At that time the pulse rose to 88. With the exception of one reading (at 9.30 p.m.) the pulse had not exceeded 84 prior to this last reading.

She was well next day. The change was very gratifying. The blood counts before and after transfusion were:

		Hb g./100 ml.	Hb %		R.B.C.	Retic.	C.I.
July 17	..	3.3	22	..	1.12	14.8	0.99
„ 18	..	3.4	23	..	1.07	15.2	1.08
Transfusion							
July 19	..	10.1	68	..	4.02	2.2	0.84
„ 24	..	8.4	60	..	3.444	1.0	0.87

The following night she developed dyspnoea, due to pulmonary oedema, which by 9 a.m. next day was severe. It responded to oxygen and rest, and by the afternoon she was perfectly well. No further complications occurred. She was resistant to treatment with liver extracts, and underwent a further transfusion at a later date. The transfusion was a slow direct transfusion without any venous escape and was well tolerated. Her haemoglobin when this transfusion was carried out was 32% (4.7 g./100 ml.).

Comment

It is suggested that exchange transfusion by the method described is indicated in (1) cases of severe anaemia with congestive heart failure, and (2) cases of severe anaemia (Hb 25% or lower) of many weeks' duration but not associated with venous congestion.

The advantages of the method are: (1) There is a greatly reduced risk of circulatory overloading, since the blood volume is controlled; and (2) the transfusion is more quickly done than with the usual practice of giving several small slow transfusions over the course of a few days.

Summary

A technique for exchange transfusion, in which exsanguination and transfusion are simultaneous, is described.

Three cases of severe anaemia are reported in which exchange transfusions were performed.

Indications for, and advantages of, exchange transfusion are mentioned.

My thanks are due to Dr. C. C. Ungley without whose help this paper would not have been written. They are due also to Mr. H. Campbell for the statistical interpretation of results, to Professor Duguid for the pathological data given, and to the medical and nursing staff of wards 10 and 12, Royal Victoria Infirmary, Newcastle-upon-Tyne, for their help and encouragement.

BIBLIOGRAPHY

- Altschule, M. D., and Gilligan, D. R. (1938). *J. clin. Invest.*, 17, 401.
 Caughey, J. L., Jun. (1935). *Proc. Soc. exp. Biol., N.Y.*, 32, 973.
 Drummond, R. (1943). *British Medical Journal*, 2, 319.
 Marriott, H. L., and Kekwick, A. (1940). *Ibid.*, 1, 1043.
 Riddell, V. H. (1939). *Blood Transfusion*. London.
 Sharpey-Schafer, E. P., and Wallace, J. (1942). *British Medical Journal*, 2, 304.
 Watson, L. (1943). *Lancet*, 1, 107.

On March 19 the first party of 25 British children left for Vordinborg, in Denmark, under the Anglo-Danish Society's scheme for their treatment at a Danish sanatorium. The children were chosen by the medical committee of N.A.P.T., and the British Red Cross helped to make the travel and welfare arrangements. Funds to meet the cost of transport and maintenance of this and subsequent parties of British children suffering from tuberculosis will come from the special fund created for the purpose by the Anglo-Danish Society. The ages of the children range from 8 to 15; there are 14 boys and 11 girls, mainly from London and the Birmingham and Oxford regions. It is expected that treatment in most cases will last about six months. The scheme will do something to reduce the waiting-list for beds in this country.

HOMOLATERAL PYRAMIDAL SIGNS WITH TUMOURS OF THE POSTERIOR FOSSA

BY

LESLIE C. OLIVER, F.R.C.S.

Neurosurgeon, West End Hospital for Nervous Diseases
and Royal Northern Hospital, London; Surgeon in Charge
of Neurosurgical Centre, Oldchurch Hospital, Romford

AND

J. R. GIBBS, F.R.C.S.Ed.

Senior Surgical Registrar, Neurosurgical Centre, Oldchurch
Hospital, Romford

It is well known that tumours and other displacement lesions of the cerebral hemispheres sometimes give rise to homolateral pyramidal signs. Kernohan and Woltman (1929) made a careful study of this phenomenon. The expanding lesion causes displacement of the brain stem, so that indentation of the *opposite* cerebral peduncle is produced by the edge of the tentorium; the affected pyramidal fibres cross below, in the decussation of the pyramids, to the same side as the lesion. The following case is cited as an example.

