PostScript

LETTERS

Stiff person syndrome with eye movement abnormality, myasthenia gravis, and thymoma

Stiff person syndrome (SPS) is a rare disorder of the central nervous system characterised by progressive fluctuating rigidity and painful spasms of the body musculature. We describe a patient with SPS with positive glutamic acid decarboxylase (GAD) antibodies who developed diplopia. Thymoma was detected by computed tomography (CT), and after thymectomy his symptoms improved. One month after thymectomy, he tested positive for antiacetylcholine receptor (AchR) antibodies.

Case report

A 45 year old man presented with a four week history of back pain and stiffness of his trunk causing difficulty in bending forward and turning over while lying down, which he attributed to a minor injury sustained while playing squash. He later developed asymmetrical stiffness of the legs and difficulty walking. His past medical history was notable for an episode of dysphagia (two weeks' duration) associated with heartburn six months ago; a gastroenterological evaluation and an endoscopy at that time were normal. He recovered spontaneously and there was no recurrence.

On examination his mental status, speech, and cranial nerves were normal. He had exaggerated lumbar lordosis. Neurological examination showed normal bulk with increased tone of the flexors and extensors of the knee and ankles. Power and coordination were normal, deep tendon reflexes were brisk, but he had flexor plantar responses. There was no evidence of fatigable muscle weakness. Sensory examination was normal.

A chest radiograph and magnetic resonance imaging (MRI) of the brain and the spinal cord were normal. He was anti-GAD antibody positive at 3.4 U/ml (radioimmunoassay; normal 0–1 U/ml). Full blood count, vitamin B_{12}, folate, thyroid function tests, liver function tests, urea, electrolytes, glucose, cortisol, immunoglobulins, and electrophoresis were normal. Antinuclear antibody and smooth muscle, mitochondrial, parietal cell, gliadin, reticulin, microsomal, thyroid peroxidase and antineutrophil cytoplasmic antibodies were negative. Cerebrospinal fluid (CSF) examination revealed 9 lymphocytes/mm^3. CSF protein and glucose were normal at 0.31 g/l and 3.1 mmol/l, respectively and oligoclonal bands were absent.

The spasms were controlled with diazepam, but his symptoms recurred on reducing the dose. A diagnosis of SPS was made. Treatment with intravenous immunoglobulins (400 mg/kg per day for five days) was not beneficial. He later improved on baclofen 20 mg/day and clonazepam 0.5 mg at bedtime.

Four months after the onset of stiffness, he developed diplopia. Visual acuity was 6/4 in both eyes. He had variable alternating esotropia of up to 10 prism dioptres at distance and esophoria at near. Eye movement examination showed bilateral mild abduction deficit, variability of horizontal and vertical saccades with a tendency to be slow, and slight endpoint nystagmus. There was no ptosis or weakness after sustained upgaze for one minute. Eye movement recordings, obtained with a high resolution video pupil tracker (EyeLink, Sensomotoric Instruments, Berlin, Germany; sample rate 250 Hz) confirmed the clinical findings (fig 1, top panel). Anti-AChR antibodies were negative. The neurological findings were unchanged.

Motor and sensory nerve conduction studies and ulnar and radial repetitive nerve stimulation were normal. Concentric needle electromyography (EMG) showed sporadic fasciculation potentials in the tibialis anterior. Single fibre EMG from 34 potential pairs from the orbicularis oculi revealed only one site with definitely abnormal jitter. A chest CT scan revealed a thymic mass. Histological examination confirmed thymoma with minimal involvement of the perithymic fat. His symptoms improved over a month after thymectomy.

One year from the onset of symptoms, one month after thymectomy, he tested positive for anti-AChR antibodies (44×10^{-10}M/l) (radioimmunoassay in the same laboratory, normal $0–5\times10^{-10}$ M/l) and remained positive for anti-GAD antibodies (2.0 U/ml). His eye movements improved significantly after thymectomy as evidenced by eye movement recordings that showed less variability of saccadic velocity (fig 1, bottom panel). Eighteen months after the onset of symptoms he is off medications and back to his normal routine. He has mild intermittent stiffness of his back, precipitated by anxiety. Occasional mild diplopia at far distance persists.

Discussion

SPS was first described by Moersch and Woltman in 1956 and was subsequently shown to be associated with anti-GAD antibodies in 40–60% of cases[1] and anti-amphiphysin antibodies in some paraneoplastic cases.

In 1990, Piccolo *et al*[2] reported a case of generalised myasthenia in a patient with SPS. This patient had radiological evidence of thymoma. A patient in the series of Vincent *et al*[1] had SPS with anti-GAD antibodies, neuromyotonia and myasthenia with anti-AChR antibodies. Nicholas *et al*[3] reported a case of SPS associated with histologically proved thymoma, who developed ocular myasthenia after thymectomy.

Hagiwara *et al*[4] described a patient with SPS associated with invasive thymoma but not with myasthenia or anti-AChR antibodies. However, since the patient reported by Piccolo *et al*[2] developed myasthenia six years after spontaneous resolution of SPS, and our patient's anti-AChR antibodies turned positive after one year, it is possible that the patient reported by Hagiwara *et al*[4] will develop myasthenia in the future. Saravanan *et al*[5] described a patient with SPS associated with ocular myasthenia. Neither anti-AChR nor anti-GAD antibodies were detected.

At the time of initial presentation, our patient did not have any clear signs of generalised myasthenia, although the transient dysphagia he experienced prior to the development of symptoms of SPS may have represented symptoms of bulbar myasthenia.

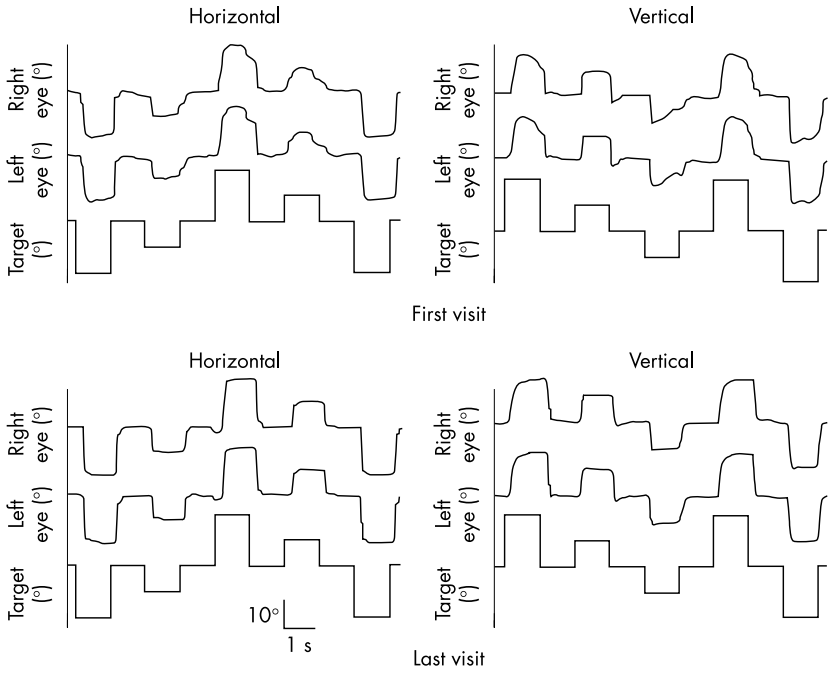

Figure 1 Horizontal and vertical eye movement recordings during saccades; (top panel) before thymectomy and (bottom panel) after thymectomy.

