Pseudotumour after arteriovenous malformation embolisation

The association between venous outflow obstruction and the development of pseudotumour syndrome is well known, although the mechanism by which the rise in CSF pressure is brought about is less certain. Although there is much evidence that the manifestations are a result of a disturbance of CSF dynamics, previous reports have focused solely on a disturbance to absorption. We present a case in which it is proposed that alterations in CSF formation, and to a lesser extent, absorption, are responsible for the development of the syndrome.

At 2 years of age, as part of investigating a finding of hyperrefractory growth, a female child underwent cerebral CT. This showed an unexpected arteriovenous malformation involving the vein of Galen. Although there was no evidence of cardiac failure or hydrocephalus associated with this, assessment by angio-CT was advised. This, initially declined by the parents, was not undertaken until the age of 5 years when vertigo and intermittent numbness of the left arm and leg had been present for about 12 months.

Angiography showed a deep right temporal lobe arteriovenous malformation consisting of three separate fistulae supplied by the right posterior cerebral and posterior communicant arteries. These drained into a large venous varix which subsequently drained into the Galenic venous system. A cerebral blood flow study showed a steal syndrome affecting the right frontoparietal area, and a decision was made to attempt embolisation. Complete occlusion of the fistulae was achieved by transarterial platinum coil embolisation.

The patient complained of right sided headache for 24 hours after the procedure, resolving with minor analgesia. Brain CT the next day was reported as normal. A full ophthalmological review was undertaken before discharge showing normal fundi and fields.

Ten days after the embolisation the patient was re-presented with a generalised, pounding headache, present since discharge. Examination showed mild left papilloedema, with no focal ache, present since discharge. Examination presented with a generalised, pounding headache for 24 hours after the procedure, with no evidence of occlusion to major venous outflow pathways. At this time, CSF protein, via lumbar puncture, was normal, work has been done in the area of the relation between CSF formation and venous occlusion.

Although the above report is somewhat speculative, it could serve to explain the facts which at this stage of our understanding of CSF dynamics cannot be conclusively accounted for. A case of pseudotumor developing in the setting of minimal venous thrombosis, particularly in part of the venous system not thought to play a major part in the absorption of CSF, must force us to reconsider our opinions as to the relation between venous obstruction and CSF dynamics.

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False negative polymerase chain reaction on cerebrospinal fluid samples in tuberculous meningitis established by culture

The polymerase chain reaction (PCR) has been reported to be of diagnostic value when performed on CSF samples in tuberculous meningitis. Examination of CSF disclosed a lymphocytic exudate. Repeated samples were sent to a British referral laboratory where CSF PCR for Mycobacterium tuberculosis specific DNA enabled results to be available within 48 hours and can influence treatment decisions.

Recently two patients presented to our hospital with symptoms and signs suggestive of tuberculous meningitis. Examination of CSF disclosed a lymphocytic exudate. Repeated samples were sent to a British referral laboratory where CSF PCR for M tuberculosis was reported negative. Despite this, antituberculous treatment was continued for 12 months and both patients responded clinically. Several weeks after the negative PCR result, M tuberculosis was cultured on Lowenstein-Jensen slopes from CSF taken from both patients. False negative CSF PCR in tuberculous meningitis established by culture has rarely been reported. The two patients are described to emphasise the dangers of overreliance on PCR in cases of suspected tuberculous meningitis. Premature cessation of treatment would have had tragic consequences for the two patients concerned.

The first patient was a 28 year old Asian man, last in India 8 years previously. He was sent from a clinic to hospital for incision and drainage of two deep seated Staphylococcus
aaus absent. Since an inpatient he complained of headaches and nausea and developed a low grade pyrexia and meningism. Brain CT was normal. Lumbar puncture disclosed a high opening pressure (19 cm CSF), 133 white blood cells/µl, predominantly lymphocytes, and a low CSF/blood glucose ratio (1.62 g/l), and a low CSF/blood glucose ratio (1.7/6). A sample of 0.5 ml CSF was sent to a British referral laboratory and PCR for M tuberculosis was negative. Twenty four hours later, because of increasing confusion and agitation, treatment with intravenous acyclovir, antituberculous chemotherapy (600 mg rifampicin, 300 mg isoniazid, 2 g pyrazinamide, and 10 mg pyridoxine daily), and dexamethasone was commenced. He did not show any sign of improvement and was discharged home 2 weeks later on the above treatment. A repeat lumbar puncture 4 weeks later showed similar results. A CSF PCR for M tuberculosis was again negative although a fully sensitive M tuberculosis grew 12 weeks later from the first sample on Lowenstein-Jensen slopes.

The second patient was a 21 year old Kenyan woman living in the United Kingdom for 3 years. She was referred with a 3 month history of photophobia and occipital headaches. The CSF showed a high opening pressure (15 cm CSF), 133 white blood cells/µl, predominately lymphocytes, and a low CSF/blood glucose ratio (1.7/6.1). A sample of 1 ml CSF was sent for a Genus level detection of tuberculous meningitis. The assay included a genus specific PCR, for M tuberculosis. PCR was performed using two primer sets and appropriate controls. 1 The assay included primers for the target IS6110, an insertion sequence normally present in multiple copies in the M tuberculosis genome, which has been used successfully for the detection of M tuberculosis in CSF. Multiple primer sets were used as this is thought to increase the probability of detecting target DNA within a specimen.

Recent studies suggest that CSF PCR for M tuberculosis is more sensitive than culture in cases of clinically suspected tuberculous meningitis that responded to empirical treatment. 2 Although some authors have even suggested the usefulness of serial CSF PCR in assessing the efficacy of treatment. 3 False negatives and positives are rarely reported in the literature and unless these results are critically reviewed patients could, tragically, have treatment prematurely stopped or be started on prolonged antituberculous chemotherapy. False negatives occurred in two studies, in which reported CSF PCR sensitivities were 32% and 85%. 4 In one study 6.1% of CSF specimens received from patients with no evidence of tuberculous meningitis were falsely PCR positive. These results also show that sensitivity and specificity can vary when different assays and laboratories are used. Claims that PCR can detect 1–10 M tuberculosis organisms “in vitro” seems not to be the case in clinical samples such as CSF.

