Parkinson's Disease - Admission with other Medical or Surgical Problems - Full Clinical Guideline

Reference No: CG-T/2015/066

Contents

Checklist for the Initial Medical & Surgical Management of Patients with Parkinson's Disease (PD)

Date/time Clinical area: Staff member completing form: Grade	*Stick patient label here*

KEY MESSAGES

- **Avoid abrupt withdrawal of PD medication – it can be life-threatening**
- **Do not prescribe centrally acting dopamine antagonists: eg haloperidol, metoclopramide, prochlorperazine**
- **Consider patient self-administration of medication**
- **Seek early specialist advice**

Consultant managing patient's Parkinson's Disease Name ……

Clinical management for the first 48 hours (Doctor to complete – circle Yes or No as appropriate)		
Problem / Situation	**Answer & Action**	**Sign & Date (when completed)**
Has PD been well controlled recently? (minimal freezing, tremor, immobility, little effect on ADLs)	**No:** refer to Parkinson's nurse specialist (ext 83535) **Yes:** no action	
Has patient brought their PD medication to hospital?	**No:** Liaise with pharmacy before next dose is due **Yes**: Use all available information	
Does patient know **when** they take all their PD medicines? Ask for their own medication list.	**No:** Liaise with pharmacy **Yes:** Annotate drug chart with **EXACT** times of usual administration that patient tells you.	
Can the patient take their PD medicines in the same formulation as they would at home?	**No** – prescribe alternative forms of medication (see chart over page) if unable to swallow usual oral medication. **The patient MUST receive some form of PD medication.** **Yes:** Prescribe usual medication	
General Patient Status Related		
Are there concerns about the patient's **swallowing** or is the patient **drowsy**? [See flow chart next page]	**No / Yes**,If yes, perform basic swallow assessment (sip of water test), if still unsure refer to SALT for urgent assessment. Consider medication & insertion of nasogastric tube.	
Is patient **confused**? [See Trust delirium guideline]	**No / Yes** If yes, consider infection and prescription of antibiotics. Consider metabolic problem. Recent drug changes?	
Does patient require **sedation** (due to **agitation**?)	**No / Yes** If yes, consider lorazepam 0.5-1mg po or iv	
Is the patient **constipated**?	**No / Yes** If yes, consider prescribing laxatives.	
Does patient have **nausea and / or vomiting**?	**No / Yes** If yes, prescribe domperidone, cyclizine or ondansetron.	

Surgical patient checklist – clerking doctor to complete for all surgical patients	
Special Instructions to consider for Parkinson's disease patients	**Sign & Date (when completed)**
Operating List - Place 1st on list.	
Review Dosing Regimen: If timing of PD medication is going to clash with surgery, regimen must be altered. Ask PD nurse specialist or pharmacy for advice on dosing regimen.	
Review regular medication prior to surgery i.e. morning dose(s). Ensure morning dose(s) of all PD medication are prescribed. Clearly mark drug chart that they must be given prior to surgery	
Duration of surgery: If the total duration of surgery & NBM period will be > 6 hours get further advice from PD nurse specialist or pharmacy about use of a rotigitine patch or other alternative medication regimens.	
Post Surgery Review: If surgery > 3 hours & you are concerned about post-operative Parkinson's related complications, arrange post-surgery review by patients usual Parkinson's disease specialist	
Deep Brain Stimulation: If patient has had previous DBS, ensure surgeon is aware pre-surgery (electrocautery diathermy may be contraindicated – if absolutely necessary use bipolar mode)	
If unsure, please contact patient's PD consultant via switchboard or Parkinson's nurse specialist (Ex 83535). **Out of hours contact Neurological Specialist Registrar On-Call via switchboard**	

