Parkinson's Disease Medication UHL Guideline

University Hospitals of Leicester NHS
NHS Trust

Trust Reference: B26/2017

1. INTRODUCTION

1.1 Guideline for the management of Parkinson's disease medication in adult patients presenting to UHL with a history of Parkinson's disease. This guideline applies to all staff within UHL who have responsibility for the prescribing, supply and administration of medicines to patients with Parkinson's Disease.

1.2 Parkinson's disease (PD) is a complex, neurological condition which requires appropriate management and monitoring. It has been demonstrated that PD patients have longer inpatient stays and higher hospital mortality rates than other groups of patients. Rapid recognition and appropriate management of PD specific hospital related problems may be delayed given the common lack of expertise in PD management of doctors, nurses, and allied healthcare professionals. Special considerations are required for patients who are admitted into hospital to ensure that symptom control is maintained during the inpatient period. Furthermore, inpatients with PD are at a higher risk of developing delirium, chest Infections (particularly aspiration pneumonia), urinary tract infections (UTIs), postural hypotension and falls.

1.3 Incidents involving PD medications are common in UHL. These are related to all stages involved in drug therapy; prescribing, administration and supply. Examples include patients designated 'Nil By Mouth' (NBM) going over a week without administration of any PD medication; patients receiving the incorrect dosage of their intended regimen throughout inpatient stay, and usual regimens being inappropriately altered due to apparent confusion caused by infections such as UTIs, resulting in extended inpatient stay.

1.4 Patients with PD often have complex medication regimens with frequent doses throughout the day. Missed doses and inappropriate prescribing can cause deterioration in symptom control, resulting in acute akinesia (rigidity) and decreased mobility. Abrupt withdrawal of PD medications can be life threatening and can precipitate the onset of Parkinsonism-Hyperpyrexia Syndrome (PHS) (similar to Neuroleptic Malignant Syndrome) – see appendix 2 for details on signs/symptoms and management.

2. GUIDELINE STANDARDS AND PROCEDURES

2.1 KEY RESPONSIBILITIES ON ADMISSION

2.1.1 Healthcare Professional(s)

HEALTHCARE PROFESSIONAL(S)	KEY RESPONSIBILITIES
DOCTOR OR OTHER PRESCRIBER	• Obtain an accurate drug history including timings, doses and strengths of regular and 'when required' medications. Please also note the preparation of the medication eg. whether it is dispersible or modified release etc. • Prescribe medications promptly as per the patient's regular regimen in order to avoid delay in doses. Please note that the electronic prescribing system, NerveCentre will permit entry of specific times of administration for individual dosage regimens. If nothing is inputted, the system will automatically set default times. Therefore, always include the specific times when prescribing on NerveCentre. **IT IS ESSENTIAL TO AMEND THE TIMINGS AS PER HOW THE PATIENT WAS USUALLY TAKING THEIR MEDICATION** Consider whether the patient's PD is well controlled. Treat each patient individually and consider adjusting doses accordingly with input from the PD specialist team (see appendix 1 for contact details)
NURSING STAFF	• Consider whether the patient is able to self-administer their own medications whilst they are an inpatient. Please complete a self- administration assessment and refer to the UHL self-administration policy on InSite. • Administer medication at the times prescribed and **do not** delay or omit doses. **PLEASE NOTE ADMINISTRATION TIMES ARE UNLIKELY TO MATCH USUAL MEDICATION ROUNDS** • Consider use of 'timers' as a reminder for administration. Please contact the PD specialist team for more information. **UNAVAILABILITY OF MEDICATION SHOULD NEVER BE A REASON FOR OMITTING DOSES – SEE SECTION 2.1.3 'WHERE TO FIND PD MEDICATIONS.'**
PHARMACIST	• Prioritise medicines reconciliation in patients who have PD. • Obtain an accurate medication history including timings, doses and strengths of regular and 'when required' medications. Please also note the preparation of the medication e.g. whether it is dispersible or modified release etc. Ensure to enquire about medications that might not appear on the GP record e.g. subcutaneous apomorphine • Check patient's own supply of medication, ward stock availability and order promptly from pharmacy where necessary.

2.1.2 Preferential Base Wards for PD Patients

Where possible, patients should be transferred to wards which have experienced staff in PD management. At the LRI, these wards are 24 (Neurology), 30 (Older People's) or 31 (Older People's)

2.1.3 Where to Find Parkinson's Disease Medications

- Check whether the patient has brought their own medications to hospital.
- If not, or they are in a form which is unsuitable such as a dosette box, inform the ward pharmacist well before the next dose is due so that the drugs can be ordered promptly.
- In case of emergencies and out of hours at LRI, a PD medication stock cupboard is available on Ward 30. In case of emergencies and out of hours at GGH, a PD medication stock cupboard is available on CDU. For LGH, contact the on-call pharmacy service for advice.
- For combination preparations which are not available the dose can be made up of the separate components. E.g. Stalevo 100/25/200 can be made up of co-careldopa 100/25mg tablets and 200mg of entacapone.

