Matters arising

Apnoea testing to confirm brain death in clinical practice

Sir: The report of Van Donselaar, Meerwaldt and J Van Gijn¹ on apnoea testing supported observations that I have made and placed into practice over the past 4 years. The biggest problem I have encountered with valid apnoea testing is achieving a PCO₂ elevation of at least 60 mm Hg in the 10 min observation period.

Unless the initial PCO₂ is in the high normal 40–45 mm Hg range, it is unlikely that the goal of PCO₂ 60 mm Hg will be achieved. My practice has been to prepare the patient for apnoea testing, by oxygenating with 100% O₂, but reducing respiratory rate to the 6–8 per minute range, for 10

minutes before disconnection. This will generally result in a PCO₂ in the 40–45 range, with good oxygenation. The PCO₂ will usually rise to the 60 mm Hg level or higher during the subsequent 10 minute observation period when the patient is passively oxygenated with 6 l O₂ via endotracheal catheter. I found that this procedure, avoids the need for multiple apnoea tests with progressively higher initial PCO₂ until the PCO₂ 60 mm HG is ultimately achieved.

I have also noted that the cardiopulmonary status of some patients will not allow a full 10 minute observation period without arrhythmia developing. In these circumstances I will terminate the apnoea test and consider it positive. Further obser-

vations on the PO₂ and PCO₂ levels in these patients are being made.

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Reference

- 1 Van Donselaar CA, Meerwaldt JD, Van Gijn. Apnea testing to confirm brain death in clinical practice. *J Neurol Neurosurg Psychiatry* 1986;49:1071–3.

Book reviews

Current Neurology. Vol 6. Edited by Stanley H Appel. (Pp 361; £58.00.) Chicago: Year Book Medical Publishers Inc. Distributed by Wolfe Medical Publications Ltd, 1986.

This is an excellent addition to the *Current Neurology* series and a useful text in any library, either personal or departmental. As outlined in the preface, the aim is to place advances in the neurosciences into a clinical context and this is achieved in the main. The particular emphasis in this volume is on neuromuscular disorders. As is often the case, the volume could be further improved with a more generous number of illustrations.

The rewards gleaned from any text of review articles depend on one's own interests and expertise. The initial chapters on muscular dystrophy and the molecular basis of inherited neurological diseases are of interest and serve as a helpful introduction for the uninitiated into recombinant DNA techniques, gene probes, and gene linkage. These techniques potentially will lead to isolation of the gene products responsible for various inherited disorders.

Following these chapters is an excellent contribution from Professor Newsom-Davis on myasthenia gravis and the Lambert-Eaton syndrome with explanations of how basic medical research has led to major developments in patient management. These two conditions serve as excellent models of organ-specific autoimmunity in man, and the discussion is therefore also of general application.

The physiology of calcium channel control and clinical pharmacology of calcium antagonists are reviewed by Professor Greenberg. Already well established in cardiology, neurological indications for these drugs are given with interesting prospects for potential use in ischaemia and epilepsy.

There follows a chapter on recent aspects of multiple sclerosis. In many ways I found this the least satisfactory chapter. Although genetics, immunology and imaging in multiple sclerosis are all mentioned, some of the more interesting developments are not fully covered. Magnetic resonance imaging has made a considerable impact on the study of multiple sclerosis and promises to assist in the evaluation of therapeutic trials (a difficult area for clinical evaluation alone due to the variability in clinical course) and this technique is only briefly touched.

There are two chapters on movement disorders of the head and neck and neuromuscular control of speech which fit well together. The former chapter provides a simple taxonomy of the various tremors, grimaces and dystonias which affect the head and neck, a subject many find confusing. The latter chapter was perhaps less easy to immediately extrapolate to a clinical setting.

In reviewing new developments in epilepsy management the choice of drug and the surgical management of drug are stressed. The merits of anterior temporal lobectomy and amygdalohippocampectomy are discussed, reflecting the differences in practice on the two sides of the Atlantic.

Alzheimer's disease is well reviewed and generously referenced giving a comprehensive overview of the subject. Most chapters covering aspects of dementia begin by highlighting the problem posed by increasing

numbers of demented due to an ageing population, and this chapter is no exception.

The final section entitled *Neurobehaviour* explores hemisphere function and dominance particularly with regard to language. Aphasia, crossed aphasia, neglect and agnosia are covered. Localisation of function and the nature of the defects in agnosia are usefully discussed. The clinical sequelae of right hemisphere damage have long fascinated the neurologist and the further developments in the understanding of those sensory phenomena are of considerable interest.

Books of review articles may not be particularly innovative. However, informed authorities contributing well referenced texts on topics in which there have been recent developments provide useful and informative reading and may guide further in-depth exploration of the subject.

IEC ORMEROD

Surgery of Occlusive Cerebrovascular Disease. By Reginald SA Lord. (Pp 543; £72.50.) Oxford: Blackwell Scientific Publications, 1986.

Surgical cerebral revascularisation probably has as important a place in therapy as that of coronary revascularisation, but natural caution on the part of physicians, and over-enthusiasm on the part of surgeons have made it difficult, until now, to assess the place of surgery in the treatment of cerebrovascular disease. This book, written by a vascular surgeon, summarises the present situation and reviews the subject from a his-

torical, anatomical, pathophysiological and therapeutic point of view.