Medication management in PD patients with swallowing difficulties

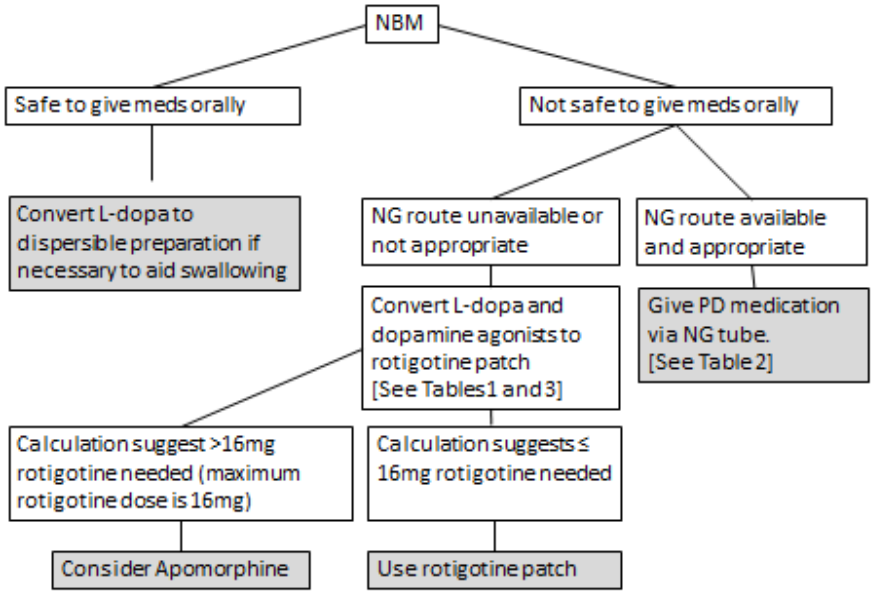


Table 1. L-dopa to Rotigotine conversion chart

Example regimen	Total daily dose of L-dopa	Recommended strength of rotigotine patch/24hr
Co-beneldopa 62.5mg tds	150mg	4mg
Co-careldopa 125mg tds	300mg	8mg
Sinemet plus 125mg qds	400mg	10mg
Co-beneldopa 250mg tds	600mg	16mg
Co-beneldopa 250mg qds	>600mg	16mg (or Apomorphine)

Note

1. **If patient presenting with confusion and hallucinations, reduce above recommendation by 50% and inform PD nurse**
2. Approximate conversion factor is 40mg L-dopa: 1mg rotigotine

Help and Advice
PD Nurse ext 83535
Dr Jarman, Consultant neurologist, Duty Neurology consultant / SpR
Dr Skelly or Dr Vasireddy via switchboard
Pharmacy
Consider referral to Speech therapist and dietician

Table 2. Giving Medication via NG tube

Medicine	Formulation	Recommendation
Co-Beneldopa (Madopar®)	Dispersible Tablets	Continue , no change required
	Capsules	Use dispersible tablets. Keep dose unchanged
	Modified Release Tablets	Use dispersible tablets. Keep dose unchanged Inform PD nurse (dose reduction and increased dose frequency may be required)
Co-Careldopa (Sinemet®)	Tablets (standard release)	Continue current regimen, plain release tablets dispersed in water; or use dispersible co-beneldopa
	Modified Release	Use standard release co-careldopa tablets or dispersible co-beneldopa Keep dose unchanged. Inform PD nurse (dose reduction and increased frequency may be required)
Pramipexole	Tablets (plain release)	Continue current regimen, plain release tablets will disperse in water
	Modified Release Tablets	Convert to plain release tablets. Divide total daily dose in TDS regimen
Ropinirole	Tablets (plain release)	Continue current regimen, plain release tablets will disperse in water
	Modified Release Tablets	Convert to plain release tablets. Divide total daily dose in TDS regimen
Rasagiline	Tablets	Continue current regimen, tablets can be crushed & mixed with water
Selegiline	Tablets	Tablets will disperse in water. Liquid also available
	Orodispersible tablets	If buccal route unsafe, convert to tablet dose (Note: 1.25mg orodispersible = 10mg standard tablet) and see above.
Entacapone and Stalevo®	Tablets	Continue current regimen, tablets will disperse in water, but care required as powder is a dye
Amantadine	Capsules	Continue current regimen, capsules can be opened and contents will dissolve in water. Liquid also available

Table 3.Conversion of oral dopamine agonists to rotigotine patch (Also see full PD management guideline on intranet)

Ropinirole : rotigotine	1:1
Pramipexole (base): rotigotine	1:5

Acknowledgement:
Guidance adapted from Norfolk and Norwich PD Guideline, Dr Paul Worth

General principles to follow when a patient with Parkinson's disease is admitted to hospital.

Introduction
PD patients stay in hospital longer than other patients and have a higher in-hospital mortality rate. More than half of admitted PD patients are over 75 years old (Low et al 2015)

Is admission necessary?
Careful consideration should be given to the need for hospital admission. Intermediate care services and virtual wards may be able to support patients in the community without need for admission.