THERE SHOULD NEVER BE A SITUATION WHERE A DOSE IS MISSED DUE TO MEDICATION UNAVAILABILITY. A DATIX SHOULD BE COMPLETED IN CASES WHERE DOSES ARE OMITTED SO THAT A FULL INVESTIGATION CAN BE CARRIED OUT

2.2 DISEASE-DRUG INTERACTIONS

Certain drugs are contraindicated in PD due to their action on Dopamine Receptors:

DRUG	EXAMPLES
Antipsychotics	Haloperidol, Chlorpromazine, Promazine, Sulpiride, Risperidone
Antiemetics	Metoclopramide, Prochlorperazine (Domperidone or Cyclizine are preferred anti-emetics for PD patients. Ondansetron should be avoided if patient is using apomorphine)
Anticholinergics	Oxybutynin, Tolterodine and Tricyclic Antidepressants are best avoided in patients with PD dementia as they may worsen cognitive function.

This list is by no means exhaustive and it is imperative that anticholinergic burden and polypharmacy are considered when caring for patients with PD and particularly PD-associated dementia.

2.3 SWALLOWING DIFFICULTIES AND FEEDING TUBES

- Refer to Speech and Language Therapy (SALT) and to the PD specialist nurses where appropriate (See appendix 1). NB. Correct posture can contribute to effective swallow. Parkinson's UK(2013)
- Review whether the gastrointestinal (GI) route is still available – if so, please refer to the table (Section 2.3.1 'Drug Administration via Nasogastric (NG) tubes or Orally with Poor Swallow.' Please note a NG tube may not always be appropriate e.g. if the patient is nearing end of life. If in doubt please contact a PD specialist.
- Dispersible Madopar 62.5mg 'when required' can be considered for loss of symptom control alongside medication changes. This must be initiated under specialist advice only.
- If the GI route is unavailable or inappropriate convert usual oral medications to an equivalent dose of rotigotine patches (see Section 2.4.2).
- Never crush or split modified release preparations

2.3.1 Drug Administration via NG tube or Orally with Poor Swallow (NEWT Guidelines 2015)

It is crucial not to stop Parkinson's disease drugs. Alternative routes for patients who are Nil By Mouth or have swallowing difficulties need to be considered (see chart below).

COMT inhibitors (Entacapone, Tolcapone, Opicapone) and MAOB inhibitors (Selegiline, Rasagiline, Safinamide) can be temporarily omitted if the patient is experiencing swallowing difficulties.

DRUG	FORMULATION	RECOMMENDATION
Co-Beneldopa (Madopar®)	Dispersible Tablets	Continue
	Capsules	Convert to Dispersible Tablets (Same dose)
	Modified Release Capsules	Convert to Dispersible Tablets (Same total daily dose). Inform PD nurse as may need to reduce dose / alter frequency.
Co-Careldopa (Sinemet®)	Tablets (Plain Release)	Continue. Tablets disperse in water
	Modified Release Tablets	Convert to standard release Co-Careldopa or Dispersible Madopar® (Same total daily dose). Inform PD nurse as may need to reduce dose / alter frequency
Pramipexole	Tablets (Plain Release)	Continue. Tablets disperse in water
	Modified Release Tablets	Convert to Plain Release Tablets. Divide total daily dose into TDS regimen
Ropinirole	Tablets (Plain Release)	Continue. Tablets disperse in water
	Modified Release Tablets	Convert to plain release tablets. Divide total daily dose into TDS regimen
Rasagiline	Tablets	Continue. Tablets can be crushed and mixed in water
Selegiline	Tablets	Continue. Tablets disperse in water
Cabergoline	Tablets	Continue. Tablets disperse in water
Opicapone	Capsules	Limited information available. However, can trial opening and dispersing contents of capsules in water for administration. Ensure the enteral feeding tube is flushed well before and after giving the dose
Entacapone	Tablets	Continue. Take care if crushing as this produces red dust which may stain. Entacapone does not fully dissolve in water, so if giving via enteral feeding tube, the tube should be flushed well after administration.
Entacapone, Levodopa, Carbidopa (Stalevo®)	Tablets	Option 1 (if patient does not have own stock): switch to dispersible madopar (same total daily dose) and entacapone Option 2 (if patient has brought own stock): Continue, tablets will disperse in water. If for swallowing difficulties, consider mixing with honey, jam or orange juice – they have a bitter taste.
Amantadine	Capsules	Continue. Capsules can be opened and dissolved in water.
Safinamide	Tablets	Limited information available however can trial crushing and mixing with water for administration. If crushing is trialled ensure the coating is well broken up, and the enteral feeding tube is flushed well before and after giving the dose.