Illustrative Case

Case 1. Subdural haematoma of the right hemisphere: weakness of the right hand and arm, and equivocal right plantar response.—A man aged 47, who suffered from sleepiness for three months and headache and irritability for one month, became suddenly unconscious on June 22, 1946. There was no history of a head injury. On admission to hospital the same day he was conscious but very drowsy. There was no papilloedema and there were no localizing signs. The cerebrospinal fluid contained 80 mg. of protein per 100 ml., and it was yellow after treatment in the centrifuge. During the next few days the drowsiness fluctuated. Two weeks after admission the patient was referred to us. At that time there was *weakness of the right hand and arm* and the *right plantar response was equivocal*. Ventriculography, performed on July 6, showed displacement of the anterior part of the ventricular pattern to the left. A right frontal burr-hole revealed a subdural haematoma, which was solid and adherent to the membranes. A bone-flap was turned down and the haematoma exposed after wide reflection of the dura mater. The whole of the superolateral surface of the hemisphere was involved. There was no haematoma on the opposite side.

Comment.—It is not so well known that a closely similar phenomenon may occur with tumours in the posterior fossa, though Kernohan and Woltman found records of five examples in the series of intracranial tumours which they investigated, and Gould (1928) stressed the occurrence of *homolateral* hyperreflexia with some tumours of the posterior fossa. Tumours of the frontal region may produce "cerebellar" signs, and, conversely, slowly growing tumours in the posterior fossa may cause little or no disturbance of cerebellar function. Therefore the possible occurrence of pyramidal signs on the same side as a posterior fossa tumour may cause further difficulty in diagnosis.

In the following five cases various homolateral pyramidal signs were observed.

Case Reports

Case 2. Cyst of the left cerebellar hemisphere: paresis of the lower half of the face and weakness of the upper extremity on the same side.—A woman aged 46 was admitted to hospital in April, 1949, with a six-weeks history of intermittent headaches, giddiness, and vomiting. She showed a

mild degree of neck stiffness, moderate hypotonia of all the limbs, brisk knee-jerks, and considerable apathy. The patient refused ventriculography and left the hospital. She was readmitted six weeks later with bilateral frontal headache and insomnia. Diplopia had been noticed for two weeks. She was doubly incontinent, and neck rigidity, bilateral papilloedema, *marked left lower facial paresis*, and *weakness of the left arm* were present. All the limbs were hypotonic, especially on the left side. The left ankle-jerk was diminished and the plantar reflexes could not be elicited. The patient was given a general anaesthetic, as she refused local infiltration; while the towels were being arranged preparatory to needling of the frontal lobes she suddenly died. At necropsy a large cyst was found in the left cerebellar hemisphere. Microscopical examination of a nodule in the wall of the cyst failed to show any tumour cells.

Case 3. Astrocytoma of the left cerebellar hemisphere: paresis of the lower half of the left side of the face.—A man aged 43 had been perfectly well until three weeks before admission to hospital on October 17, 1949. During this period he had developed headache, vomiting, and severe lassitude; he had also had a cough for the same time. Drowsiness and slight neck stiffness were present, but no other physical signs. Several relations had succumbed to tuberculosis of the lungs; tuberculous meningitis was therefore suspected. The cerebrospinal fluid was slightly turbid; it contained 200 mg. of protein per 100 ml., 500 cells (all polymorphs) per ml., increased globulin, and 80 mg. of sugar per 100 ml. The patient's temperature ranged between 97.8 and 101.4° F. (36.6 and 38° C.). During the next two days deterioration occurred and on October 19 he was transferred to the neurosurgical department in a stuporous condition. There was no papilloedema. *There was a marked left lower facial paresis*, but no other physical signs. Ventriculography showed enlargement of the lateral ventricles and the third ventricle. A large tumour was partially removed from the left cerebellar hemisphere; histological examination showed it to be an astrocytoma.

