MATTERS ARISING

Magnetic evoked responses elicited in the frontalis muscle

A recent paper by Kandler and Jarrat describes a method for eliciting magnetic evoked potentials (MEP) from the frontalis muscle by transcranial magnetic stimulation (TCMS). Comparison of MEP latency values in normal controls and patients with Bell’s palsy indicates that their prolongation beyond the morphologic limits predicts that functional recovery will be poor.

Evocation of MEP from the facial muscle by TCMS has been the subject of several recent studies, all of which have pointed to the possibility of eliciting responses similar to the blink reflex, especially from the superiour muscles.1 2 Cruccu et al have described TCMS-induced frontalis MEPs whose latency range differs from that of the R1 component of blink reflex.

We carried out a study in 5 healthy volunteers (4 women, 1 man) age ranged 26–38 years, to evaluate if the R1 response obtained following electrical stimulation of the supraorbital nerve showed statistical difference in latency with the MEPs recorded in the frontalis muscle.

TCMS was supplied by a Cadwell MES-10 coil ID 9.5 cm; peak magnetic flux (centre of coil) 2 Tesla. Optimum results were obtained with the coil centre 4 cm anterior to CZ (10–20 international system). Slight shifting was occasionally necessary to adjust to shall conformation and the response amplitude. Between 70% and 90% of the maximum flux capacity was delivered to the resting subject. Latency (defined as the interval between the beginning of the stimulus artefact and onset of the first component of the evoked muscle potential) was calculated with a Multibasis apparatus (Esami Biomedica) from the average of at least four analysed and amplified responses (bandpass 200–10,000 Hz).

A pair of Ag/Cl skin surface electrodes (cup diameter 1 cm) were used. The recording electrode was placed on the frontalis muscle, the reference electrode on the nasal bone. Both frontalis muscles were explored simultaneously.

The latency of the R1 and R2 components of the blink reflex was also evaluated by electrical stimulation of the right supraorbital nerve (figure). A blink reflex was always obtained. The mean (SD) ipsilateral R1 and R2 latencies were 10.52 (6.09) and 31.36 (7.77) ms respectively, that of the contralateral R2 was 32.9 (1.8) ms.

An early and a late bilateral response to TCMS were always observed. Interpulse latency times were: right 10.71 (0.64) and 30.92 (3.4) ms; left 10.62 (0.52) and 32.46 (4.4) ms. Student’s t test for paired data showed that there was no significant difference between these values and those of the R1 and R2 components of the blink reflex. The morphology of the two responses was also similar to that of these components. Short and long latency responses may be inferred by the slight preinnervation of the muscle.

Blink reflex-like responses evoked in this way could stem from stimulation of the proprioceptors of the masseter muscle,1 since contraction of this muscle can be induced by TCMS near the vertex. Another possibility is that TCMS excites the supraorbital nerve at the foramen, or that it activates the trigeminal roots of the trigeminal nerve. An explanation would thus be found for the bilaterality of the early response obtained by TCMS and the comparable TCMS and electrical stimulation latency times.

Our data show that responses obtained by TCMS in the frontalis muscle do not differ in latencies from those evoked with electrical stimulation of the supraorbital nerve in the same subjects. Therefore this response may well be induced by stimulation of the trigeminal nerve, rather than true MEP.

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Kandler and Jarrat reply:

Cocito and Cassano’s method differs from ours in two important respects. First, they have used a larger coil. Current density varies directly with coil diameter and so they will have stimulated a wider area of the cortex. Second, they positioned the coil frontocentrally whereas we attempted to locate the coil over the facial area of the cortex. It is therefore not surprising that they were able to record early and late trigeminal nerve responses in all normal subjects. That our method did not do so can be seen from our figure.

We recommend the use of a small diameter coil when trying to examine focal areas of the central nervous system with magnetic stimulation.

BOOK REVIEWS

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The title of this volume, the 7th in the series, is a misnomer. Only a single chapter, on molecular and clinical genetics in relation to psychiatric diseases can truly be said to address recent advances. The remaining 10 chapters cover disparate areas of clinical interest that range from suicidal behaviour in children and adolescents to a review of psychiatric aspects of the mouth and face. Furthermore, a whole chapter is devoted to a review of what are termed “key papers covering the years 1989 to 1990.”

This therefore is a book that cannot be recommended to readers wishing to keep abreast of recent developments in psychiatry. Perhaps a change of title that actually reflects the content, such as Reviews of Current Clinical Practice in Psychiatry might be appropriate for future issues.

R J DOLAN


This book sets out to provide basic information and current thinking on the care of patients with spinal injuries.

In general, the book suffers from the lack of proper trials of different forms of operative and non-operative treatment that prevails in...
relation to the whole literature on spinal injury. The one prospective randomised control trial that has been shown to improve outcome following spinal injury (in relation to high dose methylprednisolone) is not mentioned. The numerous illustrations demonstrate almost all fractures of the dorsal and lumbar spine. The photographs and diagrams of the anterior and posterior immobilisation techniques are of high quality.

AD MENDELOW


This book is a comprehensive multi-authored survey of the cerebellum in health and disease, from molecule to patient. There are no British contributions! It covers anatomy, neurochemical pathology, neuropathology, the mighty mutant mice, eye movements, clinical classification, etiopathogenesis (whatever that horrible word means!). There is obviously something for everybody, but how much for anybody?