Notably, Hagiwara *et al*'s patient also reported dysarthria,[4] which could have been due to myasthenia. The diplopia, variable velocity of saccades and endpoint nystagmus were likely due to ocular myasthenia. This patient became seropositive after 12 months, even though his myasthenic symptoms improved after thymectomy.

Five cases of SPS associated with myasthenia gravis have been reported. This is the first report of abnormalities on eye movement recordings strongly suggesting myasthenia gravis in SPS before the patient became seropositive for anti-AChR antibodies. Our patient is probably the third patient with SPS and myasthenia with histologically proven thymoma and the second such patient with positive anti-GAD and anti-AChR antibodies. Our report suggests that patients with SPS can develop other autoantibody mediated disorders even after many months and should be followed up over a long period even if they are asymptomatic. In addition, when patients with SPS have eye movement abnormalities or bulbar symptoms, myasthenia gravis should be suspected even if they are negative for anti-AChR antibodies at presentation. Thymoma should be investigated for, as thymectomy may improve both SPS and myasthenia.

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Internal jugular vein thrombosis associated with shiatsu massage of the neck

Thrombosis of the internal jugular vein is a relatively rare condition that can be induced by a variety of mechanical injuries.[1 2] Acupressure, or ''shiatsu'', is an oriental massage technique and many acupoints on the body surface, known as ''tsubos'', are used for shiatsu. Shiatsu of tsubos in the nape of the neck is known to improve tension headache due to neck and shoulder aches. However, we recently came across a case of internal jugular vein (IJV) and cerebral sinus thrombosis after shiatsu massage of the neck.

Case report

A 35 year old man, a non-smoker, was suffering from a stiff neck. He consulted a shiatsu masseur, who performed shiatsu massage on the right side of his neck and right shoulder for 30 minutes. Immediately after the shiatsu massage, the patient noticed pain and swelling of the right side of the neck, both of which subsided within seven days. Two days after the shiatsu massage, he developed a severe, constant right occipital headache and consulted his attending physician. His cervical radiograph was normal. The patient continued to have severe headache, however, and on the seventh day after the massage, he developed blurred vision. On the twentieth day, he developed weakness and paraesthesia of his right arm and leg, and mild agraphia for kanji characters. When he also developed focal motor seizure, he was admitted to our hospital. He underwent a neurological examination on the twenty third day after the shiatsu massage.

The patient did not have any history of recent trauma, dental procedures, or upper respiratory infection. There was no history of any other relevant medication including homoeopathic or herbal medicines, or pathologic conditions. There was no family history of premature stroke or thrombotic events.

Physical examination was normal and no neck mass was detected. On neurological examination, he showed normal consciousness and orientation. Funduscopic examination revealed bilateral papilloedema without haemorrhage, but the remaining cranial nerves were intact. He had mild muscle weakness and sensory deficit in the right arm and leg. Ataxia was not detected in any of the limbs and trunk. Mild agraphia for kanji characters was observed.

Laboratory analysis showed prothrombin time, partial thromboplastin time, antithrombin III, protein C, and protein S were normal, but values for anticardiolipin antibody IgG and lupus anticoagulant were negative. Plasma homocysteine was within normal limits. Autoantibodies and cryoglobulins were absent. No evidence of any systemic disease was found on investigation.

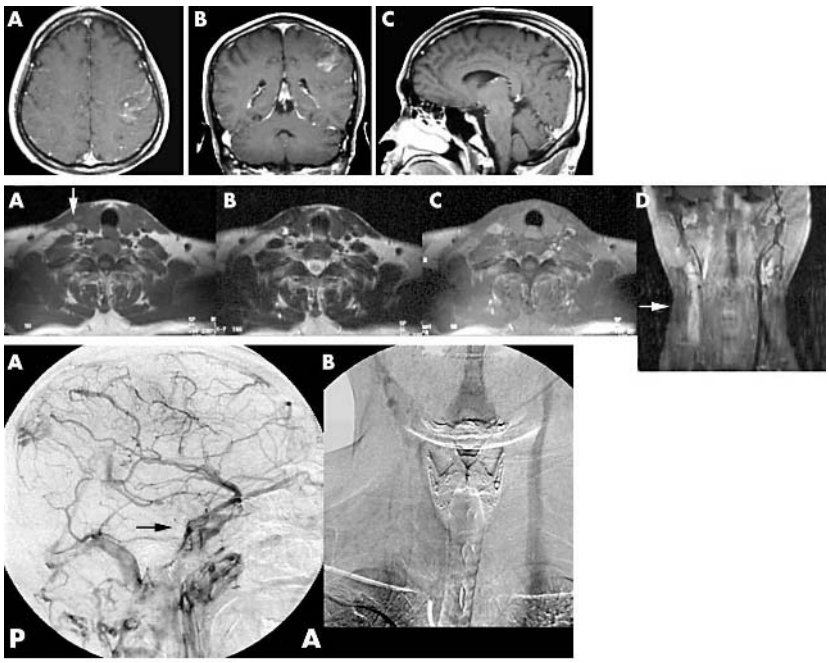

Figure 1 Top panel: post enhancement T1-weighted magnetic resonance (MR) image of the head (A) axial, (B) coronal, and (C) sagittal. (A) and (B) show the left parietal haemorrhagic infarct. The superior sagittal sinus and right transverse sinus show high intensity signal within the lumen instead of the normal ''flow void'', indicating thrombosis. Middle panel: MR image of the neck (A) T1-weighted, (B) T2-weighted, (C) post enhancement T1-weighted, and (D) coronal T2-weighted showing right internal jugular vein thrombosis without other structural abnormalities (arrows). Bottom panel: digital subtraction angiogram (A) lateral view of the head during the early venous phase of right carotid digital subtraction angiography confirms the non-opacification of the superior sagittal sinus, the deep cerebral venous system and the transverse sinuses. The predominant venous drainage is via the sphenoparietal sinus (arrow). (B) Anteroposterior view of the neck—the right jugular vein had an area of obstruction at its junction with the right subclavian vein.

Cerebrospinal fluid was clear without pleocytosis, but the cerebrospinal fluid pressure was 350 mm H_2O.

Magnetic resonance imaging (MRI) scan of the brain showed infarction with haemorrhage in the left parietal lobe and an area of increased signal intensity in the area of the right transverse and superior sagittal sinuses (fig 1). In addition, MRI of the neck with and without enhancement revealed thrombosis of the right IJV, starting from the junction with the right subclavian vein (see fig 1). However, there were no structural abnormalities adjacent to the right IJV, and the carotid arteries were normal. Digital subtraction venous angiography confirmed extensive thrombosis in the right IJV, the right sigmoid sinus, the right transverse sinus, and the superior sagittal sinus (see fig 1). The rest of the intracranial dural sinuses were patent, and no vascular malformation was detected.

Phenytoin and valproic acid were promptly administered resulting in improvement in the patient's focal motor seizures. He was also given heparin and warfarin and the intracranial hypertension was treated with a lumboperitoneal shunt. The headache and papilloedema slowly improved over the next three weeks, after which the patient was discharged. Neurological examinations over the past several months have revealed only mild clumsiness and paraesthesia of his right hand and leg.

