good initial recovery occurred, and the capacity of such cases to emerge rapidly from coma was a remarkable feature. There was a high death rate in patients suffering more than one haemorrhage and a higher incidence of multiple haemorrhages before admission than with aneurysms at other sites. Hypertensive cases fared slightly worse than those with a normal blood pressure. Depression of consciousness carried the worst prognosis. There was a tendency to early recurrent haemorrhage. Most of the aneurysms were at or near the basilar artery termination and large aneurysms had a much higher mortality.

There was a remarkably low morbidity in patients surviving for one year, 19 of 22 patients being at full work and the other three being only partially disabled. In a longer follow-up the position changed very little and with eight cases observed for three to six years and 14 for one to two years there had been only one death from an unrelated cause, and no change in the neurological status of the others. After reviewing the literature he concluded that though the surgical results were varied the high natural death rate in this group should foster an aggressive and urgent therapeutic approach to these lesions, particularly as they were relatively easy of access.

#### NEUROLOGICAL MANIFESTATIONS OF THORACIC INTER-VERTEBRAL DISCS

J. CARSON (Sheffield) reviewed 18 cases of median dorsal disc prolapse. Eight had been seen for the first time in a spinal injuries unit and the remainder were studied pre-operatively. In this latter group the diagnosis had been made pre-operatively in nine and was discovered at

operation in one. Three, whose disability was slight, had declined operation, the others were treated operatively.

He noted that the clinical pattern was remarkably consistent but could not be distinguished from the symptoms and signs of spinal cord compression from other causes. The presenting symptom was usually paraesthesiae, more obtusive on one side and often described as a feeling of cold or burning pain. This was followed by weakness of the legs. Backache was mild and occurred in four cases. Sphincter disturbance was present in two. All had a spastic paraparesis with impairment or perversion of pain sensation below the level of the lesion. Postural sense was, in most cases, intact. In all but two cases the history was short and less than four months' duration. Twelve were male and all in the third decade or over. The disc levels ranged from T.4.5 to T.11.12.

Apart from a block in one case examination of cerebrospinal fluid was unhelpful and in most cases manometry was recorded as normal; in a few there was a slow rise and fall. Radiographs showed disc calcification in two and narrowing of the disc space in four. Final diagnosis depended on myelography and all 10 cases studied pre-operatively showed abnormality, suggestive of an extramedullary lesion. In some, however, first examination was normal or doubtful and only a second or third examination at an interval of a few days revealed the defect.

He stressed that accurate diagnosis was essential, for removal by a conventional laminectomy might convert a partial disability into a paraplegia and even laminectomy without disc removal might severely disturb cord function, whilst the lateral approach was safe and effective. Careful myelography would establish the diagnosis and indicate the correct surgical approach.

#### PALENCEPHALOGRAPHY

C. G. DE GUTIERREZ-MAHONEY (New York) described a method of sound recording from the head which could be used in neurological diagnosis. He reviewed the previous work on this method by the school of Barcia Goyanes following the thesis of Calvo in 1950.

The technique consisted of applying a microphone to various parts of the head and recording the sound vibrations with a phonocardiogram or electroencephalogram. It was essential that the patient be at rest, for emotional states could increase the heart rate and cause an increase in frequency, amplitude, and configuration of the waves. Movements of the teeth and swallowing also caused a high wave to be recorded.

The recordings were waves which were rhythmical, related to the cardiac cycle, had a frequency of 5 to 20 c/s and a variable amplitude, being highest in the frontal region, of medium grade in the mid-temporal and parietal regions, and lowest in the occipital area. The frequency was also highest in the frontal region, about 20 c/s and about 10 c/s in other areas.

Amplitude was the most useful diagnostic feature of the tracings. This was low over subdural and intracerebral haematomas and high over gliomas, metastatic tumours, meningiomas, and arteriovenous malformations. He had

also noted that there was a greater regularity to the wave amplitude with meningiomas than with other processes where the amplitude change was more variable and spiky in character.

#### SEDATIVE INTRAVENTRICULAR THERAPY

S. OBRADOR (Madrid) recorded his experiences of the intraventricular injection of a number of different drugs. The effects had been studied in 83 patients, 58 before diagnostic ventriculography, 15 Parkinson patients before stereotactic surgery, eight with intractable facial pain, cases of mental disturbance and epilepsy before psychosurgical operations, and two patients in post-traumatic coma. A total of 28 drugs were tested in 145 intraventricular injections, either directly or by means of a special device allowing repeated injections through percutaneous punctures.

