LETTERS TO THE EDITOR

Magnetic resonance imaging and vertebral artery dissection

Since the advent of advanced radiological modalities such as MRI and magnetic resonance angiography (MRA), dissections of cervical arteries are increasingly recognised as a common cause of stroke in young adults. Auer et al. recently advocated MRA as the initial diagnostic tool for vertebral artery dissection. Conventional angiography might be avoided altogether in subjects with a suspicious history and MRA images suggestive of a dissection (double lumen or mural haematoma). The sensitivity of MRA for the diagnosis of vertebral artery dissection was only 20% in one study, but the specificity was excellent (100%). The sensitivity was considerably better in the hands of Auer et al., but in this study the specificity (true negative rate in subjects free of disease) was not considered because all patients had vertebral artery dissection. The following case report illustrates that care must be taken to avoid false positive results when using MRA for the diagnosis of vertebral artery dissection.

A 47 year old male pilot suddenly experienced clumsiness and slight loss of strength in the right arm and leg during a long distance flight, while he stooped forward. During the following hours, he developed a global headache without irradiation to the neck, but the other symptoms gradually diminished. Prior history was unremarkable, except for a 3 hour period of horizontal diplopia which suddenly developed 3 months earlier. He had never smoked. Family history was negative for cardiovascular disorders. The patient later confessed that he had recently picked up the habit of gargling his throat with toothpaste twice a day, always with his neck in extreme retroflexion.

General physical examination (8 hours after onset of symptoms) was normal. Neurological examination showed minimal paresis and impaired dexterity of the right hand, mild circumdution of the right leg, and an insecure tandem gait. An MRI (including T1 weighted spin echo images with and without fat suppression, and proton density and T2 weighted fast spin echo sequences, performed on a 1.5 Tesla whole body MRI system) performed several hours later visualised both a fresh and an old right sided cerebellar infarct (figure A). In addition, MRI showed an irregular right vertebral artery in which a patient lumen was partially surrounded by a semilunar area of high signal intensity on T1 and T2 weighted images. On fat suppressed images, this area’s high signal intensity persisted, excluding the possibility that it originated from perivascular fat. This image was suggestive of mural haematoma due to vertebral dissection (figure B). Because we were reluctant to base any treatment decisions (antiocoagulants) merely on MRI findings, digital subtraction angiography was performed on the day of admission. This examination was normal (figure C). Shortly after this procedure, the patient developed vertigo and nystagmus which disappeared after 3 hours. Because we were puzzled by the discrepant findings on conventional angiography and MRI, we performed an MRA 4 days later. At this examination, the semilunar area of high signal intensity was found again (figure D), despite saturation of cranial vessels and craniofugal and craniopetal flow respectively, which was applied to exclude the possibility that the high signal originated from flow in the perivascular venous plexus. Therefore, this examination was again suggestive of right vertebral artery dissection. An extensive search for other causes of stroke showed no abnormalities. Hence, due to the continuing discrepancy between conventional angiography and MRA, and due to the absence of any other cause of stroke, no certain diagnosis could be established.

In this patient, a diagnosis of right vertebral artery dissection was initially made given the clinical course with repeated episodes of ischaemia restricted to the vertebrobasilar system, as well as the suggestive MRI findings. We speculated that habitual gargling was a potential underlying cause, as neck retroflexion can cause cervical dissections. However, we had to reject this diagnosis in view of the normal conventional angiography, which remains the gold standard for diagnosing cervical artery dissection. In one series, conventional angiography was never falsely negative in patients with clinical signs or symptoms of vertebral artery dissection. The possibility that conventional angiography had nevertheless yielded a false negative result seems highly unlikely. In dissected arteries, MRI/MRA can detect intimal flaps, mural haematomas, or aneurysmal dilatations that are sometimes missed by conventional angiography, but even in such patients conventional angiography is never completely normal in the acute stage. Follow up examinations of patients with proven vertebral artery dissection indicate that the appearance of a dissected artery on conventional angiography can normalise in a substantial proportion of patients, but always after an interval of at least 1 to (usually) several weeks. Conventional angiography in our patient was performed on the day of admis-
Cerebral angiography remains the gold standard, but false positive results are common in cases of vertebrobasilar artery dissection. MRI/MRA can play a part in the diagnosis of vertebrobasilar artery dissection, provided that the pitfall of false positive MRA results is avoided. In case of doubt, anatomical structures surrounding vertebral arteries are recognised to be of help in this distinction. Furthermore, it is a non-invasive procedure, which is an important advantage over cerebral angiography, which carries a morbidity and mortality risk. Our patient, who developed transient neurological deficits shortly after the "abnormal" MRA, created an image suggestive of intramural haematoma which cannot be satisfactorily explained. The present case report illustrates that flow in this plexus cannot always be suppressed.

The second tissue that may falsely present as a dissection is fat that directly surrounds vertebral arteries. This fat also gives rise to high signal intensity, but using fat suppression techniques it can be readily differentiated from intramural haematoma. Furthermore, the usual diameter asymmetry of vertebrobasilar arteries, turbulence and magnetic susceptibility near sharp vessel turns can also cause false positive MRA results. In some patients, MRI cannot distinguish between intramural and intramural haematoma, leading to false conclusions.

Decisions based on false positive MRI/MRA results can be hazardous due to the sometimes severe side effects of anticoagulation therapy that is recommended by some to prevent further ischaemic events. Another danger of a false positive diagnosis of vertebrobasilar artery dissection is that it may preclude the search for other causes of stroke that could be amenable to secondary prevention.

MRI/MRA remains important because it helps visualise ischaemic lesions and, in some patients, provides complementary morphological information to cerebral angiography. Furthermore, it is a non-invasive procedure, an important advantage over cerebral angiography which carries a morbidity and mortality risk. Our patient, who developed transient neurological deficits shortly after angiography, underscores this. Therefore, MRA can play a part in the diagnosis of vertebral artery dissection, provided that the pitfall mentioned above are recognised to avoid false positive results. In case of doubt, cerebral angiography remains the gold standard for vertebral artery dissection.