Admit where?
If acute admission is needed, it may be necessary to admit to specialist areas such as T+O, surgery, coronary care, gastroenterology ward, respiratory ward, renal ward, ITU etc. If care in one of these specialist areas is not required, and a general medical or DME admission is appropriate, please try to admit the patient to ward 401 where staff have had additional training in the management of PD patients.

Communication.
Ensure there is effective consultation with the patient about their management and where appropriate involve family / carers who are familiar with the patient's care needs (Department of Health 2005)

Self-administration of medication.
Whenever possible, enable patients to self-administer their Parkinson's disease medication.

Give PD medication BANG ON TIME.
Individual timing of medications should be adhered to so that patients are able to maintain as much independence as possible.

Think infection.
There should be a high index of suspicion for chest and urine infections in Parkinson's patients admitted acutely. Treatment should be initiated promptly.

Nausea and vomiting.
For symptomatic treatment of nausea give domperidone 10mg tds PO or 30mg tds PR (Try to avoid domperidone if QT interval is prolonged). Cyclizine and ondansetron are acceptable alternatives (do not use metoclopramide or prochlorperazine).

Liaise with PD team.
Changes to PD medication should be discussed with the PD nurse or consultant as soon as practical. If any difficulties arise in the effective management of the patient's Parkinson's disease the Parkinson's Disease Nurse Specialist should be contacted on extension 83535.

Referral to The PD Team

If Parkinson's disease is suspected as a possible new diagnosis or there is diagnostic uncertainty Consultant to Consultant referral to:

Dr Skelly or Dr Vasireddy – email referral to dhft.dme@nhs.net
Criteria: Age over 70 years
Multiple Co-morbidities
Frailty

Neurology Consultant - email referral to dhft.neurologysecretaries@nhs.net
Criteria: Age under 75 years

For patients who already have a diagnosis of Parkinson's disease or a related disorder a referral for advice can be made to the Parkinson's Disease Nurse Specialist if:

You are unable to adhere to the patient's usual medication regime despite following the guidelines.
There is a problem directly related to the patient's Parkinson's disease
There have been recent changes to PD medication and there are possible side effects to this.

There is no need to refer to the PD Team if the patient has been admitted for another problem and their Parkinson's disease is stable.

-Refer by phone on ext 83535 or email dhft.pd@nhs.net

If specialist advice over and above that which can be provided by the PD Nurse Specialists is needed please make a consultant to consultant referral to the patient's usual PD Consultant:-

DME - Dr Skelly dhft.dme@nhs.net
Dr Vasireddy dhft.dme@nhs.net

Neurology – Dr Jarman dhft.neurologysecretaries@nhs.net
Dr Vaithianathar dhft.neurologysecretaries@nhs.net
Dr Kolappan dhft.neurologysecretaries@nhs.net
Dr Knopp dhft.neurologysecretaries@nhs.net
Dr Toh dhft.neurologysecretaries@nhs.net

Therapy help and advice are available from the Specialist PD Physiotherapist and Occupational therapist based in Specialist Rehabilitation who can undertake joint therapy assessment with ward therapists. Refer by phone 01332 258255

On discharge, please copy the discharge summary to the PD team so post discharge telephone assessment can be made and the need for expedited out-patient follow up can be considered.

Management of confusion and hallucinations in patients with **Parkinson's disease**

Has there been a recent change in cognition or behaviour? If so, this could be delirium. Look for the following treatable causes:

- Infection
- Metabolic disturbance (eg dehydration, hypothyroidism, hypoxia)
- Drugs and alcohol (or their withdrawal).

Review non-PD medication first. Even if there has been no new medication to account for an acute confusional state, it may be helpful to reduce or stop high risk medications. Consider the risks and benefits of anticholinergics (oxybutynin, tolterodine,) amitriptyline and opiates (eg tramodol, codeine, morphine).

If general medical causes of confusion have been addressed, the anti-Parkinson's medications may need to be reviewed. This is best done by the PD nurse or PD consultant. They will normally discontinue:

Recently introduced PD medication

Reduce or stop PD meds in the following order:

- Anticholinergics
- Amantadine
- Selegiline
- Ropinerole/pramipexole/rotigotine
- Rasagiline / entacopone
- Levodopa

Parkinson's disease patients who are confused or hallucinating should not be given conventional antipsychotic drugs (eg haloperidol, chlorpromazine).