In the two patients presented above adequate volumes and repeated samples of CSF were assayed using suitable primers and appropriate controls at a British referral laboratory. Results for these two patients show the dangers of overreliance on PCR CSF when tuberculous meningitis is clinically suspected.

We are grateful to Dr Deborah Binzi-Gascogne of the Leeds mycobacterium laboratory, where the PCR tests were performed and who provided additional information for the manuscript.


A novel mutation of the myelin P gene segregating Charcot-Marie-Tooth disease type 1B manifesting as trigeminal nerve thickening

Charcot-Marie-Tooth disease (CMT) is the most common type of hereditary peripheral neuropathy. It is classified into two types based on pathological and electrophysiological findings: type 1 and type 2. CMT type 1 is also known as CMT1, which is mapped to the chromosome 17 (CMT1A), chromosome 1 (CMT1B), another unknown chromosome, (CMT1C) and the X chromosome (CMTX), CMT1B is a rare form of CMT1 associated with mutations of the myelin protein zero (P) gene. Mutations in the P gene have recently been identified in a number of families with CMT1B.
been recognised in Dejerine-Sottas disease, peripheral neuropathy with an early onset in childhood, and a more severe phenotype than CMT1. CMT1 and Dejerine-Sottas disease are characterised by thickening of peripheral nerves, and thickening of the cauda equina, nerve roots, and ganglia have often been found.  Although cranial nerves are generally spared in CMT, thickening of the acoustic or optic nerves has been recognised in Dejerine-Sottas disease, in which peripheral nerves and roots were not thick on physiological, and histopathological data between patients with CMT should be conducted.

We are indebted to the families studied for their cooperation and support. This work was partly supported by Uehara Memorial Foundation, the Sassa- kawa Health Science Foundation, the Primary Amyloidosis Research Committee, and the Ministry of Education, Science and Culture of Japan. 2002, 10832002, 18832993.

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Intracranial extradural follicular lymphoma mimicking a sphenoid wing meningioma

Primary lymphoma in the brain is uncommon, accounting for only 2% of primary intracranial neoplasms. Although its incidence seems to be dramatically increasing, Lepomeningeal lymphomas are even rarer but have been described; however, no leptomeningeal lymphoma of the follicular type has previously been reported. We present a case of a primary meningeal follicular lymphoma which mimicked a sphenoid wing meningioma, both radiologically and intraoperatively.

A 57 year old Ghanaian woman was referred with a 3 year history of worsening bitemporal headache, followed by a 6 month history of daily right frontal headache lasting for 2–3 hours associated with mild photophobia. There were no reports of seizures, nausea, or other visual disturbances. Her medical history was 3 years of treated hypertension, sickle cell carrier trait, and a cataract extraction. The patient was obese but physical examination was otherwise normal. Neurological examination showed no papilloedema and there were no cranial nerve or long tract signs.

Brain CT showed an enhancing mass consistent with a right sided sphenoid wing

Axial T1 weighted (TR 600/TE 15) brain MRI at 1.5 Tesla of our patient with CMT. Note the thickness of the bilateral trigeminal nerves.
Chemical profile confirmed a follicular lymphoma.

The patient made an uneventful recovery and was referred for staging investigations and consideration of postoperative therapy. An LDH estimation was within normal limits and HIV serology was negative. Whole body CT including repeat CT of the brain did not show any evidence of lymphadenopathy or lymphomatous deposit. Bone marrow examination was declined. Postoperative adjuvant whole brain or localised radiotherapy was discussed with the patient, however, she declined any further intervention. She has been closely reviewed in the follow up clinic and after 6 months there has been no clinical or radiological evidence of recurrence.

Primary intracerebral lymphomas represent about 2% of intracranial neoplasms and 2% of all lymphomas. They occur most commonly in the 6th decade of life with a female to male ratio of 2:1. The association between primary intracranial lymphoma and immunodeficiency has long been established, and it is not surprising, therefore, that the incidence has increased 10-fold over the past 3 decades with the onset of transplant surgery and, particularly, the AIDS epidemic. In postmortem studies, these neoplasms are found, on average, in 5.5% of AIDS cases, and malignant cerebral lymphoma is the most common diagnosis of a focal intracranial lesion in patients with AIDS. Maligant primary lymphoma can occur throughout the CNS and they often have a periventricular distribution. Multifocality seems to be more common in patients with AIDS. The CT scan usually shows hyperdense masses with peritumoral oedema and 92% enhancement after administration of contrast medium.

Leptomeningeal lymphoma is usually encountered as a late complication of systemic non-Hodgkin's lymphoma, although primary leptomeningeal lymphoma is occasionally seen. The prognosis for these tumours is poor. Diffuse intracerebral lymphomas have been mistaken for more common lesions: solitary primary B cell lymphoma of the cerebellopontine angle mimicking acoustic neurinoma or meninoglioma has been reported; however, this tumour was entirely extradural. Lymphomatous deposit in the dura of a 61 year old man at necropsy. Cranial mononeuropathy as the first sign of intracranial metastasis.