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Association between butyrylcholinesterase K variant and the Alzheimer type neuropathological changes in apolipoprotein E ε4 carriers older than 75 years

Apolipoprotein E (ApoE) ε4 has a strong influence on the development of sporadic Alzheimer’s disease in many ethnic populations. However, ApoE ε4 is neither necessary nor sufficient for the development of Alzheimer’s disease, suggesting that other genes increase the risk of Alzheimer’s disease. One such new candidate is the butyrylcholinesterase (BChE) gene (BCHE). BCHE is associated with senile plaques (SPs) and neurofibrillary tangles (NFTs). Lehmann et al reported that the K variant of BCHE (BCHE-K) was associated with the development of Alzheimer’s disease, especially in ApoE ε4 carriers older than 75 years. A possible mechanism to how BCHE-K is related to Alzheimer’s disease under the influence of ApoE ε4 is the acceleration of Alzheimer type neuropathological changes. If BCHE-K has an effect on the development of Alzheimer’s disease in ApoE ε4 carriers, the formation of Alzheimer type neuropathological changes may be accelerated by BCHE-K in the ApoE ε4 carriers.

We have examined genotypes of BCHE and ApoE, and densities of the senile plaques (SPs), with dystrophic neurites (NPs), and neurofibrillary tangles (NFTs) in the brains of 51 patients with Alzheimer’s disease and 90 non-demented subjects from a postmortem series of Japanese. Clinical and postmortem diagnosis of Alzheimer’s disease was carried out as described previously. The densities of Alzheimer type neuropathological changes were quantified by averaging the counts of those in the hippocampus and superior temporal gyrus. Genotypes of BCHE and ApoE in all patients were determined as described elsewhere. Genotypic and allelic distributions of BCHE were analysed by χ² test. The densities of the SPs, NPs, and NFTs, and ages at onset and durations of illness were compared among BCHE genotypes with the Kruskal-Wallis test or Mann-Whitney U test in total subjects, those with Alzheimer’s disease, and non-demented subjects. We also examined these relations in the subgroups divided by the ApoE ε4 status or the age of 75 years. Statistical significance was defined as two-tailed probabilities of <0.05.

There were no significant differences in the frequency of BCHE-K genotypes or alleles between patients with Alzheimer’s disease (0.16 in allele frequency) and non-demented subjects (0.18), and in the total subjects, ApoE ε4 carriers or non-ApoE ε4 carriers, although a strong association of ApoE ε4 alleles with Alzheimer’s disease was found in this population (p<0.004). Genetic association of BCHE-K genotypes with sporadic Alzheimer’s disease was non-significant in all subjects older than 75 years, the ApoE ε4 carriers older than 75 years, and non-ApoE ε4 carriers older than 75 years. There was no genetic association of BCHE-K with the densities of the SPs, NPs, or NFTs in the hippocampus and superior temporal gyrus in the total subjects, all ApoE ε4 carriers, Alzheimer’s disease or non-demented groups, or with ages at onset or duration of illness in Alzheimer’s disease. However, when we divided total subjects into two subgroups with different ApoE ε4 status, there was significant association between BCHE-K and the density of the SPs and NPs in the superior temporal gyrus (STG) in the ApoE ε4 carriers (SPs, p=0.04; NPs, p=0.03; data not shown). Further, we analysed the correlation between BCHE-K and the densities of the SPs, NPs, and NFTs in the hippocampus and superior temporal gyrus in the ApoE ε4 carriers older than 75 years and non-ApoE ε4 carriers older than 75 years. There was no significant association of BCHE-K with the density of the SPs and NPs in the hippocampus and superior temporal gyrus in the ApoE ε4 carriers older than 75 years and non-ApoE ε4 carriers older than 75 years. There was a decrease of severity of Alzheimer type neuropathological changes with BCHE-K. A similar trend was seen in the hippocampus though this did not reach significance.

Our results showed that BCHE-K might have no effect on the development of sporadic Alzheimer’s disease even in the ApoE ε4 carriers or subjects older than 75 years. By contrast with a significant genetic association in patients confirmed at postmortem in the British population, there was no correlation in the Japanese population. Although our sample size was small, there were not even trends for a positive association in our study, suggesting that the lack of association was not due to small sample size. The frequency of BCHE-K in our Japanese control population was 0.18. This was not significantly different from that in the British population examined by Hiltunen et al (0.20). However, the frequency of BCHE-K in the British control population reported by Lehmann et al was 0.09, which was significantly lower than our results (p=0.04). These findings indicate that the frequency of BCHE-K and its genetic linkage with the development of Alzheimer’s disease would be different among sample populations.

Our neuropathological study disclosed a significant association of BCHE-K with Alzheimer type neuropathological changes in the ApoE ε4 carriers older than 75 years, but not in the non-ApoE ε4 carriers. Lehmann et al showed that BCHE-K was strongly associated with the development of Alzheimer’s disease in the ApoE ε4 carriers older than 75 years. Analyses of the same subgroup of ApoE ε4 carriers older than 75 years increased statistical significance in both our studies and that of Lehmann et al. This suggests that BCHE-K as a genetic marker is linked with formation of Alzheimer type neuropathological changes or development of Alzheimer’s disease in the ApoE ε4 carriers older than 75 years. However, a decrease of the severity of Alzheimer type neuropathological changes with BCHE-K in our study was not expected because Lehmann et al showed an increased frequency in the BCHE-K allele in Alzheimer’s disease. Singleton et al also reported that BCHE-K was not associated with the densities of the SPs and NFTs, even in the ApoE ε4 carriers. In addition, BCHE-K was not related to the development of Alzheimer’s disease in the ApoE ε4 carriers in our study. Russ et al and Singleton et al also showed a lack of association between BCHE-K and the development of Alzheimer’s disease. However, Hiltunen et al showed that BCHE-K had a protective effect on the development of Alzheimer’s disease in ApoE ε4 carriers younger than 75 years. The effects of BCHE-K on the Alzheimer type neuropathological changes or development of Alzheimer’s disease are different among studies, suggesting that the significant genetic association in the studies by Lehmann et al, Hiltunen et al, and ourselves might be linkage disequilibrium with relevant variability in BCHE or other adjacent gene on chromosome 19, and that BCHE-K does not play a direct part in the pathogenesis of Alzheimer’s disease.

