

Parkinson's disease in the acute hospital

Sion L Jones, ST5 trainee in geriatric medicine; **John V Hindle**, consultant geriatrician and clinical senior lecturer

School of Medical Sciences
University of Bangor
Llandudno Hospital

Parkinson's disease (PD) is the second most common neurodegenerative disease, with a prevalence of 1.8 per 100 in people aged 65 or over in Europe.¹ Historically, it has been regarded as a motor condition characterised by rigidity, bradykinesia and tremor. Increasingly, however, non-motor complications of the disease, such as depression, dementia and autonomic dysfunction, are being recognised as significant contributors to morbidity.

Parkinson's disease medications: 'get it on time'

Medication concordance is a fundamental part of the management of PD. A vicious cycle of dysphagia and difficulties with drug delivery can be initiated by:

- failure to prescribe usual medications at the correct times
- inflexible timing of drug rounds
- injudicious application of nil by mouth (NBM) orders.

Falls, fractures and aspiration pneumonia are potential complications. One study found that medications were omitted or prescribed inappropriately in 74% of emergency admissions of PD patients,² 61% of whom developed significant sequelae including a hip fracture and admission to intensive therapy unit with severe akinesia. The National Institute for Health and Clinical Excellence guidelines for PD advocate self-medication as a strategy to circumvent this problem.³ The Parkinson's UK 'get it on time' campaign promotes medication concordance by providing checklists and an audit toolkit which are available online.⁴

Swallowing

On objective assessment, nearly all PD patients have some degree of swallowing dysfunction,⁵ although this may become apparent only as the disease progresses.⁶ Clinicians should be alert to the possibility of aspiration pneumonia. Often the only clue may be a temperature rise and oxygen denaturation.

Management

The management of dysphagia includes early referral for speech and language

therapy assessment and/or multidisciplinary swallowing assessment (Fig 1). Referral for percutaneous endoscopic gastrostomy (PEG) feeding is rarely required in idiopathic PD and should be considered only as a last resort.⁷ Swallowing problems are less pronounced in dyskinetic patients,⁸ indicating a degree of responsiveness to levodopa and emphasising the need to maintain delivery of PD medications. If possible, PD patients in the later stage of the disease should be encouraged to eat during 'on' periods. Novel routes of drug