Discussion

Our patient started complaining of a swelling and pain in the right side of the neck immediately after the shiatsu massage of the neck. Subsequently, over a period of about a month, he developed progressive headache, right extremity paralysis, papilloedema, and partial seizures. Although it may be coincidental, the possibility of a causal link between the shiatsu massage and IJV thrombosis is supported by the patient's claim of a massage induced swelling and pain in his neck, and by the temporal relation between the massage and the onset of symptoms that progressed to IJV and cerebral venous sinus thrombosis.

It is difficult to determine the exact mechanism of the IJV thrombosis in our patient. One possibility is that direct trauma or pressure may have induced both venous stasis and vascular injury during the shiatsu massage. The other possibility is that extrinsic compression of the IJV by tissue swelling subsequent to trauma during the shiatsu massage may have induced venous stasis, resulting in thrombosis at this unusual site.

Various forms of trauma have been reported in association with IJV thrombosis, such as jugular thrombosis after catheterisation[1] and Glisson traction for the neck.[2] To the best of our knowledge, IJV and cerebral venous sinus thrombosis possibly caused by shiatsu massage has not been previously reported. Our case may thus represent a newly identified traumatic aetiology.

Chiropractice is a popular alternative therapy in Western countries, and there are several reports of a relation between chiropractic manipulation and stroke.[3] Shiatsu massage, an oriental technique of massage, is a popular alternative therapy in Japan and other Asian countries. Recently this therapy, including the use of a mechanical shiatsu-type massager, is becoming increasingly popular in Western countries. In addition, it is generally accepted that this technique is risk free. However, there are two other reports of vascular complications following shiatsu massage in the literature.[4 5] Tsuboi[4] reported a case of retinal and cerebral artery embolism directly caused by shiatsu massage of the neck. Elliott and Taylor[5] also reported two cases of carotid dissection that occurred after use of a shiatsu-type massaging machine. We would therefore like to draw attention to the possibility that shiatsu massage of the neck may cause serious neurological complications.

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Congenital dumbbell neuroblastoma mimicking birth trauma

Neuroblastoma is the commonest extracranial malignant tumour in children and neonates.[1] It may involve the vertebral bodies or extend into the spinal canal, compressing the spinal cord, or spread into the retroperitoneal space, involving the lumbosacral plexus. Early diagnosis is important for treatment. We report two cases of congenital neuroblastoma mimicking obstetric related palsies.

Case 1

A 4 month old baby boy with a diagnosis of unilateral leg palsy due to birth trauma, despite normal vaginal delivery, was admitted because of a palpable abdominal mass. The infant's left leg lacked spontaneous movement, was flaccid, and deep tendon reflexes were absent. He had poor rectal tone and dribbling of urine. The levels of urinary catecholamine derivatives were increased. Spinal magnetic resonance imaging (MRI) demonstrated a large retroperitoneal mass with thoracolumbar cord involvement. A diagnosis of neuroblastoma was made following biopsy of the abdominal mass. Multiagent chemotherapy proved effective in reducing the size of neuroblastoma. His left leg function returned after several months' chemotherapy. At present, after two years he is free of disease, he can stand and walk with a brace, and his neurogenic bladder is managed with clean intermittent catheterisation.

Figure 1 Case 2: spinal magnetic resonance imaging scan revealed severe cord compression from T12 to L4 and a large intra-abdominal retroperitoneal mass.

Case 2

A 10 day old baby boy was seen for evaluation of right lower limb weakness. He had not moved this leg since birth. He was born at full term via a normal vaginal delivery with vertex presentation. He had a hyperextended thigh and decreased tone in the remainder of the leg. Other limbs were normal. Abdominal examination revealed a palpable mass in the right upper quadrant just lateral to the midline. Sonography of the abdomen revealed a unilateral retroperitoneal tumour adjacent to the right kidney with spinal cord involvement. A spinal MRI showed extensive spinal cord compression from T12 to L4 (fig 1). Biopsy of the paravertebral mass revealed neuroblastoma. The neonate was treated with multiagent chemotherapy. However, he developed paresis of the left leg within two weeks of starting chemotherapy. The spinal cord was therefore surgically decompressed through an osteoplastic laminotomy and the extradural mass was fully resected. Although there was partial recovery of left leg function the right limb remained plegic.

Discussion

Birth trauma causing brachial plexus injury is relatively common where obstetric services are limited, but lumbosacral plexopathy after a normal vaginal delivery is extremely rare. Unilateral lower extremity palsy in a neonate must lead the primary care provider to consider other diseases. The combination of neurological deficits and an abdominal mass should alert the physicians to consider neuroblastoma. Early diagnosis can improve outcome,[2 3] and neuroblastoma diagnosed even in the prenatal period has been reported to have excellent prognosis.[4]

Although congenital dumbbell neuroblastomas are rare, spinal cord compression and involvement of the peripheral nerves or nerve plexus are not uncommon with abdominal neuroblastoma.[5] The incidence of intraspinal involvement of neuroblastoma varies between 6% and 24%.[6 7] Intraspinal neuroblastoma is a direct extension of a peripheral tumour.[8] Dumbbell neuroblastoma is the commonest malignant cause of spinal cord or nerve root compression in young children and is regarded as an unresectable tumour.[7] Chemotherapy should be considered for patients with partial deficits and surgical decompression should be reserved for children with recent onset of severe neurological dysfunction or deterioration in a 24–72 hour period.[7] We treated case 1 with chemotherapy only, because his neurological deficit had been observed four months ago and was not progressive. After disappearance of the retroperitoneal and intraspinal masses with chemotherapy the deficit improved partially. The second neonate's condition deteriorated during chemotherapy, and surgical decompression resulted in recovery of one limb although the fixed deficit from birth, in the lower right extremity, did not change.

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Anorexia nervosa remission following left thalamic stroke

Anorexia nervosa is an intense fear of weight gain, inaccurate perception of body size, weight or shape, amenorrhoea, and a body weight <85% of expected weight (or body mass index (BMI) ⩽17.5). We report a patient who, following a left thalamic stroke demonstrated a remarkable recovery from a 7 year history of anorexia nervosa.

The patient grew up in a family with both parents and two older brothers. When she was 14 years old, a young cousin died of a "brain haemorrhage". Six months later the patient started a "healthy eating" regimen. She was first admitted to hospital for her eating disorder in April 1995, aged 15 years, and was prescribed antidepressant medication. The problem continued despite psychiatric and psychological treatment (usual weight 43 kg, BMI 17).

In May 2002, aged 22 years, she experienced a sudden onset of right arm and leg weakness with a sensory disturbance of the right face, arm, and leg. There was no history of diabetes, cigarette smoking, illicit drugs, or oral contraceptive use. She was admitted to hospital. She was told that a computerised tomogram (CT) showed that she either had a brain tumour or had suffered a stroke. She was transferred to the regional neurology unit. There she was alert, but had a slight decrease in sensation on the right side of the face; there was no visual field defect. She had a right pronator drift. She had grade 4 strength throughout the right upper limb. Leg strength was normal. The right arm and leg were mildly hyperaesthetic and there was impaired proprioception in the right fingers. There was right sided ataxia. On the right she had brisk reflexes and an extensor plantar response.