Case 4. Astrocytoma of the left cerebellar hemisphere: paresis of the lower half of the left side of the face.—A youth aged 17 gave a history of frontal and suboccipital headache, vomiting, and loss of appetite for 14 weeks. On admission to hospital on October 12, 1949, moderate bilateral papilloedema and a slight *left lower facial paresis* were present, but there were no other physical signs. Radiography showed several Wormian bones at the pterion on both sides. Ventriculography on October 18 showed great enlargement of the lateral ventricles and the third ventricle. The posterior fossa was explored through a horseshoe incision. Reflection of the dura mater showed the left cerebellar hemisphere to be more prominent than the right, and there was considerable herniation of the tonsils, the left descending lower than the right. A brain cannula passed into the left cerebellar hemisphere entered a cyst containing 25 ml. of yellow fluid (7 g. of protein per 100 ml.). The cyst and its associated tumour were removed on another occasion (histology: astrocytoma).

Case 5. Solitary secondary carcinoma in left cerebellar hemisphere: paresis lower half of the left side of the face, and positive Babinski sign on the same side.—A man aged 55 was admitted to hospital in coma on February 15, 1950. His wife reported that for two months he had suffered from severe recurrent frontal and vertical headache, recently accompanied by vomiting. For three weeks there had been a cough and thick yellow sputum. He did not respond to pressure on the supraorbital nerves. Marked neck stiffness and advanced bilateral papilloedema were present. Radiography of the chest showed a large shadow on the right side; its appearance was that of a carcinoma of the bronchus. The patient recovered consciousness and was able to co-operate. There was a slight *left lower facial paresis*, a *left Babinski response*, and hypotonia of both legs. There were no other physical signs. The right frontal lobe was needled, but no evidence of a tumour was found. Ventriculography showed enlargement of the lateral ventricles and the third

ventricle. Burr-holes were made over the cerebellar hemispheres and a cannula was passed into the left lobe: 6 ml. of thin pus was withdrawn; the fluid contained pus cells, but no tumour cells. Penicillin was instilled into the cavity and the patient's condition improved. Needling was repeated the next day and tissue containing tumour cells was obtained. The patient died on March 4, and at necropsy a large solitary tumour was found in the left cerebellar hemisphere, secondary to a bronchial carcinoma.

Case 6. Meningioma of the right side of the posterior fossa: positive Babinski sign on the right, and later paresis of the lower half of the right side of the face.—A man aged 48 complained of occipital headaches for six months. At first they occurred only in the morning, but later they persisted throughout the day. For about two months there had been vomiting, loss of weight, and defective memory. He was admitted to hospital on February 8, 1950, with very severe headache, which made him somewhat uncooperative. There were moderate bilateral papilloedema and nystagmoid movements on fixation to either side. There was a *positive Babinski sign on the right side*. Five days later he developed a *right lower facial paresis*, but on this occasion both plantar responses were normal. Needling of the left frontal lobe was negative. Later, ventriculography showed enlargement of the lateral ventricles and the third ventricle. Exploration of the posterior fossa on March 14 revealed on the right side a large extracerebellar tumour, which was removed; it was later shown to be a meningioma.

Comment

The pyramidal signs observed in these cases were all on the same side as the tumour, and included the central type of facial paresis, weakness of the upper limb, and a positive Babinski sign—in variable combinations. It is noteworthy that in none of the cases was any weakness of the lower limb found. The lower limb has never been paretic in our cases of supratentorial tumour with homolateral pyramidal signs. Ectors (1945), however, states that the leg is always affected first, and to a greater extent than the arm, and he attributes this effect to the distribution of the pyramidal fibres in the cerebral peduncles as demonstrated in monkeys: the leg fibres are placed laterally, the arm fibres in the middle, and the face fibres medially (Simpson and Jolly, 1907).

Our own observations are supported by the work of Walker (1949) and of Guiot and Pecker (1949), who have divided the lateral part of the opposite cerebral peduncle for the relief of unilateral involuntary movements. Their case records show that after the immediate post-operative hemiplegia the paralysis recovers rapidly, leaving some residual weakness of the face and arm, with no detectable weakness of the leg.

