Proceedings of the Society of British Neurological Surgeons: 65th meeting

The 65th Meeting of the Society of British Neurological Surgeons was held at St. Bartholomew's Hospital, London, on 10 May to 12 May 1962. The President, Mr. D. W. C. Northfield, was in the Chair.

SURGICAL PROBLEMS IN THE SEPARATION OF CRANIOPAGUS TWINS

J. E. A. O'CONNELL (London) gave a detailed account of his experiences in the separation of two pairs of craniopagus twins. He noted that accounts in the literature were rare but that their incidence was probably commoner than it suggested. Many problems had to be considered—embryological, ethical, and philosophical—as well as the practical ones of nursing care and surgical separation. The aim was to produce two separate individuals with minimal damage to nervous tissues and their vascular supply, and to provide adequate covering of dura and scalp and, if possible, bone.

The first pair of twins were boys and the union involved the entire vertex, rotation of one head having occurred on the other between 150°. Angiography revealed a cerebral deformity in each child with increase of the vertical dimension in the frontal region. In addition it appeared that much of the venous blood from each cerebral passed to the torcular of his brother. Separation which involved three operations was begun at the age of 10 months. At the first operation partial scalp flaps were raised and at the second two weeks later these were completed and a linear craniectomy made on one side. At the third operation a craniotomy on the other side was made, the dura divided on either side of the line of contact, and the cerebral convolutions separated from each other. One group of frontal veins draining into the brother's lateral sinus was divided without incident but when the other side was divided severe circulatory disturbance in that hemisphere was noted at once. The heads were then separated, the brain was covered with freeze-dried dura, and satisfactory cover with skin flaps was achieved. The twins developed venous obstruction died eight months after separation without having regained full consciousness. The other twin was now aged 4 and had markedly retarded speech.

The second pair of twins were girls. Union again involved the entire vertex and there was rotation around a longitudinal axis so that the faces were set at an angle of 130° to each other. Angiography revealed a marked asymmetry in each child between the cerebral hemispheres. The vertically elongated right cerebral hemisphere of each child reached her sister's tentorium and each hemisphere lay above the left one to come in contact with the left side of the conjoined skulls. Operations were begun at 11 months and carried out in three stages. Two major difficulties were encountered at the final operation. First was the absence of a plane of cleavage and the attachment of the frontal portions of each hemisphere to the twin's tentorium, and secondly, the presence of two dural septa, asymmetrical falx, attached to the left side of the skull, which prevented access to the medial side of the right cerebral hemispheres. After resection of one of these folds, separation of the right hemisphere was finally effected by division of nervous tissue. One child died immediately. In the other cover with freeze-dried dura and scalp flaps was achieved. This child was now 2 years old. She showed a left hemiparesis, was retarded, and continued to have epilepsy from which she suffered before separation.

INTERMITTENT SYMPTOMS IN SPINAL CORD COMPRESSION

R. CAMPBELL CONNOLLY (London) said that in cases of spinal tumour symptoms such as pain and paraesthesia might remain intermittent throughout the course of the illness, but in the great majority real neurological disability would be steadily progressive. Recognized exceptions were arachnoidal spinal cysts and angiomatous and meningiomas occurring during pregnancy.

Six cases were described in which there was evidence of neurological disability which remitted spontaneously and was unrelated to pregnancy or other hormonal changes. Four of the cases had tumours in the cervical region and two had chronic granulomas in the dorsal region.

The most striking of the cervical group was a woman aged 67 who developed tetraparesis which lasted four months. She then improved spontaneously and suffered no disability for two years, when she again became severely incapacitated. An intradural meningioma was removed with a good recovery of function. The other three cases showed either that the onset of severe disability was associated with movement of the neck or improvement occurred with immobilization.

The two cases of chronic granuloma showed similar and considerable spontaneous variations in the severity of their disability over periods of five months and seven years. In the latter case viable organisms (Staph. pyogenes) were isolated and it was understandable why the degree of spinal compression might vary with granulomas, particularly while active infection persisted.

Owing to the atypical history in cases of spinal compression of this type, difficulties arose in diagnosis so that at one stage two of the cases were diagnosed as disseminated sclerosis and in two others the neurological
lesions were attributed to subluxation of the cervical spine. In the narrower parts of the spinal canal myelography would in most cases prove the diagnosis without difficulty, but in the cervical region small tumours might be extremely difficult to demonstrate. It was therefore concluded that in such cases the diagnosis of tumour should only be discarded when there was unequivocal evidence of another disease.