Her brain CT demonstrated left thalamic hypoattenuation, which on magnetic resonance imaging showed involvement of the left posterolateral thalamus and posterior temporal lobe (fig 1). The infarct area involved the left inferolateral artery territory. Magnetic resonance angiography was normal. Other investigations (chest *x* ray, electrocardiogram, thoracic echocariogram, full blood profile, thrombophilia screen, glucose, liver function tests, and thyroid function tests) were normal. The patient was extremely anxious and thought frequently about her cousin's death. However, she gradually improved and reported to a neuropsychologist that she no longer had an eating disorder. Her realisation came quite suddenly 3 days after her transfer to the neurology service. She chose cauliflower cheese for her evening meal and asked a visitor for a chocolate chip biscuit; neither of these foods would have been acceptable as part of her anorexic diet.

Within 6 months the patient gained 4 kg in weight (41 kg to 45 kg, BMI 18.7). Regular menses returned after two years of amenorrhoea. Eight months after the stroke she wrote the following descriptions of her feelings before and after her stroke: Pre-stroke: "Anorexia controlled my life and influenced things which I did or did not do." "… relationships – lost interest in them. Only interested in anorexia."

Of her post-stroke state she said, "I have no feelings of guilt. I no longer count calories. I am relaxed about eating/around food. I can eat out in restaurants now."

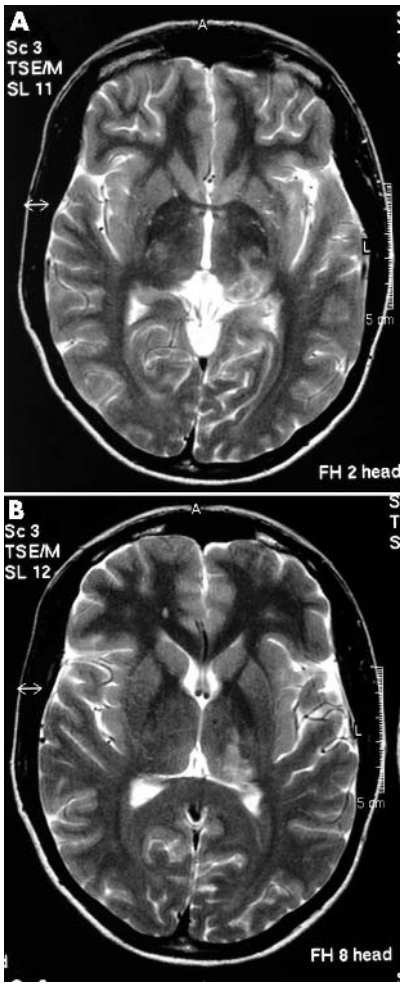

Figure 1 Axial T2 magnetic resonance images demonstrating high signal and mild mass effect in the posterolateral thalamus and posteromedial temporal lobe consistent with recent infarction. The infarct distribution corresponds to thalamogeniculate branches of the posterior cerebral artery.

She continued with antidepressant medication and her mood remained stable. The patient completed the Eating Disorders Inventory-2[4] from the perspectives of pre-stroke and 13 months post-stroke. The bulimia and interpersonal trust scales were at the mean for non-patient college females both pre- and post-stroke. Drive for thinness and body dissatisfaction were high pre-stroke, even in comparison with the eating disorder group. The scores on drive for thinness, body dissatisfaction, ineffectiveness, and interoceptive awareness all fell dramatically post-stroke, and her post-stroke scores were close to the mean for non-patient college females.

Discussion

Our patient demonstrated sustained remission from anorexia nervosa for a 13 month period following a left posterolateral thalamic stroke. She reported significantly changed attitudes to food. Clearly the pre-stroke assessment, completed retrospectively, has to be interpreted cautiously. Nevertheless, the findings strongly suggest important shifts in her attitudes. There are two possible hypotheses to account for her anorexia

remission: (*a*) the cerebral infarct switched off her anorexia; or (*b*) the personal trauma of the stroke, including being told that she might have a brain tumour or had had a stroke.

Thalamic pathways have been implicated in the control of normal eating. As part of Papez circuit, the anterior thalamus projects to the cingulate gyrus and the dorsomedial thalamus projects to the basal nuclei of Meynert. The thalamus may have an integrative role with higher order somatosensory and visuospatial function. Neuroimaging techniques have demonstrated several abnormalities in the anorectic state, some of which are reversible with treatment. The smaller size of the thalamus[2] and thalamic perfusion changes in anorexics[3] suggest that the thalamus plays an important role in anorexia nervosa. Our patient demonstrated the usual clinical features of lateral thalamic infarction: hemiataxia, and hemisensory and motor deficit.

Hyperphagia has been reported with a variety of lesions in the thalamus, hypothalamus and frontal lobe. Lesions in these areas have also been implicated in the onset of anorexia nervosa. In contrast to our patient's remission from anorexia with a left posterolateral thalamic infarct, anorexia has been associated with dorsomedial thalamic infarction. Stereotactic thalamotomy has been used as a treatment of anorexia nervosa.[4 5]The right dorsomedial and intralaminar thalamic nuclei were lesioned in one patient,[4] while a bilateral procedure was performed in two;[5] all three made a sustained improvement. There are other reports of improvements following an encephalitic illness and a right thalamic haemorrhage.

Trauma may contribute to the development of anorexia nervosa. However, there are no reports, to our knowledge, of a traumatic event leading directly to the cessation of an eating disorder. Our patient was traumatised by the sudden death of a 21 year old cousin from a ''brain haemorrhage'' when she was aged 13 years. A change in her eating pattern developed into anorexia nervosa over subsequent months.

Whether this sudden and sustained recovery from an eating disorder was due to a psychologically traumatic event or to the direct effect of the left thalamic stroke is not certain. The abruptness of the change, and reported functional thalamic abnormalities in anorectics that reverse in remission, lends weight to the latter hypothesis.

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Is the rapid assessment stroke clinic rapid enough in assessing transient ischaemic attack and minor stroke?

Our rapid assessment stroke clinic (RASC) was established as part of a single point of access for general practitioners to refer patients with suspected transient cerebral or ocular ischaemic attacks (TIA) or recovered non-hospitalised stroke in response to the publication of the *National Clinical Guidelines for Stroke*[1] and the *National Service Framework for Older People*.[2] Similar rapid access neurovascular clinics have been set up throughout the United Kingdom to provide readily available access to primary care for the management of similar patients. These clinics have significant revenue costs for the NHS, and hence the importance of reviewing their process and outcome. We now report the fate of non-attendees to highlight the risk of early stroke.

Between October 2000 and December 2002, 1460 patients were referred to the RASC. When a referral (usually by phone or fax) is received, the patient is contacted by phone to arrange a convenient appointment, or by post if not contactable by phone. Those who fail to attend the clinic on the first appointment are given a second appointment to attend, and all patients were prospectively registered in the single point of access database. The medical notes of the non-attendees were reviewed to determine the reason for the non-attendance. If there was no relevant record in the medical notes, the general practitioners or the patients themselves were contacted by phone. Death certificates were reviewed where appropriate. Any relevant imaging, including computed tomography of the head or carotid Doppler ultrasound, was also reviewed.