It was only in 1954 that the first report of successful carotid reconstruction was published, earlier attempts having been made in the previous three years. In 1983 85,000 endarterectomies were carried out in the USA, and the number predicted for 1986 was over 100,000. Like many lesions in the head and neck, carotid disease and its consequences fall within the scope of several disciplines, and the need for collaboration between them is paramount. "Medical and surgical therapy should be seen as mutually supportive and complimentary" especially in the evaluation of treatment. The burgeoning of surgical therapy means that many operations are likely to be undertaken by surgeons with limited experience of neurology, or even of vascular surgery in some cases. This book provides guidance for the investigation and treatment of patients, but selection of the surgeon is also extremely important.

After a full discussion of atheroembolic mechanisms and haemodynamic factors giving rise to cerebral lesions, the clinical aspects of strokes are summarised. More information on the natural history of untreated strokes might be helpful to those without neurological experience. Surgical therapy consists in the restoration of occluded vessels or the provision of a bypass. The many methods for demonstrating lesions are described, and thereafter there are descriptions of carotid endarterectomy and various alternative reconstructions of these and other vessels. Finally, the different forms of Extracranial/Intracranial (EC/IC) by-pass are mentioned in detail.

It is not until the final three chapters that one is able to reach a conclusion as to the present position of surgical treatment for all forms of stroke. The chapters on the treatment of asymptomatic lesions and transient ischaemic attacks (TIA) will be of most interest to neurologists. Despite the problems of providing sufficiently up-to-date information in a book, this work includes references to 1985 publications, among them the disappointing findings concerning the results of EC/IC by-pass in complete carotid occlusions, middle cerebral artery occlusions and TIA and small strokes. Excellent results in the treatment of other vascular lesions are well documented and are likely to continue to improve in the future.

Cerebrovascular disease can be looked at from several points of view. This surgical appraisal is to be welcomed, and neurologists should take the opportunity to add

it to their experience. It is to be hoped that more neurological evaluation of surgical results will be undertaken in the future as collaborative research, so that the possibility of a surgical procedure is not regarded as a qualification for its performance, unless it can be justified by the results. Neither is an operation that could be beneficial denied on account of prejudice or ignorance of the possibilities. The book will help to bring this about.

PETER H SCHURR

Multiple Sclerosis. Edited by W Ian McDonald and Donald H Silberberg. (Pp 193; £25.00.) Sevenoaks: The Butterworth Group, 1986.

This is essential reading for those responsible for the diagnosis and care of patients with multiple sclerosis. Having the advantage of a dual authorship from Queen Square and Philadelphia, we have the benefit of a very balanced approach to the problem of multiple sclerosis considering both the United Kingdom and the North American attitudes. The book assumes in the reader a considerable knowledge of neurology and of the disease itself. An excellent introductory chapter on the diagnosis of multiple sclerosis and a review of the Poser Committee's criteria for diagnosis is followed by an up to date chapter on imaging, including the recent findings on MR scanning. What we understand of the epidemiology is very clearly outlined in the fourth chapter and after Compston's careful consideration of the genetic factors involved in the aetiology of this disease, Lisak writes on the immunological abnormalities, Silberberg himself writes on the pathogenesis of demyelination, and Professor McDonald on the pathophysiology of the disease, with further chapters on psychological aspects and treatment including an excellent chapter on the symptomatic management of the patient.

This book is enjoyable to read, accurate and comprehensive. Inevitably it must be compared with the Churchill Livingstone volume on multiple sclerosis initially edited by McAlpine, and now by Lumsden and Aitchison in its third edition. I feel the aims of the larger work are different, and the authors of that volume attempt to cover a much wider research field than is addressed by the volume under review. However, the two books are complementary and I would wholly recommend that any neurologist,

whether in training or in practice, would benefit from this up to date, accurate and well produced summary of current knowledge of this enigmatic disease.

JB FOSTER

The Thalamus. By Edward G Jones. (Pp 655; \$135.00.) New York: Plenum Publishing Corp, 1986.

In 1932 Wilfrid Le Gros Clark needed only 64 pages of *Brain* to review almost everything that was known at the time about the organisation, development and comparative anatomy of the thalamus. Today, we need a monumental book of 2 kg weight to review the same topic, but are we any closer to knowing what the thalamus actually does? Concluding his classic book on the primate thalamus 50 years ago, the 31 year old A Earl Walker stated his case quite clearly. "The thalamus . . . holds the secret of much that goes on within the cerebral cortex." After more than 800 pages, Dr Jones is rather more sceptical, and confides that it "would almost be possible to study the cortex without considering the thalamus as anything more than a direct relay that neither added to nor subtracted from the information flowing through it."

Such an attitude is, of course, extreme and Dr Jones goes on to attack it with vigour. However, it is an attitude that I have heard several neuroscientists espouse in the past. Indeed, surveying much of the information in this book, one might be tempted to agree with them. Segregation of information flow appears to be a general rule of thalamic organisation. The thalamic nuclei are quite separate, with no interconnections between them. Within the principal sensory nuclei not only is there a spatially ordered projection of afferent fibre terminals, but in many cases, different types of afferent fibre from the same body part or area of retina remain separate. Such segregation, however, does not mean that the thalamic nuclei only relay input to the cortex. This was made clear in the classic studies by Hubel and Wiesel of receptive field properties in the lateral geniculate nucleus (LGN). The contrast sensitivity of LGN cells is greater than in retinal ganglion cells, indicating that the incoming signal is transformed in, as well as transmitted through, the LGN. Similar experiments also suggested a second important thalamic function: transmission through the LGN was highly dependent on the overall state of the animal. That is, as