LETTERS TO THE EDITOR

Acute cauda equina syndrome caused by thrombosis of the inferior vena cava

Deep venous thrombosis of the lower limbs is the most common vascular disorder in hospital. Although the clinical features are not specific, the most important symptoms are oedema, local tenderness, and pain. Well known complications of deep venous thrombosis are pulmonary embolism and chronic venous insufficiency. Neurological complications are uncommon after deep venous thrombosis.

We report on a patient who presented with an acute cauda equina syndrome, which turned out to be caused by thrombosis of the inferior vena cava.

A 58 year old previously healthy white man presented at the emergency department of our hospital with acute severe low back pain irradiating to both legs. The pain in the legs was severe and was located from the lower half of the upper legs down to the feet. He also had noted decreased strength as well as sensory disturbances of both legs. Spontaneous micturition was not possible.

On physical examination, blood pressure was 110 over 75 mm Hg. Heart, lungs, and abdomen were normal. Peripheral arterial pulsations were present. Both legs were slightly swollen and coloured red to purple and livido reticularis was present. On catheterisation of the bladder, there was no urine retention.

Neurological examination showed weakness of both legs with proximal strength Medical Research Council (MRC) grade 2–3 and distal MRC grade 1–2. There was bilateral sensory loss in the dermatomes L1 to S1. Tendon reflexes of the legs were absent. Plantar responses were both indifferent. The patient was diagnosed as having an acute cauda equina syndrome with possibly deep venous thrombosis of both legs, and an immediate MRI of the thoracic and lumbar spine was performed. This MRI disclosed a strongly dilated anterior epidural venous plexus with compression of the cauda equina and nerve roots in the foramina (fig 1A–C). Signal intensity of the thoracic spinal cord was normal. Ultrasound examination of the lower abdomen and legs showed thrombosis of the inferior caval vein. Abdominal CT confirmed the presence of thrombosis of the inferior caval vein (just below the insertion of the renal veins) extending into the iliac veins. No other abnormalities that could have caused the inferior vena cava thrombosis were seen on CT. Renal and liver investigations (including coagulability testing) were unremarkable, except for slight increase in erythrocyte sedimentation rate.

The patient was diagnosed as having an acute cauda equina syndrome due to dilated anterior epidural veins secondary to thrombosis of the inferior vena cava. He was treated with intravenous heparin and acenocoumarol to prevent spread of thrombosis. In the next few days, the neurological disturbances gradually diminished. Despite exhaustive testing, no cause of the thrombosis was found.

We report on a patient with an acute cauda equina syndrome due to thrombosis of the inferior vena cava. An acute cauda equina syndrome is usually caused by a prolapsed intervertebral disc and less often by a tumour, trauma, or epidural bleeding.

Well known complications of deep venous thrombosis are pulmonary embolism and chronic venous insufficiency. To our knowledge, an acute cauda equina syndrome secondary to thrombosis of the inferior vena cava has not been reported previously.

The mechanism by which the neurological symptoms and signs were produced is probably twofold. Firstly, there is compression of cauda equina nerve roots in the spinal canal and foramen by the dilated anterior internal vertebral veins. Secondly, the symptoms and signs may be due to ischaemia of the cauda equina caused by stasis of the blood flow in the radicular veins. The mentioned anterior internal vertebral veins and radicular veins are part of the spinal venous plexus. This valveless plexus is connected by the intervertebral veins to the ascending lumbar veins which drain to the inferior caval vein (fig 2). The ascending lumbar veins, however, also communicate with the azygos system and the occipital and basilar sinuses. After occlusion of the inferior vena cava, this vertebral-lumbar collateral pathway can function as an alternative route for venous blood from the lower limbs. Due to this bypass effect running parallel to the inferior caval vein, the anterior epidural veins are dilated by increased blood flow. In our case, the dilated veins have probably compressed the cauda equina and certainly compressed spinal roots in the intervertebral foramina, as can be seen on the MRI.

