

The neurology of old age

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Neurological disorders in older people result in many acute hospital admissions and substantial long-term disability. Although neurologists treat many older people and geriatricians treat many neurological disorders, there are often few links between the two specialties. This conference provided an opportunity for neurologists and geriatricians to share knowledge on the latest developments in research and clinical practice. By bringing together the perspectives of both specialties, it aimed to increase clinicians' confidence in the assessment and management of complex elderly patients with neurological conditions.

The 'normal' neurology of ageing

Community studies of healthy older people have shown a high prevalence of certain neurological signs, including diminished ankle jerks, up-going plantar responses, and reduced distal vibration sense (Table 1).^{1,2} This knowledge is crucial to interpreting neurological examination findings in an older person: physical signs are more likely to be incidental, rather than related to the presenting problem. But are such changes really part of 'normal' ageing? There is good evidence that older people with more than three abnormal neurological signs have increased mortality over the next 10 years.² In addition, increasing numbers of neurological signs are associated with higher rates of falls and functional impairment.³ It seems likely that these signs actually reflect subclinical neurological disease. The crucial question for future research is whether these patients might benefit from interventions such as treatment of vascular risk factors or exercise programmes to improve functional abilities.

The interpretation of neurophysiological investigations is also more complicated in older people. Over the age of 60, normal nerve conduction studies begin to deteriorate, with decreased amplitudes and velocities. On an electromyography (EMG), motor unit potentials increase in duration and amplitude, meaning that changes that would be considered suggestive of a neurogenic process in a young person may become inconclusive. On an electroencephalograph (EEG), the increase in temporal slow activity with age makes EEG less useful in the investigation of possible seizures in older people.

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Table 1. Prevalence of selected neurological signs in community-dwelling older adults without a diagnosis of neurological disease.

	Patients over 65 (%)	Patients over 75 (%)
Diminished ankle jerks	22	33
Reduced distal vibration sense	17–31	26
Reduced voluntary upgaze	20	28
Up-going plantars	25	30
Palmo-mental reflex	14–19	21–24

Epilepsy in older people

The differential diagnosis of possible 'seizures' is particularly wide in older patients.⁴ Mimics of epilepsy with loss of awareness include vasovagal syncope, cardiac dysrhythmias, psychogenic non-epileptic seizures and hypoglycaemia. In elderly patients, syncope following meals is particularly common and the recovery may be uncharacteristically slow. Non-epileptic seizures, more often considered in younger patients, do occur in elderly patients and may also take the form of an 'absence'. Mimics of partial seizures include transient global amnesia, migraine, transient ischaemic attack (TIA) and panic disorder. Although the abrupt onset and negative symptoms of TIAs often makes this an easy diagnosis, 'shaking TIAs' can occur, particularly in the context of critical internal carotid artery stenosis. An eyewitness account is the most important part of the history, but can be difficult to obtain in elderly people who live alone.

Headache in old age

Sinister causes of headache are slightly more common in older than younger patients, but they remain very rare.⁵ Despite this, many older patients with new headache will need brain imaging to exclude a structural cause. Temporal arteritis should be considered in all patients over 60 with headache, particularly if it is unilateral or associated with local tenderness. Other systemic causes of headache to consider include hypertension, acute angle glaucoma, obstructive sleep apnoea and hypothyroidism.

Most headaches in older people are benign, with migraine the most common cause. Migraine may have less typical features in older people, with less prominent throbbing and photophobia but more frequent autonomic features. Management of migraine follows the same principles as in younger people, but lower starting doses and slower titration of medication are recommended.

Conference programme

The normal neurology of ageing – how physical signs differ

Dr Jim George, Cumberland Infirmary

The neurophysiology of old age

Professor Jonathan Cole, Poole Hospital

Gait analysis

Dr Geraint Fuller, Gloucester Royal Hospital

Falls

Dr Finbarr C Martin, Guy's & St Thomas' NHS Foundation Trust, London

Epilepsy in old age

Dr Yvonne Hart, John Radcliffe Hospital, Oxford

Chair: Professor Graham Mulley, president, British Geriatrics Society

Parkinson's disease

Dr Doug MacMahon, Cambourne and Redruth Hospital, Cornwall

Headache in old age

Dr Heather Angus-Leppan, Royal Free Hospital, London

Cognitive impairment

Professor John Starr, University of Edinburgh

When to send for the neurosurgeon

Professor John Pickard, University of Cambridge

Stroke

Dr John Bamford, Leeds General Infirmary

Urinary incontinence

Professor Clare Fowler, The National Hospital for Neurology and Neurosurgery, London

Stroke

The incidence of ischaemic stroke increases dramatically with age. Many older patients also have pre-stroke disability which affects their capacity for rehabilitation. When diagnosing acute stroke, the important mimics to consider are seizures, sepsis, syncope and somatisation. Thrombolysis with alteplase is not currently licensed for patients over 80. The ongoing IST-3 trial will assess the efficacy of thrombolysis beyond this age cut-off, and has already recruited more than 800 patients over the age of 80.