<table>
<thead>
<tr>
<th>BCHE genotype</th>
<th>ApoE ε4 carriers over 75 years (n=28)</th>
<th>non-ApoE ε4 carriers over 75 years (n=95)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KN (N=8)</td>
<td>KN (N=20)</td>
</tr>
<tr>
<td>Hippocampus:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPs</td>
<td>3.0 (0.0, 17.2)</td>
<td>12.2 (4.5, 28.7)</td>
</tr>
<tr>
<td>NPs</td>
<td>0.7 (0.0, 11.9)</td>
<td>11.0 (3.9, 25.3)</td>
</tr>
<tr>
<td>NFTs</td>
<td>1.1 (0.4, 23.1)</td>
<td>17.4 (2.5, 59.6)</td>
</tr>
<tr>
<td>Superior temporal gyrus:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPs</td>
<td>0.2 (0.0, 22.8)</td>
<td>49.7 (12.1, 83.8)</td>
</tr>
<tr>
<td>NPs</td>
<td>0.2 (0.0, 8.8)</td>
<td>10.7 (3.6, 19.0)</td>
</tr>
<tr>
<td>NFTs</td>
<td>0.0 (0.0, 0.2)</td>
<td>0.9 (0.0, 4.9)</td>
</tr>
</tbody>
</table>

Values are medians (25th percentile, 75th percentile). The density represents the average counts in 2.56 mm² for the SPs and NPs, and in 0.64 mm² for the NFTs. BCHE=butyrylcholinesterase gene; ApoE=apolipoprotein E; K=the K variant allele of butyrylcholinesterase gene; N=the normal allele of butyrylcholinesterase gene; SPs=senile plaques; NPs=senile plaques with dystrophic neurites; NFTs=neurofibrillary tangles.
The patient was a 71-year-old, retired physician with a 3 to 4 year history of memory impairment. Neuropsychological evaluation disclosed a high average to superior general intellectual functioning, with mild impairment in naming to confrontation and episodic memory for visual and verbal memory. His visuospatial ability remained relatively unimpaired and was rated as average for his age. His comprehension for verbal and written instructions was intact. At the present time he is still well oriented to time and place, and is somewhat independent in activities of daily living. He is, remarkably, not depressed, but does, repeatedly, raise concern regarding when he has become to his wife. Moreover, mild hypofusional-in the frontaltemporal lobes bilaterally was seen on SPECT investigation and no evidence of pathognomonic laboratory results were found. Taken together, the patient's episodic memory and naming impairments and functional imaging findings was thought to be consistent with the early stages of dementia of the Alzheimer's type (DAT) in keeping with National Institute of Neurological and Communicative Disorders Association-Alzheimer's Disease and Related Disorders Association criteria. The patient was consequently referred to our department for “prospective memory book training” and follow up assessments to index progression of disease. During our sessions his wife had stated that the patient could no longer “act” as the complained that her once “flamboyant” and “unblushing” husband could no longer “put any feeling into his lines” when they read play scripts together. She thought that he had “lost his enthusiasm to act” consequent to his new found memory loss and an “understandable depressive reaction.” It became clear, however, that the patient was remarkably not depressed and that he maintained normal expressive prosodic speech during conversation. When asked to use prosody to command when reading script, however, this once gallant actor spoke without melody, loudness, stress, accent, with inappropriate pauses. To quantify this patient’s peculiar deficit, the patient was required to read and repeat words and sentences to prosodic command and imitation. Observation revealed five words and sentences that the patient read without the acoustical features expected prosody. Indeed, the patient had lost his ability to “act.” The patient’s use of prosody did, however, improve dramatically with imitation. That is, he was able to repeat right eight of the 10 items in the table with appropriate and expected prosody. Interestingly, the single item that he continued to have trouble producing was item three (You know...there was a time when...). He could not after the words “you know” suggest that this patient seems to also have features characteristic of motor apraxia. Hence, he had available the knowlegde to successfully select and use appropriate prosody, but failed to produce prosodic speech to command, dysfunction of the praxis production system is implied rather than the conceptual system. Thus, somato-motor or pro sedan prosodic apraxia can be defined as an inability to produce prosody to command during speech. The precise underlying mechanism(s) responsible for producing this deficit is unknown, although Heilman et al and Tucker et al have hypothesised that the right hemisphere is indeed dominant for organising the affective-prosodic components of language and gestural behaviour and that the functional anatomical organisation of affective language in the right hemisphere was analogous to the organisation of propositional language in the left (non-dominant) hemisphere. Conversely, there is evidence of poor affective prosody to command yet normal spontaneous affective prosody, and good affective prosodic repetition and comprehension would suggest a “transcortical aprosodia.” Note however, that the patient’s spontaneous prosody was unaffected whereas spontaneous speech is affected by a transcortical motor aphasia. Hence, we might place the critical lesion for prosodic apraxia in the right dorsolateral frontal lobe, extending into the deep frontal

**Idiomotor prosodic apraxia**

Prosody is a non-verbal or suprasegmental feature of language that conveys various levels of information to the listener, including linguistic, affective (attitudinal and emotional), dialectical, and idiosyncratic data. The acoustic features underlying prosody include production, modulation, melody, cadence, loudness, timbre, tempo, stress, accent, and pauses. These acoustic features are typically spared in patients with cortical dementia such as Alzheimer's disease in which temporoparietal cortices are primarily affected. Patients with Alzheimer's disease, however, often develop apraxia, which can be defined as a disorder of skilled movement not caused by weakness, ataxia, deafferentation, abnormal tone or posture, movement disorders (such as tremor or chorea), intellectual deterioration, poor comprehension, or uncooperativeness. Moreover, subtypes of apraxia have been delineated and are defined by the nature of errors made by the patient and the means by which these errors are elicited. According to this classification, a patient with probable dementia of the Alzheimer's type is described who had normal prosodic elements to his spontaneous everyday speech, but could not produce the same acoustic features underlying prosody to command. The nature of his errors might constitute what can be termed “ideomotor prosodic apraxia.”