Determinants of the copper concentration in cerebrospinal fluid

The measurement of CSF copper concentration can serve as an indicator of brain copper concentration. However, the complex mechanisms by which copper crosses into the CSF, and the factors determining the CSF copper concentration in humans are largely obscure. Copper can pass into and out of the CSF by various mechanisms. For example, active transport through the blood-brain barrier or the blood-CSF barrier, or passive diffusion of the free or the bound fraction (bound to albumin or coeruloplasmin) through the blood-CSF barrier. We studied the factors influencing CSF copper concentration using a stepwise multiple linear regression model. The independent variables were age, plasma coeruloplasmin, CSF serum albumin ratio, total serum copper concentration, and calcularated serum free copper concentration (based on serum coeruloplasmin and total serum copper concentration). The CSF copper concentration was calculated as a dependent variable. Continuous type. We investigated lumbar CSF samples from 113 patients. These patients had dementia, extrapyramidal, or tremor symptoms; lumbar puncture was performed to exclude Wilson's disease, and none of the patients had the disease. Copper was measured by flameless atomic absorption (Perkin Elmer, HGA 500, Ueberlingen, Germany). Coeruloplasmin was determined nephelometrically (Beckman Instruments, Brea, CA, USA). The age of the patients was 50.0 (SD15.5) years; 50 were women and 65 were men. Mean serum coeruloplasmin concentrations were 394.3 (SD127.7) mg/l. Mean serum copper concentrations were 1194 (SD 335) µg/l. Mean calculated free copper concentrations in serum were 78.5 (SD 1285) µg/l. Mean CSF copper concentration was 11.16 µg/l. Mean total copper concentration was 14.16 (SD 6.0) µg/l. The mean albumin ratio (AR) was 6.63x10^-10. The mean calculated ratio of free copper concentration to total serum copper was 6.6%, the ratio of CSF copper to serum copper was 1.2%, and the ratio of free serum copper to CSF copper was 18%.
Correlation of blood-CSF barrier (albumin ratio, (AR)) with total CSF copper concentration (on logarithmic axes). R²=0.46, p=0.0001; 95% confidence bands for the true mean of the total CSF copper concentration are shown.

Stepwise linear regression model (F to enter: 4.0, F to remove: 3.996), significant positive predictive value of the total CSF copper concentration was found to be AR (p=0.0001) and serum coeuroplasmin (p=0.0057). The other independent variables mentioned above showed no statistically significant relation with CSF copper concentration. The figure shows the simple linear regression between CSF/serum albumin ratio and CSF copper concentration (on logarithmic axes; R²=0.46, p=0.0001).

The formula for the CSF copper concentration, derived from the multiple linear regression model, is: copper CSF (µg/l) = 5.32×10^4 × serum albumin ratio (x 10^-1) + 0.012×serum coeuroplasmin (mg/l). According to this analysis, CSF/serum albumin ratio and serum coeuroplasmin together determine 25.3% of the variation in CSF copper concentration (adjusted R²=0.253), implying that other (unknown) factors determine the remaining 74.7% of the variation. We have been able to demonstrate here that the CSF copper concentration is determined in a highly significant manner by disturbances in the blood-CSF barrier and by the serum coeuroplasmin concentration. It can be assumed from this that in the case of normal blood-CSF barrier function and a normal serum coeuroplasmin concentration, 28.7% of the measured CSF copper originated from the brain, the CSF by passive diffusion bound to coeuroplasmin, and only around 0.09% by passive diffusion bound to albumin. In the case of a markedly raised CSF/serum albumin ratio of 20×10^-1, this would mean that 60.6% of the measured CSF copper originated from the blood (bound to coeuroplasmin). A variable fraction of the CSF copper concentration, depending on the degree of damage to the blood-CSF barrier, therefore crosses from the blood into the CSF and can be measured there. Our formula would therefore predict, in patients with Wilson's disease with intact blood-CSF barrier (assuming a CSF/serum albumin ratio of 6.5×10^-1), that the CSF copper concentration is actually reduced by 27.4%, when the serum coeuroplasmin concentration falls from its normal value of 394 mg/l to 66 mg/l. In consequence, CSF copper in patients with Wilson's disease is evidently substantially free, implying that a larger fraction than previously assumed of the raised CSF copper in patients with untreated Wilson's disease originally entered the brain, the fraction entering the CSF by passive diffusion (bound to coeuroplasmin) tends towards zero. It can be concluded from this that, when the aim of therapy is considered in terms of the total CSF copper concentration, a region around 30% lower than the upper limit of the normal range should be aimed for. This is supported by the clinical finding that patients report feeling better when the CSF copper concentration is below this value. This analysis also shows that the raised copper concentration in the CSF can only originate from the brain. In particular, it is not associated with free serum copper, but evidently only via storage in the brain. The investigation here also shows that, after determining the CSF copper concentration, the coeuroplasmin-bound fraction originating from the plasma should be subtracted according to the formula we have given, or better, all measured copper concentrations in the CSF should be adjusted using the CSF/serum albumin ratio and serum coeuroplasmin concentration. A statistical relation with a low correlation (p=0.05) between CSF protein content and CSF copper was already shown in various neurological diseases, our study shows a much higher significance and, in addition, the effect of serum coeuroplasmin (therefore of bound serum copper). Furthermore, we have been able to determine quantitatively the fraction of CSF copper which enters the CSF across the blood-CSF barrier.

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Central nervous system involvement is exceptionally rare and has been reported as a finding in the multicentric type of myelomatosis.1,2 We describe a solitary interhemispheric myofibroma which presented as an intracranial mass in a 20 month old child. To our knowledge, only one other case of solitary intracranial myofibroma has been reported.3

A 20 month old Irish boy, the only son of healthy, unrelated parents, was admitted for investigation of a large head. He had one previous hospital admission at the age of 6 weeks for a respiratory tract infection. There was no history of muscle hypotonia was noted at that time as was his skull circumference of 43 cm. At 6 months there was no hypotonia, neurological examination was normal, and the head circumference was 49 cm. The father's head circumference was 61 cm and he stated that all of his family had “big heads**. By 20 months, the patient's head circumference measured 55.6 cm and was diverging from the 97th centile. Brain CT showed a well circumscribed, contrast enhancing mass in the midline and left frontal lobe, with surrounding oedema. There was evidence of left sided hydrocephalus due to displacement of the right foramen of Munro by tumour. The radiological differential diagnosis included a primary meningeal tumour, glioma, and leukaemic deposit. The patient underwent a left frontal craniotomy and a firm, rounded mass was removed from the left ventricle. The mass was firmly adherent to the falx, but was firmly adherent to the left pericallosal artery. A fragment (4 mm×2 mm) had to be left attached to the vessels. The child made an uneventful recovery, although he had transient paresis of the right leg, which subsequently resolved completely. Repeat CT 6 months later and at 4 years after the operation showed no evidence of recurrence or mass effect. His head circumference persisted on the 97th centile 4 years after operation. His development and clinical examination otherwise remain normal 6 years after surgery. A younger sibling is normal.