Autonomic effects were noted with many drugs and included nausea and vomiting, sweating and lacrimation, vertigo, vasodilatation, and blood pressure and cardiac changes. Central sedative effects were obtained with barbiturates, reserpine, butyrophenone, and other psychotropic substances. Stronger depressant action affecting respiration appeared with cocaine, morphia, atropine, and xylocaine in high dosage. Chlorpromazine and promethazine induced an intense fall in blood pressure.

As well as other effects morphine induced curious visual hallucinations with distorted perception of optical images, and sensations of movement. In 50 patients tested with barbiturates there was a clear sedative action in 29 with some degree of sleep appearing in 15 minutes and persisting for half an hour. In the remainder there was no clear sedative or depressant action and it was noted that in this group there was a high proportion (43%) of third ventricle and posterior fossa tumours.

It was found that adrenaline and other sedative drugs lowered the body temperature for several hours after injection and he suggested that this effect might have a therapeutic application in some cases of head injury and other lesions.

He concluded that intraventricular therapy with sedative drugs might have a useful place in sedating patients before ventriculography and after head injury or cerebral operations. The barbiturate drugs had a marked anti-emetic effect which was a useful adjunct to sedation in this group of patients.

#### COLLOID CYSTS OF THE THIRD VENTRICLE

W. MCKISSOCK (London) reported a series of 50 cases of colloid cyst of the third ventricle. The incidence in nearly 10,000 cases of verified intracranial tumour had been 0.5%. Seven patients had no physical signs at all and in 20 papilloedema was the only sign. In 24 there was x-ray evidence of raised intracranial pressure. He suggested that in the presence of a suggestive history of headache, visual disturbance, vomiting, 'drop' attacks, and intermissions in symptoms following straight radiographs of the skull the ventricular size should be measured by echo-encephalography; in no cases had the ventricles

been normal in size. If ventricular enlargement were proved by this method then ventriculography should be carried out and pressed to an exact conclusion. Demonstration of enlarged lateral ventricles and a block at the foramen of Monro was not enough. If the third ventricle could not be filled then the lateral ventricle should be tapped and a small amount of air introduced cisternally or by the lumbar route.

He described in detail the operative treatment of these cases and stressed that a small brain incision, no more than 1 to 2 cm. in length, was all that was required to gain access to the lateral ventricle. It was important to prevent blood seeping into the ventricle. When the cyst had been visualized through the foramen of Monro it was essential to puncture it with a fine needle for sometimes aneurysms could masquerade as cysts. After drainage of the colloid material the pedicle of the cyst could be clipped and divided or, if this proved difficult, the base of the pedicle could be coagulated. It was essential to avoid damage to the terminal vein which might sometimes be adherent to the cyst wall.

There had been eight deaths, six in the first 25 cases. In two of these the patient was in coma on admission and he noted that no patient presenting in this manner had recovered even when ventricular drainage or cyst removal had been carried out at once. In one no cause of death was found. Damage to the terminal vein had been the cause in two cases.

Of the survivors, there were bad results; of these, two had mental disturbances before operation which had not recovered. Six had mild residual disability, epilepsy in three and memory defect in three, but were working and leading normal lives. The remainder were completely normal people. He concluded that with proper investigation, modern anaesthesia, and attention to certain details of surgical technique, it should be possible to return to a normal existence all but an occasional patient suffering from this condition.

#### CYSTIC CEREBELLAR TUMOURS: A CLINICO-PATHOLOGICAL RE-APPRAISAL

LIONEL WOLMAN (Sheffield) reviewed the histological findings in a series of 73 cerebellar tumours, the majority of which were associated with a cyst of varying size. Macroscopically the nodule in these cystic tumours ranged in appearance from white, grey or gelatinous, to pink, brown or red. The age distribution of the patients extended from 1 to 65 years, with 45% of them being over 20 years of age. Microscopically, the features common to the group were the rich reticulin network between vacuolated cells or small groups of cells and the frequency of involvement of the pia arachnoid. The reticulin pattern tended to become fragmented in many areas due to hydropic degeneration of the intervening cells or by a gliotic reaction which frequently consisted of piloid astrocytes arranged in bands. This reaction was especially marked in the adjacent compressed folia.

The difficulties in classifying these tumours were outlined and some of the conflicting reports in the literature mentioned. Objections were raised to such a term as 'juvenile or piloid astrocytoma' as these tumours

were not restricted to the young nor did they behave like gliomas from which they differed in many ways. True astrocytomas of the cerebellum, both fibrillary and gemistocytic, were occasionally encountered and these differed in no respects from these tumours in the cerebrum or brain-stem. 'Spongioblastoma polare' was now applied to an entirely different type of tumour. Haemangioblastoma implied a tumour of 'blast' or primitive cells and had malignant connotations. Although angioreticuloma was a good descriptive term, it had not met with wide acceptance. By comparison with the nomenclature of similar tumours elsewhere in the body and their tendency to sclerosing change, the term 'gliosing haemangioblastoma' was tentatively suggested for this group of cerebellar tumours.