**Tent item prosodic apraxia scale**

**Script to be read**

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1. Honey PLEASE!
2. Are you hungry?
3. You know......there was a time when I could recite all the streets in my neighborhood
4. Holy COW!
5. YUP, yup, yup, yup, yup...
6. Le da da da...
7. O Canada, our home and native land...
8. SHIT!
9. Thank you
10. May I go to the bathroom, I really need to go quite badly...
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**Type of emphasis**

```
Accents
Honey PLEASE!

Rise in pitch
Are you hungry?

Pause after “You know”
You know......there was a time when I could recite all the streets in my neighborhood
Holy COW!

With surprise
You know......there was a time when I could recite all the streets in my neighborhood

With melody
Le da da da...
O Canada, our home and native land...

With tempo
You know......there was a time when I could recite all the streets in my neighborhood
Thank you

With stress
You know......there was a time when I could recite all the streets in my neighborhood

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Directions: Read the above word[s] and sentences as if you really mean them. Pretend you are auditioning for a play and you are required to read the lines with the type of emphasis noted beside each line.

*These items were selected based on observation of the patients spontaneous speech. Therefore, they are qualitatively constructed and should not be used as a general measure of prosodic apraxia with all patients.
white matter, in keeping with typical dominant hemispheric lesions producing transcortical motor aphasia. This speculation is supported by the patient's SPECT findings of mild hyperfusion in the frontotemporal lobes bilaterally.

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Vocal cord abductor paralysis in spinocerebellar ataxia type 1

Vocal cord abductor paralysis (VCAP) is considered a sign of a poor prognosis in neurodegenerative diseases, because severe laryngeal dysfunction by VCAP may result in acute airway obstruction and require emergency tracheotomy.1

Although VCAP is a cardinal feature in multiple system atrophy (MSA), it has not been reported in several types of spinocerebellar ataxia with dominant inheritance. We evaluated the movements of the vocal cords of seven patients with SCA1 by laryngofibroscopy.

Seven unrelated patients with SCA1 who had a documented CAG repeat of ataxin-1 were investigated. There were two men and five women ranging in age from 27 to 67 years old (mean 44.5 years). Spouses and other family members, in addition to the patients, were questioned about events of stridor, dysphagia without stridor at night even in an early stage of the disease. The VCAP was found to be severe on laryngofibroscopy in all three patients with breathing difficulty on inspiration. Patient 1, who had the severe VCAP, developed stridor during wakefulness as well. In patients 4 and 5, the breathing difficulty on inspiration was improved by tracheotomy. The respiratory flow volume loop study did not detect abnormality in patient 2.

The CAG repeat length tended to be higher in the patients with VCAP than in the patients without VCAP (p=0.05), but the duration of illness was not significantly correlated with the presence of VCAP (p=0.43).

This is the first report that VCAP is often found in patients with SCA1. As VCAP may not usually be a late feature in patients with SCA1, evaluation of VCAP is necessary even in early stages of the disease. It is not surprising to find VCAP in patients with stridor, because stridor is usually caused by airway obstruction of the larynx. However, VCAP was detected by laryngofibroscopy in a patient without stridor who had dysphagia. Furthermore, all patients with VCAP exhibited dysphagia. Therefore, that the laryngofibroscopy should be performed in SCA1 patients with dysphagia as well as stridor.

The mechanism of VCP may be divided into some types, the paralytic type, the non-paralytic type, and these two combined type. The first is possibly caused by loss of activity of the intrinsic laryngeal muscles.2 Stridor due to paralysis has been found to be more prominent in sleep than during wakefulness; whereas stridor by non-paralytic dysfunction has been found both during the daytime and during sleep.3 We suspect that the VCAP in patients with SCA1 may be dominantly paralytic, because the nucleus ambiguus is sometimes pathologically involved in SCA1 and because stridor in our patients with SCA1 was more marked in sleep.

Our laryngofibroscopic findings suggested that severe VCAP caused breathing difficulty on inspiration in the patients with SCA1 by obstructing the airway. Moreover, the stridor during wakefulness as well as sleep indicated it to be very serious. The important question concerns when tracheotomy should be carried out after the diagnosis of VCAP to prevent respiratory abnormalities leading to sudden death. Although we consider tracheotomy at the stage when breathing difficulty on inspiration or stridor during wakefulness is noted, it awaits further study with a large number of patients to decide which stage is best for tracheotomy.

Furthermore, we now consider endoscopic cord lateralisation as another possible management for VCAP.


Brief summary of the clinical features and CAG repeat numbers in the patients with SCA1

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Sex</th>
<th>CAG Repeat Number</th>
<th>Disease duration (yr)</th>
<th>Vocal cord paralysis*</th>
<th>Stridor at night</th>
<th>Stridor during wakefulness</th>
<th>Dysphagia</th>
<th>Breathing difficulty</th>
<th>Tracheotomy</th>
<th>(CAG)n of mutant allele</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30/M</td>
<td></td>
<td>2</td>
<td>53</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>53</td>
</tr>
<tr>
<td>2</td>
<td>50/F</td>
<td></td>
<td>5</td>
<td>59</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>48/F</td>
<td></td>
<td>9</td>
<td>46</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>27/F</td>
<td></td>
<td>11</td>
<td>46</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>46</td>
</tr>
<tr>
<td>5</td>
<td>32/F</td>
<td></td>
<td>7</td>
<td>54</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>46</td>
</tr>
<tr>
<td>6</td>
<td>46/F</td>
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<td>9</td>
<td>46</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
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</tr>
<tr>
<td>7</td>
<td>48/F</td>
<td></td>
<td>14</td>
<td>51</td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>46</td>
</tr>
</tbody>
</table>

* (−) = normal, (+) = median position, (+++) = paramidline position, (++++) = midline position.
Lateral gaze synkinesis on downward saccade attempts with paramedian thalamic and midbrain infarct

The symptoms of paramedian thalamic and midbrain infarct include ocular motor disturbances mainly in the vertical plane. We here describe a patient with the additional feature of an unusual horizontal eye movement synkinesis.

A 60 year old overweight man, with diabetes and mild hypertension, suddenly fell into a coma that lasted for 4 hours and was followed by slight right hemiparesis, recent memory impairment, hypersomnolence, and vertical gaze impairment.