Vascular spinal neurological complications are also known in spinal arteriovenous malformations (AVMs) and spinal angiomas. More than half of the patients with AVMs have bladder dysfunction, paresis, and sensory change caused by the ischaemic effect of venous hypertension. In patients with spinal AVMs, an apoplectiform onset of clinical presentation, as presented in our patient, is described in 30%–50% due to thrombosis or haemorrhage. Neurological signs are also known as a related phenomena to spinal angiomas. Although ischaemia of the cord in these angiomas is mostly caused by stealing blood through a significant arteriovenous shunt, spinal compression by very large draining veins is also important in some patients. Besides cauda equina compression, dilated veins secondary to thrombosis of the inferior vena cava can also lead to destruction of pedicles of lumbar vertebral bodies and partial obstruction of the ureter. In conclusion, an acute cauda equina syndrome may be rarely caused by a dilated venous spinal plexus secondary to thrombosis of the
Persisting rhinorrhoea and headache as the initial symptom of bilateral carotid artery dissection

Carotid artery dissection is a frequent non-atherosclerotic cause of stroke in young adults. In up to 20% of cases it is bilateral or associated with vertebral artery dissection. Common clinical features include unilateral pain on the side of the dissection, signs of cerebral ischaemia, ear bruits, and Horner’s syndrome, which is usually incomplete and sometimes transient. Horner’s syndrome is thought to result from a lesion of the periarterial sympathetic plexus caused by the dissection. Rhinorrhoea and nasal congestion have not yet been reported as symptoms of spontaneous carotid artery dissection but have been seen in patients undergoing cranial base surgery. We here describe a patient with spontaneous bilateral carotid artery dissection in whom rhinorrhoea, nasal congestion, and headache were the first symptoms, which preceded the development of incomplete Horner’s syndrome for several weeks.

A previously healthy 33 year old man was referred for evaluation of headache. He admitted to having had rhinorrhoea and nasal stuffiness for 7 weeks. Treatment with antibiotics and corticosteroids before admission had been unsuccessful. An infectious or allergic cause could not be determined. Four weeks later he developed severe periodical retro-orbital headache lasting for hours, and pulsatile tinnitus on the right side. Two weeks before admission he noted severe stabbing retro-orbital pain on the left side irradiating to the neck. This did not respond to aspirin. Pain attacks and vomiting occurred regularly during the afternoon, progressing during the night without fluctuations. Intake of alcohol and nicotine triggered the attacks. He had no history of cluster headache or migraine.

On examination he showed rhinorrhoea, increased lacrimation of the left eye without redness, left eyelid swelling, incomplete Horner’s syndrome on the left side, and ear bruits on the right side that were not detected by auscultation of the skull. There were no other focal neurological deficits, in particular no anhidrosis. Routine laboratory blood tests, screening for cardiovascular diseases, and Doppler sonography were all normal. Cranial magnetic resonance angiography and cerebral digital subtraction angiography showed bilateral dissection of the internal carotid artery with dissecting aneurysms on both sides (figure A-D). Anticoagulation with heparin and then dicumarol was initiated and the patient’s symptoms gradually improved. On follow up examination 6 months and 14 months later, he showed marginal ptosis and a slightly smaller pupil (2 mm) in the dark on the left side, but no headaches, rhinorrhoea, or tinnitus. Cerebro magnetic resonance angiography of the left internal carotid artery was now normal but the dissecting aneurysm of the right internal carotid artery was unchanged. Therefore anticoagulation was continued.

We suggest that in our patient bilateral carotid artery dissection led to a lesion and dysfunction of the sympathetic pericarotid plexus leading to a parasympathomimetic state with nasal hypersecretion and congestion of nasal vessels. This condition was reversible after recanalisation of the left internal carotid artery. Nasal stuffiness or rhinorrhoea may be rarely reported by patients because this phenomenon may be associated only with sympathetic pericarotid lesions after infrequent bilateral internal carotid artery dissections whereas unilateral dissections may cause only a mild and clinically often inapparent irritation.