D. M. C. FORSTER (Sheffield) continued with a clinical review of these 73 patients and compared them with 358 with posterior fossa tumours seen over the same period. These included 48 ependymomas, 37 medulloblastomas, and 21 astrocytomas.

In those with haemangioblastoma the average survival had been seven years and the longest since operation 24 years. Nineteen per cent had died within three months of attendance. For ependymoma the average survival was 13 months, with 46% dying in the first three months and for medulloblastoma eight months and 46%. In the fibrillary astrocytoma the figures were 11 months and 66% and all cases of malignant astrocytoma (grades 3 and 4) had died within a month. No difference in prognosis was found between the cystic and solid tumours and age did not influence the results. No tumour with attachment to the floor of the fourth ventricle was found in patients over 11 years of age.

Of the 73 patients, 70 had surgery, two died before operation, and one had radiotherapy. There were 12 operative deaths, six from pressure cones, and one each from air embolus, pulmonary embolus, mitral stenosis, and meningitis. In two cases there was no necropsy. There were five late deaths; two of unconnected causes, two unknown cause, and one from radiation necrosis and meningitis.

Complete excision was the aim in all patients and this was achieved in 35, of whom 30 were alive. In 14 cases with nodules in large cysts the nodule with adjacent cyst wall was excised and 12 were alive. In 17 cases partial excision was carried out, usually because of attachment of tumour to the floor of the fourth ventricle, and of these 11 were living. Four cases had exploration only and all were dead. Eight patients received radiotherapy at some stage and of these only three were alive so that he considered that this treatment in no way improved the survival rate. Only one recurrence was found in a patient 16 years after decompression and cyst aspiration.

He concluded that the survival rate of these cases after treatment showed a close correlation with the life expectancy of the normal population of the same age. Provided that the initial pressure disturbances could be corrected and operation safely performed without damage to the brain-stem, the future was extremely good, without recourse to radiotherapy and with little risk of recurrence.

#### LATE INTRACRANIAL BLEEDING AFTER HEMISPHERECTOMY

HUW GRIFFITH (Oxford) described the post-mortem findings in three patients with hemispherectomy who had died some years after operation. These had come from a series of 18 cases of which five had died. He noted that so far the only complications described had been herniation of the remaining brain into the cavity and hydrocephalus of the cavity.

All operations had been done for fits and behaviour disturbances. In two cases the progress had been normal at first but in the third the cavity had had to be re-explored for persistent subgaleal communication and a blocked aqueduct for which a Torkildsen operation had been carried out. After the initial period of good result, headaches and vomiting appeared with pain and stiffness of the legs. The patients slowed up mentally, became ataxic and tremulous, and the previously unaffected limbs became weak and spastic. Investigations showed a blocked aqueduct in one and fourth ventricle in two. One had a subarachnoid haemorrhage and one a high protein fluid in the cavity. One finally died of multiple intracranial haemorrhages in ventricle and cavity and the other two declined steadily in spite of ventriculocisternostomy.

Post-mortem examination showed membrane formation in cavity and lateral ventricle from which repeated haemorrhages had taken place at different times. He believed that in these cases a cycle of bleeding, granular ependymitis, and membrane formation had been set up and repeated bleeding had led eventually to their death.

#### SOME IMPRESSIONS OF SOVIET NEUROSURGERY

M. A. FALCONER (London) reported that he had been member of a three-man delegation from the United Kingdom to the U.S.S.R. to discuss problems of cerebrovascular disease, and that during that time he had visited among other centres, the three principal Soviet Institutes of Neurosurgery at Moscow, Leningrad, and Kiev respectively. Of about 500,000 medically qualified doctors in the U.S.S.R., more than half of whom are women, there were probably 700 trained neurosurgeons who were organized into one national society and about 50 regional societies. All doctors, including the neurosurgeons, were salaried, and carried out their work under a hierarchical system, the neurosurgeons working in general hospitals, army hospitals, accident centres of various types, or in one of the three research institutes of neurosurgery.

The Burdenko Institute of Neurosurgery at Moscow, now headed by Professor A. E. Artyunov, was the largest with 300 beds, and a medical staff including about 40 neurosurgeons, 15 neurologists, and smaller numbers of neuropathologists, neuroradiologists, and neurophysiologists. The Polonov Institute at Leningrad, headed by Professor U. M. Ugriumov, had about 180 beds and a slightly smaller staff, while the Institute at Kiev under Professor Volochin and his docent, Dr. J. A. Zozulia, had about 150 beds with an additional 150 under construction. They were thus all self-centred, as were

the Institutes of Neurology in Moscow and Leningrad which had their own neurosurgeons.