In all, 1460 patients were referred during the 27 months study period and 121 failed to attend in spite of being sent two appointment. The median waiting time from referral to appointment was 17 days (range 0 to 96); 47.6% of patients were seen within two weeks of referral. The mean age of the non-attendees was 71 years (29 to 93); 44 were male and 77 female. Risk factors for TIA or minor stroke included atrial fibrillation (5.7%), hypertension (14%), diabetes (5.7%), and hypercholesterolaemia (11.5%). Reasons for non-attendance included 39 (32%) who had a stroke requiring admission to hospital, of which 27 (69%) occurred during the first three days after referral (fig 1). Thirteen of the 39 strokes (33%) were fatal. CT showed evidence of infarction in 31 (80%), intracranial haemorrhage in 2 (5%), and was normal or not undertaken in 6 (15%). Seventeen patients (44%) had carotid Doppler ultrasound, and of these, four had stenosis exceeding 50%.

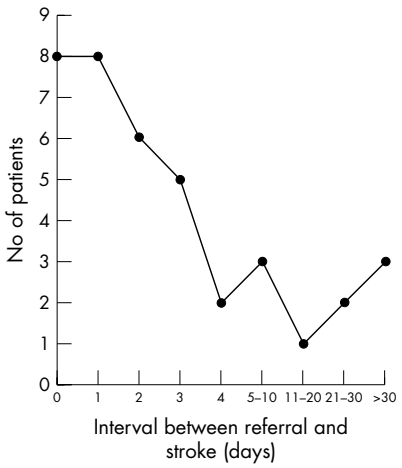

Figure 1 Time interval between referral and stroke occurrence.

Patients with TIA are at significant short term risk of stroke, previously reported as ranging from 4% to 8% in the first month.[3] Therefore the *National Service Framework* and *National Clinical Guidelines for Stroke* recommended the setting up of rapid access neurovascular clinics in which patients should be seen within 14 days of referral. In a study of patients presenting to an emergency department—almost all of whom were enrolled within 24 hours of the TIA—the reported stroke risk was 5% in the first two days.[4] The Oxfordshire community stroke project (OCSP) prospectively followed a population of patients presenting to their primary care provider with a TIA or completed stroke reported a 4.4% risk of stroke in the first month following a recent TIA.[5] In the subsequent OCSP study, which redefined the index event, the authors suggested that the risk was much higher than the initial estimate, lying at 8.6% and 12.0% at seven and 30 days, respectively.[6] In our present review, 32% of patients who failed to attend the clinic did so because they had a stroke requiring hospital admission in the interval between seeing their general practitioners and the clinic appointment; 27 occurred in the first three days after referral, suggesting that the recommendation in the *National Clinical Guidelines for Stroke* about the timing of referrals to neurovascular clinics may need revision.

Our study may be criticised on the grounds that information about the timing of the index event was not included; however, we regard this report as being a pragmatic view of what is happening in reality. A rapid access neurovascular service is unlikely to be effective in preventing stroke unless patients can be seen and treated on the same day that they present. This study highlights the need for urgent evaluation and treatment of those at risk of stroke, ideally on the same day as the index event. Studies are required to determine the most effective intervention. The challenge for stroke physicians is to test the effects of combination treatment comprising combined antiplatelet therapy, a cholesterol lowering drug, and blood pressure lowering

agents given as soon as possible after the index event to reduce the risk of immediate stroke.

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An unusual cause of dysphagia

We report a case of a patient with Lambert Eaton Myasthenic Syndrome (LEMS) associated with small cell lung cancer (SCLC) presenting with a 2 year history of dysphagia. This presentation has not been described in previous literature.

Case

A 71 year old right handed deck worker initially presented with a 6 month history of dysphagia, weight loss, nausea, and fatigue. He was cachetic with no other clinical signs to be found on examination. Baseline blood tests were unremarkable. Upper gastrointestinal (GI) endoscopy revealed a small hiatus hernia only. Subsequent investigations included a barium swallow, computer tomography (CT) scans of the chest and abdomen, oesophageal manometry, small bowel follow through, and laparoscopy, which were all normal. He was empirically started on cisapride and managed on an appropriate pureed diet.

Eighteen months after his initial presentation the patient complained of a gradual deterioration in his speech and problems with proximal muscle weakness. Clinical examination demonstrated an obvious dysarthria and broad based gait. There was no limb weakness or sensory neuropathy and reflexes were preserved with no post-tetanic potentiation. There was no disturbance of extraocular eye movements or ptosis. The patient did not display any cognitive impairment. He subsequently developed involuntary choreoathetoid movements.

Baseline blood tests and chest x ray (CXR) were again normal. Magnetic resonance imaging of the brain demonstrated evidence of small vessel disease. Electromyography and nerve conduction studies were performed. Sensory conduction velocities were within normal limits. Motor conduction velocities demonstrated a clear and reproducible decremental response to repetitive stimulation in the right ulnar nerve (32%) and in the right median nerve (25%), maximal at 3 Hz stimulation. Compound action potentials in the muscles tested increased by more than 50% following a period of exercise (right ulnar nerve 0.9 to 2.8 mV, right median nerve 1.7 to 2.8 mV). Electromyogram (EMG) of the right biceps and 1st dorsal interosseous muscles were normal. Overall the results were felt to be consistent with a diagnosis of Lambert-Eaton Myasthenic Syndrome (LEMS). The presence of anti-voltage gated calcium channel antibodies confirmed the diagnosis.

Repeat CT scanning in combination with positron emission tomography (PET) scanning revealed enlarged subcarinal lymph nodes only. A transbronchial lymph node aspiration confirmed the diagnosis of small cell lung cancer. Anti-Hu antibodies were found to be positive.

The patient initially received a course of intravenous immunoglobulins (IVIg)(1 g/kg for 5 days), which resulted in an improvement in speech, swallowing, and gait. He then proceeded to start treatment with cisplatin/etoposide chemotherapy and concomitant radiotherapy. His movement disorder improved slightly during this time but his dysphagia resolved completely. Repeat CT staging after completion of his treatment demonstrated a complete response.

Discussion

Dysphagia occurs in 24–34% of patients with LEMS.[1] This usually develops late in the course of the disease, but may be present at the onset.[2] Dysphagia as the sole presenting symptom of LEMS is extremely rare however.

Proximal lower limb girdle weakness is the most frequent presentation. In a case series of 50 consecutive patients, leg weakness was the presenting complaint in 62% of patients.[1] Less frequent presentations are generalised weakness, aching and stiffness, autonomic symptoms (impotence, dry mouth, constipation), arm weakness, diplopia, and dysarthria.

Guruprakash *et al* reported a case of a 59 year old man presenting with dysphagia who was subsequently found to have LEMS.[3] Further investigation revealed adenocarcinoma of the prostate with bony metastases. The dysphagia resolved completely with a combination of preoperative guanidine hydrochloride, followed by bilateral orchidectomy and diethylstilbestrol diphosphate.

