ventricle on the side of operation to increase in size and make catheter obstruction less likely.

CSF 'PULSE PRESSURES' IN HYDROCEPHALUS

ELDON L. FOLTZ and SCOTT LEDERHAUS (Irvine, California) had recorded ventricular CSF pressures and subdural pressures in 16 normal dogs, two hydrocephalic dogs, and 10 hydrocephalic humans. The aim of this study had been to record the characteristics of the transcerebral pressure of the pulse wave generated in the ventricle by the choroid plexus, and to record CSF 'pulse pressure' relationship to mean CSF pressure relative to peak-to-peak pressure ranges, characteristic waveform and duration, and latency of appearance of the pulse pressure as related to the cardiac QRS complex.

It was concluded from this study that the intracranial CSF compartment acted normally as a dampening and absorbing system modifying the 'water hammer' action of the pulse pressure which presumably originated from the choroid plexus in the ventricles. This effect was apparently the result of expansion of the limiting membranes of the CSF compartment. This might represent part of the so-called 'ventricular compliance' which was an early compensatory factor in hydrocephalus. The venous volume of the brain also acted in a similar manner to reduce the impact of the pulse pressure on the brain. Further indirect evidence to support the concept that the amount of pulse pressure was a critical factor in progressive ventricular enlargement in hydrocephalus was provided by the observation that head compression in the expansile heads of infants with hydrocephalus produced an increased mean pressure but a reduced pulse pressure.

TUMOURS OF THE CLIVUS OF BLUMENBACH

EDWARD S. CONNOLLY and JAMES DOMINGUE (New Orleans) discussed their experience of clivus tumours and reviewed the world literature. Differential diagnosis, clinical course, pathology, and therapy were discussed.

RESULTS AND COMPLICATIONS OF TRANSLABYRINTHINE AND TRANSTENTORIAL APPROACHES TO 60 ACOUSTIC NERVE TUMOURS

T. T. KING (London) had totally removed 60 acoustic nerve tumours by a translabyrinthine or a translabyrinthine-transtentorial approach. The translabyrinthine surgery had been carried out by the otologist and the tumours had been removed by the neurosurgeon. Twenty-nine tumours were large (exceeding 3 cm in diameter), and the remainder were medium sized (1.5–2.5 cm in diameter), or small (intracanalicular). There had been one death. No patient was totally disabled after operation. Of

those with intracanalicular tumours five had returned either to work or to normal activities and one was independent subject to some limitations. All of the patients with medium sized tumours had returned to work. Twenty-six of the patients with large tumours had resumed work, and two patients with large tumours were independent with some limitation of activity. The facial nerve was preserved in all patients with small tumours, in 21 of the 25 with medium sized tumours, and in two of the 29 with large tumours. Facial nerve function was normal in one of the patients with small tumours, in 13 of those with medium sized tumours, but in none of those with large tumours. Slight facial weakness and asymmetry were present in four of the patients with medium sized tumours and in one of those with large tumours. Five of those with small tumours had well-marked facial weakness associated with mass movements. Four of those with medium tumours and one of those with large tumours also had facial weakness and mass movement. The principal complications of these procedures had been 11 cerebrospinal fluid leaks from the ear requiring further operation, temporal lobe epilepsy in 18% of those operated on by a transtentorial approach, and dysphasia in four of 17 patients undergoing transtentorial operations on the left side.

ACADEMY AWARD PAPER

RICHARD L. RAPPORT (Seattle) described the use of phenytoin (Dilantin) in the control of experimental epileptogenic foci in cats.

EFFECT OF TRAUMA ON SPINAL CORD BLOOD FLOW IN MONKEYS

W. GEORGE BINGHAM, JR (Columbus) had used indicator fractionation techniques utilizing [^{14}C] and antipyrine to measure spinal cord blood flow in normal and in bluntly traumatized spinal cords of adult male Rhesus monkeys. The injuries had been inflicted by dropping 20 g weights from a height of 15 cm on to the exposed T6 segments of the cords. The dura mater had been left intact in each case. Control tissue had been obtained from the T2 segments which had not been injured. After injury the animals had been allowed to survive for periods varying from five minutes to four hours. Arterial pressure, blood gases, and end-expiratory CO_2 were monitored throughout the experiment. During each experiment 25 μCi of [^{14}C] antipyrine were injected intravenously. Each animal was killed by being injected with a 5 ml bolus of saturated KCl. Four animals underwent laminectomy without cord trauma and served as laminectomy controls. Eight animals were not submitted to surgery and were used for the study of normal flow rates in several cord segments. In both the experi-

mental group and the unoperated control group of animals the grey matter was dissected from the white matter with the aid of a dissecting microscope, and separate flow rate determinations were made for the grey and white matter.