A rare case of solitary interhemispheric myofibroma with excellent outcome in a 20 month old child is described. The clinicopathological features of this unusual condition are reviewed with emphasis on the CNS manifestations.

A case of congenital fibrosarcoma was first diagnosed by William and Schrum and was subsequently renamed congenital generalised fibromatosis by Stout in 1954 as a distinct form of juvenile fibromatosis characterised by tumour-like nodules involving the skin, soft tissues, bones, and viscera. Based on the ultrastructural and immunohistochemical features of the cell of origin and the occurrence of this condition in infants, as well as congenitally, it was renamed infantile myofibromatosis by Chung and Enzinger in 1981. This disorder is considered to represent a hamartomatous myofibroblastic prolifera-
Axonal polyneuropathy and encephalopathy in a patient with verotoxin producing Escherichia coli (VTEC) infection

Escherichia coli serotype O157:H7 causes serious food poisoning worldwide, especially in children and elderly people.1 It is also called verotoxigenic Escherichia coli (VTEC), which produces a Shiga-like toxin.2–4 Gastrointestinal, haemorrhagic, and uremic effects are well known in VTEC infection, and neurological problems are likely to be more frequent than is generally recognised.5 Here we describe axonal polyneuropathy and encephalopathy in a young female patient associated with haemolytic-uraemic syndrome caused by VTEC infection.

A 26 year old woman began to have abdominal pain and haemorrhagic diarrhoea. She was admitted to an emergency hospital with proteinuria, acute renal failure, haemolytic anaemia, coagulopathy, and diarrhoea. Her urine microscopy showed haematuria, proteinuria, and red blood cells in the stool. She had haemolytic-uraemic syndrome associated with severe thrombocytopenia and increased creatinine. She was transferred to our hospital. On the 9th day she had a high fever of 39.7°C with increased C reactive protein of 7.6 mg/l and a leukocytosis of 17 800/mm³. She was in a state of anuria and her blood analysis showed severe kidney dysfunction (increased serum creatinine 6.76 mg/l). She had severe anaemia (haemoglobin 6.0 g/dl), fragmentation, and tear drop deformation of red blood cells in the blood smear and increased lactate dehydrogenase concentration of 4095 IU (normal range 250–460 IU), suggestive of haemolytic anaemia. Her platelet count was decreased to 10 000/mm³ in the peroneal nerve. There were also axonal polyneuropathy and encephalopathy in a young female patient associated with haemolytic-uraemic syndrome caused by VTEC infection.

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spreading into the hippocampus and the brainstem. The convulsions in our patient was successfully treated with 250 mg/day diphenylhydantoin, and her encephalopathy gradually improved during plasma exchange and haemodialysis.

After recovering consciousness, she began to complain of numbness of her limbs, and a burning pain which exacerbated in the night. Nerve conduction studies and the clinical features confirmed the diagnosis of sensory-dominant, axonal polyneuropathy. At this stage metabolic abnormalities were not detected and serum concentrations of vitamins B1, B6, and B12 were normal. Her numbness and weakness ameliorated after 2 weeks administration of 300 mg/day oral melixin, an agent with a membrane stabilising effect. Up to now, to our knowledge, peripheral neuropathy has not been reported in VTEC infection other than in one patient, by Hamano et al., who showed bilateral phrenic nerve palsy for 2 weeks after recovering consciousness. The above experimental evidence suggests that microcirculatory disturbances occur in the autonomic system and in the neurones cells by verotoxin could cause axonal neuropathy in VTEC infection.

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Crying spells as symptoms of a transient ischemic attack

In the absence of depression, crying spells associated with neurological disease usually result from pseudobulbar palsy or, more rarely, from crying seizures. To our knowledge, there are no prior reports of crying spells heralding or signifying a transient ischemic attack. We report on a patient with prominent cerebrovascular risk factors who had a transient episode of intractable crying and focal neurological findings.

The patient was a 55 year old right handed man who presented with acute, uncontrolled crying spells following by left sided paraesthesia. Around 6.00 am he woke with a severe pressure headache and suddenly started crying for no apparent reason. There was no accompanying feeling of sadness. This crying, which involuntarily lacrimation and “sobbing” abruptly ceased after 5 minutes. Within 30 minutes of his initial crying spell, his headache had resolved but he became aware of numbness over his left face and numbness and pain in his left neck and arm. The numbness was not progressive, and the patient did not complain of paraesthesias in his trunk or left leg. He had photophobia, nausea or vomiting, blurred vision, visual obscurations, difficulty swallowing, dysarthria, or focal weakness. Over the next 2 to 3 hours, he had five more crying spells, each lasting 5 to 10 minutes, occurring out of context, without precipitating factors or sadness, with an acute onset and offset, and without alteration of consciousness. The patient’s left face and arm numbness persisted during and between the crying spells but abruptly resolved shortly after his last crying spell. This patient had hypertension, diabetes mel-litus, coronary artery disease, an old myocardial infarction, raised cholesterol concentrations, and a history of heavy smoking.