Recognising LEMS swiftly is important, as it may be an early warning sign of an underlying malignancy. Approximately 60% of LEMS patients have cancer, usually SCLC.[4] Other less commonly associated malignancies include lymphoproliferative disorders, carcinoma of the breast, colon, stomach, gall bladder, kidney and bladder, adenocarcinoma of the lung, pancreas and prostate, and intrathoracic carcinoid. The diagnosis of LEMS usually precedes the cancer diagnosis by a median of 6 months.[4] Carcinoma associated LEMS patients tend to present at an older age than LEMS without carcinoma. A male predominance has been noted in the past, but more recent epidemiology does not support this, likely reflecting the changes in smoking patterns.

Our patient also developed chorea. Multiple paraneoplastic syndromes are very rare but have been previously described. Vernino *et al* reported a series of 16 patients with paraneoplastic chorea, of which one patient in the series also had a diagnosis of LEMS.[5]

Currently an autoimmune aetiology is favoured for the development of paraneoplastic syndromes. Antibodies have been demonstrated against calcium channel antigens shared between SCLC and presynaptic cholinergic synapses in LEMS. Anti-HuD antibodies have also been detected in patients with SCLC presenting with other paraneoplastic syndromes. This antigen is common to SCLC cells and the nuclei of neurones in the central and peripheral nervous systems.

Management of LEMS includes the use of 3,4 Diaminopyridine, which provides symptomatic improvement in patients with or without a neoplasm. Steroids and immunosuppression with azathioprine or cyclosporin are of particular value in patients with non-cancer associated LEMS.

Our patient was successfully treated with IVIg and chemoradiotherapy. This resulted in resolution of the dysphagia and some improvement in the chorea. The role of IVIg in treating LEMS is established. It is also recognised that treatment of the underlying tumour can result in improvement or remission of symptoms relating to the paraneoplastic syndromes.

This case illustrates that LEMS is an unusual but important cause of swallowing difficulties. In the present patient, establishing the cause of dysphagia led to the diagnosis and treatment of the underlying SCLC.

Acknowledgements

Thank you to Mr R Mason (Consultant General Surgeon, St Thomas' Hospital, Lambeth Palace Road, London SE1 7EH) and Mr J Prendeville (Consultant Medical Oncologist, Guys Hospital, St Thomas Street, London SE1 9RT) for their review of this case.

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Traumatic brain injury and haemorrhagic complications after intracranial pressure monitoring

Intracranial pressure (ICP) monitoring is now a widely accepted tool in the management of patients with head injuries.[1 2] However, intracranial haemorrhage is a recognised as a possible complication following placement of an ICP device.[3 4] The purpose of this study was to investigate the incidence of haemorrhage after ICP monitor insertion through a thorough review of post-insertion computed tomography scans, and to classify them in a clinically relevant manner.

Materials and methods

Patients

Over 5 months, the Neurosurgery Service at Harborview Medical Center treated 314 patients with traumatic head injury. There were 247 males and 67 females with a median (SD) age of 35.16 (22.9) years (range 0.4 to 102 years), and all were admitted to the hospital. Placement of an ICP monitor (Camino™, intraparenchymal) was undertaken in 130 of these patients. We retrospectively analysed the patient's hospital charts and all available radiological studies, with particular attention paid to our own interpretation of CT scans before and after ICP monitor insertion. The final numbers in the study were 101 males and 29 females with a median (SD) age of 36.6 (21.9) years (range 1.8 to 102 years).

ICP monitoring

Indications for ICP monitoring followed the head injuries (ICP monitoring) guidelines:[5] (*a*) patients with severe head injury, GCS $\leqslant$8 with an abnormal head CT; (*b*) patients with severe head injury, GCS $\leqslant$8 with a normal head CT, and having two or more of the following: age >40 years, systolic blood pressure <90, or posturing; (*c*) patients with GCS 9–12 and abnormal head CT, if undergoing therapies for other injuries with possible deleterious effects on ICP; and (*d*) subsequent to removal of intracranial mass.

The fibre optic device was placed at the bedside (intensive care unit, emergency room) or at completion of the surgery in the operating theatre. Some patients needed replacement of an ICP device because of technical problems with the device. The right side was preferred for the insertion of the ICP monitor.

CT scanning

The institutional protocol was to perform CT scanning during the first 24 hours after the insertion of ICP device. We were not able to obtain CT in this time frame in four cases. A grading system for haemorrhages after ICP monitor insertion from our institution was used (fig 1). Grade 0 was used to report patients with no complications on post-placement studies. Grade 1 is a small punctuate haemorrhage or localised subarachnoid haemorrhage (SAH). Grade 2 haemorrhage is an intracranial bleed, diffuse SAH or extra-axial haematoma without a new neurological deficit and does not require operative intervention. In a case of grade 3 complication, revision craniotomy is required or there is a new neurological deficit, even a death.

Results

Of the 314 patients with traumatic head injury, ICP monitor insertion was performed in 130 (41%). Nineteen patients had more than one ICP monitor inserted; altogether, 155 procedures were carried out. Right sided procedures prevailed (n = 102, 66%). The majority of the patients in this study were admitted with the diagnosis of a closed head injury (n = 116, 89.2%), 10 patients had open head injury, and four suffered a gunshot wound to the head. One hundred and six procedures (68%) were performed at the bedside, and 49 insertions (32%) took place in the operating theatre.

We retrospectively analysed the patient's hospital charts and all available radiological studies. There were 140 procedures performed without any haemorrhagic complications on follow up radiological studies (grade 0). After 10 insertions (6.5%), a small punctuate haemorrhage or localised subarachnoid haemorrhage occurred. These complications were classified as grade 1 haemorrhages. Five patients (3.2%) sustained an intracerebral haematoma that did not necessitate evacuation or manifest as a new neurological deficit (grade 2). There were no haemorrhagic complications requiring evacuation or resulting in a noticeable change in the patient's clinical condition (grade 3). Altogether, the complication rate was 9.7% for this study. More haemorrhagic complications occurred after ICP monitor placement in the operating theatre (n = 8/49, 16.3%), compare the bedside procedures (n = 7/106, 6.6%). This distribution did not reach statistical significance (p = 0.057).

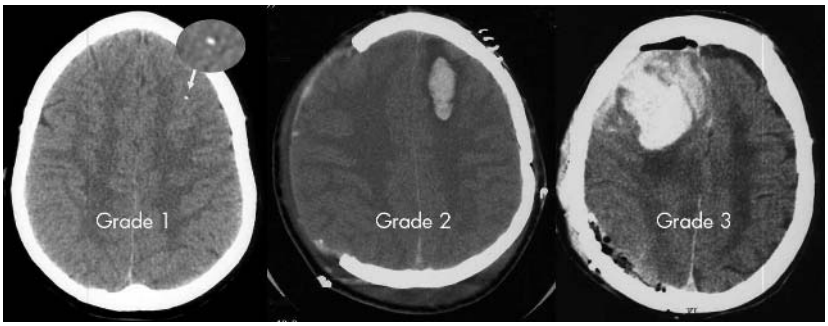

Figure 1 The different degrees of post-insertion haemorrhages.

Conclusions

There is a wide range (0–15.3%) in the literature of reported incidences of intracranial haemorrhages following placement of an ICP monitoring device.[3 4] However, most studies had multiple targets such as outcome, different treatment options or indication criteria and these published reports failed to distinguish between large haematomas requiring surgical evacuation and small punctuate haemorrhages picked up incidentally only on imaging. In head trauma, there are multiple lesions on radiological examinations, and without detailed knowledge of the patient's surgical procedures, a punctuate haemorrhage can be counted as an evolving contusion or go unnoticed. Due to previous metal artefacts from tip of the ICP monitor catheter, some small lesions were detected only after its removal.