Use multicomponent intervention for the prevention of delirium (see Trust Delirium guideline)

Avoid sedation unless patient is a danger to themselves or others.

If patient is agitated consider:

lorazepam 0.5-1 mg po or im (risk of falls, respiratory depression)

Quetiapine 12.5mg –25mg od or bd. Discuss with pharmacist before prescribing. Inform PD team. Do not use if ECG shows prolonged QT interval.

Contraindicated medication in Parkinson's disease

Anti-psychotics:

Haloperidol	(Serenace, Haldol)
Chlorpromazine	(Largactil)
Promazine	
Sulpiride	
Respiridone	

Anti-emetics:

Metoclopramide	(Maxalon)
Proclorperazine	(Stemetil)

The following medications with anticholinergic activity are best avoided in people with Parkinson's disease dementia:

Oxybutynin
Tolterodine
Trihexyphenidyl
Tricyclic antidepressants

Management of Orthostatic Hypotension in Parkinson's disease

One of the most disabling non motor symptom in PD is orthostatic hypotension, which is defined by a sustained reduction of systolic blood pressure of at least 20 mmHg or diastolic blood pressure of 10 mmHg within 3 min of standing. It is thought to be related to the impairment of sympathetic vasomotor neurons due to the neurodegenerative process of PD and can affect up to 40% of people with Parkinson's disease. Symptoms include light-headedness or dizziness after standing, syncope, fatigue, neck and shoulder (coat-hanger) pain.

Management strategies for symptomatic orthostatic hypotension

Advise / introduce non pharmacological measures:-

-Increase water intake (350 – 500ml taken in the morning and possibly with meals if post-parandial hypotension is a problem)

-Increased salt intake (9-12 grams per day of common salt, check urine sodium - range between 170 and 260 mmol/day).

-Physical counter-maneuvers, i.e. leg crossing, bending forward and squatting.

-Pressure stockings or abdominal band.

-Raising the head of the bed (10–15 cm or 12°)

Offer Parkinson's UK patient information sheet on postural hypotension

http://www.parkinsons.org.uk/sites/default/files/publications/download/english/fs50_lowbloodpressure.pdf

Review non PD medications –can they be reduced or stopped?:

-Anti-hypertensives,

-Diuretics,

-Anti-psychotics (eg Quetiepine)

-Anti-anginals: nitrates

“urological” alpha-blockers: tamsulosin, doxazosin

Review PD medication

Consider stopping any recently commenced PD medication.

Consider reversing any recent increases in PD medication.

Ask PD team to review PD medication to see if dopaminergic medication can be reduced – there may be a risk of worsening of motor function.

Pharmacological intervention to increase blood pressure.

The evidence base for this approach is weak but,If the above strategies fail to improve symptoms, pharmacological treatment with:

First line (specialist use), Midodrine, 2.5mg 3 x a day escalating if required after at least 1 week to 5mg 3 x a day, monitor for supine hypertension (NICE PD Guideline 2018). Last dose should be given at least 4 hours before bedtime. Please see BNF for contraindications which include: aortic aneurysm, heart failure, proliferative diabetic retinopathy. May cause urinary retention.

Second line, Fludrocortisone 50 – 300micrograms daily can be considered (discuss with PD team, monitor for supine hypertension, hyperkalaemia and peripheral oedema) (Sánchez-Ferro 2013). Do not use in patients who already have peripheral oedema.

Constipation in Parkinson’s disease

Constipation occurs frequently in Parkinson's, affecting over 50% of patients. There are several causes, including, poor fluid intake, reduced activity levels, reduced food intake, effects of drugs (eg analgesics, anticholinergics prescribed for tremor) and also autonomic failure due to direct effects of Parkinson's pathology on the nerves that control bowel function, leading to a slowing of bowel transit time.

Management

Encourage physical activity such as walking.
Ensure plenty of fluids are taken.
Ensure adequate fibre intake, eg prune juice, fruit and vegetables, high fibre cereals.

If the motions are hard, pellets then fluid intake needs to increase.

If they are soft, extra fibre and possibly a stimulant (eg senna, sodium docusate) may be required.

If they are hard and large then fluid, fibre, a stimulant and/or an osmotic laxative (lactulose, macrogol) may be required. (Zesiewicz et al 2010)

Constipation can cause poor absorption of Parkinson’s medication and therefore affect control of Parkinson’s symptoms. It is important to consider constipation as a potential factor when there is a sudden deterioration in PD control.