2.4 DOSAGE CONVERSION

2.4.1 Online Dosage Conversions

- An online dosage conversion calculator developed by a team of PD specialists and pharmacists is available via the following link and is especially useful for patients with complex PD medication regimens.

  http://www.parkinsonscalculator.com/

- Please note that rotigotine patches are associated with side-effects including postural hypotension, aggression, Impulse Control Disorders and other dopaminergic adverse reactions such as hallucinations, dyskinesia and peripheral oedema. It is therefore important that the patient goes back to their usual oral medications once their swallowing function or the oral route is restored. Please note that patches should **NOT** be cut. They are available as 2mg/4mg/6mg/8mg patches (More than one patch can be used to make up the total dose).

2.5 APOMORPHINE

Apomorphine is a non-ergot dopamine agonist which is delivered as an intermittent Subcutaneous Injection or a continuous infusion via pump. It must **NOT** be used via the Intravenous route

2.5.1 On Admission

- Patients who are already on an established apomorphine routine need to be continued at the prescribed dose and frequency of subcutaneous injection or rate of infusion via pump.
- Assess whether the patient administers apomorphine themselves and whether they are capable of continuing this during their hospital stay (refer to UHL Self-Administration of Medicines policy)
- Assess whether a relative or carer usually administers the apomorphine and whether they are willing to continue to do so during the patient's hospital stay (refer to UHL Self-Administration of Medicines policy)
- Determine whether the patient has brought in all the relevant apomorphine equipment and medication with them with them e.g. APO-go pump, prefilled syringes, chrono syringes or connectors (if not brought in, see section 2.5.2)
- If patients are on the pump device determine their usual flow rate. A treatment free period is usually observed during sleeping hours, unless the patient has severe night time symptoms.
- Check the patients understanding and refer to recent neurology appointment letters

2.5.2 Equipment Unavailable

Check whether the patient has brought their own equipment in. If not, consider contacting the APO-go nurse advisor (See Appendix 1). Equipment can also be ordered from pharmacy via your ward pharmacist. For out of hours supply please contact the on-call pharmacist via switch board.

2.5.3 Initiation

Apomorphine should be initiated by a specialist only. Patients treated with apomorphine will usually need to start domperidone at least two days prior to initiation of therapy. The domperidone dose should be titrated to the lowest effective dose and discontinued as soon as possible. Before the decision to initiate domperidone and apomorphine treatment, risk factors for QT interval prolongation in the individual patient should be carefully assessed to ensure that the benefit outweighs the risk:

- 1mg of apomorphine HCl (0.1ml), may be injected subcutaneously during a hypokinetic or 'OFF' period and the patient is observed over 30 minutes for a motor response.
- If no response or an inadequate response is obtained, a second dose of 2 mg of apomorphine HCl (0.2ml) is injected subcutaneously.
- Thereafter, increase dose at minimum of 40 minute intervals until a satisfactory result is obtained.

- The daily dose of apomorphine as a subcutaneous injection varies widely between patients, typically within the range of 3mg-30mg, given as 1-10 injections and sometimes as many as 12 separate injections per day

Patients who have shown a good 'ON' period response during the initiation stage of Apomorphine therapy, but whose overall control remains unsatisfactory using intermittent injections, or who require many and frequent injections (more than 10 Injections per day), may be commenced on or transferred to a continuous subcutaneous infusion by mini-pump and/or syringe driver. Intermittent bolus boosts are also usually needed on top of this.

2.6 OTHER ADVANCED THERAPIES

2.6.1 Duo-dopa

- An advanced therapy for those with advanced PD and severe motor fluctuations that involves a gel (levodopa and carbidopa) administered via portable pump into the duodenum or upper jejenum by a percutaneous endoscopic transgastric jejeunostomy (PEG-J).
- If patients have a duo-dopa pump then it is imperative that the specialist PD team are notified as soon as possible in order to support the nursing and medical teams with the practical aspects of using the pump.
- Additionally, with apomorphine and duo-dopa pumps, be mindful of additional/top-up doses that may be being administered by the patient and/or their carers - it is essential that all doses are documented in order to ensure optimal treatment.

2.6.2 Deep Brain Stimulation (DBS)

- A pulse generator, a device similar to a cardiac pacemaker, is placed under the skin around the chest or stomach area and is connected to one or two fine wires that are inserted into specific areas of the brain.
- All patients with a DBS pulse generator need to be flagged to the specialist PD team to ensure timely review.
- If surgery is likely to be required, the surgeon and anaesthetist should be made aware told as there are certain precautions that need to be taken during surgery eg not using diathermy.
- MRI scans can only be used under very strict conditions and the radiology department will need to be made aware of the presence of pulse DBS generator.

2.7 PATIENTS UNDERGOING SURGERY

- Ensure morning doses of PD medications are prescribed and given prior to the surgical procedure even if the patient is Nil By Mouth (NBM). Clearly mark the drug chart (STAT dose on paper or NerveCentre) that they must be given prior to surgery.
- Prioritise patients with PD to the top of the surgery list
- If the patient's medication regimen will be interrupted by surgery or if the total duration of surgery is over 6 hours, please contact the specialist PD nurse for advice on adjustment to therapy.
- If the patient has had Deep Brain Stimulation (DBS), please ensure that the surgeon is aware prior to the surgical procedure.
- Anti-dopaminergic anti-emetics such as Metoclopramide should be avoided (see section 2.2).