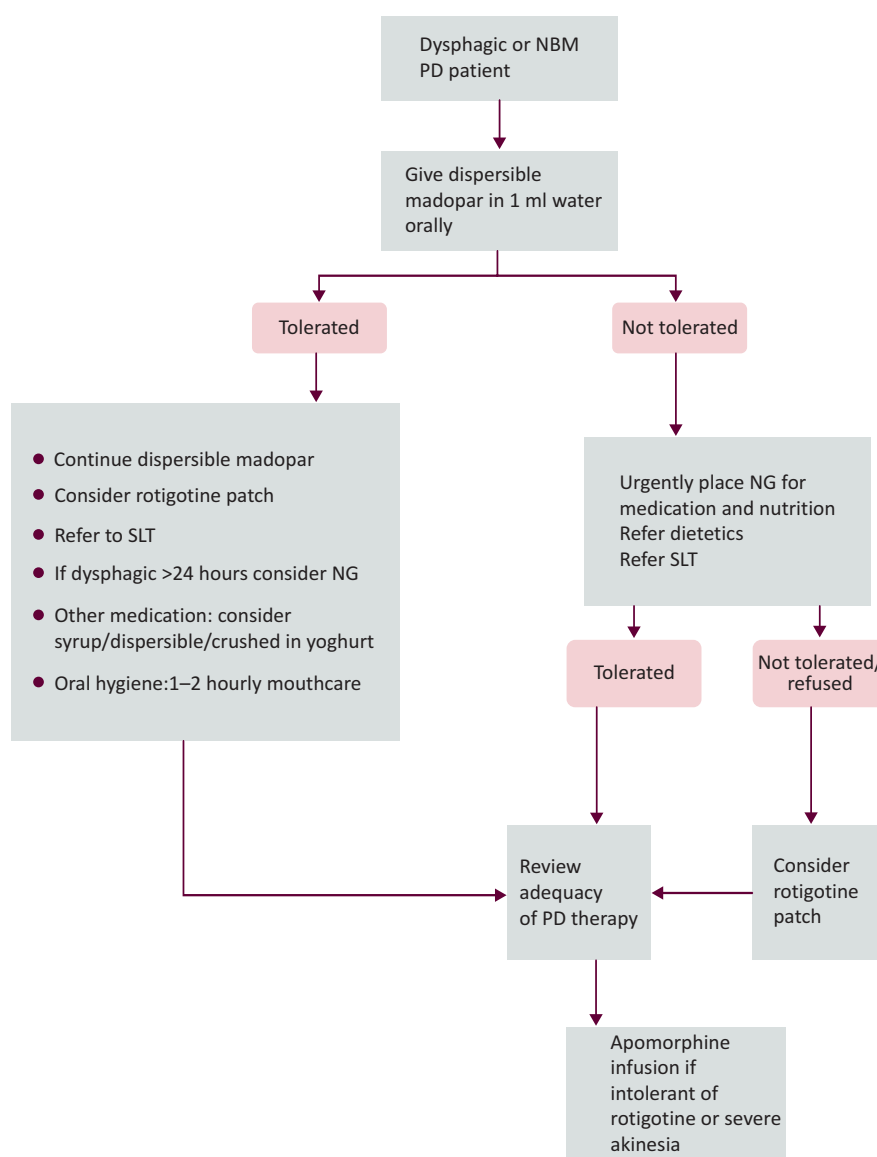


Fig 1. Management of the dysphagic Parkinson's disease (PD) patient. NBM = nil by mouth; NG = nasogastric; SLT = speech and language therapy. (Adapted from the Parkinson's Disease Nurse Specialist Association website).

administration may need to be sought. Co-careldopa (Madopar®) is available in soluble form and a nasogastric tube can provide a temporary solution for the provision of PD therapy.

Rotigotine. A non-ergot dopamine agonist, rotigotine, is available as a 24-hour transdermal patch. Although initially developed as a therapy for early stage PD, its utility in dysphagic or NBM hospital patients is being increasingly recognised. One case report describes its use in an akinetic crisis in a patient in whom amantadine and apomorphine were contraindicated.⁹ Its ease of administration and relatively uncomplicated switch over from the oral to transdermal route makes it an attractive option in elective abdominal surgery where interruption of enteral delivery of medications is inevitable.¹⁰

Anaesthesia. Patients with PD require detailed assessment before anaesthesia¹¹ because PD can cause respiratory, autonomic, cardiovascular and gastrointestinal problems which may interfere with anaesthesia. Management is particularly challenging due to potential drug interactions and the need to avoid cessation of PD treatments (Fig 2). Parkinson's UK website provides a helpful information sheet for patients undergoing anaesthesia.¹²

Parkinsonism-hyperpyrexia syndrome

Clinically indistinguishable from neuroleptic malignant syndrome (NMS), the rare but potentially fatal condition of parkinsonism-hyperpyrexia syndrome is characterised by rigidity, hyperpyrexia and stupor (Fig 3).¹³ It is usually precipitated by abrupt withdrawal or malabsorption of levodopa^{14,15} but can arise secondary to triggers such as infection or anaemia.¹⁶ The condition is characterised by a sustained unresponsiveness to dopamine or dopaminergic therapy which may last days to weeks and must not be interpreted as treatment failure.¹⁴ In most cases, muscle enzymes will be significantly elevated.

