The 79th Meeting of the Society of British Neurological Surgeons was held at the London Hospital on 30 and 31 May 1969. The President, Mr. John O'Connell (London), was in the Chair. During the course of the meeting, the fifth Sir Hugh Cairns Memorial Lecture, entitled 'The Place of Microsurgical Techniques in Neurological Surgery', was delivered by Professor Hugo Krayenbühl (Zürich).

AN APPROACH TO TUMOURS IN FRONT OF THE BRAIN-STEM

T. T. KING (London) described a combined middle and posterior fossa approach passing in front of the sigmoid sinus in dealing with extrinsic tumours related to the anterior aspect of the brain-stem. These included meningiomas arising from the clivus or from the petrous apex, chordomas of the clivus, and the larger medially extending acoustic nerve tumours. The patient was put either in the full lateral position or supine with a small pillow under the ipsilateral shoulder with the head somewhat dependent and turned well to the opposite side. Lumbar drainage and intravenous mannitol had been employed and the use of a loupe giving 3·5 magnification was recommended for certain parts of the operation. A small lateral flap was used, the posterior limb descending behind the mastoid process into the upper part of the neck. The bone flap was hinged anteriorly and extended to the floor of the middle fossa until the commencement of the sigmoid sinus was exposed. The bone at the base of the mastoid process was removed with a dental drill and was continued in an inward direction removing the mastoid air cells and the petrous ridge and opening the antrum. If the bone removal were carried too medially, the semicircular canals might be opened, resulting in deafness. However, the petrous bone could be removed medially as far as the internal auditory meatus and as far inferiorly as the jugular bulb. The effect of this bone removal was to expose the superior petrosal sinus and the posterior fossa dura below it as well as the inferior aspect of a portion of the dura of the middle fossa. The dura was opened over the lateral aspect of the temporal lobe by turning a small flap upwards. A linear incision was then extended from the lower margin of this flap, across the floor of the middle fossa encountering the superior petrosal sinus at a point somewhat medial to the point where it entered the sigmoid sinus. The posterior fossa dura could then be opened by a small incision just below the superior petrosal sinus, which was ligatured by stitches transfixing the base of the tentorium. With the middle and posterior fossa incisions in continuity and the superior petrosal sinus divided, the incision continued medially through the tentorium close to the posterior margin of the remaining medial part of the superior petrous ridge until the tentorial notch was reached and opened. The exposure thus extended from above the tentorial notch well down into the posterior fossa and the direction of approach to the brain-stem, which could usually be seen very well from the mid brain to the lower pontine level, was from almost directly laterally or even slightly antero-laterally rather than postero-laterally. To expose the upper part of the brain-stem gentle elevation of the temporal lobe was necessary, but exposure of the lower part of the brain-stem required only minimal retraction of the cerebellum.

Three cases employing this exposure were described in detail. Certain disadvantages of this approach were mentioned: (1) the increased operation time because of the slow removal of the petrous temporal bone; (2) otorrhoea and infection must be guarded against by packing the middle ear with muscle; (3) dysphasia might occur from interference with the venous drainage of the dominant temporal lobe; and (4) deafness, mentioned above, from damage to the labyrinth.

PAST, PRESENT, AND FUTURE DEVELOPMENTS IN PERCUTRANS TANEOUS STEREOTAXIC SPINAL SURGERY

E. R. HITCHCOCK (Edinburgh) described the design by Clarke (1920) of a spinal stereotaxic instrument for animal work and said that comparatively few attempts had been made to use true stereotaxic methods for spinal tractotomy. A spinal stereotaxic instrument had been designed for clinical use and, using this apparatus, 22 patients had been treated for various types of intractable pain. The technique used a direct posterior approach through the atlanto-occipital membrane. Seven patients were treated by stereotaxic spinothalamic tractotomy, placement being accurate in six. Levels of analgesia were not well maintained. Percutaneous stereotaxic trigeminal tractotomy was performed in six patients with one failure. Levels of analgesia had been well maintained.

Five patients were successfully treated by high cervical stereotaxic commissurotomy or myelotomy. The advantages of this procedure over spinothalamic tractotomy were in the wide analgesia obtained and in the absence of respiratory or micturition complications. The pattern of sensory loss was difficult to explain in terms of conventional neuroanatomy and required further study. It was possible that interruption of the mediodorsal systems might explain the results. Stimulation, electro-
coagulation, and electrophysiological recordings of spinal cord activity had facilitated target recognition and would enlarge our knowledge of the complex physiological and anatomical arrangements at cord level.