Cusimano and Sekhar described a syndrome they termed “ pseudocerebrospinal fluid rhinorrhoea” with ipsilateral nasal hypersecretion and nasal stuffiness after surgery of the cranial base. In these patients, the pericarotid sympathetic plexus, the petrous or cavernous carotid artery parts, and the greater petrosal nerve had been removed or dissected. Experimental selective parasympathetic nerve activation in the nasal mucosa of the cat leads to an increase in nasal secretion and vascular congestion. Lung found nasal congestion to be related to a withdrawal of sympathetic discharge rather than to an over-activity of the parasympathetic nerves. Thus the nasal hyperscretion and stuffiness in our patient is in agreement with the assumption of a lesion of pericarotid sympathetic nerve fibres after carotid artery dissection. In the differential diagnosis, cluster headache and paroxysmal hemicrania have to be considered. Our patient’s symptoms differed from typical cluster headache and paroxysmal hemicrania in that headache followed the beginning of autonomous symptoms after...
several days and pain was progressing over hours during bouts without fluctuations. We conclude that structural lesions of sympathetic nerve fibres should be considered when (1) the headache profile is not typical for cluster headache and paroxysmal hemicrania, and (2) autonomous symptoms precede and outlast headache.

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White muscle disease in humans: myopathy caused by selenium deficiency in anorexia nervosa under long term total parenteral nutrition

Selenium is an essential trace element that is known to be a component of glutathione peroxidase, a scavenger of hydroperoxides. Its deficiency causes a decrease in glutathione peroxidase function, thereby resulting in oxidative damage to many organs. The two major clinical signs in patients with selenium deficiency are skeletal myopathy and cardiomyopathy. White muscle disease, named because of its characteristic acolouration of the muscle is a myopathy caused by selenium deficiency in animals in the areas where the soil is low in selenium. In humans, it was demonstrated that Keshan disease, dilated cardiomyopathy in the Keshan area in China, was caused by selenium deficiency. In addition, there are reports that selenium deficiency occurs in patients who are nourished by total parenteral nutrition alone for a long time because of inflammatory bowel disease or resection of the intestine due to various intestinal diseases. We experienced a case of anorexia nervosa with skeletal myopathy caused by selenium deficiency under long term parenteral nutrition. A 28 year old woman was admitted to our hospital with a 7 year history of anorexia nervosa receiving parenteral nutrition intermittently. At admission, she complained of general fatigue, but had no muscle weakness or myalgia. On physical examination, she was markedly emaciated (weight 22 kg, height 158 cm). Her skin was dry and her nail beds appeared pale. Because her voluntary food intake was not sufficient to maintain an adequate weight, we started parenteral nutrition. A month after initiation of parenteral nutrition, her body weight had increased from 22 kg to 27 kg and her presenting complaint of general fatigue had disappeared. Instead, she had begun to complain of proximal muscle pain and weakness in all four limbs, and soon after, she had difficulty in walking or standing up.

Laboratory studies showed a rapid rise in creatine kinase to 5638 (normal 35–169) U/l. Other myogenic enzymes such as myoglobin and aldolase were also raised. Serum electrolites were all within the normal range. Serum thyroxin and thyroid stimulating hormone concentrations were normal, but serum tri-iodothyronine was slightly decreased because of impaired conversion of thyroxin caused by malnutrition. Serum selenium concentration markedly decreased to 13 (normal 107–171) µg/l, and glutathione peroxidase also decreased to 145 (normal 280–450) IU/l. Serum vitamin E decreased to 0.35 (normal 0.75–1.41) mg/dl despite being added to the parenteral nutrition. Because serum vitamin E concentration often parallels the serum selenium concentration, these antioxidants will compensate for each other. The forearm ischaemic exercise test showed a normal response. Chest radiography showed neither congestive changes nor enlargement of the heart. On an echocardiogram, the wall motion of the left cardiac ventricle was normal. Electromyography of proximal limb muscles showed myopathic patterns. Motor

Microscopic (A,B) and electron microscopic (C,D) findings of muscle biopsy from the left biceps of this patient. (A) Haematoxylin and eosin staining. There were many atrophic changes and intranuclear vacuoles. bar=10 µm. (B) Routine ATPase reaction. Predominance of the type II fibre as well as many vacuoles in the fibres. bar=10 µm. (C) Subperinuclear and intermyofibrillar clasts composed of amorphous matrix material were found in muscle fibres. Myofibrils showed thinning and interruption. bar=4 µm. (D) There were intermyofibrillar clasts, containing numerous small granules and enlarged mitochondria with normal cristae. bar=1 µm.
Correspondence to: Dr Hiroyuki Ishihara

Selenium is relatively abundant in meat, fish, and cereals, but there is very little in total parenteral nutrition or liquid formula diets. A fish, and cereals, but there is very little in total parenteral nutrition or liquid formula diets. A fish, and cereals, but there is very little in total parenteral nutrition or liquid formula diets.