VERTEBRAL ARTERY INSUFFICIENCY IN SPINAL CORD DISORDERS

A. R. TAYLOR (Belfast) discussed the aetiology of cervical myelopathy associated with spondylolisthesis in the light of the related facts that the spinal cord was seldom found at operation to be compressed, and that the level of the spondylotic bars seen at myelography frequently did not correspond to the level of neurological dysfunction.

It was suggested that the condition was primarily one of chronic ischaemia brought about by compression of the radicular vessels in the narrowed intervertebral foramina and fibrosed root sleeves.

The similarities between the clinical picture of cervical myelopathy and conditions known to be caused by ischaemia were considered.

The possible causative lesions in the vertebral system of vessels were reviewed and vertebral and anterior spinal arterial insufficiency discarded.

The reasons for considering the primary lesions to lie in the intervertebral foramina were enumerated and reasons given for preferring the operation of multiple root decompression to spinal cord decompression as the surgical treatment for the disorder.

The preliminary results of seven such operations were described.

SOME ASPECTS OF THE NATURAL HISTORY OF ANEURYSMS

G. H. DU BOULAY (London) discussed some features of intracranial aneurysms, referring to the literature and to a personal series of 196 cases examined at Maida Vale Hospital. He believed that, with the exception of mycotic and traumatic aneurysms and perhaps of arteriectasia, all intracranial aneurysms had the same cause. He also stressed that they were, or became, without exception, associated with cerebral atherosclerosis. Atherosclerosis was found in all patients coming to necropsy in his series and this association had been shown also by Crawford and by McDonald and Korb. Both atherosclerosis and aneurysms occurred at points of branching and the first symptoms of aneurysms commonly occurred at an age consistent with such an association. Both aneurysms and atherosclerosis were commoner in women than in men. In his series atherosclerosis had been recognized in angiograms in 44% but only in 23% of a series of similar age grouping suffering from cerebral tumours.

He stated that defects in the musculature of arteries were probably unimportant in the development of aneurysms. Such defects were common in all intracranial arteries and in many other arteries of the body as well.

Anatomical examination of the arteries of 28 different mammals and 115 different birds had shown similar muscular defects but aneurysms were unknown in these animals. He did not think that such defects represented points of weakness and noted that in them the elastica was always intact but was never intact even in the smallest aneurysm.

He suggested that aneurysms were formed by some sudden, perhaps biochemical, event which destroyed the elastica and strength and cohesion of muscle and collagen. Perhaps some similar event might predispose to the early changes of atherosclerosis. Intracranial arteries had little or no adventitia and its absence might allow an arterial wall, weakened by such an event, to blow out in saccular aneurysmal form. He stressed that though the first appearance of an aneurysm was sudden as were also many of the changes occurring in them such as loculus formation, these sudden changes were not necessarily associated with symptoms and signs. In his series patients with unilocular aneurysms had suffered an average of 1·7 haemorrhages whereas those with multilocular ones had a haemorrhage rate of only 1·6.

He concluded that many aneurysms were probably symptomless and some, after a period of instability, might become so. He believed that the incidence of these aneurysms was of the order of 1 in 250 seemingly healthy adults and, if this were true, the average course of the disease taken over the whole population must be a relatively benign one.

CEREBRAL PATHOLOGY IN RUPTURED INTRACRANIAL ANEURYSMS

VALENTINE LOGUE and BARBARA SMITH (London) reported the pathological findings in a series of eight brains of patients dying from ruptured intracranial aneurysm. The brains were chosen because they showed no intracerebral clot or cerebral disruption. Macroscopically they showed little abnormality apart from the subarachnoid haemorrhage and some superficial cortical damage in relation to the aneurysm. Three patients had had no surgery, three had had the aneurysm treated intracranially, and two had had carotid ligations. No patient had had prolonged or significant hypertension and only one had radiological evidence of vasospasm.

The pathology in all eight cases consisted of neuronal necrosis and ischaemia in the cortex, and severe patchy pallor of the white matter. The grey matter lesions were usually arteriolar in size, although sometimes confluent, and were present throughout the cortex, although maximal in the area supplied by the aneurysm-bearing vessel. In two cases there was white matter infarction in the corpus callosum but elsewhere there was no myelin breakdown in the white matter lesions. There was relative sparing of the central grey matter and cerebellum and the brainstem was normal.