The diagnosis of TIA now leads to prescription of multiple therapies to modify vascular risk, so accurate diagnosis is more important than ever. The National Stroke Strategy suggests that most patients with TIA should have magnetic resonance imaging (MRI) of the brain to help confirm the diagnosis and localise the lesion. However, interpretation of MRI in patients with TIA is not straightforward.⁶ The sensitivity of diffusion weighted MRI is less than 10% in TIAs of duration less than an hour, yet asymptomatic infarcts are commonly seen on MRI in older people. Risk stratification

using the ABCD2 score allows us to predict which patients are at highest risk of stroke. There is good evidence that high-risk patients benefit from rapid intervention with endarterectomy where appropriate or with immediate anti-platelet, statin and anti-hypertensive treatment.

Neurosurgery

Biological age is much more important than chronological age in assessing patients' suitability for neurosurgical intervention. Straightforward procedures with established benefits, such as drainage of subdural haematomas, may be appropriate at any age. It may be possible to use a less invasive approach in older people (eg decompression rather than total excision of a vestibular schwannoma) to ensure that the benefits of surgery outweigh the risks. As less invasive surgical techniques are developed, for instance in the field of degenerative spinal disease, neurosurgical intervention may become a realistic option for more older patients.

Incontinence

Urinary incontinence is very common in older people, with about 30% of over 65s reporting overactive bladder symptoms.⁷ Urodynamic changes occur in healthy older people, but most remain continent despite these changes in lower urinary tract function. Incontinence is often multifactorial and precipitated by superimposed changes within and beyond the lower urinary tract.

Functional imaging studies have provided new insights into the neural control of micturition.⁸ Afferents send signals of the bladder filling up through the spinal cord to the peri-aqueductal grey. These inputs are then processed through the thalamus, hypothalamus, insula, pre-frontal cortex and anterior cingulate cortex, which exert tonic inhibitory control on the peri-aqueductal grey and pontine micturition centre. This inhibition is released once an appropriate situation in which to void is reached. Efferents from the pontine micturition centre then signal to the bladder to initiate micturition. Thus, damage in many parts of the nervous system, including the brain, spinal cord, cauda equina or pelvic nerves, can result in disturbance of normal voiding.

Incontinence in frail older people without frank dementia or cerebrovascular disease seems to be associated with falls, cognitive impairment and depression, perhaps due to underlying small vessel disease. Urge incontinence and nocturia are both more common in older people with more severe leukoaraiosis on imaging.⁹ White matter lesions in right frontal regions may be particularly important in disrupting the normal pathways controlling bladder function.

Falls

Falls affect at least one third of older people annually, and the incidence and severity of consequences increases with age and

co-morbidity.¹⁰ Falls are usually multifactorial, resulting from an interaction between specific impairments (particularly of gait and balance), behaviour and the environmental context. Contributing factors may include vestibular dysfunction, orthostatic hypotension, cardiac arrhythmias and postural instability. However, at least 50% of variation in outcome is associated with general frailty rather than being condition specific, so training to improve strength, endurance and balance may be a useful intervention for many patients.¹¹ Randomised controlled trials have not yet provided conclusive evidence of benefits from such exercise programmes, but studies are ongoing.

Conclusions

Treating neurological conditions in older people is a core part of the work of both neurologists and geriatricians. Diagnosis may be challenging in complex older patients, where clinical features are often atypical and the history may be more difficult to obtain. Neurological signs incidental to the presenting problem are common and neurophysiological tests more difficult to interpret. Common symptoms, such as walking difficulties and falls, are often multifactorial and can result from pathology at many sites within and beyond the nervous system. Functional assessments and generic interventions to improve strength, endurance and balance are an important part of management. Older patients benefit from most of the same therapeutic approaches as younger patients. The advent of less invasive neurosurgical approaches and the developing evidence base for stroke thrombolysis beyond current age limits may allow new interventions to be offered to more older patients.

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