The serum selenium and glutathione peroxidase levels were normal. The living environment, the parents, did not have easy peer relationships, and peculiar dysmorphisms were present. We also had the opportunity to study a girl affected by elective mutism in whom karyotype analysis showed an identical deletion of the chromosome 18. Speech delay, facial dysmorphisms such as flattened nasal bridge, broad philtrum, and micrognathia were the main clinical findings. Aneuploidy indices were found in a subgroup of patients only. It may be indicative of a distinct clinical entity.

Elective mutism is most probably a heterogeneous syndrome and several aetiological factors such as minimal brain dysfunction, somatic or psychological trauma, particularly during speech development, and a particular family structure especially the mother-child relationship, have been suggested. As a consequence clinical features are variable and speech delay and dysmorphisms can be found in a subgroup of patients only. Moreover, in most patients elective mutism is a transient disorder as it usually disappears.

Selective mutism, speech delay, dysmorphisms, and deletion of the short arm of chromosome 18: a distinct entity?

Elective (or selective) mutism is a rare psychiatric disorder. Diagnostic criteria in both ICD-10 and DSM-V include: (a) consistent failure to speak in specific social situations in which there is an expectation for speaking (for example, at school) despite speaking in other situations (for example, at home); (b) the disturbance interferes with educational or occupational achievement or with social communication; (c) it is not better accounted for by a communication disorder or by a lack of knowledge of the spoken language required in the social situation; (d) it has a duration of at least 1 month.

It typically starts at preschool age, is more common in girls, and is seen in all social strata with shyness, withdrawal, sensitivity or internalising behaviour problems as the most common personality features.

We followed up a 7.5 year old girl who was the third child from non-consanguineous parents. She was born normally at 37 weeks gestation and was normal at birth. She was able to walk alone and stand up from a chair. The concentrations of serum selenium and glutathione peroxidase decreased three times with oral diet alone.

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Selenium deficiency can cause cardiomypathy and sudden death, we should carefully monitor for selenium deficiency in anorexia nervosa, especially in patients on long term parenteral nutrition.

Family history was non-contributory. There were no language abnormalities such as echolalia, and selective mutism. Speech delay as she used single words meaningfully as late as 14 years old. "I entered by elective mutism associated with deletion of the short arm of chromosome 18, del(18), p(11.1)." Their patient had had developmental abnormalities but these could not account for her social communication disorders, and peculiar dysmorphisms were present. We also had the opportunity to study a girl affected by elective mutism in whom karyotype analysis showed an identical deletion of the chromosome 18. Speech delay, facial dysmorphisms such as flattened nasal bridge, broad philtrum, and micrognathia were the main clinical findings. Aneuploidy indices were found in a subgroup of patients only. It may be indicative of a distinct clinical entity.

Elective mutism is most probably a heterogeneous syndrome and several aetiological factors such as minimal brain dysfunction, somatic or psychological trauma, particularly during speech development, and a particular family structure especially the mother-child relationship, have been suggested. As a consequence clinical features are variable and speech delay and dysmorphisms can be found in a subgroup of patients only. Moreover, in most patients elective mutism is a transient disorder as it usually disappears.
in a few months. By contrast, in our patient as well as in the one reported by Simons et al., elective mutism appears as a chronic disorder and it has been affecting our patient for about 4 years. Therefore, we think that in a substantial proportion of patients elective mutism is related to a genetic background. This hypothesis is further corroborated by the study of Steinhausen et al, who pointed out that genetic factors play a part in the aetiology of selective mutism, as they found that disorders of speech, language, and psychiatric illness were more common in the relatives of affected than in the control groups.

Deletion of the short arm of chromosome 18 has also been associated with several phenotypic expressions, mental retardation, and autism. However, in our patient diagnosis of elective mutism was firmly made as autism, and it has been a factor is noted. In the cohort of Radanov et al, who pointed out that genetic factors play a part in the aetiology of selective mutism, as they found that disorders of speech, language, and psychiatric illness were more common in the relatives of affected than in the control groups.