On admission to our centre, about 10 days after symptom onset, the patient still presented fluctuating drowsiness from which he could be easily aroused, normal cognitive functions with mild attention disturbance, slight right facial weakness, and mild incoordination at the finger-to-nose test with his right arm.

The most important findings involved ocular motor function. Both pupils were normal in diameter and reacted normally both to light and to convergence. The cover test did not disclose any eye misalignment. During attempted fixation, the patient showed saccade oscillations (usually square and macrosquare wave jerks)—that is, back to back involuntary horizontal saccades with an amplitude ranging from about 2 to about 10 degrees and with an intersaccadic interval of about 200 ms, that brought the eyes away from and back to the fixation point, at an approximate rate of three every 2 seconds.

Clinical examination of eye movements in the horizontal plane and visually guided reflexive saccades recorded by the infrared reflection technique were both normal, whereas the amplitude range of vertical saccade and smooth pursuit eye movements covered only a few degrees of upward gaze. Vertical amplitude range was slightly greater for the vestibulo-ocular reflex in the pitch (yes-yes) plane. Moreover, when the patient attempted to make a downward saccade, he showed a gaze deviation to the left (figure). This synkinesis was more evident when the examiner lifted the patient’s lids, thus preventing lid synkinesis during downgaze. Attempted upward saccades did not produce any horizontal gaze deviation. Finally, the patient showed normal Bell’s phenomenon.

An EEG showed frontal, bilateral theta and theta/delta activity and sporadic drowsiness, and MRI (figure) disclosed a bilateral thalamomesencephalic infarct which involved predominantly the right side. Horizontal gaze deviation on attempted downward saccades disappeared after about 15 days, whereas vertical gaze impairment and hypersomnia were unchanged 1 year later. Subsequent polysomnographic testing disclosed sleep apnoea.

The clinical features of our patient are those reported for thalamic infarcts involving the rostrointerstitial nucleus of the medial longitudinal fasciculus (riMLF). By contrast, the leftward gaze deviation elicited by the attempt to make a downward saccade is at variance with all previous descriptions.

The triggering of a saccade requires not only the activation of the excitatory burst neurons (EBNs), but also the deactivation of the omnipause neurons (OPNs), which provide tonic inhibition of both horizontal and vertical EBNs.

Accordingly, any attempt to activate a lesioned riMLF should be associated with maximal OPN inhibition. However, OPNs discharge for saccade in any direction and are not strictly direction selective, as shown by horizontal oscillations during vertical saccades detectable in normal subjects. These oscillations suggest that during vertical saccades the inhibition of OPNs disinhibits both vertical and, to a lesser extent, horizontal EBNs.

In our patient, the horizontal gaze deviation was always directed to the left rather than in both directions as during oscillations. Many ocular motor structures, including those located in the midbrain, trigger a purely vertical (downward) saccade only when stimulated bilaterally, so as to nullify horizontal components with different direction depending on the stimulation side. This probably occurs for the riMLF too, as it shows ipsilateral projections to the abducens nucleus. In our patient, the projections to the left nucleus were probably spared by the fact that the lesion predominantly affected the right side.

Overall, our patient’s horizontal ocular motor synkinesis is unusual, and probably derives from a strong inhibition of OPNs, which in turn frees the horizontal EBNs, and from an unbalanced activation of the left abducens neurons via riMLF projections spared from the lesion, although it is not possible to exclude the possibility that the unbalanced activation of abducens neurons originated from frontal or parietal cortical areas or from the superior colliculus rather than from riMLF projections.

This hypothesis is strengthened by the reinforcement of the leftward eye deviation when the examiner kept the patient’s lids lifted. Since this manoeuvre prevents lid synkinesis, it results in what resembles an attempted forced lid closure which, on the basis of blink induced eye oscillations, is likely to be an additional stimulus for OPN inhibition. Moreover, although they occur in various conditions, saccade oscillations during fixation are in keeping with a reduction of OPN inhibition level.

In conclusion, our patient presented an ocular motor synkinesis that should be listed among those occurring in thalamomesencephalic infarcts. This sign is unusual and it is likely to be overlooked, but it is fully explicable both by neurophysiology and...
by anatomical connections of the saccade system.

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Botulinum toxin is a useful treatment in excessive drooling of saliva

Excessive drooling of saliva or hypersialorrhea is a common problem in neurodegenerative disorders such as motor neuron disease or Parkinson’s disease. It is usually caused by swallowing dysfunction and can facilitate choking, aspiration, and chest infections. Socially it is embarrassing and disabling. There are not many treatment options. Anticholinergic drugs are sometimes tried but are usually of little benefit and side effects (orthostatic hypotension, dizziness, and mental confabulation, particularly in the elderly) limit their usefulness.

Occasionally, as a more drastic treatment irradiation of the parotid gland is carried out when hypersialorrhea becomes intractable.

Apart from its established usefulness in dysphagia and strabismus there are some data showing that botulinum toxin injections are effective in autonomic disorders—for example, gustatory sweating and hyperhidrosis of the palm.1 It has been hypothesised that botulinum toxin may help in sialorrhea.1 In a historical note Erbguth recently pointed out the potential use of botulinum toxin for hyposalivation, quoting a paper by the German physiologist and poet Justus Keilhack, written in 1814.2

Botulinum toxin inhibits acetylcholine release in nerve terminals mainly in the neuro-muscular junction, but also in sympathetic and parasympathetic ganglion cells and in postganglionic parasympathetic nerves, by blocking SNAP-25, a protein involved in the fusion of acetylcholine containing vesicles with the plasma membrane.3