2.8 ORTHOSTATIC (POSTURAL) HYPOTENSION

- Moderate orthostatic hypotension occurs in at least 20% of patients and may be related to the disease itself or PD medications.
- Non-pharmacological treatment includes increasing sodium intake, use of compression stockings, improved hydration, and electronically raising the head of the bed.
- Review non-PD medications to see whether they can be stopped or the dose can be reduced, for example Diuretics, Antidepressants, Anti-hypertensives, Antipsychotics and Anticholinergics. Please note that certain medications such as Antipsychotics should not be stopped suddenly – please contact your ward pharmacist for advice.

- Consider asking the PD specialist team to review the PD medication to see whether dopaminergic medication can be reduced.
- Consider a trial with midodrine, taking into account contraindications and monitoring requirements.
- This can be switched to fludrocortisone if midodrine is contraindicated / not tolerated or ineffective. Do not continue pharmacological treatment if no benefit is observed.

2.9 DEPRESSION

- Depression occurs in approximately 80% of all PD patients and can significantly affect quality of life.
- Depression may be under diagnosed in PD because the clinical features of depression overlap with motor features of PD (NICE 2006).
- Although non-pharmacological treatment such as counselling may be helpful, the mainstay treatment is medication as the pathological cause is thought to be organic in PD (Lyons 2011).
- Management of depression should be tailored to the individual, in particular, to their co-existing therapy. First line therapy is usually a Selective Serotonin Reuptake Inhibitor (SSRI) or mirtazapine.

2.10 SLEEP DISTURBANCE

- Up to 98% of PD patients experience sleep disturbance which may be exacerbated during a patients inpatient stay.
- All patients should try to maintain good sleep hygiene and be counselled on the importance of keeping up a regular sleep schedule.
- Disturbed sleep could be a manifestation of 'OFF' symptoms during the night and therefore evening Modified Release preparations can be considered with specialist input.
- Dopamine Agonists can also cause insomnia and therefore these medications may require dose or timing adjustments – again, specialist input should be sought.
- For those patients with REM sleep disorder (common in PD), very disrupted sleep patterns or nocturnal behavioural concerns, clonazepam can be helpful. A starting dose of 250 microgrammes can be trialled **after discussion with a specialist** but should be reviewed regularly to ensure ongoing efficacy.

2.11 MANAGEMENT OF DELIRIUM OR PSYCHOSIS

- Refer to the UHL Trust Guidelines on Delirium for general management principals.
- Wherever possible, seek to reassure the patient using a calm manner. If the patient finds the presence of family comforting and reassuring, please contact them to come in, even if outside of conventional visiting hours.
- Look for underlying causes of delirium or psychosis such as dehydration, infection, hypoxia, electrolyte disturbance, acute urinary retention and constipation.
- Review the patient's non-PD medications to determine whether they are contributing to the patient's delirium eg.anticholinergics such as oxybutynin, solifenacin; tricyclic antidepressants; and opiates can all have a detrimental effect on cognition.
- Consideration should be given to withdrawing or reducing PD medication that might have triggered delirium or psychosis (NICE 2017). Specialist input would be necessary from the PD team.
- Pharmacological interventions should be avoided wherever possible but if the patient is very agitated or aggressive, and at risk to themselves or others, consider using lorazepam at the lowest dose, 0.5mg-1mg (PO or IM), and titrate up, as necessary, to a maximum dose of 4mg in 24hrs. Refer to the UHL Trust Guideline for Rapid Tranquilisation of Disturbed Adult Patients.
- Be mindful that benzodiazepines are associated with an increased risk of falls and respiratory depression when administered IM.
- If this in ineffective, specialist PD and psychiatric input will be required for consideration of antipsychotic medications such as quetiapine or aripiprazole.
- Typical antipsychotic drugs such as haloperidol and chlorpromazine **must** be avoided (section 2.2).

2.12 MANAGEMENT OF CONSTIPATION

- The vast majority of patients living with Parkinson's and admitted to hospital, will be constipated.
- Constipation has a profound effect on their mental and physical health and so should be investigated and treated as a priority.
- Rectal examination early in their admission is key. Treat with regular laxatives, enema/suppositories, as necessary.
- First line pharmacological treatment is an osmotic laxative such as macrogol compound 1-2 sachets twice a day in combination with a stimulant laxative such as senna 7.5mg – 15mg at night.
- Review medications that might be contributing to constipation e.g. opioids, anticholinergic drugs
- Encourage adequate fluid intake and mobilisation where appropriate.
- Review diet including fibre intake.

2.13 DISCHARGE CONSIDERATIONS

- Clearly document any inpatient PD reviews or medication changes on the discharge letter.
- A copy of the discharge letter should be sent to the patient's PD consultant as soon as possible.