In our traumatic brain injury group, we found a complication rate of 9.7% with no grade 3 haemorrhage. Although the most common grade 1 haemorrhage seems to be unimportant, we do not know its long term consequences and it may cause a false reading of a high ICP with subsequent unnecessary therapeutic interventions. The incidence of grade 3 haemorrhage was 0.15% (1 in 684 procedures) in our institution for the general neurosurgical population (trauma, tumors, cerebrovascular),[4] and there is a similar complication rate and stratification for the paediatric subpopulation.[4]

Although intracranial pressure monitoring plays an indispensable role in the management of head injuries, the indications for this invasive neurosurgical procedure should always be carefully considered. Even with the utmost precautions, haemoragic complications may occur. Classification of the complications in the clinically relevant scheme may help to compare results of future studies.

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BOOK REVIEWS

Critical care neurology and neurosurgery

Edited by Jose I Suarez. Totowa: Published by Humana Press, 2004, $145.00 (hardback), pp 611. ISBN 1-58829-089-1

This is a worthy attempt to produce a comprehensive multi-author text of neurological and neurosurgical ITU. The volume is extensive with more than 60 authors contributing 34 chapters in over 600 pages. The scope is wide ranging and covers a broad sweep of topics relating to critical illness due to primary neurological and neurosurgical conditions. It has little or nothing to say about the neurological complications of general medical intensive care.

There are many excellent individual chapters—I learnt a great deal from the neurosurgical contributions concerning raised intracranial pressure and monitoring, and also from the neurological section on vascular disease. However, there are surprising omissions; for example, as general neurologists we are probably asked to consult about ischaemic-hypoxic brain injury more than any other single condition and yet this book has little concerning this important topic. There is a relatively little about the practical aspects of management although there are honourable exceptions and I particularly enjoyed the section on ventilation and tracheostomy. A more up to date description of central respiratory abnormalities due to neurological disorders would have been preferable. Does anybody really see the patterns of central herniation described by Plum? In the modern world ventilation is introduced much earlier and these descriptions are generally of historic interest only. For such a comprehensive text I would have preferred a little more about the history and philosophy of neurological intensive care—particularly a recognition of the different sorts of units related to stroke and long term ventilatory management.

This book attempts to present an overview of the subject, including chapters on most aspects of neurological critical care, but unfortunately the structure is rather loose and the content is organised without an obvious overall strategy. This is a disappointment and rather dilutes the value of this book as a textbook. It is relatively expensive and I was disappointed by the poor quality of the illustrations. It is surely essential in the modern world of neuro-imaging within the ITU to be presented with high quality reproduction of functional imaging in addition to more conventional modalities. Similarly, the lack of structure demands a more coherent presentation of individual chapters making better use of tables and figures.

There are several excellent new texts of critical care neurology and neurosurgery against which this book must be measured. The lack of structure and organisation means that it falls short of the more coherent books written by single authors or small groups. The book will be an asset to specialist neurocritical care units but is unlikely to be of value to general neurologists or trainees.

R Howard

Neurology of the arts: painting, music, literature

Edited by F Clifford Rose. Published by Imperial College Press, 2004, £65.00 (hardback), pp 432. ISBN 1-86094-368-3

Neurology of the arts: painting, music, literature is a multi-authored book that explores the intersection between neurology and the arts. The topics in the book are wide ranging, moving from discussions of Dostoyevsky and epilepsy, to amusia, back to Samuel Johnson and Mozart's movement disorders. Neurology is the underlying glue that binds the book. The chapters are really quite diverse and touch on the use of literature or painting to portray neurological disorders, include descriptions of the neurological conditions of famous artists, writers or musicians, or delineate the neurological basis for music and painting. Many of the authors have a background in neurology or neuroscience, but there are fascinating contributions from Professors of music, literature, and art.

The editor offers an erudite chapter on the representation of neurology in art, beginning with an ancient tablet from Egypt illustrating a person with an atrophic leg, suggestive of polio. Also, he explores migraine as a possible source for artistic creativity in Hildegarde de Bingen and outlines the influence of neuroanatomy upon artists like Leondardo da Vinci, Theodore Gericault, and Rembrandt van Rijn. Finally, he summarises the panoply of diseases from which Van Gogh may have suffered. A full chapter is dedicated to the various artists who have suffered from epilepsy. In other chapters the art of Sir Charles Bell and the poetry of Henry Head are described.

There are two exceptionally strong chapters on the cerebral localisation of music. In one the neuroanatomy of music perception and musical memory is described while another summarises research into the neural basis for music in musicians and non-musicians. In this vein, another chapter describes amusia—a rare but intensely studied cognitive disorder. The effect of Mozart on epilepsy (protective), and the relationship of music and madness provide interesting contrasts on music's effects on behaviour.

For readers with background in neurology with a special interest in literature there is much to enjoy. Christopher Goetz—a leading medical historian—notes the influence of Shakespeare on Charcot's teaching. The astute observations by Shakespeare on various neurological conditions once used by Charcot as a teaching tool offer remarkable insights into both Shakespeare and Charcot. Joyce's use of medical metaphors in Ulysses and other work elucidates a unique perspective on this author's work. Two chapters address Dostoyevsky; one depicts his use of epilepsy in writing, the other discusses the potential aetiology for his epilepsy. A fascinating and highly scholarly chapter by Ragnar Stien outlines the description of depression, polyneuropathy, as well as ancient Nordic remedies in old Nordic sagas.

This book should have wide appeal in the neurological and neuroscience community. Not every chapter will appeal to every reader, but there is much to enjoy in this book. It reminds me of some of the later books of Macdonald Critchley as it touches upon a wide range of topics of interest to neurologists. Neurology attracts a disproportionate number of individuals with a strong interest in both science and the arts. This book understands the desire of our community for this information.

B L Miller

Fifty neurologic cases from mayo clinic

Edited by John H Noseworthy. Oxford: Published by Oxford University Press, 2004, £24.95 (paperback), pp 218. ISBN 0-19-517745-2

A book of 218 pages, which starts with semantic dementia and ends with mild cognitive impairment of amnestic type via Tangier disease, necessarily lays the emphasis on the esoteric rather than the mundane. Whether the subject matter will be of interest to ''surgeons…..and of particular help to medical students'' is a matter for others to judge. However, it seems to this reviewer, that the average surgeon will not have any particular desire to be enlightened about Whipple's disease, Angelman's syndrome, or Erdheim-Chester disease. The agendas of publishers and clinicians do not always coincide and it would be churlish to shoot the messenger when Professor Noseworthy's work contains much else to savour—especially the preface and acknowledgements!

Neurologists tend to be competitive individuals and this book certainly lays down the gauntlet. The format is tried and tested, with the history, examination findings, and results of investigations inviting the reader to predict the denouement, which is presented overleaf, together with a commentary by an expert in the field. The quality of the illustrations is first class. The range of cases presented is mind boggling and the commentaries extremely well researched and up to date.