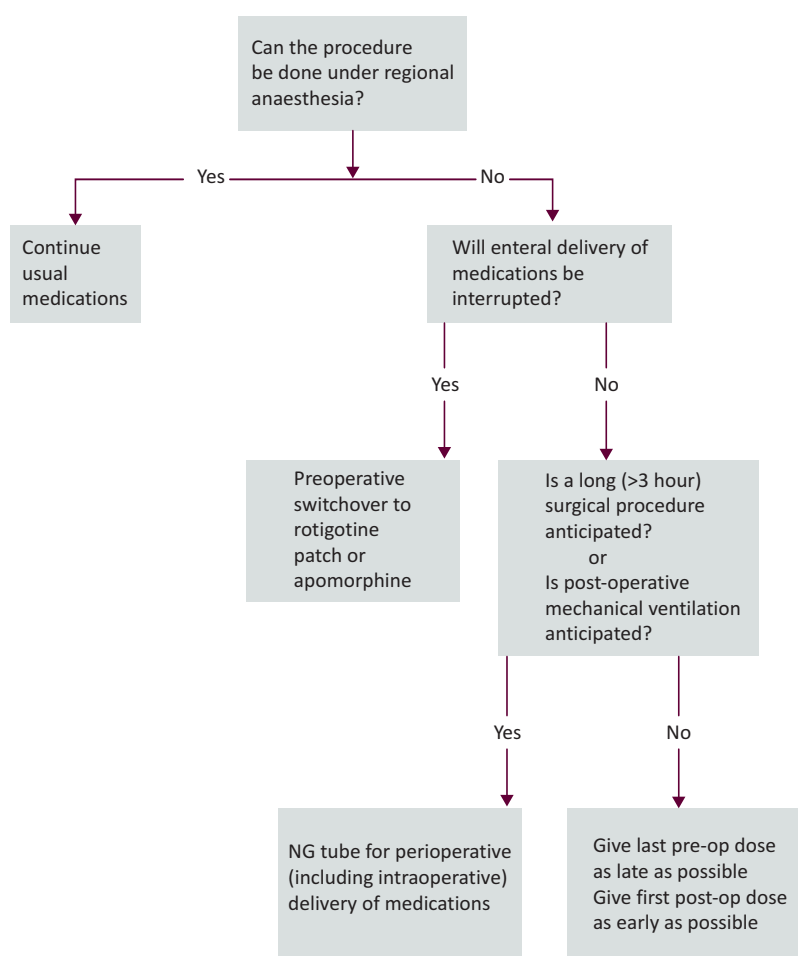


Fig 2. Maintaining Parkinson's disease (PD) drug therapy during perioperative period (not including patients with deep brain stimulation). NG = nasogastric.

Management

Basic supportive care includes intravenous (iv) hydration, temperature control and thromboprophylaxis. Mechanical ventilation may be necessary. As in NMS, dantrolene can be used to treat rigidity and hyperpyrexia (Fig 3).¹³ Although not established treatments, iv steroids¹⁷ and electroconvulsive therapy¹⁸ have also been successfully used. Dopaminergic replacement therapy is the mainstay of treatment by nasogastric levodopa administration,

continuous subcutaneous administration of the dopamine agonist apomorphine or a combination of both.¹⁹ Apomorphine must be given under expert supervision: it is a powerful emetic and prior loading with domperidone (20 mg tds orally or 60 mg tds rectally) is vital.

Falls

Falls in PD are usually multifactorial in origin. Postural instability is common with advancing disease as are visuospatial

Key points

Avoid abrupt withdrawal of antiparkinsonian therapy

Be alert to the possibility of Parkinsonism-hyperpyrexia syndrome

Seek early specialist help

KEY WORDS: delirium, dysphagia, falls, Parkinson's disease, palliative

deficits and orthostatic hypotension. Executive dysfunction is also prevalent in PD and associated with an increased risk of falling.²⁰ Fracture risk should be quantified and initiation of bone protection considered. Medication review should aim to identify common culprit medications such as benzodiazepines. Dopaminergic agents can exacerbate postural hypotension, but considered assessment is required before hastily reducing medications.

Management

The management of orthostatic hypotension involves non-pharmacological measures such as advice on hydration, avoiding rapid positional changes and compression stockings. Pharmacological therapies such as fludrocortisone are also used.²¹ The evidence for physiotherapy in reduction of falls in late-stage PD is limited, but involvement of physiotherapists and occupational therapists is essential in

promoting confidence and managing a safe discharge from hospital.

Dyskinesias

Dyskinesias affect approximately 40% of patients and are pathognomic of advancing PD. Occasionally patients present to acute units with severe dyskinesia. This is rarely life-threatening but can cause considerable distress and weight loss, with rhabdomyolysis and raised muscle enzymes rare complications.²² Non-PD specialist clinicians may mistakenly tell patients that they are 'overtreated' because of their dyskinesia or hallucinations, an inappropriate explanation which can cause distress to patients.

Management

A very graduated reduction in dopaminergic therapy may help reduce dyskinesias but can exacerbate 'off' periods. Oral

amantadine (100 mg 2–4 times daily) may reduce dyskinesias, but is perhaps limited by its anticholinergic side effects and subsequent risk of delirium and psychosis, especially in older people.²³ Introduction of long-acting dopamine agonists or continuous subcutaneous apomorphine with a reduction in levodopa dose may help over a period of months but will not be helpful in the acute setting.