2.14 ADVANCE CARE PLANNING

- PD is a progressive neurological condition that can cause disability and age adjusted increase in mortality.
- Discussions about Advance Care Planning (ACP) can, and should, take place at any stage of the disease provided that the patient and/or next of kin feel emotionally ready.
- Refer to any advanced care planning that has taken place to ease decision making. This may be in the form of a ReSPECT form, Emergency Healthcare Plan (EHCP), Advance Statements and/or discussions with appointed Lasting Power of Attorney (LPA).
- Specific indications that may prompt ACP discussion include:
    - High levels of disability from motor symptoms -(frequent 'off' states, confined to chair or bed for >50% of the time, high levels of care required, frequent falls).
    - High levels of complications from medications to treat Parkinson's, despite input from specialists (e.g. dystonias, dyskinesia, hallucinations).
    - Advanced dementia.
    - High burden of symptoms from non-motor symptoms not previously listed (excessive salivation, swallowing difficulty, incontinence, pain, mental health symptoms).
    - Dysphagia causing recurrent aspiration pneumonias.
    - Repeated or prolonged admissions.

2.15 END OF LIFE MEDICATIONS

- PD medications are critical but are sometimes stopped in the last stage of life after clinical review and liaison with the PD specialist team.

- For symptom control, 'when required' midazolam can help with rigidity as well as agitation.

- Although less critical at end of life, levomepromazine has the potential to worsen extra-pyramidal symptoms and as such, should be avoided. Instead, consider using cyclizine, which can be added to a syringe driver, for management of nausea and vomiting.

3. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Number of Parkinson's Disease medication doses omitted or delayed	Audit	Dr Kate O'Kelly	Annually	Medicines Optimisation Committee

4. Supporting References

1. UHL Trust Guideline for the Identification and Management of Delirium (Trust Reference B27/2009)
2. UHL Trust Guideline for Rapid Tranquilisation of Disturbed Adult Patients (Trust Reference B11/2016)
3. Fife Guidelines (2017). Acute management of Parkinson's Version. Approved on behalf of NHS Fife by the Fife Area Drugs & Therapeutics Committee Approved by the Managed Services Drug and Therapeutics Committee August 2017. (Review date August 2019)
4. National Institute for Health and Care Excellence (NICE) Parkinson's Disease in Adults. NG71 July 2017. Available at https://www.nice.org.uk/guidance/ng71
5. NEWT Guidelines, Administration of medication to patients with enteral feeding tubes or swallowing difficulties (2015) Copyright © 2015 J Smyth, Betsi Cadwaladr University Local Health Board (East). Available at http://access.newtguidelines.com/

5. Key Words

Parkinsons Disease, Co-Careldopa, Rotigotine, Apomorphine, Levodopa, Madopar, Sinemet

CONTACT AND REVIEW DETAILS	
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Contributing Authors Nirav Sheth (Lead Pharmacist for Neurology) Anna Delf (Lead Pharmacist for Geriatrics) Fareedah Dakri (Senior Pharmacist) Dr Sam Cohen (Senior Registrar, Geriatric Medicine) Martin Wiese (Consultant Emergency Physician) Binita Bhakta (Advanced Specialist Pharmacist)	
Details of Changes made during review: Preferential base wards updated Opicapone added to swallowing difficulties table Contact details updated Where to find PD meds updated Directions for optimising PD medicines removed, replaced with advice on seeking specialist input Advanced therapies update Delirium update Medication conversion charts moved to appendix Advance care planning section expanded	

6. Appendices

Appendix 1: Key Contacts

WITHIN NORMAL WORKING HOURS 9AM-5PM

Parkinson's Disease Specialist Nurses	Consultant Neurologists	Consultant Geriatricians	Specialist Pharmacists
Elizabeth Hillman Mobile: 07415 332544 Tel: 01162 584795 Elizabeth.M.Hillman@uhl-tr.nhs.uk	**Dr.Peter Critchley** Tel. 0116 258 8057 Peter.Critchley@uhl-tr.nhs.uk	**Dr. Kate O'Kelly** Tel: 0116 258 4051/7635 Kate.okelly@uhl-tr.nhs.uk	**Anna Delf** Lead Pharmacist for Geriatrics Mobile: 07960871114 Anna.delf@uhl-tr.nhs.uk
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		Dr. Anand Chunduri Tel: 0116 258 4051 Anand.chunduri@uhl-tr.nhs.uk	

Out of Hours

Neurologist On-call
Contact Via Switchboard

On-call pharmacist available 24 hours via switchboard

Nurse Advisor in Apo-Go Therapy
Liz Carter
Tel: 01189209500
Mobile**:** 07503 230128