On examination between recurrent crying spells, his blood pressure was 143/92 with a regular pulse of 62, and there were no carotid bruits. His mental status was normal. Cranial nerve examination disclosed mild flattening of the left nasolabial fold and decreased pinprick sensation over his left face with an occasional mild facial twitching. Cranial nerves IX-XII were intact, and gag reflex and palate elevation were normal. The patient did not have dysarthria or a brisk jaw jerk. The rest of the neurological examination showed mild weakness in his left upper arm, and decreased pinprick and temperature sensation over the left half of his body. Reflexes were +2 and symmetric with downgoing toes.

The patient lacked prior depression, new depressive symptoms, or prior crying spells as an adult except for a single episode during dental anaesthesia. At the time of his admission, he had not had any recent adverse events in his life, and was totally surprised by his reaction.

The patient’s crying spells, paraesthesias, and neurological findings entirely resolved within about 3 hours. Routine laboratory tests, ECG, and CT were normal. Two days after admission, MRI disclosed a mild degree of white matter capping over the right frontal horn, and an EEG showed frontal intermit-tent rhythmic delta activity but no epileptiform changes. Carotid Doppler studies showed atherofoetic changes without haemodynamically relevant obstruction. He was discharged on antplatelet therapy with aspirin.

These results suggest that crying spells can be a manifestation of a transient ischemic attack. He presented with paroxysmal crying spells followed by a left sided hypesthesia and a mild left sided weakness, all of which resolved. His crying was non-emotional, inappropriate to the context, and did not correspond to his underlying mood. Moreover, the patient had multiple vascular risk factors supportive of a cerebrovascular aetiology for his episode.

The most common cause of pathological crying is pseudobulbar palsy, a complication of strokes and other diffuse or bihemispheric brain damage. Pseudobulbar palsy results from bilateral interruption of upper motor neuron innervation of bulbar motor nuclei and brainstem centres. In addition to crying, pseudobulbar palsy may include dysarthria, dysphagia, bifacial weakness, increased facial and mandibular reflexes, and weak tongue movements. There were no signs or symp-toms of pseudobulbar palsy at this patient in any of the crying spells.
Continuous drop type of orthostatic hypotension during 25 minute tilt up in a patient with MSA. SBP=systolic blood pressure; HR=heart rate; CO=cardiac output; SVR=systemic vascular resistance; NA=plasma noradrenaline concentration.

Maximum 74 mm Hg), taking more than 10 minutes to reach the minimum (continuous drop type) (figure). The other five patients could not remain standing for more than 5 minutes because of symptoms of orthostatic hypotension. No patient showed the sudden drop in blood pressure and heart rate seen in vasovagal syncope. In the continuous drop type, there were no decreases between 5 and 20 minutes in heart rate (+2.3 bpm) and the noradrenaline (norepinephrine) level (+0.05 ng/ml) during the decrease in blood pressure. A slight increase in packed cell volume during the decrease in blood pressure. Cardiac output proportionally decreased but systemic vascular resistance did not change (figure).

Our results suggest that in many patients with MSA the blood pressure drops continuously on standing. The continuous blood pressure drop is caused by continuous reduction of cardiac output. A part of the mechanism for continuous reduction of cardiac output should be lack of reflex tachycardia and no significant release of noradrenaline. No significant release of noradrenaline which are caused by interruption of the baroreflex arc, as is known in MSA.

Most patients with continuous drop type of orthostatic hypotension reported reduced endurance for more than 10 minutes of exercise (easy fatigability). Two experienced syncope more than 20 minutes after standing.

We used a Swan-Ganz catheter to investigate the haemodynamics in three patients with orthostatic hypotension of the continuous drop type. To prevent the concentration of plasma, saline of calculated volume was infused during tilting. During the continuous decrease in blood pressure, cardiac output proportionally decreased but systemic vascular resistance did not change (figure).

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CORRESPONDENCE

Respiratory aspects of neurological disease

An account of respiratory aspects of neurological disease, such as the highly informative one presented,1 would be incomplete without mention of breathlessness resulting from neurogenic pulmonary oedema, characterised by an “increase in extravascular lung water in patients who have sustained a change in neurological condition”. Neurological disorders associated with this syndrome include subarachnoid haemorrhage, middle cerebral artery stroke, and cerebellar haemorrhage.2 Brain stem stroke, acute hydrocephalus due to colloid cyst of the third ventricle, closed head injury, and status epilepticus, were also documented as risk factors in a literature review by Smith and Mathay,3 who proposed, on the basis of their own study, that increased pulmonary vascular hydrostatic pressure might be a more significant aetiological mechanism than increased pulmonary capillary permeability.4 A more direct link between neurogenic myocardial damage and pulmonary oedema can be postulated when subarachnoid haemorrhage is complicated by reversible severe left ventricular dysfunction, as documented in two cases reported by Wells et al.5


Idiopathic cerebellar ataxia associated with celiac disease: lack of distinctive neurological features

Although applauding the contribution of Pellecchia et al., we note a more widespread recognition of the association between gluten sensitivity and ataxia: we disagree that ataxia associated with gluten sensitivity lacks “distinctive neurological features”. Both their data and our own indicate that this group of patients can be distinguished by the late (non-childhood) onset of gait ataxia with relatively mild upper limb signs, analogous to Harding's group. Again, coexistent neuropathy is common in these patients, found in two out of three of the patients of Pellecchia et al and 21 of our 28. We agree that gastrointestinal symptoms are rare: rather than entitling their paper “lack of distinctive gastroenterological features”, perhaps “lack of distinctive gastroenterological features” might have been more appropriate.