AIR EMBOLISM IN NEUROSURGERY

J. V. I. YOUNG and R. A. SPILSBURY (London) described two cases of air embolism during anaesthesia in neurosurgical operations in the sitting position. On both occasions the air entered a large vein in the early stages of the operation as the muscles were being stripped from the laminae. The anaesthetist heard a rhythmical gurgling noise in time with the heart sounds through the oesophageal stethoscope and, after about 30 seconds, ventricular fibrillation occurred. The patients were lowered from the sitting position and recovered with external cardiac massage, and the operations were successfully completed after the patients' return to the sitting position. The authors felt that there was no reason to avoid the use of controlled ventilation in the sitting position as they did not agree with the view that the risk of air embolism was thereby increased. Indeed, in the spontaneously breathing subject, a reflex gasping inspiration may be one of the first signs of air embolism, and this sudden increase in negative intrathoracic pressure might greatly increase the volume of air entering the circulation. As a precautionary measure they employed manual squeezing of the neck for long periods during the stages of the operation when the risk of air embolism was greatest, in order to increase venous pressure. They interpreted the delay of about 30 seconds between the occurrence of the splashing systolic murmur and the onset of ventricular fibrillation as suggesting the entry of air into the coronary arterial system and representing the time taken for the passage of bubbles and foam through the pulmonary circulation.

EXPERIMENTAL FEATURES AND THERAPEUTIC IMPLICATIONS OF 'INTRACEREBRAL STEAL'

LINDSAY SYMON (London) referred to the demonstration in recent years of increased carbon dioxide tension producing a reduction of regional cerebral blood flow in an area of ischaemic brain, whereas in normal brain, increased arterial pCO₂ tensions produced a rise in regional blood flow. The term suggested by Lassen for this paradoxical effect, 'intracerebral steal', was now generally accepted. Such a reduction in regional blood flow was of interest clinically, both in the treatment of cerebrovascular disease and in possible explanation of spreading neurological disability secondary to established vascular disease or swelling. An experimental analysis of the condition was, therefore, of importance both to the experimental physiologist and to the clinician. In this particular field, the experimental analyses had produced results which correlated well with the features of intracerebral steal observed in the clinic by regional cerebral blood flow determinations, principally by the method of Ingvar and Lassen.

Experimental analysis of the constituent features had been made by a number of authors (Symon, 1963, 1968; Shalit, Reinmuth, Shimojyo, and Scheinberg, 1967; Brawley, Strandness, and Kelly, 1967; Brawley, 1968; Kindt and Youmans, 1968), while the clinical features of the syndrome had been delineated by Lassen in a series of publications (Haedt-Rasmussen, Skinhoj, Paulson, Ewald, Bjerrum, Fahrenkrug, and Lassen, 1967; Wülkenweber, 1968; Fieschi, Agnoli, Battistini, Bozzao, and Prencipe, 1968). In both clinical and experimental fields, general agreement existed with regard to the findings of the intracerebral steal syndrome. The constituent features of intracerebral steal as revealed by experimental analysis were described and their implications, principally neurosurgical, reviewed.

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Wülkenweber, R. (1968). Ibid., 22, Suppl. 102 XIII C.

THE EFFECT OF NEUROLEPTANALGESIC DRUGS ON CEREBRAL BLOOD FLOW AND METABOLISM

J. DOUGLAS MILLER and JOHN BARKER (Glasgow) stated that the volatile anaesthetic agent Halothane had been shown to increase cerebral blood flow (CBF) (McDowall, 1967). Clinical studies had shown that Halothane and other volatile agents caused increases in intracranial pressure (ICP), which might be very great in patients with intracranial tumours (Jennett, Barker, Fitch, and McDowall, 1969), but that the neuroleptanalgesic drugs (NLA), Fentanyl and Droperidol, did not increase ICP and might even reduce it (Fitch, Barker, McDowall, and Jennett, 1969). Previous reports of the effect of NLA on CBF had, however, yielded conflicting results, and this study was designed to assess the effects of Fentanyl and Droperidol on cerebral blood flow and metabolism in six anaesthetised, ventilated dogs.