Neuropsychiatric complications

Neuropsychiatric complications of PD are common. In one cohort studied over 15–18 years, 84% developed cognitive decline, with 48% satisfying the criteria for dementia and 50% reporting hallucinations.²⁴ Hallucinations and psychosis are due to a mixture of the cognitive, visuospatial and neurochemical changes of the disease itself combined with the effects of dopaminergic drugs.²⁵ In the acute setting, a reversible precipitating cause for delirium such as infection or electrolyte disturbance should first be sought.

Management

Neuroleptic drugs such as haloperidol should be avoided in the agitated patient as they can exacerbate the motor features of PD. If it is absolutely necessary to use sedation in severe agitation, a short-acting benzodiazepine such as lorazepam is preferred.

Delirium or psychosis may be associated with the introduction of a new antiparkinsonian medication. A graduated withdrawal of therapy may then be required and a 'last in, first out' approach is logical. Under expert supervision, drugs commonly implicated in the development of psychosis, such as anticholinergics, selegiline and amantadine, should be withdrawn first.²⁵ The atypical neuroleptic clozapine is particularly effective in psychosis in PD,²⁶ but is not appropriate in the acute setting due to strict licensing restrictions relating to the small risk of fatal agranulocytosis. Quetiapine in small doses (25–50 mg) is used widely as it is felt to be safer than other atypical neuroleptics, but the

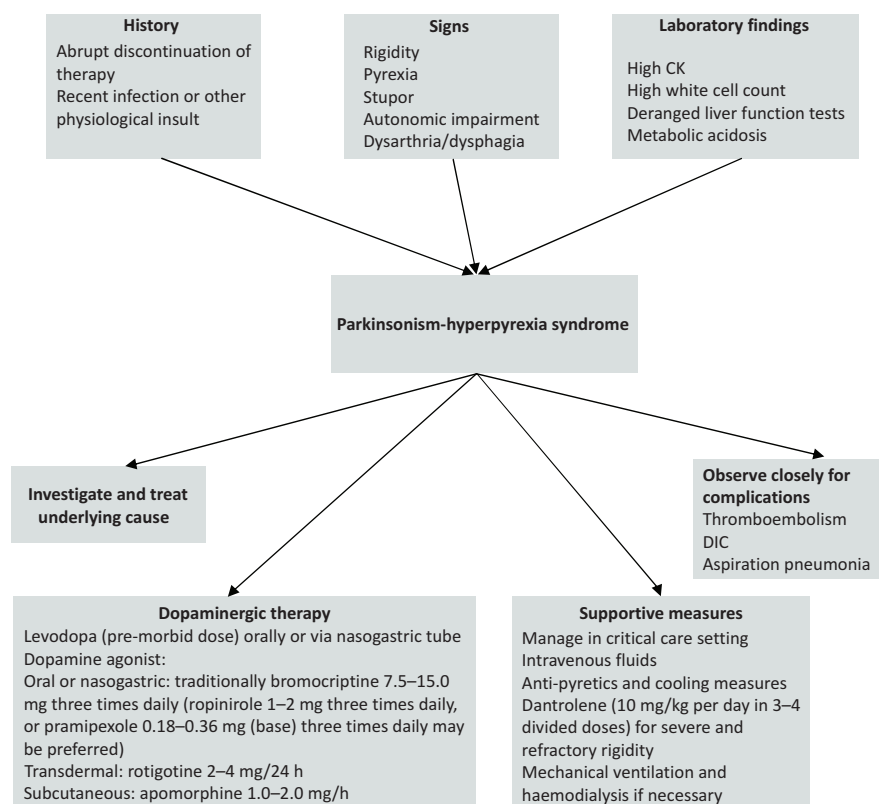


Fig 3. Clinical features and management of the parkinsonism-hyperpyrexia syndrome.

CK = creatine kinase; DIC = disseminated intravascular coagulation. Reproduced with the kind permission of Dr Donald Grosset.

evidence to support its use is limited. It may be that much of its effect is due to sedation, which can be a limiting side effect in older people. There is evidence that it is associated with a similar increased mortality risk in people with dementia to that reported with other atypical neuroleptics.²⁷

Admission with delirium may herald the onset of dementia; once stabilised, the patient should be evaluated for a fixed cognitive deficit. Rivastigmine, a cholinesterase inhibitor given orally (1.5 mg bd initially) or as a transdermal patch (4.6 mg/24h), has been shown to confer modest benefits in terms of cognitive function²⁸ and may ameliorate symptoms of psychosis and hallucinosis.

Complex treatments

Increasing numbers of PD patients are undergoing complex treatments such as deep brain stimulation (DBS) implants or Duodopa® therapy.