They concluded that if the lesions were due to spasm of the main trunks transmitted centrifugally, it did not explain the fact that the perforating branches were unaffected. If the vessels were acted upon by a substance
in the cerebrospinal fluid from the clot it did not account for the sparing of the cerebellum and brain-stem. These lesions, particularly those in the white matter, appeared severe enough to account for coma in those patients who had no macroscopic brain damage.

SUGICAL TREATMENT OF INTRACRANIAL ANEURYSMS UNDER HYPOThERMIA AND CONTROLLED RESPIRATION

R. ALEX DAWs (Preston) discussed the advantages of the combined use of hypothermia and controlled respiration for the direct surgical treatment of intracranial aneurysm. The value of temporary control of the blood supply to the aneurysm was outlined.

In a series of 106 patients operated upon for intracranial aneurysm, there were 33 with aneurysm of the middle cerebral artery. Of these 33 patients, five died (four with massive intracerebral clots, the removal of which did not improve their condition, and one patient died while awaiting surgery), an overall mortality of 15%. Of the 28 remaining patients, all had direct intracranial operations. There were no deaths. Of the 28 patients a gratifying result was obtained in 13 in who had no significant disability, either physical or mental. Seven patients were moderately disabled but eight were severely disabled. Only four patients were made worse by operation and two of these eventually made good recoveries.

Some views on the part played by the aneurysm in initiating and maintaining spasm were given. He concluded that early operation, in the absence of coma, might help to relieve spasm and improve the chances of useful survival.

THE INCIDENCE AND SIGNIFICANCE OF SPEECH DISTURBANCES DURING TEMPORAL SEIZURES

M. A. FALCONER and E. A. SERAFETINIDES (London) reported that a study of the pre-operative fit patterns in 100 cases of temporal lobe epilepsy, which were subsequently submitted to an anterior temporal lobectomy, had revealed that paroxysmal dysphasia occurred in relation to the seizures in slightly more than a third of the cases, and ictal speech automatisms in another third. These latter phenomena consisted of utterances which, although linguistically correct, were often out of context and were not subsequently recalled by the patient. The dysphasic utterances, on the other hand, involved a difficulty in expression and were subsequently recalled by the patient. Very few patients exhibited both types of disturbance, and in these few the two types never occurred together in the same seizure. It was found that whereas dysphasia in relation to seizures almost always occurred in cases in which excitation appeared to arise in the dominant temporal lobe, ictal speech automatisms could occur with excitation arising in either cerebral hemisphere, and indeed slightly more often in the recessive hemisphere than in the dominant one. The possible significance of these observations on speech mechanisms was discussed and attention was drawn to other published observations on ictal speech mechanisms.

POSTERIOR ORBITAL AREAS AS AN OBJECTIVE IN PSYCHOSURGERY: STEREOTAXIC APPROACH

GEOFFREY KNIGHT (London) said that vertical leucotomy incisions which entered the posterior orbital regions produced serious autonomic and trophic disturbances through their effect upon the adjacent structures in the striatum and caudate nucleus rather than from their effect upon the agranular cortex. Posterior lesions produced by horizontal incisions in the human were harmless, neither autonomic disturbance or stereotyped restlessness having been observed in 430 cases of orbital undercutting performed by a narrow incision 1-8 cm. wide lying 1 cm. from the middle line and 1 cm. above the orbital roof passing back for a distance of 6 cm. on the inner aspect of the lobe. The results obtained by this limited incision were parallel to those obtained by undercutting entire orbital cortex.

Successful re-operation in cases of previous failed leucotomy suggested that the formation of the posterior 2 cm. of this incision behind the old leucotomy scar produced improvement in many cases. This portion of the incision accurately overlay area 13 of the human brain. This area of agranular cortex gave origin to descending tracts which projected through the genu of the corpus callosum to the ventro-median hypothalamic nuclei bilaterally. Anatomical connexions and the effects produced by stimulation suggested that area 13 may exert influence during intense emotional reaction.

Stereotaxic isolation of area 13 had been performed by the implantation of radioactive yttrium (Y.90) in cooperation with Dr. F. H. Doyle, Department of Radiology, and Dr. J. R. Mallard, Department of Physics, Postgraduate Medical School of London. Of eight cases so far treated good results had been obtained in six cases of psychotic depression; one long-standing obsessional had been improved; one hysterical had not improved.