Management of swallowing problems in patients with Parkinson's disease

Swallowing problems are common in Parkinson's so safety of swallowing should be considered in all PD patients admitted acutely (see **NBM-Dysphagia clinical guideline**). Observe patient's swallow using water or thickened fluid according to what is normal for that patient. If there is prompt laryngeal elevation without coughing, gurgling or "wet voice", then it may be safer to allow oral medication than not. NBM risks include: malnutrition, missed medication, complications from NG tubes, and further deterioration of swallowing.

Where a patient is unable to swallow their medication, a nasogastric tube should be placed promptly to enable medication to be given. An NG tube may not always be appropriate. Is the patient near end of life? Will patient tolerate an NG tube? Is there already a dysphagia plan with risks of aspiration accepted by patient and medical team?

For guidance on formulations of PD medication suitable for NG administration see checklist for the initial medical and surgical management of patients with PD (beginning of this document) or seek advice from Clinical Pharmacist

If the patient is unable to swallow their medication and NG route is unavailable or not appropriate conversion to an appropriate dose of rotigotine transdermal patch can be made as per Checklist for the initial Medical and Surgical management of Patients with PD – beginning of document (more detailed information available in appendix 1 and 2). **Remember to use reduced rotigotine dosing in patients that are confused**.

If putting a PD patient NBM because of dysphagia, please make a prompt referral to Speech & Language Therapy.

Management of Parkinson's disease when a period of nil by mouth is required.

The patient should be allowed to take their normal PD medication with water **up to 2 hours** prior to the procedure time.

The patient may be able to continue taking their medication within 2 hours of the procedure time with a minimal amount of water but this will need to be discussed with the anaesthetist or the consultant carrying out the procedure.

Ideally the PD patient should be first on the operative or procedure list to enable the procedure time to be known accurately, this will keep the period without medication as short as possible and avoid cancellation.

Normal PD medication regime should be resumed as soon as the patient is able to drink.

Domperidone can be used to manage postoperative nausea. This can be given orally at 10mg tds or rectally at 30mgTDS.(Try to avoid domperidone if QT interval is prolonged). Cyclizine or ondansetron are acceptable alternatives. Do not use metoclopramide or prochlorperazine.

Management of Parkinson's disease when major abdominal surgery is required or when a prolonged period of gut dysfunction or nil by mouth is anticipated.

Planned Surgery

Please contact the Parkinson's Disease Nurse Specialist about planned surgery so that an appropriate drug plan is made to cover the perioperative and postoperative period.

If enteral access (eg NG/NJ/jejunostomy) is being considered by the surgeon, this will enable early re-institution of levodopa medication postoperatively.

Oral dopamine agonists can also be crushed and given by enteral feeding tube. Once daily long-acting dopamine agonists should be converted to 3-times daily standard release preparations (aiming to give a similar total daily dose) and given via the feeding tube. For example Ropinirole XL 6mg daily orally should be converted to ropinirole 2mg tds via enteric feeding tube. [**See page 2**]

If enteral access is not appropriate and the anticipated nil by mouth period is likely to be prolonged parenteral therapy with rotigotine patches and/or apomorphine should be considered. The patient's Parkinson's Disease Consultant or the Parkinson's Disease Nurse Specialist will want to be involved in this decision. They are likely to use the flow chart in **Appendix 2** to help guide their recommendation.

To enable Apomorphine therapy to be used:

- Domperidone should be commenced for 3 days prior to the apomorphine response test.
- A pre-operative apomorphine response test should be done by the PDNS to establish tolerance and dose.
- The apomorphine pump should be commenced on the day prior to operation.
- The apomorphine therapy can be discontinued once oral or nasogastric medication has been recommenced.

If the patient already has apomorphine therapy this should be continued throughout the perioperative period.

Unplanned Surgery

If emergency surgery is required and enteral access (eg NG/NJ/jejunostomy) is being considered by the surgeon, this will enable early re-institution of levodopa medication postoperatively.

If enteral access is not appropriate the patient's Parkinson's disease Consultant or the PDNS should be contacted as subcutaneous apomorphine therapy can be initiated cautiously without a response test.