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performance were found in patients who had had mild traumatic brain injury or only an injury to other parts of the body. Interestingly, in patients with more severe injuries to other parts of the body a higher impairment in cognitive functioning was found. These results may suggest that experience of symptoms (for example, pain) and the process of adjustment to the symptoms (for example, worry about achieving the pretraumatic level of functioning) may contribute to psychological changes as shown previously. Based on these changes, of which the prolonged experience of impaired wellbeing may be crucial, an inability for effort may follow, eventually leading to subthreshold problem-solving function.

Considering these issues may help to develop a therapeutic approach which should allow patients to adjust better to their problems and improve recovery. Previous research generally indicates a lack of morphological brain damage after whiplash or mild traumatic brain injury. However, functional brain damage, whatever the cause, cannot be fully excluded and further research may provide some additional insights. For example, using SPECT, short term disturbance to prefrontal structures was found in patients with mild traumatic brain injury, which probably indicated some sort of impaired functioning. Such a functional impairment may introduce a cascade of additional problems eventually contributing to a vicious circle on which basis the previously shown symptom augmentation may follow. This has to be prevented. Blaming patients for malingering is hardly the most appropriate approach and does not have anything to do with a non-dichotomous perspective of illness behaviour. B P RADANOV

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Secondary prevention after cerebral ischaemia of presumed arterial origin: is aspirin still the touchstone?

I agree that, for secondary prevention of ischaemic stroke, alternatives to aspirin have to be identified, not only because the scope for aspirin related therapeutic benefit is limited by the fact that aspirin blocks only one of at least eight potential pathways for activation of platelet aggregation, but also because some patients, initially responsive to the inhibitory effect of aspirin on platelet aggregation, subsequently escape from this effect, with consequent risk of recurrence of ischaemic stroke. Glycoprotein IIb/IIIa receptor blockers might superficially seem to be the final solution to this problem, as they block the final common pathway of platelet aggregation, but enthusiasm for their use should be tempered by the acknowledgement that acute profound thrombocytopenia (platelet count < 20 000 mm–3) may be an occasional side effect, with the consequence (at least in theory) of clinically significant intracranial haemorrhage in elderly patients who have ischaemic stroke coexisting with the type of small vessel disease predisposing to silent intracerebral microhaemorrhages, or coexisting with cerebral amyloid angiopathy, itself a risk factor for intracranial haemorrhage.

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Secondary prevention after cerebral ischaemia of presumed arterial origin: is aspirin still the touchstone?

In a recent editorial, Algra et al summarised the current state of knowledge of drug treatment in secondary prevention after ischaemic stroke or transient ischaemic attack (TIA). A recent review of aspirin, ticlopidine, clopidogrel, and anticoagulation with warfarin, and a critical discussion of recent relevant clinical trials, they speculate that antagonists of the platelet fibrinogen receptor with glycoprotein IIb/IIIa inhibitors may also have a preventive role in cerebrovascular disease in the near future and they indicate that clinical trials are planned. Unfortunately, the authors fail to mention the premise of β-hydroxy-β-methylglutaryl (HMG) co-enzyme A reductase inhibitors (statins) in preventing stroke and TIA in patients with established vascular disease. These are a novel group of compounds which lower serum cholesterol, and which have been shown to lower mortality in large randomised controlled trials on secondary prevention in patients with known vascular disease, both with and without hypercholesterolaemia, and in primary prevention in those with hypercholesterolaemia without clinical vascular disease. In addition, these trials have demonstrated that statins reduce the risk of stroke by about 30% in patients with coronary artery disease. As well as reducing serum cholesterol, statins have been shown in various models to have a broad range of beneficial effects on vascular pathophysiology, including plaque stabilisation, and direct vasodilatory, antithrombotic, and antiplatelet effects. Some of these drugs are currently being tested in clinical trials in patients with a history of minor stroke or TIA. As statins do not exert their beneficial effects primarily through antiplatelet mechanisms, the possibility that a statin combined with aspirin (or clopidogrel or both) could provide additive therapeutic effects is exciting and needs to be tested in patients with or at risk of cerebrovascular disease. As usual the time community lags behind their cardiology colleagues in managing their cerebrovascular share of the systemic disease of the endothelium known as atherosclerosis.