THE VALUE OF STIMULATION IN THE SURGERY OF THE DEEP THALAMIC NUCLEI

BRODIE HUGHES (Birmingham) discussed the value of stimulating deep thalamic nuclei in stereotactic surgery for Parkinsonism. The material consisted of 480 stimulations in 80 patients undergoing surgery for Parkinson's disease. Two groups of stimulation were carried out in each patient, one in the nucleus ventralis oralis anterior and one in the posterior part of this nucleus. Three frequencies were used 8, 20, and 40 c/s with a square wave of pulse width 1 m.sec. Anodal stimulation was used with an electrode 0·9 × 5 mm. Four types of response were noted, initiation or aggravation of tremor, decrease of tremor, movements related to the stimulus frequency, and lastly a variety of effects, usually sensory, related to malposition of the electrode. No correlation with stimulus frequency was noted. Tremor was aggravated or decreased in the same proportion at each frequency, increase of tremor being noted rather more than twice as often as decrease.

The effects of position in the nucleus were interesting. The effect on tremor was much more marked from
anterior stimulations than posterior; this included both increase and decrease of tremor. It was noted that this result was in conflict with that reported by other workers and was the opposite to what one would expect from the anatomical connexions.

No very clear picture had emerged from relating the results of stimulation with those of making a lesion in the position stimulated. An aggravation of tremor with added motor movements related to stimulus frequency appeared to carry with it the best prognosis.

Stimulation, it was stressed, was useful in avoiding complications and the appearance of gross motor movements, athetosis, or hemiballismus, and sensory defects on stimulation indicated that lesions in those positions were dangerous. Stimulation could also be useful in positioning an electrode with respect to a particular limb.

MODIFICATION OF ETHOIDAN VENTRICULOGRAPHY USING A RADIO-OPAQUE CATHETER

S. R. IWAN and C. B. SEDZIMAR (Liverpool) described a method of introducing a radio-opaque catheter into the third ventricle through a burr hole in the coronal suture using a portable image intensifier and 1 ml. or less of any of the oily contrast media. They said that the whole of the upper median cerebrospinal fluid pathways could be screened and x-ray plates exposed as necessary. The method had been used in 150 cases and the catheter was placed in the third ventricle 124 times or in 83% of cases. The radio-opaque catheter might be used to institute ventricular drainage or in Torkildsen's procedure. Using the catheter in the third ventricle, both the anterior and posterior walls of the ventricle could be outlined with contrast medium and air ventriculography was easily carried out by this method. The method was brief in consumption of time and caused the patient minimal disturbance.

TRIGEMINAL NEURALGIA: TRIGEMINAL ROOT INJECTIONS USING PHENOL IN GLYCELINE

ANTONY JEFFERSON (Sheffield) presented the results in a series of 32 patients who had received injections of phenol 1:20 in glycerine into Meckel's cave. This agent was chosen following the work of Maher and in general it produced a partially dissociated sensory loss with some preservation of touch sensation.

The patient was premedicated with Omnopon and Scopolamine. The Hartel approach was used with radiographic control (lateral and submento-vertical projections). The needle was inserted as near as possible to the centre of the foramen ovale and advanced until the point lay 2 to 3 mm. anterior to the profile of the clivus. The patient was then sat up. In roughly half the injections cerebrospinal fluid escaped from the needle. A tuberculin syringe was used for the injections which should be made in increments of 0·1 ml. up to a total of 0·2 ml. This quantity might produce adequate sensory loss. Thereafter the increments should be of 0·50 ml.; it was seldom necessary to use more than 0·4 ml. After the injection the patient remained sitting for half-an-hour. The needle was then withdrawn and the patient returned to bed.

Only one patient (aged 79) had a sixth nerve paresis lasting about 18 hours. There had been no other cranial nerve complications, no anaesthesia dolorosa, no corneal ulceration. Post-injection herpes had not been reported by any patient.

The 32 patients had been followed for an average period of 13 months (the first injection was carried out in December 1959). Ten patients had negligible to minor sensory changes and in several of them the pain had recurred. Eight patients with considerably sensory loss, including a greatly reduced or absent corneal reflex, had a protective side shield fitted to their glasses. Fourteen patients had a moderately severe sensory loss but with a preserved corneal reflex.

Studies on the capacity of Meckel's cave indicated that frequently it did not exceed 0·1 to 0·2 ml.

It was suggested that this injection constituted one form of chemical 'radiculysis' and it deserved consideration as an alternative to the use of alcohol in the treatment of trigeminal neuralgia. Moreover, the position of the needle point was probably slightly less crucial than in performing alcohol injection; therefore this method was probably easier technically.