Measurements were made of regional cortical blood flow (rCBF), arterial blood pressure, cerebral arteriovenous oxygen content difference (C(a-v)O₂), cerebral arteriovenous carbon dioxide tension difference (P(a-v)CO₂), and regional cerebral oxygen uptake (rCMRO₂). After control measurements, Fentanyl and Droperidol were administered intravenously and further measurements made at 15 min intervals for one hour.

NLA caused a significant fall in rCBF from 0·92 ± 0·10 to 0·70 ± 0·12 ml/g/min accompanied by rises in C(a-v)O₂ from 5·1 ± 0·8 to 6·9 ± 0·8 vol. %, and
in \( \text{P(a-v)CO}_2 \) from 8.8 ± 0.6 to 14.9 ± 0.7 mm Hg. At the end of one hour rCBF had returned to control values. Since the increase in the \( \text{P(a-v)O}_2 \) balanced the fall in rCBF, there was no significant change in the calculated \( \text{rCMR} \). This suggested that the effect of NFLA on ICP was entirely related to its effect on CBF.

REFERENCES


FURTHER EXPERIENCES IN CEREBRAL EMBOLLECTOMY

RICHARD MALMROS (Arhus, Denmark) referred to a method of indirect embolectomy presented at the Society’s meeting in Copenhagen in 1960. The internal carotid artery with the middle and anterior cerebral arteries were exposed; a temporary clip was placed on the carotid and a permanent one on the anterior cerebral close to its origin. The anterior cerebral was then divided on the proximal side of the clip and the embolus from the middle cerebral artery was extruded through the stump of the anterior cerebral artery, which was then clipped. When the temporary clip on the carotid was removed, blood flow was resumed along the middle cerebral artery. Since 1960, seven patients suffering from embolization of the middle cerebral artery or the internal carotid artery had been operated upon in this way and in all cases, as demonstrated by arteriography, circulation had been re-established. One patient died in the post-operative period from haemorrhagic infarction and no improvement was seen in a 64-year-old woman who died two years after operation. However, in four cases there was good recovery of neurological function, although in one, dystonic movements of the arm subsequently developed. Detailed accounts of the surgical management of these cases were presented.

TWO EMBRYONAL TUMOURS OF THE CEREBRAL HEMISPHERES IN CHILDREN

H. Uritch (London) presented two cases of unusual tumours, the common factor of which was the presence of spaces lined by a tall columnar pseudostratified epithelium closely resembling that of the primitive neural tube in the embryo. In the first patient, a boy aged 3 years, the tumour arose in the right parieto-occipital region and gradually involved most of the hemisphere. The child died after several attempts at surgical removal of the neoplasm. It consisted of areas of primitive neuroepithelium and contained areas of astrocytic, oligodendroglial and, possibly, ependymal differentiation. The second case was that of a boy aged 2 years who developed a tumour in the left temporal lobe. After a diagnostic biopsy, it was treated with radiotherapy, with transient improvement, and subsequent recurrence. Histologically the tumour consisted of relatively scanty areas of primitive neural epithelium, most of the tumour showing differentiation towards the neuronal series.

THE CONTINGENT NEGATIVE VARIATION (CNV) IN NEUROSURGICAL PATIENTS

B. H. CUMMINS (Bristol) described work at the Burden Neurological Institute over the past five years showing a new wave form in EEG records. This appeared when the subject expected a second stimulus after an earlier one and it was abruptly ended by the decision, taken voluntarily by the subject, to arrest the second stimulus. It was a negative wave variation of some 20 \( \mu \text{V} \) and might last for some seconds before the anticipated second stimulus. It was best demonstrated by the average of a number of consecutive EEG records where random activity was cancelled out. This wave form appeared to demonstrate the expectation of action by the individual. In normal subjects it was maximal at the vertex, but could be recorded over the entire vault with little discrepancy between right and left. It was little altered by distraction in the normal individual, but was considerably altered in patients with psychiatric disorders. He reported studies which had been made on 30 neurosurgical patients. Three main categories of lesion were represented: (1) tumours and vascular anomalies well localized by clinical signs, radiology, and surgery; (2) extradural haematomas; and (3) Parkinson's disease and pituitary tumours. Whenever possible, both pre- and post-operative records were obtained, and follow-up records were being obtained. Clear and localizing asymmetries of this wave form were shown in most of these cases with a marked reduction in the wave in the quadrant of the lesion. Routine EEGs recorded at the same time frequently did not show any asymmetry. The contribution of this painless and potentially valuable investigation was discussed.