Flow rates in traumatized tissue demonstrated marked differences in regional perfusion of white matter and grey matter. Grey matter perfusion was nearly obliterated, while white matter blood flow persisted and indeed was higher than in the uninjured controls. Cardiac output dropped after injury and returned to only approximately half its normal level during the course of the four hour experiment. Circulatory blood volume also decreased after injury. Mean arterial blood pressure rose immediately after injury but returned to normal within five to 10 minutes.

These findings do not support the concept of ischaemia as a factor in failure of function of white matter after trauma. If trauma causes pathobiochemical alterations in the cord it may be possible to reverse these by utilizing the intact white matter circulation for chemotherapy.

REPORT ON 100 CASES OF SYRINGOMYELIA

J. HANKINSON (Newcastle upon Tyne) described the clinical presentation and radiological findings in 100 cases of typical and atypical syringomyelia. In the more typical cases stiffness of the neck, numbness of the hands, and pain in the neck, shoulders and arms featured but there were also cases presenting with headache, oscillopsia, diplopia, and vertigo, and, in two cases, drop attacks. Seventy-eight cases presented with typical syringomyelia clinically but 11 showed signs of hydrocephalus and 29 had 'brain-stem' signs. These latter consisted of nystagmus in 27 cases, trigeminal sensory disturbance in four, wasting of the tongue and palatal weakness in three, and cerebellar incoordination in two. The general appearance of these patients was normal in 65, but there was a noticeably short neck in 13, 22 had scoliosis, and five had large heads. In seven patients the onset of symptoms was associated with trivial injuries. Radiographs of the skull were normal in 80, showed a degree of basilar impression in 12, and exhibited signs of arrested hydrocephalus in seven. Radiographs of the cervical spine were normal in 74, showed a wide AP diameter in eight, and atlanto-occipital fusion or occipitalization of the atlas in 16.

Ninety-two cases were studied by myelography, of whom four were examined only in the prone position. Tonsillar ectopia was found in 62 cases with an expanded cervical cord in 34, and the appearances were considered normal in nine. Posterior fossa decompression was performed on 47 of the 63 patients showing ectopia. Eight of the 18 patients with

arachnoiditis of the cervicomedullary junction underwent operation. Of the 47 patients shown by myelography to have tonsillar ectopia three were cured, 30 were improved, and 12 showed no change after operation. There was one postoperative death, and one patient died later from leukaemia.

SPINAL DURAL PATCH GRAFTS IN EXPERIMENTAL ANIMALS

K. KUROKAWA, STEWART DUNSKER, and FRANK H. MAYFIELD (Cincinnati) had considered various methods of repairing torn spinal dura mater with the objective of preventing pseudomeningoceles, cerebrospinal fluid leaks, meningitis, and low pressure headaches. In 18 dogs a segment of lumbar dura mater had been removed under general anaesthesia and the defects had been repaired with autogenous dura mater, fascia, muscle, and fat. The animals were killed at various times up to six months post-operatively and the graft sites had been examined histologically. Muscle, fat, and fascia had all been found effective but each tissue had its own disadvantage. Fascia was more rigid and was therefore more difficult to use to close small defects. Muscle caused a moderate inflammatory response for two to eight weeks, although the authors did not encounter any adhesions between the muscle grafts and the underlying neural elements. Fat induced low grade inflammatory response but was difficult to sew. There were no long-term differences between these three substances, all of which were associated with a good formation of new dura mater. When tears occurred near the axilla of a spinal nerve root they could be closed with large muscle or fat plugs introduced through mid-line dural openings and pulled into the torn areas with sutures.

EXTENSION OF CARCINOMA OF THE CERVIX TO THE LUMBAR SPINE

ROBERT G. FISHER, STEVE ACKER, and RALPH W. DAY (Oklahoma) noted that carcinoma of the cervix was not generally thought to involve the spine. In two recent cases lumbar vertebral compression leading to paralysis had been due to compression of vertebrae by metastases in lymph nodes. It was considered that decompressive laminectomy followed by radiation therapy only temporarily altered the course of the disease. The authors considered that present radiotherapy techniques did not prevent the development of the lesions.

MYELOVASCULAR COMPLICATIONS OF CERVICAL RHIZOTOMY

H. HAMLIN and W. H. SWEET (Boston) drew attention to the crucial importance of the extrinsic collateral