I have only a few minor criticisms. Many of the commentaries contain little mention of the differential diagnosis. It seems churlish to present a case of facioscapulohumeral muscular dystrophy (FSH) without facial involvement or mention of Beevor's sign and expect the average reader to hit the nail on the head. I am unconvinced by the argument that asking our patients to wiggle their ears is ever likely to lead to a fruitful outcome. It might have been helpful to include the normal ranges alongside the results of tests.

At £24.95 this seems good value for money and in my opinion will enhance any departmental or personal library.

A J Wills

STROKE—pathophysiology, diagnosis, and management, 4th edition

Edited by J P Mohr, Dennis W Choi, James C Grotta, Bryce Weir, Philip A Wolf. Published by Churchill Livingstone, 2004, £170.00 (hardback), pp 1546. ISBN 0-443-06600-0

This is a major update—by a new editorial team—of a major reference book in cerebrovascular diseases. Updating such a big reference work is a huge task, and by and large the editors have succeeded in their task. They have assembled many very distinguished authors and put together a pretty

comprehensive reference work. The early chapters on epidemiology, clinical manifestations, and underlying causes provide a very broad and detailed coverage. There is even a chapter devoted solely to infarcts of the anterior coroidal artery! The chapters are well written and heavily referenced. There are plenty of illustrations (the chapter by Bousser on cerebral venous disease has particularly good illustrations that are clearly annotated).

However, in some of the other early chapters the selected scans and angiograms have not been done on state-of-the-art technology. I accept that of course to find a scan to illustrate a particular and unusual problem is not always easy (particularly not a recent one!). In view of this, it would have been preferable for some of the figures to have more arrows and annotations to point out exactly what the abnormality was. It would be preferable to replace the unsubtracted angiograms with subtracted films.

The chapters on management and treatment are comprehensive, and cover all of the options that are currently in use. Thus, one can find useful material on everything from the treatment of hyperacute ischaemic stroke, to the use of neuro-interventional treatments for arteriovenous malformations (AVMs), arterial dissections, and vascular stenosis in the blood supply to the brain. Thus there is good coverage of what *can* be done but it is not always clear what *should* be done. By this I mean that the best evidence on the choice of treatment—balancing its harms and benefits—comes from randomised controlled trials and systematic reviews of such trials. In general, the authors in the book have tended to discuss each trial in considerable detail, mentioning relevant systematic reviews relatively infrequently and it is often quite difficult to extract from this mass of detail what the overall message should be. So, this book will appeal to the thoughtful, methodical reader who wishes to assess the evidence in very great detail but the ''reader in a hurry'' may find it difficult to locate the text that gives the final verdict on a particular treatment.

Producing reference works of this size is a huge challenge and the authors and editors must be congratulated in bringing it to fruition. Unfortunately such large beasts have long gestations and I suspect that many of the manuscripts were submitted some time in 2002, to achieve a 2004 publication date. The editors themselves recognise this in their introduction:

> ''We even hope that the information contained in this edition makes for its rapid obsolescence, so great are our aspirations for continued rapid development in our field''.

In many ways it is good news that the authors' predictions have been proven, since for example, the International Subarachnoid Aneurysm Trial (ISAT)—published in 2002—has clearly shown that for patients with ruptured intracranial aneurysms, coiling with detachable platinum coils leads to a substantial reduction in death or disability, compared with conventional neurosurgical clipping. It appeared too late to be included in the book. The pace of change in change in stroke is indeed rapid!

So, this fourth edition is a welcome update to a well known reference book. The dense text and heavy referencing (e.g. the 50 page chapter on intracerebral haemorrhage has 390 references), mean that it is a mine of information, but in the very nature of such books, not always light reading.

P Sandercock

The treatment of epilepsy

Edited by Simon Shorvon, David Fish, W Edwin Dodson, Emilio Perucca. Published by Blackwell Publishing Ltd, 2004, £150.00 (hardcover), pp 952. ISBN 0-63206-046-8

This is a text that ought to be read by all physicians who treat people with epilepsy. It may appear dauntingly large on first acquaintance, but it is well written, full of practical advice, and gives the reader helpful details about the drugs that most of us use on a daily basis.

The first section contains chapters on the clinical and epidemiological aspects of epilepsy and the clinical pharmacology of antiepileptic drugs. The second section is on the management of epilepsy, including: newly diagnosed epilepsy, status epilepticus, epilepsy in remission, reproductive aspects of epilepsy, and the management of special groups such as learning disabled people. The third section is devoted to individual antiepileptic drugs introduced by a thoughtful assessment of the evidence upon which we have to make choices of antiepileptic therapy and practical advice on the changing of antiepileptic drugs. The final section is about epilepsy surgery with details of the necessary investigations, assessments, and surgical procedures.

If this all sounds like too much detail for the general neurologist I would beg to disagree. You may not want to read the introductory chapter on historical aspects of the treatment of epilepsy (but you will miss out on a fascinating account of drug development if you don't) or you may feel you do not need to read the chapter on mechanisms of antiepileptic drug action (though you would be wise to do so for this is one of the best chapters on the subject that you could hope to find), but the sections on the principles of medical treatment and antiepileptic drugs should be of interest to all who have patients with epilepsy.

Chapters such as that on the treatment of epilepsy in general medical conditions will be particularly useful to neurologists working in hospitals with renal and liver units. The section on the individual drugs contains all details that you need but can't remember when you are rung up and asked about those side effects and drug interactions (which you should know and can't find in the BNF). For anyone unfamiliar with epilepsy surgery this section is an excellent summary of the subject.

There are only one or two weak points: as in most multi-author texts there is some overlap, e.g. in the description of seizure models in two adjacent chapters, and I was puzzled why there was no chapter on the treatment of the idiopathic generalised epilepsies as there was in the first edition. It would be useful to have had more practical advice for special circumstances such as foreign travel and the management of patients unable to take oral medication, but these are minor quibbles. My advice would be: get a copy and keep it by your desk at work, you won't regret it.

M Jackson

Disorders of the brain and mind 2

Edited by Maria A Ron, Trevor W Robbins. Cambridge: Published by Cambridge University Press, Cambridge, 2004, £49.95, pp 467. ISBN 0-521-00456-X

This is the second book in the series ''*Disorders of brain and mind*'' edited by neuropsychiatrist Maria Ron. Her co-editor for this book is the neuroscientist and cognitive psychologist Trevor Robbins. Together they have produced a formidable compilation of articles written by leaders in their respective fields, themselves included. These describe our current understanding of the neural basis of commonly encountered psychiatric disorders including schizophrenia, mood disorder, dementia, personality disorder, and addiction. The structure of the book is a particular strength. First, the format of grouping chapters thematically is retained so that both basic and clinical scientific aspects of particular disorders are covered. Examples include a chapter on how mutations in the tau gene are central to the development of a range of dementias, a chapter that describes how advances in neuropsychological and neuroimaging research has improved early diagnosis and differential diagnosis of the dementias, and a chapter on the scientific study of consciousness coupled with one on how this applies to an understanding of avolition in schizophrenia. Second, by including more generic groupings devoted to neurodevelopment, genetics, and neuroimaging, the methodologies or concepts that are currently proving to be of fundamental importance to the advancement of knowledge in neuropsychiatry are also addressed. Thus this excellent book should provide something of interest to research workers in the clinical neurosciences as well as clinicians who wish to catch up or learn about aspects of neuropsychiatry de novo.

E Joyce