CHANGES IN INTRACRANIAL DYNAMICS DURING VENTRICULOGRAPHY

J. C. CHAWLA (Bristol) described polygraphic studies of intracranial pressure and related physiological variables during ventriculography in neurological patients. These records confirmed the marked disturbance in intracranial pressure that occurred and associated changes in other parameters. The significance of these findings was discussed.

NASAL GLIOMAS

K. RATNARAJAH (Haywards Heath) reported two cases of nasal presentation of a glioma. He referred to the disputed origin of these tumours and to the high mortality they had caused in the past due to meningitis from CSF rhinorrhoea before the use of antibiotics. Both occurred in young boys; a 5-year-old boy had been subject to watery discharge and intermittent bleeding.
from the left nostril from birth and the mother is said to have noticed a polyp in the left nostril two days after birth. Radiographs of the skull showed a large mass in the left nasal cavity extending into the left ethmoid air cells associated with a defect in the left frontal bone, thought to be congenital. No extension of the subarachnoid space into the nose was demonstrated by air encephalography. Left frontal craniotomy revealed a defect 0.5 cm in diameter at the front of the cribiform plate which contained gelatinous tumour tissue extending into the nasal cavity. The olfactory nerve and bulb were absent on the left side. The defect was repaired with fascia lata and the tissue removed was described histologically as a ganglioglioma. This child had remained well since operation for almost three years. A similar case in a boy of 11 was treated by craniotomy and the repair of a defect in the cribiform plate after the removal of a polyp from the right nostril, histologically described as 'tissue of cerebral origin'. He had remained well for two years since operation.

A review of the literature of these rare cases was given and it was shown that in general they behaved in a very benign fashion, although some had recurred after removal.

THE TREATMENT OF MEDULLOBLASTOMA BY IRRADIATION

H. F. HOPE-STONE (London) gave an account of a modification of the Manchester technique for treating the whole of the central nervous system with irradiation. One advantage of this method of producing a rapid treatment plan which allowed a homogeneous dose of irradiation to be given was that the patient's treatment could be started as soon as the craniotomy wound was healed. He compared the five to 10 year survival figures with results previously obtained with an inhomogenous dose. He also remarked on the lack of gross irradiation stigmata in these cases.

CHROMOPHOBES PITUITARY ADENOMA: THE SIZE OF THE SUPRASELLAR PORTION IN RELATION TO THE SAFETY OF OPERATION

ANTONY JEFFERSON (Sheffield) pointed out that, although it is recognized that 'massive' suprasellar extension carried an operative mortality of roughly 33%, measurements which defined the massive lesion had not been published. From the air encephalograms of a personal series of 48 patients with chromophobe pituitary adenoma, measurements had been obtained which, it was suggested, enabled one to predict the possible hazards of surgery. Operation should probably be avoided when the profile of the suprasellar area (as traced from a lateral view during air encephalography) reached 7.5 sq. cm and when the summit of the adenoma was within 6.0 mm of the foramen of Monro.

A CONFIDENTIAL REPORT ON THE USEFULNESS OF THE TWIST-DRILL IN NEUROSURGERY

JOHN POTTER (Oxford) expressed sympathy towards the late Dr. William Cone's disinclination to publish the twist-drill procedure which he practised, lest the uninitiated might be led to utilize the technique with dangerous abandon' (Rand, Ward, and White, 1966). Lewkowicz (1916) administered serum against meningococcal meningitis directly into the ventricles via twist-drill holes, and Purves-Stewart (1925) introduced the technique to Great Britain, Cohen (1932) used it to carry out over 40 ventriculographies without mishap. Rand et al. (1966) advocated its use particularly in the evaluation of head injuries and El-Banhawy (1965) had employed it for stereotactic surgery. The method was a quick, simple, and convenient one for gaining access with a cannula to the extradural and subdural spaces, the ventricles, intracranial abscesses, cysts, and neoplasms. There was independence of the operating theatre and, provided the technique were carefully and properly learnt and performed, its dangers—potentially serious ones—need probably be no greater than those of burl hole exploration. Seventy twist-drill holes in 47 patients were described as having been performed for a variety of purposes.