It therefore appears that, whatever the arrangement of the pyramidal fibres in the peduncles may be, the more important factor is the degree of bilateral cortical representation of the parts concerned. Bucy and Fulton (1933) have obtained ipsilateral motor responses in monkeys by electrical stimulation of the motor and premotor cortex, and their work has been confirmed by Wyss (1938). In classical cerebral apoplexy the arm is more paralysed than the leg; and, after hemispherectomy for infantile hemiplegia, recovery of motor function is more marked in the leg than in the arm (Krynauw, 1950).

Summary and Conclusion

Some intracranial tumours displace the brain stem enough to cause indentation of the *opposite* cerebral peduncle; and thus both supratentorial and infratentorial tumours sometimes give rise to pyramidal signs on the same side as the tumour, and cause difficulty in localization.

The literature on this subject is largely concerned with supratentorial tumours; this communication aims at redressing the balance by the presentation of cases of

infratentorial tumours in which homolateral pyramidal signs occurred and definite cerebellar signs were lacking. The practical implications of the syndrome are indicated.

The association of increased intracranial pressure with mild pyramidal signs, without other localizing evidence, should lead to ventriculography rather than to angiography, unless electroencephalography shows a definite focus of delta activity in one cerebral hemisphere.

REFERENCES

- Bucy, P. C., and Fulton, J. F. (1933). *Brain*, 56, 318.
 Ectors, L. (1945). *Les Méninigiomes de la Troisième Frontal*. Masson, Paris.
 Gould, E. M. (1928). *Arch. Neurol. Psychiat.*, Chicago, 19, 509.
 Guiot, G., and Pecker, J. (1949). *Sem. Hôp. Paris*, 25, 2620.
 Kernohan, J. W., and Woltman, H. W. (1929). *Arch. Neurol. Psychiat.*, Chicago, 21, 274.
 Krynanaw, R. A. (1950). *J. Neurol. Neurosurg. Psychiat.*, 13, 243.
 Simpson, S., and Jolly, W. A. (1907). *Proc. roy. Soc. Edinb.*, 27, 281.
 Walker, A. E. (1949). *Acta psychiat.*, Kbh., 24, 723.
 Wyss, O. A. M. (1938). *J. Neurophysiol.*, 1, 125.

Medical Memoranda

Emergency Operation on Patient under A.C.T.H. and Cortisone Therapy

The decision to carry out an emergency operation should not be delayed for fear of a breakdown of the wound and of poor healing due to the effect of the new antirheumatic agents on tissue repair. The following case of a strangulated femoral hernia in which sound healing occurred within the normal time limits shows how wrong it would have been to procrastinate.

CASE REPORT

A spinster chiropodist aged 52 had been treated for rheumatoid arthritis in both hands, elbows, shoulders, ankles, and knees by several courses of gold injections, later with progesterone, and during the past seven months with A.C.T.H. and cortisone. A.C.T.H. was given in doses up to 200 mg. in 24 hours, the cortisone in daily doses of 100 mg., until the day of the operation.

A right femoral hernia, which the patient had first noticed two and a half years previously, was painful for four days and then became tender, firm, and tense. The skin in the groin was found to be red and oedematous. There was a pyrexia up to 100.5° F. (38.1° C.). Lower abdominal pain and sickness followed. An enema gave a good faecal result, with flatus. The pyriform hernia, extending into the femoral triangle, was thought to contain strangulated omentum and it was decided to operate immediately.

Under general anaesthesia an incision was made, starting over the neck of the hernia and extending vertically downwards for 3 in. (7.5 cm.) into the femoral triangle. The tense sac, the size and shape of an outdoor cucumber, contained blood-stained fluid and necrotic omentum, as confirmed on section. This was resected. For the herniotomy and closure of the femoral canal linen thread was used. A corrugated rubber drain was inserted for four days, and the considerable subcutaneous fat layers were closed by interrupted catgut stitches.

Systemic soluble penicillin was given, 250,000 units six-hourly for five days, and ascorbic acid for three weeks post-operatively in doses of up to 100 mg. three times a day by mouth. Cortisone, which was the only antirheumatic agent administered at the time, was reduced from the daily dose of 100 mg. to 75 mg. All sutures were removed on the fourteenth post-operative day. The abdominal symptoms had subsided on the morning after the operation and the wound healed soundly. When examined six weeks later the scar was firm and no cough impulse was felt.