Against this background we evaluated the usefulness of botulinum toxin injections into the parotid gland in four patients with excessive drooling of saliva with their consent. One patient had young onset secondary generalised dystonia with severe mouth opening spasms, one had advanced Parkinson’s disease, the third patient had progressive supranuclear palsy, and the fourth patient had motor neuron disease. Drooling in these patients was so severe that they had to wear a bib or carry a towel around their neck. With one exception 20 units of Dystourpin (Ipsen) were injected superficially subcutaneously above the angle of the mandible at the posterior margin of the masseter muscle, avoiding the bulk of the muscle. The shorter version (5/8") of the 25 gauge needle was used. Because worsening of dysphagia was feared only 10 U Dystourpin were injected into each parotid gland in the patient with motor neuron disease. Drooling did not significantly improve in the four patients due to the low dose of botulinum toxin used. He declined further treatment.

All the other patients had a beneficial response beginning by the end of the first week and lasting 6 weeks in one patient and 3 to 4 months in the others. Apart from subjective improvement reported by the patients and caregivers, reduction of drooling was demonstrated by the fact that the patients did not have to use a bib or towel. One patient had mild worsening of existing dysphagia. Two patients had mild chewing difficulties, possibly due to diffusion of the toxin into the masseter and only one complained of a dry mouth. None developed facial weakness. All three patients considered the response good enough and side effects sufficiently minimal for them to continue botulinum toxin treatment at regular intervals.

Injections of botulinum toxin into the parotid gland (and other salivary glands) may be an effective and simple treatment for excessive disabling drooling of saliva in selected patients.

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Extensive brain calcifications in systemic sclerosis: two cases

Systemic sclerosis (scleroderma) is a multi-system connective tissue disease of unknown aetiology, characterised by progressive fibrosis of the skin and internal organs including the lungs and gastrointestinal tract.1 Pathological calcification of soft tissues (known as sclerodactylia or calcinosis) is a common feature in the CREST syndrome of scleroderma (calcinosis, Raynaud’s phenomenon, oesophageal dysmotility, sclerodactylia, telangiectasia). In contrast, internal organ calcification is rare, and isolated cases of spinal calcinosis and calcific constrictive pericarditis have been reported.2 We report here the cases of two patients with systemic sclerosis whose CT examination disclosed extensive brain calcifications.

Case 1, a 48 year old man was referred to hospital because of polyarthralgia involving the wrists and ankles, Raynaud’s phenomenon, choking, aspiration, and chest infections. Mini mental state examination score was 22/30. The patient was oriented to place, but not to time. Anterograde amnesia was noted. Agnosia, apraxia, and aphasis were absent. There was no muscle weakness and muscle tone was normal, as were other reflexes. Plantar responses were both flexor. There was no sensory loss or impairment of cranial nerves. Systemic sclerosis signs were unchanged. Routine hematological tests were normal. Results of blood chemical tests were also unremarkable (serum electrolytes, urea, creatinine, iron), including phosphorus and calcium metabolism (serum parathyroid hormone concentration, blood calcium and phosphorus, 25-hydroxyvitamin D, 1,25-dihydroxyvitamin D, calcium, and phosphoturia). Serum concentrations of free tri- doxythreonine, free thyroxine, and thyroid stimulating hormone were normal. Serological tests for syphilis, HIV-1, 2, and hepatitis were all negative. Brain CT showed bilateral extensive calcification in the dentate nuclei (figure 1A), basal ganglia, and subcortical white matter (figure 1B). On MRI T1 weighted images and T2 weighted images, calcification was visible as a low intensity signal. The patient was given fluoxetine (20 mg/day) and bromazepam (6 mg/day). At follow up, 1 year later, the patient’s clinical status was unchanged, as was the CT.

Case 2, a 64 year old right handed woman was admitted to hospital for evaluation of a Raynaud’s phenomenon which had lasted for more than 10 years. At physical examination, sclerodactylly and tightness of the facial skin

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were noted. Telangiectasias were present on the face, hands, and palate. The patient complained of pyrosis. Oesophageal manometry showed abnormalities of oesophageal motility. Hand radiography disclosed soft tissue calcifications. Anticientromere antibodies were positive at a 1/1000 dilution. A CREST syndrome was diagnosed and the patient was given buflomedil (600 mg/day) and prednisone (25 mg/day).

One year later she was admitted for the evaluation of recent transient ischaemic attacks (TIAs). During the previous week she had experienced three bouts of expressive aphasia and right hemiplegia, each lasting about 10 minutes. She never smoked and did not have diabetes, hypertension, or dyslipidemia. The neurological examination was normal. Routine blood chemical tests were normal (serum electrolytes, urea, creatinine) including phosphorus and calcium metabolism (serum parathyroid hormone concentration, blood calcium and phosphorus, 25-hydroxyvitamin D, 1,25-dihydroxyvitamin D, calcitriol, and phosphaturia). Cranial CT showed bilateral calcifications of the basal ganglia, and faint calcifications of the dentate nuclei and rubral nucleus. Moderate cerebral and cerebellar atrophy was noted. Duplex carotid ultrasound and 24 hour ECG recording were normal. Echocardiography showed a normal left ventricle with an ejection fraction of 60%. There was mild calcification and a thickening of the mitral valve leaflets. Aspirin (250 mg daily) was given at hospital discharge. No further TIA occurred during a 5 year follow up and the patient's clinical status has remained unchanged.

Systemic sclerosis is a multisystem disease predominantly affecting the skin, lungs, vascular system, and gastrointestinal tract. Neurological involvement occurs in a few patients (ranging from 0.8 to 18.5%) including cranial nerve abnormalities, peripheral neuropathy, CNS vasculitis, and autonomic peripheral neuropathy. To our knowledge, extensive cerebral calcifications have not yet been reported. In our patients, as in the patients of Heron et al, the brain calcifying process may be related to primary cerebrovascular changes induced by systemic sclerosis.

Routine brain CT examination in systemic sclerosis could help to determine the true incidence of basal ganglia calcifications and their clinical relevance.

All tibial foot: an electrophysiological artifact

Yamashita et al claim they have proved an “all tibial foot” for the motor innervation, an anomalous dual innervation of the tibialis anterior muscle by the deep peroneal and posterior tibial nerve, and a sensory conduction of the skin between the first and second toes by the tibial and deep peroneal nerve in a patient. To support their view they quote the letters of Linden and Berlit and of Glocker et al, ignoring our letter and that of Magistris and Truffer, both considering the conclusions of Linden and Berlit and Glocker et al to be wrong. I point out that the mentioned letter of Linden and Berlit and our response to it were published in the same issue.