The intention of the book is to stimulate cross fertilisation between the clinical and basic sciences (it is unlikely to achieve this). The individual sections are too long with no guide or overview. As often with multi-author texts, it reads like a number of separate independent reviews. The basic science and "etiopathogenesis" sections were too indigestible and intimidating for this clinician. The section on clinical aspects has some well reproduced MRI pictures but otherwise the text is rarely broken up apart from laborious tables with the familiar standard error bars.

Neurochemistry and molecular biology will not interest the clinician until they become of clinical importance. We all remember the dopamine deficiency in PD but who remembers the other neurochemical deficiencies? This ambitious book has been written too soon, since there is little direct clinical relevance of much of the basic science. It will not be a best seller and it is difficult to see who will rush out to buy it, whether clinician or scientist, and I suspect that much of the basic science data will be out of date soon.

Not a book for the busy clinician! Too detailed with too little or relevance and too long. (500 pages).

D BATeman


At the age of 19, Ian Waterman developed a severe sensory neuropathy, resulting in almost total loss of position sense in the limbs. He became a "deafferented man". He might have remained unique were it not for another individual battling with serious disability and handicap, confronting, overcoming or being overcome by the various frustrations of living in a world with limited sympathy for such problems. That other man was Oliver Sachs, a clinical neuropathologist and a man with broad interests and erudition. As a result of this interaction, Ian Waterman's story will join a number of classic case studies in a genre which includes Freud, Luria, Brodal, and of course Oliver Sacks, who has written the foreword.

Jonathan Cole has produced a painstaking, intricate account of Ian Waterman's story, mingling biography, science and philosophy. The biographical component details Ian Waterman's background, and describes the onset and evolution of his neurological symptoms. Jonathan Cole dwells on the details of the initial days, weeks and months of Ian's illness. We follow him through a series of good and bad experiences with nursing and medical staff. Some contacts with neurologists seem to have contributed: largely by stimulating Ian to prove their prognostics wrong! The account of Mr Waterman's prolonged struggle for recovery is illuminated by Jonathan Cole's reflections on the physiology of the nervous system and the pathophysiology of the disorder, and the recovery process. Aside from his struggle to overcome physical disability, Mr Waterman faced personal tragedy, and many periods of demoralisation and depression. Yet he was able to reassert his will and continue the struggle for independence and fulfilment. Dr Cole muses on that quality of pride which drives Ian Waterman, and which seems to contribute so much to the capacity of people with neurological disorders to overcome formidable obstacles? One suspects that the imperfections of health care and society often frustrate, but may also help to motivate some individuals. Most neurologists, and many other health care professionals, will wish to share Ian Waterman's journey and Jonathan Cole's reflections on the neurology and psychology of nerve injury. The writing is concise, lucid and entertaining. The book is nicely produced and reasonably priced. It will become a classic of its kind.

NIGEL LEIGH


One of the great revolutions in neurosurgery has been the introduction of stereotactic techniques which have become increasingly important largely because of improvements in imaging and the ability to integrate sophisticated medical images with the stereotactic apparatus. This revolution continues with the expansion of computer imaging techniques which not only reveal the target co-ordinates in relation to the stereotactic system but also has the ability to demonstrate a large variety of lesions in three and even four dimensions. This book brings much of this work together.

Admirably a great deal of the text has appeared elsewhere but the collation of this international expertise has been achieved very successfully. It deals with computer-based image processing with a particularly good description of the Analyze Software Package and goes on to describe computer-based stereotactic atlases, on-line analysis and functional mapping. The value of computer systems in surgical planning is covered extensively and there is a section on robotic systems.

A few of the chapters describe systems which are outmoded and appear extremely primitive when considered by side with the very sophisticated systems described elsewhere in the book. There are a few muted warnings of the dangers of surgical sense being overwhelmed by sophisticated computerware but the breadth and future possibilities of these developments are obvious.

The book is well bound and well printed but the illustrations are disappointing. This is a pity as this book represents one of the first comprehensive reviews. The basic sciences of stereotactic surgery and the field are well covered. It is a book which should be available to all neurosurgeons, neurologists and those working in the area. The cooperation of contributors, have in keeping abreast of all the major developments within the field. In the 5 years since the publication of the 3rd edition there have been major developments in relation to the application of imaging, and particularly magnetic resonance imaging, to the nervous system and also the impact that has already occurred from the advances in molecular biology. He has attempted to integrate some of these and the illustrations of magnetic resonance imaging scattered throughout the text. There is a new introductory chapter on the neurological examination of the child and infant and potted summaries of some of the new investigative procedures and their potential value. In addition to an update from the contributors to the 3rd edition, which include a very comprehensive review of infections of the nervous system by Marvin Weil, neurological manifestations of systemic diseases by Harry Chugani and disorders of mental development by Marcel Kinsbourne, Menkes has also enlisted the collaboration of a neurosurgeon, Kenneth Till, in the chapters on malformations of the central nervous system, post-natal trauma and injuries by physical agents, and tumours of the nervous system.

Some sections such as malformations, infections and metabolic diseases of the nervous system are covered in great detail whereas other sections provide a very broad baseline with relatively short vignettes on individual diseases.

I sought information on neurological aspects of incontinentia pigmenti. There was nothing in the text but a reference to Table 10–13 (page 571) which listed the basic components of the syndrome plus a reference (248) which was to the Doman-Delacato treatment of neurologically handicapped children (1968). In contrast Breit's textbook contained some 3 pages on the subject. On the other hand this book provided a very comprehensive review of the subject, which in turn was unindexed and not visible in Breit's book.