NORMAN DELANTY

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6 Vaughan CJ, Murphy MB, Buckley BM. Statins do more than just lower cholesterol. Lancet 1999;368:1079–82.

The authors reply:

Speculation about the results of ongoing trials was not really the purpose of our review, but we agree we might have missed the age of statins in patients with cerebrovascular disease. We note that Delanty has a poor opinion of the neurovascular research community. We shall have to live with it.

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Prospective, population-based studies of cavernous malformations are needed

In their welcome systematic review of supratentorial cavernous malformations and epilepsy, Moran et al illustrate the pitfalls of regarding the prognosis of a disease in selected case series as representative of its natural history. Studies of cavernous malformation prognosis have usually lacked clear inception cohorts with respect to mode of presentation and treatment. Referral filter bias has so often restricted ascertainment by tertiary referral centres, and further selection bias has made the prognosis seem worse than it really is, as demonstrated by the authors’ own series of 33 patients in which temporal lobe lesion location and intractable seizures predominated. Conversely, by leaving community mortality unaccounted for, the prognosis can seem better than it actually is. Completeness of follow-up has been variable and not always prospective. Furthermore, authors have varied in their choice of outcome, in particular their definition of haemorrhage (clinical or radiological), choice of period at risk (from birth, time of diagnosis, or start of observation) and calculation of outcomes for each patient or for each lesion. Any analyses of such heterogeneous case series should be ruthlessly systematic, but even so it is necessary to be wary about drawing firm conclusions from them.¹

The only existing population based study of cavernous malformations,¹ albeit with a denominator of merely 50,000, was prospective. The study spanned fundamental developments in the non-invasive diagnosis of cavernous malformations during the 1980s with magnetic resonance imaging,¹ which led to increasing detection rates with time.

There is, therefore, clearly a need for a randomised controlled trial of surgical versus conservative treatment for cavernous malformations to establish their frequency and prognosis. With a broad collaborative network, including the three other neurosciences centres in Scotland, the Scottish Intracranial Vascular Malformation Study (IVM) (www.dcn.ed.ac.uk/ivm/) to do just this for all types of intracranial vascular malformation (IVM). Using multiple, overlapping sources of case ascertainment we are building an incidence and outcome study on patients with mononeuropathy. Then each nerve is dealt with in turn. A text is needed with a strong emphasis towards conservative management with clear statements as to when more rapid intervention is needed.

The text is interspersed with illustrative cases which appear in boxes. I thought this worked well, although was surprised to find eight doctors (including a Professor of Neurology with a partial musculocutaneous nerve injury other than focal lesions, including metabolic and physical factors and tumours. The description of the clinical syndromes is clear and succinct and well referenced throughout. The advice is sensible with a strong emphasis towards conservative management with clear statements as to when more rapid intervention is needed.

While for mononeuropathies the book manages to act as a single point of reference it does not do this for some similar clinical problems whose presentations may be similar. It only briefly touches on radioulesions as they appear in the differential diagnosis of mononeuropathies and skirts round some contentious issues such as the thoracic outlet syndrome. The anatomy of the brachial plexus (something I always have to look up) is not reproduced.

Overall I think the authors have succeeded in their objectives and there is indeed justification for this book. The book is moderately priced at less than half the price of the combined costs two of the books they aim to replace. I would suggest that most neurology units should get a copy. I would urge you to persuade your orthopaedic colleagues to get one too.

GN FULLER

BOOK REVIEWS


The authors say that they wrote this book from a clinical point of view to look at several different sources to solve a single clinical problem.

The introductory chapters contain sound clinical advice on a general approach to patients with mononeuropathy. Then each nerve is dealt with in turn.

I would suggest that most neurology units should get a copy. I would urge you to persuade your orthopaedic colleagues to get one too.