COMMENT

In accordance with the widespread belief in the depressive effect of adrenocortical steroids on wound-healing, through

their influence on connective tissue (Plotz *et al.*, 1950), operations are rarely performed on patients thus treated. Repair is said to be decreased and scar formation largely inhibited if these substances are given in large doses. No reports are available in the British literature on the subject. Hume and Moore (1950), however, report on the use of these substances to improve the general condition in surgical patients. The wound in my patient healed in spite of the presence of inflammatory changes in the skin and omentum, and in spite of strangulation. Cessation of cortisone treatment may have led to a sudden loss of stimulation of the suprarenals and to a rebound exacerbation of rheumatoid and mental symptoms.

Some precautions to safeguard wound-healing could, however, be accepted as rational. General anaesthesia was used in preference to local analgesia, which may temporarily lower the vitality of the tissues; chemotherapy was indicated, even if sepsis would not have threatened; and ascorbic acid was tried empirically to block the effect of cortisone on mesenchymal tissues. Non-absorbable suture material is preferable, as it maintains in apposition tissues the wound-healing of which is potentially impaired. The lower approach to the femoral hernia was chosen in preference to Lotheissen's because the content of the sac was thought to be omentum, and because the apex of the elongated sac extended direct into the femoral triangle. The possibility of the breakdown of the wound was a contributory indication for the lower approach, where the structures in the inguinal region were not endangered. The fact that the patient's wound had healed after a dental extraction in the third month of A.C.T.H. therapy was an encouragement for immediate operation. It was also remarkable how indefinite and masked the clinical symptoms were and that even the rise of temperature was delayed in the presence of sepsis and of strangulation. This was probably due to the lowered vitality of mesenchymal tissue. The administration of the new antirheumatic substances should, however, not deter the surgeon from an emergency operation, which should, if required, be performed without delay.

I am indebted to Mr. J. M. Milloy, Dr. B. Gottlieb, Dr. A. Poteliakhoff, Dr. O. Savage, and Dr. I. M. Tweed for their kind interest in this case and for their advice.

ALFRED BECK, M.D., F.R.C.S., D.A.

St. Mary Abbots Hospital, London, W.8.

BIBLIOGRAPHY

- Baker, B. L., and Whittaker, W. L. (1950). *Endocrinology*, 46, 544.
 Creditor, M. C., Bevans, M., Mundy, W. L., and Ragan, C. (1950). *Proc. Soc. exp. Biol., N.Y.*, 74, 245.
 Forsham, P. H. (1951). *Med. clin. N. Amer.*, 35, 1233.
 Hume, D. M., and Moore, F. D. (1950). *The Use of A.C.T.H., Cortisone, and Adrenal Cortical Extracts in Surgical Patients*. Brigham Hospital and Harvard Medical School.
 Plotz, C. M., Howes, E. L., Meyer, K., Blunt, J. W., Lattes, R., and Regan, C. (1950). *Amer. J. Path.*, 26, 709; *Bull. N.Y. Acad. Med.*, 1950, 26, 251; *Arch. Derm. Syph.*, Chicago, 1950, 61, 919.
 Selye, H. (1947). *Textbook of Endocrinology*, 1st ed., p. 232. Montreal.

Glandular Fever

The five cases of glandular fever reported below all occurred in one district within eight months; no connexion, however, has been traced between any two of them. Chloramphenicol was given early in two cases and later in two others without affecting the course of the disease. This would tend to refute the conclusions drawn by Kane (1951). Three cases were similar and typical, and two had unusual courses. A sign which may be helpful in diagnosing the atypical case, and which was present in all cases, is described.

CASE REPORTS

Case 1.—A male clerk aged 26 felt ill on November 7, 1950, but ascribed it to the shock of the death of his mother, whom he had been visiting in a regional hospital (in which he may have been infected). On November 14 he went to bed with fever and sore throat, and was found to have an adenitis out of proportion to the existing tonsillitis. The glands involved were those under the upper parts of the sterno-mastoids and also in the axillae. On