Management of Apomorphine in PD patients admitted to Hospital

- Patients with subcutaneous apomorphine infusions who are admitted to a hospital ward, should, where possible, continue to manage the pump and be allowed to continue to administer their apomorphine as they did prior to admission. Carers may also be involved in apomorphine pump management

- Where this is not possible pharmacy will need to arrange for apomorphine to be administered either via the Apo-go pump or via a standard hospital infusion device. Apo-go pump is preferred if the nursing staff know how to use it. Where nurses are not able to operate the Apo-go pump, a standard hospital infusion device should be used.

- The patients own pump should be recommenced prior to discharge

- Advice regarding the Apo-go pump and troubleshooting of problems related to the Apo-go pump are available via the Apo-go helpline 0844 880 1327 (24 hours a day, 365 days a year).

Guidance for the Pharmacist when a Patient on Apomorphine is admitted

Initial Assessment

- Has the patient got their apomorphine infusion running at admission?
- Does the patient usually set up their apomorphine themselves? Are they currently able to continue to do this?
- Does a relative usually set up and administer the apomorphine? Are they willing to continue to do this whilst the patient is in hospital?
- Have they brought all necessary equipment in with them?
    - Apo-go pump
    - Apomorphine pre filled syringes
    - Chrono syringes and rigid connectors
    - Infusion lines
    - Dressings
- Have they brought enough supplies in with them?
- At what flow rate is the pump set at?
    - Usual flow rate 0.6 – 1.4 ml/hr (3 – 7 mg/hr)
    - Check this against patients understanding of their usual flow rate and last documented in neurology clinic letter.

Based on this assessment choose the most appropriate option:

1. The patient is able to continue to self administer their apomorphine whilst an inpatient, complete SAM assessment and ensure supply of apomorphine pre-filled syringes and all necessary equipment listed above.

2. The patient's relative usually sets up the apomorphine and is willing and able to continue to do so. Ensure supplies etc. as above.

3. Ward nursing staff will need to administer the apomorphine.

If ward nursing staff need to administer apomorphine:

a) If no apomorphine infusion is currently running arrange urgent supply of chrono syringe with apomorphine 100mg in 20mls (aseptic worksheet available).
(rarely a patient may require 50mg in 10mls, this will be evident from the pump settings (10ml or 20ml fill)

b) If the nursing staff are unable to work the Apo-go pump, prepare the apomorphine in a normal syringe and run it through a standard pump. This is a temporary measure until the Apo-go pump can be used.

c) If apomorphine infusion is running, arrange supply of above ready for the next morning.

d) Ensure all necessary equipment is available (if not available see below)

e) Provide set up information to ward staff:- “Apomorphine Infusion set up using pharmacy supplied ready filled Chrono syringe”

f) Provide support to ward nurses in how to set up and operate infusion pump. Advice is also available from the Apo-go help line 0844 880 1327 (24 hours a day, 365 days a year).

Equipment unavailable

During the day the ward can obtain equipment and advice from the Parkinson’s Nurse Specialist who can be contacted on extension 83535. Out of hours equipment is available from the cupboard in dispensary labelled “apomorphine equipment” or Ward 401 also have a small supply. More equipment to restock the cupboard is available during normal working hours from the PD Nurse. The out of hours pharmacist must ensure that details of equipment used is handed over on the oncall database. During the day the ward pharmacist must ensure that the equipment is restocked in the dispensary.

A supply of chrono syringes to be used with the Apo-go pump will also be available in the cupboard to ensure a supply is available to prepare an infusion out of hours.

Preparing and connecting an Apomorphine Infusion using the Apo-go pre-filled syringe (PFS)

- Wash your hands
- Obtain equipment:

Syringe pack,	Line & butterfly
APO-go PFS 5mg/ml	Rigid connector
APO-go pump,	Sharps bin
Preparation tray	