Deep brain stimulation implants

Patients with DBS implants in situ usually present to the emergency department with problems that are not directly related to this treatment. For example, in a recent study mental changes were the most common presentation of patients with DBS for PD.²⁹ Very rarely, patients with DBS can present with lead erosion, equipment infection or battery failure leading to severe rebound akinesia. In these circumstances it is essential to seek urgent specialist advice. Patients requiring anaesthesia with DBS in place should be discussed with a specialist centre.

Duodopa

Duodopa® therapy involves intrajejunal gel infusion of levodopa administered through a modified PEG tube. Once established, most complications are likely to be technical problems with the tube such as displacement or blockage. This also requires specialist advice.³⁰

End of life

Most patients with PD die in hospital.³¹ Although traditionally palliative care teams have not managed PD patients, their value in managing the later stages of the disease is increasingly recognised. The emotional needs of affected patients and their care givers are similar to those with malignant conditions.³² Pain is an under-recognised symptom, affecting 40% of patients. Rigidity and immobility can be distressing and painful. Continuation of antiparkinsonian therapy is likely to improve symptom control at the end of life. The rotigotine patch³³ and subcutaneous apomorphine³⁴ have been used in dysphagic patients in the palliative setting. Taking food and fluid orally provides benefits beyond biological usefulness.⁷ A pragmatic approach to oral feeding in the dysphagic patient at the end of life should be employed.

Conclusions

Most patients are not admitted to hospital acutely with PD as their primary diagnosis.³⁵ Consequently the team responsible for the acute care will comprise non-PD specialists. A working knowledge of PD is therefore important across specialties, particularly an awareness of the potentially catastrophic consequences of drug withdrawal. Managing the interface between symptom control and drug side effects can be complex and challenging, particularly in the acutely ill patient. It is important to liaise with PD nurses and/or specialist PD physicians in the management of the condition in the acute setting. Perhaps most important of all is to listen closely to the patients who are often expert and well informed by the cumulative experience gained from living with the disease.

References

- de Rijk MC, Launer LJ, Berger K *et al*. Prevalence of Parkinson's disease in Europe: a collaborative study of population-based cohorts. Neurologic Diseases in the Elderly Research Group. *Neurology* 2000;54(Suppl 5):S21–3.
- Magdalinou KN, Martin A, Kessel B. Prescribing medications in Parkinson's

disease (PD) patients during acute admissions to a District General Hospital.

Parkinsonism Relat Disord 2007;13: 539–40.

- National Institute for Health and Clinical Excellence. *Parkinson's disease. National clinical guideline for diagnosis and management in primary and secondary care*. London: NICE, 2006.
- Going into hospital*. www.parkinsons.org.uk/advice/publications/going_into_hospital.aspx
- Potulska A, Friedman A, Królicki L, Sychala A. Swallowing disorders in Parkinson's disease. *Parkinsonism Relat Disord* 2003;9:349–53.
- Edwards LL, Quigley EM, Pfeiffer RF. Gastrointestinal dysfunction in Parkinson's disease: frequency and pathophysiology. *Neurology* 1992;42:726–32.
- Royal College of Physicians. *Oral feeding difficulties and dilemmas. A guide to practical care, particularly towards the end of life*. Report of a Working Party. London: RCP, 2010.
- Monte FS, da Silva-Júnior FP, Braga-Neto P, Nobre e Souza MA, de Bruin VM. Swallowing abnormalities and dyskinesia in Parkinson's disease. *Mov Disord* 2005;20:457–62.
- Dafotakis M, Sparing R, Jurek A, Block F, Kosinski CM. Transdermal dopaminergic stimulation with rotigotine in Parkinsonian akinetic crisis. *J Clin Neurosci* 2009;16:335–7.
- Korczyn AD, Reichmann H, Boroojerdi B, Häck HJ. Rotigotine transdermal system for perioperative administration. *J Neural Transm* 2007;114:219–21.
- Nicholson G, Pereira AC, Hall GM. Parkinson's disease and anaesthesia. *Br J Anaesth* 2002;89:904–16.
- Anaesthesia and Parkinson's*. www.parkinsons.org.uk/pdf/FS36_AnaesthesiaandParkinsons.pdf
- Newman EJ, Grosset DG, Kennedy PG. The parkinsonism-hyperpyrexia syndrome. *Neurocrit Care* 2009;10:136–40.
- Onofri M, Thomas A. Acute akinesia in Parkinson disease. *Neurology* 2005;64:1162–9.
- Takubo H, Harada T, Hashimoto T *et al*. A collaborative study on the malignant syndrome in Parkinson's disease and related disorders. *Parkinsonism Relat Disord* 2003;9(Suppl 1):S31–41.
- Tackenberg B, Möller JC, Eggert K, Sommer N, Oertel WH. Akinetic crisis caused by rectus sheath hematoma and acute anaemia due to subcutaneous administration of apomorphine. *Mov Disord* 2006;21:126–7.
- Sato Y, Asoh T, Metoki N, Satoh K. Efficacy of methylprednisolone pulse therapy on neuroleptic malignant syndrome in