DEFORMITIES OF HANDS AND FEET IN PARKINSONISM AND THEIR REVERSIBILITY BY OPERATION

PETER GORTAVI (London) described the characteristic deformities of hands and feet as seen in some cases of Parkinson's syndrome.

He said that in the hand the first stage of the deformity was merely a characteristic posture with the fingers flexed at the metacarpo-phalangeal joints and extended at the interphalangeal joints, the thumb extended and the hand held in ulnar deviation. In the second stage of the deformity hyperextension occurred at the interphalangeal joints. In the third stage subluxation occurred at the terminal interphalangeal joints and the terminal phalanx was in flexion.

The feet were held inverted characteristically, the big toe extended and the other toes curled under the ball of the foot.

He believed that the deformities were due to the increased muscular tone of Parkinsonism and there was no clinical or radiological evidence of joint disease.

The part played by the increased tone of the small muscle of the hand in the production of the deformities was shown by the abolition of the deformities on the induction of ulnar palsy by procaine, and by the reproducibility of the characteristic posture by stimulation of the ulnar nerve.

Deformities of the hands make the patient even clumsier and deformities of the feet could impede gait. They might be associated with painful cramps. The deformities were lastingly reversible by operation on the ventrolateral nucleus of the thalamus.

A case of post-encephalitic Parkinsonism was described. The cramp and deformity of the right foot was abolished by operation on the contralateral hemisphere. When, six
months later, similar symptoms occurred in the left foot they were abolished by operation on the right hemisphere. The patient's gait was improved.

NEURALGIC AMYOTROPHY: THE PROGNOSIS

J. W. ALDREN TURNER (London) discussed the clinical features and prognosis in 109 cases of neuralgic amyotrophy. He said that the age incidence was fairly wide though there had been no patient younger than 14½ years. It was commoner in men. In many cases operations or infective illnesses appeared to be a precipitating cause and a considerable number had developed the condition while convalescing in hospital. The type of operation was very varied and the pain usually began four to 14 days afterwards; in the infective disease group the illness usually began in the convalescent period. The onset of the disease was characterized by severe pain, usually in the shoulder and upper arm and occasionally in the elbow and forearm. Severe pain seldom lasted more than three weeks but milder pain might continue for a much longer period. Pain was usually aggravated by movements of the shoulder but not of the neck and there was considerable muscle tenderness. The time of onset of muscle paralysis was difficult to assess and was often masked by the immobility occasioned by pain. Sensory loss might be detected when nerves carrying sensory fibres were involved. Pain might sometimes be bilateral but this did not necessarily mean that bilateral paralysis would develop. He then considered the prognosis in individual nerve lesions.

The long thoracic nerve was most commonly affected and in 39 cases a serratus anterior paralysis was an isolated feature. He noted that in 34 cases this was right-sided. In 11 further cases other nerves had been involved. Disability from this paralysis was usually slight and prognosis for recovery good, occurring in 18 months to two years in most cases.

When the circumflex nerve was involved deltoid paralysis produced a disability which varied considerably from patient to patient. Sensory loss was usually present and the prognosis for muscle recovery better than the serratus anterior, most patients recovering in 12 months.

In seven cases the suprascapular nerve alone was involved and in 18 further cases together with other nerves. Prognosis for recovery was good, occurring in 12 to 18 months.

The anterior interosseous nerve was involved in 10 cases of which six had other nerve lesions. The weakness involved the flexor pollicis longus and lateral part of the flexor digitorum profundus. The pronator quadratus may have been involved but was difficult to test clinically. Prognosis was good but recovery slow, sometimes taking as long as two and a half years.

Lesions of the radial and posterior interosseous nerves occurred at various levels. Musculo-cutaneous involvement occurred in four cases; the disability was usually slight and recovery occurred in 18 to 24 months. In 12 patients the distribution of muscle weakness was that of C.5.6 roots rather than peripheral nerves and the prognosis in these cases had also been good.

He then noted that recurrent attacks had occurred in a number of patients. In one group attacks were separated by more than a year, the longest interval being 16 years.

In a second group of four patients, recurrent attacks, as many as four in one patient, occurred within a few months. In this case polyarteritis nodosa had been excluded and he made a good recovery.

He concluded that the prognosis in neuralgic amyotrophy was good but that there was some danger of a recurrence at a later date.