We were surprised at the high specificity and sensitivity of increased antigliadin antibody titres in their hands. Although we found both IgA and IgG antigliadin antibodies to be invaluable screening tools in patients with ataxia, only 11 of our 28 patients with idiopathic cerebellar ataxia had history of overt coeliac disease on duodenal biopsy, the remainder having normal or non-specific inflammatory changes but with an HLA genotype in keeping with gluten sensitivity. It is in discussing to note that despite the often quoted high sensitivity for coeliac disease of increased antiendomysium antibody titres, such was found in only one of three patients of Pellecchia et al with coeliac disease. This concurs with our impression of very modest sensitivity of antiendomysium antibodies in gluten ataxia.

Gluten sensitivity is common in patients with ataxia, and can be identified by increased antigliadin antibody titres in the presence of appropriate histocompatibility antigens. Although the clinical features of gluten ataxia are not entirely specific, they are distinctive.

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Pellecchia et al reply:

We thank Hadjivassiliou et al for their interesting comments on our paper. They suggest that patients with gluten ataxia can be distinguished by the late onset of gait ataxia and the relatively mild upper limb signs. Our results support the finding of a late onset in these patients, but this feature cannot be considered a distinctive one. In fact, in our population 11 out of 24 patients with idiopathic cerebellar ataxia had a late onset, but only three of them were affected by celiac disease. Furthermore, we do not think that celiac patients may be distinguished by mild upper limb signs and coexistent neuropathy. In our study 20 out of 24 patients with idiopathic cerebellar ataxia, including the three patients with celiac disease, had ataxic gait as the presenting and prominent clinical feature. Similarly, nerve conduction studies, performed in 17 out of 24 patients, showed a peripheral neuropathy in nine, including two out of the three patients with celiac disease.

We understand that some discrepancies arise comparing our study with that of Hadjivassiliou et al. Firstly, only six out of their 28 patients had evidence of cerebellar atrophy on MRI, whereas all of our patients had cerebellar atrophy. Secondly, many of their patients had a peripheral neuropathy in the absence of cerebellar atrophy. This finding could explain the relatively mild upper limb signs. Although two of our three celiac patients had a clinically silent peripheral neuropathy, we think that their ataxia was explained by cerebellar atrophy. Thirdly, we found a high prevalence (12.5%) of celiac disease on duodenal biopsy among patients with idiopathic cerebellar ataxia, whereas none of the six patients with cerebellar atrophy described by Hadjivassiliou et al showed histological features of celiac disease. It would be interesting to know the prevalence of gluten ataxia among all ataxic patients screened for antigliadin by Hadjivassiliou et al.

Our series is too small to estimate the sensitivity of both antigliadin and antiendomysium antibodies in gluten ataxia; unfortunately Hadjivassiliou et al did not report any data on antiendomysium antibody screening in their patients. On the other hand, we were surprised at the high prevalence of antigliadin antibody positivity (12%) in the normal population studied by Hadjivassiliou et al in a previous report. This is by contrast with the 2% of antigliadin antibody positivity found in a large population by Catassi et al. Further studies are required to better characterise the syndrome of cerebellar ataxia associated with celiac disease or gluten sensitivity.

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Proacainamide for faecal incontinence in myotonic dystrophy

We read with interest the article by Abercrombie et al which describes the pathophysiology and surgical management of faecal incontinence in two siblings with severe myotonic dystrophy.

In the authors' experience, long term results of both medical and surgical management of the faecal incontinence of their patients is disappointing. The authors propose that faecal incontinence in myotonic dystrophy is difficult to relieve by any currently available treatment other than colostomy. It should be noted, however, that the medical treatment used is not specified in the text.

Our experience with medical treatment using procainamide in a patient with severe myotonic dystrophy and faecal incontinence is less disappointing. The patient—a 19 year old man—had had his illness diagnosed 4 years earlier on clinical grounds and electrophysiological and genetic tests. Early symptoms of sphincteric impairment developed soon after, including mild stress urinary incontinence and minor episodes of poor control of stool.

A complete diagnostic investigation, including physical examination, defecography, and electrophysiological tests of pelvic floor muscle, was performed. At physical examination, digital ano-rectal evaluation showed low squeeze pressures. A reduced rectal diameter (4.5 cm), anal gaping, and biochemical loss at rest were found. Electrophysiological motor evoked potentials elicited by cortical and lumbar magnetic stimulation and recorded from the external anal sphincter showed a normal latency and decreased amplitude. Somatosensory evoked potentials after anal stimulation and sacral reflex latency were normal. EMG recording of the external anal sphincter showed, as in the first patient of Abercrombie et al, a decreased number of motor units and multiple myotonic discharges. Few motor unit potentials presented polyphasic waveforms and decreased duration and amplitude.

A regular treatment with procainamide (300 mg twice a day) lead to a dramatic improvement of both systemic myotonia and faecal incontinence. A 13 month follow up assessment has shown a stable clinical improvement. Repeated electrophysiological investigation showed disappearance of myotonic discharges at the external anal sphincter, whereas defecography disclosed an improved rectal compliance (5.2 cm in diameter) at capacity and no more than a barium leak on straining.

The pathophysiology of motor disorders of the gastrointestinal tract in myotonic dystrophy is still debated and controversial. Histological study of the external anal sphincter and
the EMG pattern in patients with myotonic dystrophy show a multitude of defects including expression of myotonia, myopathy, muscular atrophy, and neural abnormalities. 1, 2

The possible management of myotonia and some of its clinical manifestations, such as dystonia, 3 by antmyotonic drugs (disopyramide and procainamide), justifies the use of the same pharmacological approach in anal sphincter dysfunction manifested in a few cases of myotonic dystrophy.

We conclude that treatment of faecal incontinence with procainamide should always be attempted before any surgical option in patients with myotonic dystrophy.