- Parkinson's disease. *J Neurol Neurosurg Psychiatry* 2003;74:574–6.
- 18 Meagher LJ, McKay D, Herkes GK, Needham M. Parkinsonism-hyperpyrexia syndrome: the role of electroconvulsive therapy. *J Clin Neurosci* 2006;13:857–9.
 - 19 Thomas A, Iacono D, Luciano AL, Armellino K, Onofrij M. Acute akinesia or akinetic crisis in Parkinson's disease. *Neurol Sci* 2003;24:219–20.
 - 20 Allcock LM, Rowan EN, Steen IN *et al*. Impaired attention predicts falling in Parkinson's disease. *Parkinsonism Relat Disord* 2009;15:110–5.
 - 21 Mostile G, Jankovic J. Treatment of dysautonomia associated with Parkinson's disease. *Parkinsonism Relat Disord* 2009;15(Suppl 3):S224–32.
 - 22 Pozzoni P, Tentori F, Corti M, Pozzi C. Rhabdomyolysis as a complication of Parkinson's disease. *G Ital Nefrol* 2002;19:13–7. [In Italian]
 - 23 Jankovic J, Stacy M. Medical management of levodopa-associated motor complications in patients with Parkinson's disease. *CNS Drugs* 2007;21:677–92.
 - 24 Hely MA, Morris JG, Reid WG, Trafficante R. Sydney Multicenter Study of Parkinson's disease: non-L-dopa responsive problems dominate at 15 years. *Mov Disord* 2005;20:190–9.
 - 25 Hindle J, Playfer J. *Parkinson's disease in the older patient*, 2nd edn. Oxford: Radcliffe Publishing, 2008.
 - 26 Pollak P, Tison F, Rascol O *et al*. Clozapine in drug induced psychosis in Parkinson's disease: a randomised, placebo controlled study with open follow up. *J Neurol Neurosurg Psychiatry* 2004;75:689–95.
 - 27 Schneider LS, Dagerman KS, Insel P. Risk of death with atypical antipsychotic drug treatment for dementia: meta-analysis of randomized placebo-controlled trials. *JAMA* 2005;294:1934–43.
 - 28 Emre M, Aarsland D, Albanese A *et al*. Rivastigmine for dementia associated with Parkinson's disease. *N Engl J Med* 2004;351:2509–18.
 - 29 Resnick AS, Foote KD, Rodriguez RL *et al*. The number and nature of emergency department encounters in patients with deep brain stimulators. *J Neurol* 2010;257:122–31. [Erratum: *J Neurol* 2010;257:158–9]
 - 30 Devos D; French DUODOPA Study Group. Patient profile, indications, efficacy and safety of duodenal levodopa infusion in advanced Parkinson's disease. *Mov Disord* 2009;24:993–1000.
 - 31 Snell K, Pennington S, Lee M, Walker R. The place of death in Parkinson's disease. *Age Ageing* 2009;38:617–9.
 - 32 Hudson PL, Towe C, Kristjanson LJ. Would people with Parkinson's disease benefit from palliative care? *Palliat Med* 2006;20:87–94.
 - 33 Christie J. The use of transdermal rotigotine in a patient with advanced Parkinson's disease and dysphagia. *Palliat Med* 2007;21:163–4.
 - 34 Dewhurst F, Lee M, Wood B. The pragmatic use of apomorphine at the end of life. *Palliat Med* 2009;23:777–9.
 - 35 Woodford H, Walker R. Emergency hospital admissions in idiopathic Parkinson's disease. *Mov Disord* 2005;20:1104–8.

Address for correspondence:
Dr JV Hindle, Llandudno Hospital,
Llandudno LL30 1LB.
Email: j.v.hindle@bangor.ac.uk