We have recorded a compound muscle action potential (CMAP) with a negative initial deflection on tibial nerve stimulation in 83% of 50 subjects, using a surface electrode over the extensor digitorum brevis. In the same subjects no potential was recorded by means of a concentric needle electrode inserted in the extensor digitorum brevis. In our view, this proves that the CMAP recorded by surface electrode over the extensor digiti- torum brevis on tibial nerve stimulation is a remote potential originated in the plantar muscles (volume conducted potential). Furthermore, we consider that the CMAP recorded over the tibialis anterior muscle by surface electrode on tibial nerve stimulation in the popliteal fossa, as reported by Yamashita et al, represents a volume conduction potential originating in the foot and toe flexors.

The sensory nerve action potential recorded dorsally in the space between the first and the second toes on tibial nerve stimulation could also be a volume conducted potential originating in the first common plantar digital nerve, as the distance between this nerve and the recording electrode is short. Such volume conduction phenomena are known to occur on surface recordings from the median nerve at the wrist in severe carpal tunnel syndrome, when the fourth finger is stimulated. It is unclear why Yamashita et al could not record a CMAP over the extensor digitorum brevis bilaterally on deep peroneal nerve stimulation in their young patient who did not have neuropathy. A probable explanation is a bilateral aplasia of the extensor digitorum brevis, comparable with the known aplasia of the thenar. The
BOOK REVIEWS


If it moves - measure it. Such is the trend in psychiatry and this has led to a proliferation of assessment scales of variable utility; from the esoteric to the ubiquitous. This book has them all, and is quite genuinely, one of the most useful volumes I have seen for a very long time. It covers everything from the AMTS through the MMSE to the KEG cognitive test. Each scale is presented in full together with a short commentary, critical references and, usefully, an estimated time taken to perform the test together with an address to contact the original author. The scales presented are divided into those covering depression, neuropsychiatric assessments, activities of daily living, global assessments, visible assessments, delirium, caregiver assessments and scales for memory function. This organisation, together with a useful and functional index, will make the task of selecting an appropriate scale much easier in the future. Some of these scales are covered by patent law, and only quibble is that it would have been useful to know which instruments can be reproduced and for what purpose without fear of being billed for the privilege. Maybe highlighting such information would give unpatented authors a stimulus to visit their lawyer and therefore ensure the book is a prayer answered and not merely indicated, and what treatments are clinically effective. Despite these drawbacks, Surgeons who manage lumbar disc disorders will want to have a copy of this book, either on their own or their department's library shelf.

RODNEY LAING


My first sensation is that such a book is long overdue. There is a paucity of books written by clinicians on this subject with the many gloom and doom tracts written by sufferers who have apparently been ill with CFS/PVS/ME for 20 years and which depress the hell out of the patients that I see. Why this lack? Undoubtedly because relatively few doctors want to put their heads above the parapet and profess to a great expertise or desire to see patients with it. It is a condition for which there is no test, no objective monitoring of progress, whose symptoms are so vague that they repeatedly defy classification and can only be catalogued. Among those patients with a genuine postinfectious fatigue (who mainly get better relatively quickly), one usually has to reassure them that one is not dismissing their symptoms as psychiatric if one does suggest such a referral. What proportion of patients I wonder go to psychiatrists as their first hospital referral? I would guess very few, as although psychiatric illness is quite common in the chronic fatigue syndrome group, most patients with chronic fatigue syndrome are very reluctant to be seen on first presentation by psychiatrists. One usually has to reassure them that one is not dismissing their symptoms as psychiatric if one does suggest such a referral.

So what about the book? Firstly it must say that it comes armour plated against criticism with a pack of glowing references from ennobled and famous psychiatrists on the back. Presumably the authors chose these referees whose major function in common is distinction in fields other than chronic fatigue syndrome. So, for whatever reason they were chosen the result is also to make this reviewer feel somewhat pinned to review if one has the temerity to disagree with such a company.

Chronic fatigue and its Syndromes is written by three psychiatrists. That in itself is a little odd as although psychiatric illness is quite common in the chronic fatigue syndrome group, most patients with chronic fatigue syndrome are very reluctant to be seen on first presentation by psychiatrists. One usually has to reassure them that one is not dismissing their symptoms as psychiatric if one does suggest such a referral. What proportion of patients I wonder go to psychiatrists as their first hospital referral? I would guess very few.

The book is very comprehensive. As a source of references on the subject of fatigue it is encyclopedic. It begins with a nice history of the syndrome. Of a 428 page book only 44 pages cover assessment of the patient and a very telling paltry 14 are devoted to treatment. What is all the rest? The answer is that the authors have attempted to deal with every fatigue associated subject including: etiology of chronic fatigue syndrome (summary - not known) and in a move which Sir Humphrey Appleby might have described as "courageous" they have ventured way outside their own areas of expertise into subjects such as psychoimmunity. The result is a collection of comprehensively referenced and uncriedically selected facts from the literature, many of which are very useful, such as the collected data on enterovirus and chronic fatigue syndrome, and some of which is of uncertain value—for example, "divorced and separated women have higher titres of EBV-VCA antibodies" quoted out of context but not unrepresentatively. To glean interesting and important information from this book requires a fair degree of skill in distinguishing timber from forest.

When in their own field of psychiatry there is, unsurprisingly, a much more confident and informative air to the book. It is...
disappointing and somewhat introspective that they do not think that subjects such as neurobiology, microbiology, and immunology might justify equally expert contributors. Is it an easy read? There is no easy way to write on a subject such as this, bedevilled by lack of objective facts and the writers who have chosen a discursive, debating style which when not tightly controlled can slip towards verbosity. This, however, is not a standard medical text book and it would be unfair to make direct comparisons.