Appendix 2: Medication conversion charts

Levodopa to Rotigotine Patches

REGIMEN	TOTAL DAILY DOSE OF LEVODOPA	RECOMMENDED DOSE OF ROTIGOTINE PATCH / 24HOURS	RECOMMENDED DOSE OF ROTIGOTINE PATCH /24 HOURS IF BACKGROUND OF DEMENTIA /DELERIUM
Madopar® or Sinemet® 62.5mg BD	100mg	2mg	2mg
Madopar® or Sinemet® 62.5mg TDS	150mg	4mg	4mg
Madopar® or Sinemet® 62.5mg QDS	200mg	6mg	4mg
Madopar® or Sinemet® 125mg TDS	300mg	8mg	6mg
Madopar® or Sinemet® 125mg QDS	400mg	10mg	6mg
Madopar® or Sinemet® 187.5mg TDS	450mg	12mg	8mg
Madopar® or Sinemet® 187.5mg QDS	600mg	14mg	10mg
Madopar® or Sinemet® 250mg TDS	600mg	16mg	12mg
Madopar® or Sinement® 250mg QDS and above	>600mg	16mg (Max daily dose) and obtain specialist advice.	12mg

Modified Release Preparations

NB: 100mg Levodopa Modified Release is approximately equivalent to 2mg/24hr Rotigotine. For example, if a patient takes Sinemet® 62.5mg BD and Half Sinemet CR® 125mg NOCTE, this is equivalent to a Rotigotine patch dose of 4mg/24hours

Oral Dopamine Agonists to Rotigotine Patches

PRAMIPEXOLE PLAIN RELEASE (SALT)	PRAMIPEXOLE MODIFIED RELEASE (SALT)	ROPINIROLE STANDARD RELEASE	ROPINIROLE MODIFIED RELEASE	RECOMMENDED DOSE OF ROTIGOTINE PATCH / 24HOURS	RECOMMENDED DOSE OF ROTIGOTINE PATCH /24 HOURS IF BACKGROUND OF DEMENTIA /DELERIUM
0.125mg TDS	0.375mg OD	750micrograms TDS	N/A	2mg	2mg
0.25mg TDS	0.75mg OD	1mg TDS	4mg/day	4mg	4mg
0.5mg TDS	1.5mg OD	2mg TDS	6mg/day	6mg	4mg
0.75mg TDS	2.25mg OD	3mg TDS	8mg/day	8mg	6mg
1mg TDS	3.0mg OD	4mg TDS	12mg/day	12mg	8mg
1.25mg TDS	3.75mg OD	6mg TDS	18mg/day	14mg	10mg
1.5mg TDS	4.5mg OD	8mg TDS	24mg/day	16mg Max daily dose) and obtain specialist advice.	12mg

Conversion of Stalevo® to Rotigotine Patches

REGIMEN	RECOMMENDED DOSE OF ROTIGOTINE PATCH / 24HOURS	RECOMMENDED DOSE OF ROTIGOTINE PATCH /24 HOURS IF BACKGROUND OF DEMENTIA /DELIRIUM
Stalevo® 50/12.5/200 TDS	6mg	4mg
Stalevo® 75/18.75/200 TDS	8mg	6mg
Stalevo® 100/25/200 TDS	10mg	6mg
Stalevo® 100/25/200 QDS	14mg	10mg
Stalevo® 150/37.5/200 TDS	16mg	12mg
Stalevo® 200/50/200 TDS	16mg	12mg

Appendix 3: PD quick reference guide (QRG)

Parkinson's Disease (PD) Quick Reference Guide

For further details, please see full Guideline for the Management of Parkinson's Disease Medication on INsite