- Ensure the pump is switched OFF (RED BUTTON)
- Ensure the plunger is reversed (Press GREY and BLUE BUTTONS SIMULTANEOUSLY)
- Place the APO-go Pump into the preparation tray.
- Take the plastic syringe and move the stem up and down a few times
- Push the stem of the plastic syringe to the far end of the barrel, locating the black bung as near as possible to the outlet tip.
- Unscrew the stem from the bung in the plastic syringe. Leaving the black bung in place.
- Place the plastic syringe onto the APO-go Pump and twist to engage the syringe's wings.
- Take the rigid connector and remove one of the caps. Screw open end onto the plastic syringe. Remove the second cap.
- Holding the glass Pre-filled Syringe vertical, remove its rubber cap. Place syringe into open end of connector, attached to plastic syringe.
- Gently but firmly, push down on the stem of the Pre-filled Syringe to transfer the solution.
- For 20ml fill, take a second Pre-filled Syringe and transfer the solution as above.
- Tap the plastic syringe to release any trapped bubbles.
- Unscrew the connector and the glass syringe from the plastic syringe and discard them in the sharps bin.
- Connect line and butterfly.
- Switch the pump ON (RED BUTTON).
- Prime the line (BLUE BUTTON). Hold the pump vertical during priming so that any remaining bubbles leave the solution first.
- Continue to prime the line until you see solution at the tip of the needle.
- Switch the pump OFF (RED BUTTON).
- Prepare dressing.
- Choose injection site - a non-inflamed site below the level of the umbilicus, mid line or to the right or left.
- Insert butterfly needle at an angle of 45^0 and secure it with the dressing.
- Switch the pump ON (RED BUTTON).
- Place pump in holster.

N.B. At the end of the infusion, switch pump OFF (RED BUTTON). Remove needle from skin and line and discard in sharps bin. With syringe still on pump, reverse the plunger (BLUE and GREY BUTTONS SIMULTANEOUSLY). When plunger has retracted the syringe may be removed and discarded.

Apomorphine infusion set up using pharmacy supplied ready filled Chrono syringe

- Wash your hands
- Obtain equipment: Chrono syringe containing apomorphine solution
  Line & butterfly
  APO-go pump
  Transparent dressing
  Sharps bin

- Ensure the pump is switched OFF (RED BUTTON)
- Ensure the plunger is reversed (Press GREY and BLUE BUTTONS SIMULTANEOUSLY)
- Unscrew the stem from the bung in the Chrono syringe.
- Place the plastic syringe onto the APO-go Pump and twist to engage the syringe's wings.
- Connect line and butterfly to the tip of the Chrono syringe.
- Switch the pump ON (Press and hold the RED BUTTON for 3 seconds).
- Prime the line (Press and hold the blue button for 3 seconds) the pump will begin to prime up to 0.99 ml.
- A further prime may be required until you see solution at the tip of the needle.
- Switch the pump OFF (RED BUTTON).
- Prepare dressing.
- Choose injection site - a non-inflamed site below the level of the umbilicus, mid line or to the right or left.
- Insert butterfly needle at an angle of 45^0 and secure it with the dressing.
- Switch the pump ON (RED BUTTON).
- Place pump in holster.

N.B. At the end of the infusion, switch pump OFF (RED BUTTON). Remove needle from skin and line and discard in sharps bin. With syringe still on pump, reverse the plunger (BLUE and GREY BUTTONS SIMULTANEOUSLY). When plunger has retracted the syringe may be removed and discarded.

Appendix 1

Dopamine Agonist Switching

There may be a need to switch between dopamine agonists due to side effects or to utilise a different mode of delivery eg. Trans-dermal if a patient cannot take medication orally.
Prior to switching consideration should be given to:

- The stage of PD the patient is at
- How the patient has previously tolerated medication changes
- Side effects previously experienced eg. postural hypotension, somnolence, impulse control problems.
- The patient's neuro-psychiatric health (hallucinations, psychosis, confusion).
- The rationale for switching and the potential side effects should be discussed with the patient.

Available evidence indicates that an overnight switch from one dopamine agonist to another is the most effective and the safest way to conduct a switch (Stewart et al 2004, Goetz et al 1999).