Brain tumour work was clearly the chief interest of all the neurosurgical centres visited, but each had developed other interests such as paediatric neurosurgery, stereotaxy, pain relief, and head injuries. Considerable interest was being built up as regards the surgery pertaining to cerebrovascular diseases. All the institutes visited were well-equipped with apparatus both of Soviet and western origin. In several instances, however, the Soviet doctors did not realize the full potential of their western equipment, largely because few of them had been outside the Soviet bloc of countries.

However, many of the younger Soviet neurosurgeons read and spoke English. Many of them also listened to the B.B.C. broadcasts. The western medical literature was culled and abstracted into Russian and so developments abroad were widely circulated. The Soviet neurosurgeons had their own journal known as *Problems in Neurosurgery* and at the end of each article was a short summary in English, while an index in English was placed at the end of each issue.

#### SPHINCTERIC DISTURBANCES IN DIENCEPHALIC LESIONS

J. ANDREW (Romford) and P. NATHAN (London) described a group of cases in which there had been disturbances of micturition in association with lesions in the anterior diencephalon. In a series of 50 anterior communicating aneurysms, five had such disturbance after operation without evidence of frontal lobe disturbance. They were unaware that the bladder was full or had any only momentary warning and could not stop voiding. They were aware of this difficulty and distressed by it. One patient had painless retention of urine and loss of reflex and voluntary detrusor activity. There were three cases of tumour below the hypothalamus in which there was urinary incontinence as a manifestation of focal brain disturbance not related to the patients' mental state. In one 48-year-old woman with a chiasmal cyst there was greatly increased libido. They believed that a similar condition could result from the 'punch-drunk' syndrome in which there was usually some thinning or perforation of the septum pellucidum. They stated that the sphincter disturbances in these cases was most probably due to ischaemia or compression of the septal nuclei and anterior hypothalamus. They noted that this area was supplied by small vessels from the anterior cerebral and anterior communicating arteries. These vessels could easily be affected by spasm in repeated head trauma, compression, or the stretching and distortion associated with expansion or rupture of an aneurysm.

They concluded that lesions in the pre-optic area, the septal nuclei, and the anterior hypothalamus could lead to disturbances of micturition, or normal bowel action

and less commonly, sexual function. These facts added to experimental data suggested that normal micturition, defaecation, and sexual function were organized in the septal and hypothalamic areas and that frontal lobe function was probably to integrate these physiological processes with the activities of daily life.

#### LOWER LUMBAR AND SACRAL ROOT AND SHEATH LESIONS

P. SCHURR (London) described various abnormalities of the roots, root sheaths, and meninges in the lumbar and sacral areas and illustrated these from his clinical material.

In root sheath lesions he said there could be dilatation and prolongation of the sheath and this might cause unusual symptoms in disc lesions. The union of two roots in one dural sheath might suggest root enlargement and this could also be suggested when the ganglion lay in the proximal root sheath. Traumatic cysts could be produced after operations for disc prolapse. Perineural cysts were found in the region of the dorsal root ganglion in the potential space between perineurium and endoneurium, or between dura and arachnoid. They contained yellow fluid or altered blood, were never more than 2 cm. in diameter, and rarely communicated with the cerebrospinal fluid. They were probably due to a proximal arachnoid block which sealed off the distal space forming a cyst which dissected the ganglion and might cause reactionary changes or haemorrhage in adjacent tissues. They were often symptomless. Treatment was often unsatisfactory and it might not be possible to do more than aspirate the fluid. Intraneural cysts had been described but he had not had an example of this form.

He said that extradural sacral cysts distorted the dura and cauda equina causing root compression and traction. They were more common in the thoracic area. They consisted of an arachnoidal herniation through a hole in the dura and arose most frequently in the axilla of a root sheath. Later the arachnoid ruptured and a false cyst formed beyond the opening. This was only in intermittent communication with the cerebrospinal fluid. They might cause extensive symptoms and signs related to the cauda equina and often scalloped the body of the sacrum and thinned the roof. Operative treatment consisted of exposure of the cyst and display of the opening and then a collar of fascia was placed around the root sheath adjacent to the opening.

He noted that these cysts could usually only be distinguished by radiography. This might show widening of the sacral canal or of a foramen and myelography would demonstrate the cyst or its border if the cyst did not fill. Late films should be taken after one or two days, and possibly again after several weeks, if the diagnosis was in doubt.