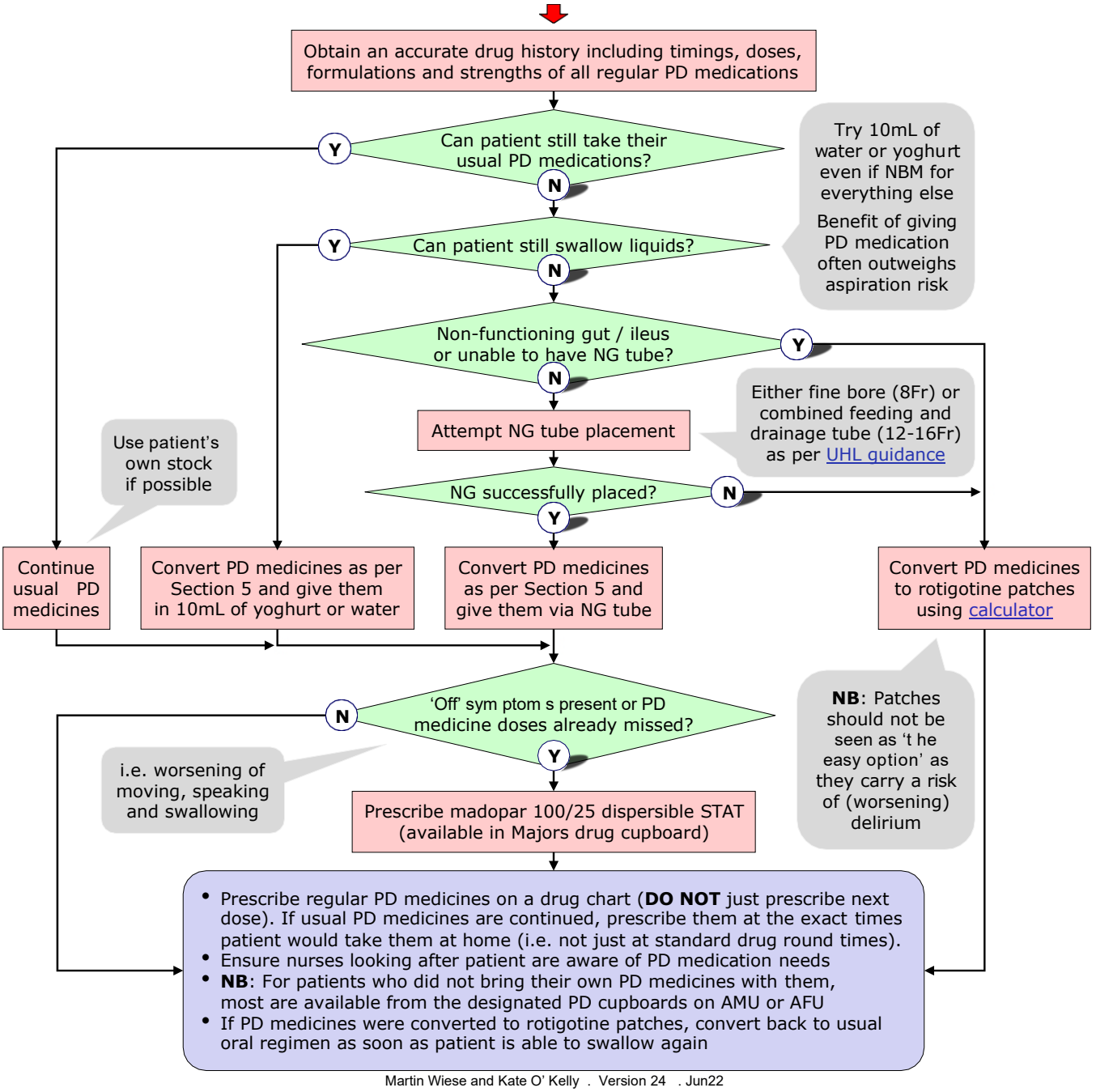
① In the ED, the patient's ED record should be marked with a '**PD patient**' sticker on arrival and a NerveCentre '**PD patient**' alert should be created

② **If a PD patient suddenly deteriorates, it has either nothing to do with their PD or they have missed some of their medication**

③ **DO NOT give PD patients any of the following medicines**

Antipsychotics	Haloperidol, chlorpromazine, promazine, levomepromazine, sulpiride or risperidone
Antiemetics	Metoclopramide and prochlorperazine – give ondansetron instead UNLESS patient is taking apomorphine (in those patients, give cyclizine or domperidone instead)

④ **PD medications MUST NOT be delayed let alone missed to avoid 'Off' symptoms (worsening of moving, speaking and swallowing). Missing medication can also cause Neuroleptic Malignant Syndrome (NMS; see Section 6 for more details). Suggested approach to prescribing:**



Martin Wiese and Kate O' Kelly . Version 24 . Jun22

⑤ Tablet / capsule-to-liquid conversion table if swallowing difficulties or NG

Drug	Formulation	Recommendation
Amantadine	Capsules	Continue - capsules can be opened and dissolved in water
Cabergoline	Tablets	Continue - tablets disperse in water
Co-Beneldopa (Madopar®)	Dispersible Tablets	Continue
	Capsules	Convert to dispersible tablets at same dose and frequency
	Modified-Release ('CR') Capsules	Convert to dispersible tablets at same dose and frequency
Co-Careldopa (Sinemet®)	Tablets (Plain Release)	Continue - tablets disperse in water
	Modified Release Tablets	Convert to standard release co-careldopa or dispersible co-beneldopa at same total daily dose
Entacapone	Tablets	Continue - tablets can be crushed and given in water • Take care when crushing tablets as this produces red dust that may stain • Tablets do not fully dissolve in water. If giving entacapone via enteral feeding tube, the tube must be flushed well after administration.
Pramipexole	Tablets (Plain Release)	Continue - tablets disperse in water
	Modified Release Tablets	Convert to plain release tablets; divide total daily dose into TDS regimen
Rasagiline	Tablets	Continue - tablets can be crushed and given in water
Ropinirole	Tablets (Plain Release)	Continue - tablets disperse in water
	Modified Release Tablets	Convert to plain release tablets; divide total daily dose into TDS regimen
Safinamide	Tablets	Continue - tablets can be crushed and given in water Tablets may not fully dissolve in water. If giving safinamide via enteral feeding tube, the tube must be flushed well after administration.
Selegiline	Tablets	Continue - tablets disperse in water
Stalevo® = Entacapone, Levodopa, Carbidopa	Tablets	Continue - tablets disperse in water • Taste bitter - consider mixing with honey, jam or orange juice • If Stalevo is not available, convert to entacapone and co-careldopa separately at same doses and frequency