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Flail arm syndrome or Vulpian-Bernhardt’s form of amyotrophic lateral sclerosis

We read with interest the article by Hu et al concerning flail arm syndrome, a distinctive variant of amyotrophic lateral sclerosis. The authors presented a subgroup of patients affected by amyotrophic lateral sclerosis that presented with signs of lower motor neuron disease in the upper limbs without significant functional involvement of other regions upon clinical presentation. This subgroup of patients is clinically characterised by the display of progressive atrophy and weakness in the arms with little effect on the bulbar muscles or legs. Atrophy and loss of strength affect the upper limb muscles in a more or less symmetric manner, prevalent in the proximal muscles. The comparative study with the rest of the amyotrophic lateral sclerosis group supplies very interesting details for the physician, such as a clear predominance among men, and a longer median survival. They conclude by suggesting that this syndrome could be a new variant of amyotrophic lateral sclerosis.

Finally, the authors carry out a historical review and refer to the fact that this distinctive amyotrophic lateral sclerosis variant was probably first described by Gowers in 1888, furnished with exquisite graphic illustrations.

To this effect, we draw attention to prior descriptions of the same syndrome, reported by Vulpian 4 in 1886, known in Franco-German literature as Vulpian-Bernhardt’s form. In his book Maladies du Système Nerveux Vulpian described a patient who showed signs of weakness and symmetric proximal atrophy of neurogenic origin, and called it chronic anterior polyneuromy. The patient showed symptoms of proximal amyotrophy, and signs of derervation and upper motor neuron involvement. Since then, in those countries and other countries under their influence, 1, 2 we have come to use the eponym of Vulpian-Bernhardt’s syndrome to describe those forms of amyotrophic lateral sclerosis with more or less symmetric involvement of the proximal muscles of the upper limbs at the clinical onset. A certain enigma exists surrounding the characteristic distribution of weakness and muscle atrophy. The reason for the preva-

ence in the proximal muscles of the upper limbs is unknown. We can furnish little more information in this respect. However, in the 1960s, in the differential diagnosis of this syndrome, it was observed that the muscles predominantly affected in Vulpian-Bernhardt’s form were the deltoideus, the infraespinaus, the supraespinaus, the sternocleidomastoideus, and the teres minor. The predominant motoneuronal involvement in these muscles permitted its distinction from that previously called Erb’s dystrophy. 3

As a consequence of the atrophy of these muscles, the upper limbs adopt a caracteristic position, with the shoulders slumped, and the arms, forearms, and hands in pronation. As the illness progresses, the hand muscles are affected, with atrophy of the following muscles: opponens pollicis, flexor brevis, abductor pollicis brevis, adductor pollicis, interossei, and lumbricales, which leads to the formation of the characteristic Aran-Duchenne hand.

Obviously, signs of corticospinal involvement with hyperreflexia in the lower limbs and Babinski’s sign both appear. In the initial stages of the illness, there is no effect on the diaphragm. The presence of signs of involvement of the upper motor neuron, its different clinical evolution, and the data supplied by genetic molecular investigation allow us to distinguish the syndrome previously known as Vulpian-Bernhardt’s to be rebaptised as flail arm syndrome from other upper motor neuron syndromes such as those of the spinal muscular atrophies, Kennedy’s disease, multifocal motor neuropathy, and monomelic amyotrophy.

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Pain after whiplash

This latest study from Lithuania 4 is an answer to many questions—namely, that the previous difficulties that these researchers had with identifying the late whiplash syndrome in Lithuania is that they were not looking “in the right place”. As it turns out, the problem is that Lithuanian simply are not behaving the way many in western coun-

tries, underlies whiplash associated disorders like. There are some methodological issues which can be considered, as below, but the lesson of discarding “unsingly” data because it is too disturbing to one’s personal view and valued interest in the whiplash domain has already been taught elsewhere. 5 Suffice it to say that the truth has been laid bare and we (those of us struggling with epidemic proportions of the late whiplash syndrome in our own countries) now need to enlighten ourselves and put this data to practical use in helping whiplash patients rather than resisting the inevitable.

After completion of the first historical cohort study, this more recent study selects an entirely separate, distinct sample of these “misbehaving” Lithuanians, but in a more intriguing fashion. This is the first true inception cohort study where people who have not been preselected by their attendance at emergency departments, or contaminated by therapists or lawyers, can be studied to appreciate the natural evolution of the injury which, underlies whiplash associated disorders grades 1 and 2. This is the study’s greatest strength. The study has, however, its limitations.

The first consideration is that there were 98 accident victims who reported acute symptoms, and thus were at risk for the late whiplash syndrome. How does this compare with other studies documenting the natural evolution of the late whiplash syndrome? The Swiss study may be useful for compari-

sion because it too has only 117 subjects, yet is much quoted. Setting aside for the moment that the Swiss study is hampered by the selection acrotie of advertising for subjects, and has a host of other reportedly fatal faults, and giving some benefit of the doubt, the study is said to be an accurate representation of the state of affairs in Swit-
zerland at that time, in Lithuanian, not even 60% manage to recover fully by 3 months and many of these were reporting total disability during that time, whereas the Lithuanians fully recover in 4 weeks or less, with little or no therapy, and no disability. Studies in other western countries disclose an even greater contrast, with 50%–70% of patients reporting pain even after 3–6 months, despite the fact that all these studies are examining the same grades (1 and 2) of whiplash associated disorders. 6, 7 Thus, while the sample size is small in this Lithuanian study, it is comparable with others reporting the prognosis of whiplash, and yet gives a different picture of outcome.
A second consideration is that perhaps these Lithuanians are in very minor collisions. True, some of their vehicles were completely wrecked, but perhaps the vehicles were not very good quality and so were easily damaged. Perhaps that is why this cohort had such a good outcome and only minor injuries. This is an unhelpful consideration however, as studies in Canada have shown that those with absolutely no vehicle damage, in very low velocity collisions, are just as likely to report chronic pain as those in more severe collisions. Lithuanians seem to behave appropriately then for minor collisions (if that is what they indeed had), but Canadians seem unable to behave appropriately. Again, another culture's experience of late whiplash syndrome in Lithuania is not the only place where we otherwise encounter.