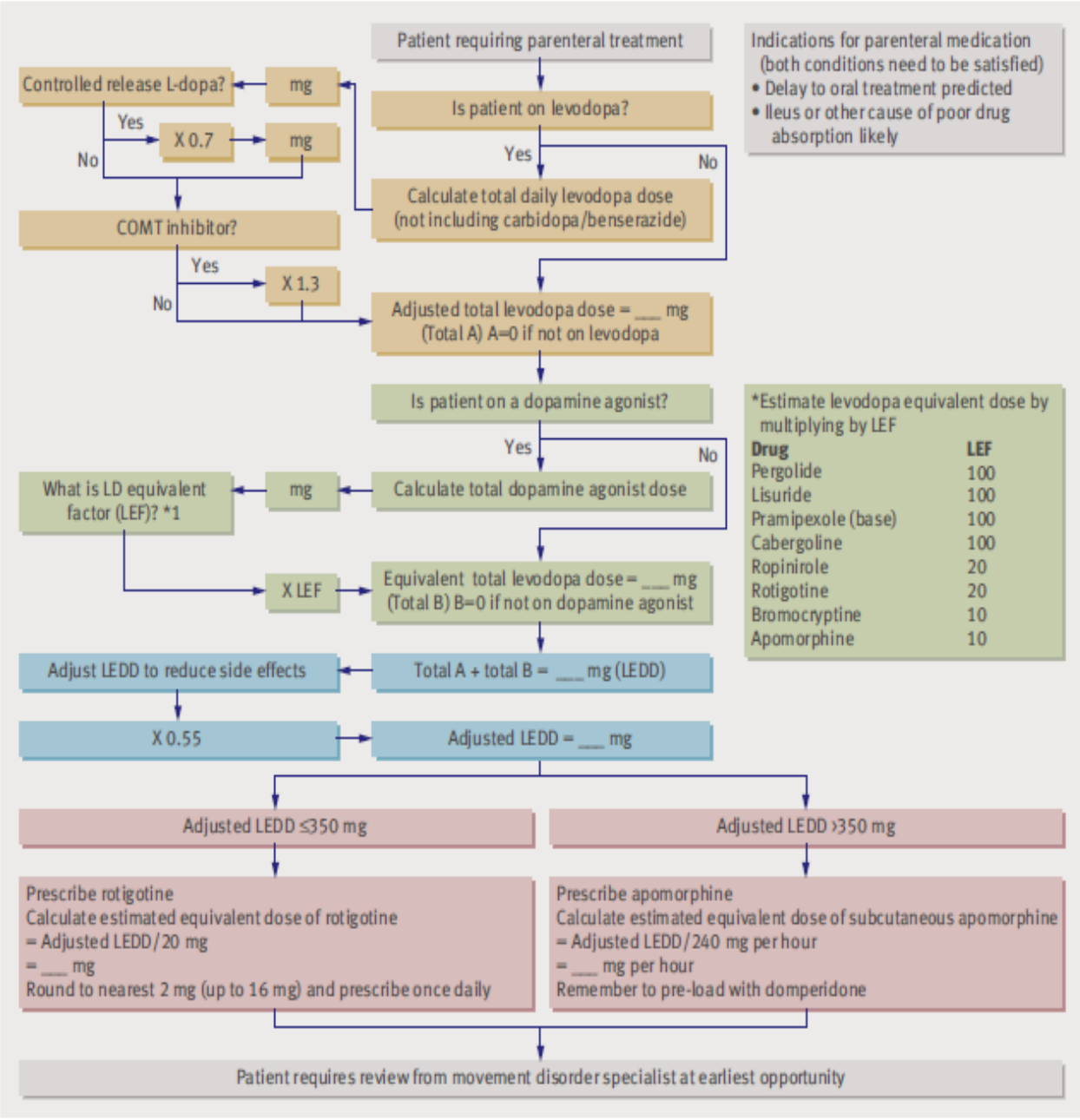
The following table gives best approximations of equivalent doses, which are guided by a combination of the available clinical data and the consensus opinion of PD specialists (Stewart et al 2004, Goetz et al 1999).

Ropinerole	Ropinerole prolonged release	Pramipexole Base Salt	Pramipexole prolonged release Base Salt	Rotigotine Transdermal patch
Starter pack to 1mg TDS	2mg OD	0.088mg 0.125mg TDS	0.26mg 0.375mg OD	2mg OD
1mg TDS	4mg OD	0.18mg 0.25mg TDS	0.52mg 0.75mg OD	4mg OD
2mg TDS	6mg OD	0.36mg 0.5mg TDS	1.05mg 1.5mg OD	6mg OD
3mg TDS	8mg OD	0.54mg 0.75mg TDS	1.57mg 2.25mg OD	8-10mg OD
4mg TDS	12mg OD	0.7mg 1mg TDS	2.1mg 3.0mg OD	12-14mg OD
6mg TDS	18mg OD	0.88mg 1.25mg TDS	2.62mg 3.75mg OD	16mg OD
8mg TDS	24mg OD	1.06mg 1.5mg TDS	3.15mg 4.5mg OD	16mg OD

Appendix 2

Algorithm for estimating parenteral doses of drugs for Parkinson's disease

Taken from Managing Parkinson's disease during surgery, KA Brennan and RW Genever, BMJ 2010; 341:c5718.



Algorithm for estimating parenteral doses of drugs for Parkinson's disease

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