⑥ PD patients may present to ED with Parkinsonism-Hyperpyrexia Syndrome (PHS, similar to Neuroleptic Malignant Syndrome - NMS); mortality 10-20%

- NMS develops if PD medication is missed or not absorbed, or if patient has had contraindicated medicines
- Look for rigidity, pyrexia, reduced GCS, autonomic instability and serum creatine kinase (CK) >1000
- Consider requesting a CK in all PD patients presenting to the ED with 'off' symptoms or after all falls
- Beware the PD patient with a high CK following a fall: The rise could be due to NMS rather than a 'long lie'
- Ask medical in-reach consultant to review urgently if on duty in ED or, if not, the ACB registrar on bleep 4578
- Treatment consists of urgent dopaminergic drug replacement (see Section 4 on reverse), supportive care including cooling, IV fluids, VTE prophylaxis and benzodiazepines for agitation, and management of complications

⑦ Considerations for PD patients with suspected delirium

- Delirium in PD patients in the ED is not usually caused by their PD medications
- Constipation is a frequent trigger
- Review patient's medication list for drugs that might be contributing to the altered mental state: Anticholinergics such as opiates, oxybutynin, tolterodine, solifenacin and tricyclic antidepressants (TCAs) can all affect cognition. Consider calculating the anticholinergic burden of patient's non-PD medications at http://www.acbcalc.com .
- See also UHL Policy for the Assessment and Management of Patients with Altered Behaviours with its 'Think Delirium' Support Tool (Appendix 1)

⑧ Preferred base wards for PD patients at the LRI

Ward 24 (neurology) and wards 30 and 31 (geriatric medicine) have staff experienced in caring for PD patients

⑨ PD team contact details for ward patients

PD Specialist Nurse
Elizabeth Hillman
Extn 0116 258 4795
Mobile 07415 33 25 44
Elizabeth.M.Hillman@uhl-tr.nhs.uk

Consultant Geriatrician
Kate O'Kelly
Extn 0116 258 4051
kate.okelly@uhl-tr.nhs.uk

Consultant Neurologist
Ben Simpson
Extn 0116 258 4868
Mobile 07968 798 759
Ben.Simpson@uhl-tr.nhs.uk

GET MEDICATIONS ON TIME / DO NOT MISS DOSES

- If strengths aren't available make up dose from separate components E.g Stalevo 100mg/25mg/200mg can be made up from 1x co-careldopa 125mg tablet and 1x200mg entacapone tablets.
- Can switch capsules to dispersible tablets if necessary or vice versa. E.g. co-beneldopa 62.5mg capsules to 62.5mg dispersible tablets. This is a last resort as will affect peak onset.
- Do not routinely switch between different formulations E.g. modified release to immediate release
- Brand names of the drug may be prescribed rather than the generic names and vice versa. If the patient's own brand is not available, please use the generic preparation
- Do not half modified release preparations

Drug Name	Strengths available at UHL	Emergency Floor Location
Levodopa + Benserazide, also known as Co-beneldopa (Madopar)	62.5mg dispersible tablets	AFU, AMU South, AMU, ED
	62.5mg, 125mg capsules	AFU, AMU South, AMU, ED
Madopar CR	125mg M/R capsule	AFU, AMU South, AMU
Levodopa + Carbidopa, also known as Co-careldopa (Sinemet)	62.5mg, 125mg tablets	AFU, AMU South, AMU
Half Sinemet CR*	125mg M/R tablets	AFU, AMU South, AMU
Entacapone	200mg tablets	AFU, AMU South, AMU
Pramipexole	180 micrograms, 700 micrograms tablets	AFU, AMU, ED
Pramipexole Modified Release	260micrograms M/R tablets 1.05mg M/R tablets	AFU, AMU, ED AFU, AMU
Rasagiline	1mg tablets	AFU, AMU, ED
Ropinirole	250micrograms, 5mg tablets 1mg tablets	AFU, AMU AFU, AMU, ED
Ropinirole Modified Release	2mg M/R tablets 8mg M/R tablets	AFU, AMU, ED AFU, AMU
Rotigotine	2mg, 4mg, 8mg transdermal patch	AFU, AMU, ED
Safinamide	50mg tablets	AFU
Selegiline	5mg tablets	AFU, AMU
Levodopa/Carbidopa/Entacapone (Sastravi, Stalevo, Stanek)	50mg/12.5mg/200mg 75mg/18.75mg/200mg 125mg/31.25mg/200mg 200mg/50mg/200mg	AFU

*Co-careldopa MR **125mg** is often known as the brand name "Half Sinemet CR," this is not to be confused with Co-careldopa MR **250mg** which can also be called by its brand name "Sinemet CR."