Thirdly, there are sex differences and even differences in seat belt usage between this population and some others, but even then, it does not seem to matter what sex age, and use of seat belts there is in other western countries, none of these preclude chronic pain. In Lithuania, those who were female, and who did not wear seat belts, still insisted on behaving as the rest of the cohort.

Finally, perhaps the Lithuanians simply refuse to report their chronic pain, and chronic pain cannot be studied in other cultures in this way. The Lithuanians have no reluctance to report acute pain, but perhaps for some reason wish to “suffer in silence” in spite of chronic pain and disability. This would be a potential flaw if it was not simultaneously shown in this study that the general Lithuanian population reports the same prevalence, frequency, and character of neck pain and headache as does the general population in western countries. If there were strong denial barriers to identifying symptoms, the control population would have grossly underreported their symptoms. Indeed, chronic pain can and is reported by studies in many different cultures and languages, including Japanese, French, Italian, and others. If researchers in these non-English speaking populations can use simple questionnaires to document the late whiplash syndrome so effectively there, then the same should be possible in Lithuania.

And so, despite the potential limitations of this study as outlined, there is no way to get around the stark realisation that the natural history of acute whiplash injury in Lithuania is a benign syndrome with 4 weeks or less of pain. Equally compelling is the fact that Lithuania is not the only place where researchers are having difficulty identifying epidemics of chronic pain. Recovery from acute whiplash injury without neurological injury or fracture routinely occurs within 4–6 weeks in Germany and Greece. The time has now come for a reconciliation of these epidemiological observations with our own experience of late whiplash syndrome in western countries. The truth has been laid bare and it is our responsibility to utilise this truth to help prevent the chronic pain and the suffering we otherwise encounter."

R FERRARI

The standard of illustrations is excellent and the style generally very readable. I shall certainly find it extremely useful as a work of reference and for teaching purposes. The editor is to be complimented on producing such a delightful work.

JOHN HODGES


I very much enjoyed reviewing this textbook of instrumented spinal surgery written by Giuseppe Tabasso under the auspices of Jürgen Harms. Dr Harms is well known to all spinal surgeons and has made a very important contribution to the development of spinal surgery over the past 20 years, based on strong personal convictions. Many surgeons who manage spinal disorders would not choose to implement all of Professor Harms’ solutions but all who have a serious interest in the surgical treatment of the spine admire and are grateful for his contribution. Within this book spinal surgeons will find a rational and practical approach which will allow them to treat a wide range of spinal disorders according to well thought out principles.

The opening chapter describes spinal biomechanics under normal and pathological circumstances mainly by using easily understood drawings and diagrams. Some of these drawings reminded me of images that I have recently seen on an interactive CD ROM that I bought for my 4 year old son. This is not a criticism and I fully support any attempt to simplify the science of biomechanics which is often cloaked in seemingly contradictory jargon. Most spinal surgeons will be able to assimilate the two basic principles which underpin much of instrumented spinal surgery—namely, that the anterior column resists load compression forces and that the posterior column acts as a tension band which when disrupted should be reconstructed in compression. The remaining chapters cover fracture management, late kyphosis, metastatic tumours, spondylolisthesis, degenerative spinal disease, and infection. Each chapter sets out the principles of management which are illustrated schematically. There then follow case studies illustrated by radiological images including CT and MRI. These have reproduced well and surgeons will admire the technical precision and excellent anatomical reductions illustrated by these clinical cases. It is, however, a source of constant annoyance to spinal surgeons that perfect postoperative films do not always correlate with good clinical results and this discrepancy remains a source of fascination and mystery.

It is in the degenerative spine that this discrepancy between radiological and clinical findings is most apparent and it is partly for this reason that the management of these conditions is often controversial. It is difficult to disagree with much of the logic presented by the authors in planning their interventions but there is a danger that inexperienced surgeons may be misled into adopting complex solutions when often more simple operations will suffice. The authors’ description of their approach to failed back surgery syndrome illustrates this problem and the inadequacies of attempting to treat a complex clinical problem by focusing on one aspect of it.

This book will be a useful addition to the shelves of spinal surgery textbooks and many orthopaedic and neurosurgical departmental libraries will wish to buy a copy.

RODNEY LAING


I wondered, when I received this book, how I could possibly say anything adverse about a book written by three such world renowned experts. I have heard them all lecture often and have seen them all at work. They have a vast knowledge and experience of treating disorders of peripheral nerves. In clinic and the operating theatre, they have shown myself and many trainees a clarity in their planning of management of complex problems that humbles one’s own thoughts. That clarity has continued in this textbook of over 500 pages. The field of peripheral nerve surgery is covered comprehensively, commencing with descriptions of anatomy, physiology, and pathological reaction to injury. This is followed in subsequent chapters with descriptions of approaches to virtually all the main peripheral nerves, and the operative management of brachial plexus injury and outcomes is covered in three detailed chapters. These are followed by chapters on nerve entrapment, neuropathy, iatropathic injury, and neoplasm within the peripheral nerve. The final section covers electrodiagnosis, pain, nerve recovery, reconstruction techniques, and rehabilitation.

The text is well written, easy to read, and supplemented by some excellent line drawings similar to those used in Lundborg’s text. There are detailed plates showing histology and various imaging techniques. Each chapter is comprehensive, containing important historical aspects as well as up to date techniques, and there is an extensive reference section. I would recommend that trainees of all specialties dealing with peripheral nerve injuries should read much of this text and it would be extremely useful as a regular reference. It would also make an important and necessary addition to most medical libraries. All clinicians would be well advised to read the chapters on iatropathic injuries, not only for the extensive causes of such injuries encompassing all medical and surgical departments, but also for the précis of the changes occurring in medical negligence claims. This text represents good value for money.

IAN WHITWORTH