Is this a useful book? As a source of references, yes. As a guide to clinicians I am less convinced. The two commonest questions publicly mentioned are: “How long does the illness last?” and “What are my chances of recovery?” Cognitive behavioural therapy is concisely and usefully summarised. There is a single page on complementary treatment, which again is often an area of considerable interest to patients notwithstanding the lack of controlled evidence for or against it. On that note it is perhaps appropriate to quote one very intelligent patient with chronic migraine whom I saw who became ill during his PhD. “I’ve done a lot of reading and internet searching about the causes and possible cures of this, before I came to see you” he said “It seems to me that most people don’t know a lot about what’s going on and nobody seems to think it odd that after glan- dular fever you can feel unwell for quite a while, and I continued “If most people get better from this” (and many do) and if you try all sorts of other treatments like homeopha- thy, acupuncture, meditation then the one you were doing when you got better will be the one you stand back cured”. He had of course discovered the maxim of entertaining the patient while nature gets them better. One could do worse perhaps than keep patients with chronic fatigue syndrome occupied, if not necessarily always entertained for quite a while, by recommending this book for them to read. They might end up with a greater understanding of fatigue and they would cer- tainly know a little really is known and the search for an instant cure (which drives many of them) is futile.

JOHN EDMEADS


There is something about the anachronistic binding of the Handbook of Clinical Neurology series that is rather reassuring. Surely if the lack of objective facts and the writers have strayed through the wards of the general hospital “faced with a dizzying array of neurologic problems”. Most British neurologists have a ward referral practice and will not be impressed by its elevation to the status of a specialty and still less by the aggrandizal title Martin Samuels has chosen for it. Which is a shame, because this book deserves a wide readership. One in the Butterworth Hein- mann series of Blue Books of Practical Neu- rology, it is attractively produced and reason- ably well illustrated. Its place on your bookshelf is earned by collating the neurolog- ical aspects of diverse medical specialties: to name a few, organ transplantation, ortho- paedics, oncology, and urology. A quick glance here before a ward referral might well be rewarding. However, the chapters on more conventional neurological topics, such as neuro-ophtalmology, stroke, and seizures are probably briefer than most neurologists would require. So, for those made dizzy by the delirious patient after bypass, the en- cephalopathic flapping tremor of the sick ward, or the weak and wasted on intensive care units, this is for you. And remember: you are a hospitalist neurologist.

ROBERT MACFARLANE


It seems that there is a new specialty in North American neurology, hospitalists. The drive to promote managed health care has apparently resulted in hospitals “filled to overflowing with more acutely ill patients requiring a pace of evaluation unprecedented anywhere in the world”. Enter the hospitalist, unencumbered by the demands of neurology and it is sponsored by the European Associ- ation of Neurosurgeons. The intention is to publish reviews of topics in which recent advances have been made, and to invite acknowledged experts to present in depth accounts of established knowledge in various fields of neurosurgery. The advances under review in this volume are the contribution of the septal region to memory, the in vivo metabolic investigation of cerebral gliomas with PET, and the use of image guidance in neurosurgery. In the tech- nical standards society, Drs. Van Vlissingen and Yasarlig discuss the endovascular treat- ment of arteriovenous malformations, Dr. Guglielmi reports on the interventional neuroradiological treatment of intracranial aneu- ryms, and Dr. Stussman and colleagues describe the management of benign in- ntracranial hypertension.

This book is aimed primarily at young neu- rosurgeons, but is an excellent source of refer- ence for those who are already trained. Of course, it is in its 24th volume is a testament to its success in achieving this objective.

This is one of a new type of medical textbook written to meet the needs of an increasingly informed patient population. Aimed very much at those with multiple sclerosis, their families, and care-workers, it is simple and clearly written with jargon and technical terms kept to a minimum but without patronising. Chronic diseases, and especially multiple sclerosis, are not always well managed by the physician. Too many of us think that there is no cure and feel helpless in a busy clinic faced with the patient with a long list of complaints. There are too few specialty multiple sclerosis clinics in which neurologists, pain specialists, urologists, physiotherapists etc liaise.

Patients often feel left in the dark, unaware which of their symptoms can be attributed to their multiple sclerosis and whether it is “worth bothering a busy doctor”. Many can cite bad experiences in their past when they have been fobbed off with well meaning reassurance but without practical help. Dysaesthesia, sexual problems, and urinary incontinence are only a few of the symptoms that can bring misery to the lives of patients and their families and which are poorly addressed by doctors. This book, in a language accessible to most (and with a glossary to explain some unavoidable jargon), explains multiple sclerosis, its symptoms, and what might realistically be obtained in terms of symptom control. All aspects are covered and nothing considered too trivial; constipation or cold feet might be extremely trying for an individual patient and each is considered.

The old idea that it doesn’t help a patient to know too much about his disease (“it will only make him introspective and hypochondrial”) is outdated. Multiple sclerosis can hit anyone and patients now want, and deserve, to be informed. While doctors find it challenging to be faced with a patient equipped with the latest information downloaded from the internet or well informed having read a book such as this, this is a challenge to which we must be ready to rise.

This textbook provides the information patients want and fills the gap left by busy doctors. It should be marketed appropriately and we must be ready to respond to the reaction of patients. Perhaps someone with multiple sclerosis should have been invited to write this review.

GILLIAN HALL


During printing, the figure in this paper (p 164) was made darker than the original. The correct version appears below.

(A) T1 weighted MRI of the lesion. (B) Anatomical scheme of the centre of the lesion, corresponding to the leftmost image of the bottom row of the MRI. The right side of the figures corresponds to the left side of the brain. GP=globus pallidus; Cd=caudate nucleus, Acb=nucleus accumbens; CI=capsula interna; DB=diagonal band.