REFERENCES


THE ANTERIOR MENINGEAL BRANCH OF THE VERTEBRAL ARTERY AND OTHER MENINGEAL VESSELS ARISING FROM THE INTERNAL CAROTID AND VERTEBRAL ARTERIES

LEON MORRIS (London) referred to the continuing interest in meningeal vessels arising from the intracranial portions of the internal carotid and vertebral arteries, especially since the description by Stattin in 1961 of the tentorial branch of the internal carotid artery. Meningeal vessels had been shown to arise from other intracranial vessels. The ophthalmic artery gave rise to the anterior falx artery and also to vessels to the subfrontal area, and the artery of the falx cerebii often arose from the vertebral artery. The main diagnostic value in the demonstration of these vessels, some of which might be seen normally but which were hypertrophied in pathological states, was in the confirmation of the diagnosis of meningioma. It had, however, been recognized and reported that these vessels might be hypertrophied in other conditions situated in relation to the meninges. These included vascular malformations, astrocytomas, haemangioblastomas, and metastatic deposits. Some of these vessels were then illustrated. The anterior meningeal branch of the vertebral artery had been described more recently. It arose from the vertebral artery at the level of the second cervical vertebra and passed forwards and upwards. It might be seen normally, in which case it measured less than 0.5 mm at its origin. It had been described with meningioma, glomus jugulare tumour, haemangioblastoma, papillary epithelial tumour, and metastatic tumour. Two further cases in which this vessel was enlarged were described. One, a man aged
30 years, had a meningoima at the level of the atlas, and the second, a man aged 50, had infiltration of the base of the skull due to a plasmacytoma. The importance of this vessel was in indicating a lesion in the region of the foramen magnum, and in some cases in helping to define its extent. Good subtraction films were essential in demonstrating this vessel.

**HERPES SIMPLEX ENCEPHALITIS—NEUROSURGICAL IMPLICATIONS AND TREATMENT**

**GRAEME DUFFY** (Birmingham) described a method of rapid diagnosis of this condition by electron microscopy to show the typical crystalline arrays of the herpes simplex virus. Fluorescein techniques might demonstrate the specific antibody to herpes simplex within two hours and culture of the virus might lead to its recognition within 24 to 48 hours of brain biopsy. Idoxuridine inhibited the synthesis of DNA and prevented the proliferation of the virus and could be used for systemic treatment by intravenous infusion. He gave a description of personal experience with seven cases in 1968, in which Dr. Flewett at the Birmingham Regional Virus Laboratory performed the virus studies.

Clinically the cases had remarkably similar presentations. In each case the illness started with rapidly worsening headache associated with a marked fever and frequently with vomiting. One to four days after the onset of the symptoms, confusion and increasing drowsiness, progressing to coma, developed. Several patients became dysphasic and fits, either focal or generalized, were a feature in all but one case. Several patients had localizing neurological signs and in two cases there was evidence of a temporal lobe space-occupying mass on radiological studies. Only in a 4-month-old baby was there evidence of a herpetic skin lesion.

Three of the four cases in which the diagnosis was made in life were treated with Idoxuridine. The first was a 43-year-old man in whom the illness presented as an acute left temporal lobe lesion, thought initially to be an abscess. Virus studies at biopsy were positive and he was treated with the drug intravenously for five days to a dose of 400 mg/kg. Within 48 hours of starting treatment his temperature began to settle, and after a week he was able to sit out of bed and showed considerable improvement. Although a right homonymous hemianopia and a minimal right hemiparesis persisted for only six weeks, he remained grossly dysphasic. A 4-month-old baby was treated with a similar dosage and responded satisfactorily, although her illness was complicated by fits. At a year she was well behind in general development and she had been treated for a moderate degree of hydrocephalus. A third case improved with Idoxuridine treatment with return of consciousness and ability to say a few words but died suddenly six weeks after the onset of his illness in another hospital after an episode of acute respiratory obstruction. Two cases, in which the diagnosis was not confirmed, were regarded as cases of encephalitis and were also treated with Idoxuridine. Although severe side effects of Idoxuridine had been described, no sideeffects attributable to Idoxuridine were encountered in this series. The author stressed that, if treatment were to be of value, it must be instituted as early as possible. Management required that they should be treated as emergencies and electroencephalography for lateralization was indicated and probably carotid angiography. If a temporal space occupying lesion was demonstrated, an abscess was excluded and brain biopsy performed through a decompressive craniotomy. Ventricular CSF was also studied and treatment with Idoxuridine commenced immediately.