GN FULLER

This book deals, in general, with issues pertinent to the clinical application of cell transplantation approaches, and has been written by many eminent members of both the American and European transplant communities, the editors also being well respected figures in this field. It covers neuronal cell transplantation therapies in its many forms, and although almost half relates to primary human foetal tissue transplants in Parkinson's and Huntington's disease, this does in fact reflect the balance of e ventions and Huntington's disease, this does in fact reflect the balance of effort over the past decade and a half. Of particular value are the summaries of data emerging from ongoing clinical trials of transplantation in both conditions, as much of this data are to be found in the literature in a rather piecemeal fashion. Prospects for transplantation in other neurological conditions are also discussed, in particular multiple sclerosis and stroke. Alternative donor tissue to human foetal cells is discussed largely with reference to the use of xenogeneic cells, both transplanted directly and also transplanted in their encapsulated form after genetic modification, the latter having already being piloted clinically, particularly for use in chronic pain syndromes. The potential of cell lines is mentioned in passing, but stem cell therapies (namely neuronal and embryonic stem cells) are not explicitly discussed, which is perhaps something of a hole given the likely reliance of transplantation therapy long term on the development of alternative sources of donor tissue. The book ends with a single chapter on the ethics of using human foetal tissue. This has been written very much from an American perspective and as this is such a central issue for much of the ongoing work, a more balanced account would have been useful. However, that having been said, this is a clear and readable account. It is suitable as an introduction to various aspects of neural cell therapies, and is an essential handbook for anyone working in the field.

ANNE ROSSIER


Are we on the verge of molecular Armageddon, to be ravaged by the onslaught of giant, genetically modified, giant tomatoes? Are we entering a molecular Utopia, where all the world's ills will be solved with a golden key to a nucleotide code or at the gateway of a eugenic nightmare? As far as epilepsy is concerned, a central message of this book is that clinical heterogeneity is the rule—the genes are only part of the story. Those of us with a deep suspicion (acquired not innate) of genetic models of life the universe and everything, can breathe a sigh of relief.

There are substantial methodological problems in genetic studies of epilepsy. It is a paroxysmal disorder, with age dependent expression, no diagnostic test, and frequent misdiagnosis. A tribute to workers in the field is that progress has been made despite these difficulties. Several early chapters consider benign childhood epilepsy with centrotemporal spikes. The characteristic EEG disturbance of this condition is probably inherited in autosomal dominant fashion, but only about 10% of siblings have epilepsy and they may have many different clinical varieties of epilepsy. Indeed there seems to be an association between this benign partial epilepsy and idiopathic generalised epilepsy, blurring the classic divisions of epilepsy classification. Autosomal dominant nocturnal frontal lobe epilepsy is genetically and clinically relatively well defined and is sometimes due to mutations of the nicotinic acetyl choline receptor. Even here the clinical expression of the same mutation may vary from a self limiting period of seizures to refractory nocturnal epilepsy with dozens of seizures each night. Other genetic epilepsy syndromes have been described recently; familial temporal lobe epilepsy and epilepsy with variable focci. MRI has allowed the in vivo classification of subtle cortical dysplasias as well as more gross disorders such as tuberous sclerosis, whose genetic bases are becoming clear. Subcortical band heterotopia or periventricular nodular heterotopia, are seen only in females and have been shown to be X linked and fatal in males.

How do genetic abnormalities produce epilepsy and what is the cause of the clinical heterogeneity? Here there are only questions. Abnormalities of regulatory homeobox genes may reproduce some aspects of cortical dysplasia and have been identified in humans too. The nicotinic acetylcholine receptor may be involved in development, cortical excitation, or the regulation of the thalamocortical sleep wake cycle—but all is speculation at this stage. Animal models may demonstrate changes in anatomy and chemistry and transgenic animal models may be valuable in exploring pathophysiology. Genetics is providing a gateway to pathophysiology but the clinical heterogeneity even in the most genetically uniform disorders suggests that these processes will not easily be revealed by simply understanding the genes. The relevance of the rarer genetic syndromes to commoner forms of epilepsy remains to be established. Targets for novel therapies are still a long way off.

This book provides a clear account of many genetically determined, focal epilepsies, a balanced view of their genetic components, and clinical and scientific methods for their future exploration. It will be of interest primarily to epilepsy specialists and geneticists.

MARK MANFORD