Managing Parkinson’s disease during surgery

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People with Parkinson’s disease undergoing surgery are at increased risk owing to their condition and to potential omission of medication. This article looks at what doctors need to consider in this situation and how specialist assistance can be accessed.

Parkinson’s disease is a common condition affecting over 100 000 people in the UK. People with Parkinson’s disease who undergo surgery have increased mortality and longer hospital stays than people without this condition. Missing dopaminergic medication during a period of perioperative starvation can result in life threatening complications. This problem can be further compounded if the absorption of drugs is impaired. Recognising these hazards is the first step in an approach that may reduce the risk of suboptimal medication faced by people with Parkinson’s disease, using three principles.

- Advance planning
- Appropriate prescribing
- Advice from specialists.

Methods

We reviewed the available literature using PubMed and Google scholar databases up to May 2010. Further papers were identified from the references of articles found by the initial search. We also searched the Cochrane Library. Much of the evidence was based on case reports so selection of papers according to the grade of evidence was not attempted. A study published in July 2010 that added substantial new evidence was included.

Potential complications of missing medication

The consequences of missing Parkinson’s medication can vary enormously. Some people can tolerate a missed tablet without experiencing any major effects. Others become immobile. However, in some situations, missing dopaminergic medication can precipitate a condition known as neuroleptic malignant like syndrome, associated with fever, confusion, raised concentrations of muscle enzyme, and even death. This syndrome is most common in people with more severe Parkinson’s symptoms and those on the largest doses of levodopa.

What particular risks are faced?

Some of the risks relate to Parkinson’s disease itself and others to the effects of omitting medication. A retrospective cohort study of 234 people with Parkinson’s disease and 40 979 controls undergoing major abdominal surgery found a higher incidence of aspiration pneumonia, bacterial infection, and urinary tract infection in the group with Parkinson’s.

Case reports have described other perioperative complications in people with Parkinson’s disease, including postoperative respiratory failure and postextubation laryngospasm. Other reports mention exacerbation of Parkinson’s symptoms during surgery and a case of severe neuroleptic malignant like syndrome precipitated by perioperative starvation for coronary artery bypass grafting.

Access to the correct medication at the right time remains a problem for people with Parkinson’s disease when they are admitted to hospital. This concern has led to a national awareness campaign from the charity Parkinson’s UK. Lack of awareness of the importance of maintaining medication at the time of surgery places patients at increased risk.
Reducing the risks

Advance planning
As part of a Parkinson’s disease education programme, patients should be encouraged to ask that their movement disorder team is consulted before admission. This will enable those at greatest risk to be identified and their treatment individually tailored. The referral could come from the patient’s general practitioner, the surgical outpatient department, or the pre-assessment clinic.

The aim is to establish whether the patient’s treatment regimen should be altered for the period around their operation and to consider any additional measures that might be preferable.

Who should give the specialist advice?
Where available, a nurse specialising in Parkinson’s disease can play a key part. They may be able to advise directly or discuss the case with the patient’s consultant. In areas without specialist nurse support the advice should come directly from the patient’s geriatrician or neurologist.

Unplanned surgery and complicated elective surgery
Specialist preoperative advice cannot always be obtained, particularly for urgent surgery. To allow a treatment plan to be enacted at any time, we recommend that hospitals develop a protocol for this situation. We propose a flowchart (figure) to guide a non-specialist until more specific advice can be obtained from the movement disorder team. Clinicians who are unfamiliar with medication for Parkinson’s disease may require assistance from a pharmacist.

Anaesthetic and surgical considerations
Pre-operative
All patients having surgery under general or regional anaesthetic require preoperative fasting. However, it is recognised that it is safe to continue clear oral fluids up to 2 h before elective surgery. It is routine practice to continue oral medications until the time of anaesthetic induction. This practice should be encouraged in patients with Parkinson’s. Consideration should be given to placing such patients at the start of the operating list, facilitating greater predictability over the time of fasting and surgery, and ensuring optimum early postoperative disease management.

Induction—regional versus general anaesthesia
Several factors affect the choice of anaesthesia. Regional anaesthesia allows monitoring of Parkinson’s symp-
toms and should be considered in people who require very frequent dopaminergic medication. In exceptional circumstances oral medication can be administered intraoperatively, although a case of exacerbation of parkinsonism despite using this approach has been reported. Although some motor symptoms of Parkinson’s disease, such as severe dyskinesia, might make a general anaesthetic preferable. The anaesthetist should be aware of the effects of routinely used anaesthetic drugs on parkinsonism. Propofol is commonly used to induce anaesthesia and two case studies have shown that it can exacerbate dyskinesia. However, propofol may temporarily suppress tremor associated with Parkinson’s disease so it continues to be the first choice of most anaesthetists. Its antiemetic effect may also be beneficial.

The need for intubation should be assessed on an individual basis. Severe Parkinson’s disease is associated with excessive salivation that is often due to swallowing dysfunction. If dysphagia is suspected, intubation is the safer choice. In these patients, anticholinergics can increase the viscosity of saliva, further impairing swallowing, and should be used with caution.

Intraoperative
Antiemetics are routinely given intraoperatively. Centrally acting dopamine antagonists such as prochlorperazine and metoclopramide are likely to exacerbate Parkinson’s disease. Domperidone is preferable as it has a largely peripheral mode of action and may be given as a suppository. Other appropriate anti-emetics include 5-hydroxytryptamine-3 antagonists such as ondansetron and the antihistamine cyclizine.

Some patients will have a deep brain stimulator in situ and this should be recorded prominently in the medical notes. Electrocautery may damage the intracranial leads hence the manufacturers recommend its avoidance. However, where necessary, bipolar diathermy should be used.

Post-operative
An assessment of Parkinson’s disease should be made at the earliest opportunity and a judgement made about the patient’s ability to absorb enteral medication. A strict nil-by-mouth instruction or active vomiting will mandate an alternative route. The need for parenteral medication is extended in the presence of ileus or delayed gastric emptying. Advice from the Parkinson’s disease specialist nurse or consultant should be sought.

Appropriate prescribing
The overall strategy should be to maintain Parkinson’s treatment that closely resembles the patient’s usual treatment. Several changes can be recommended, depending on the particular drugs in use and the nature of surgery.

Using a different preparation of the same drug treatment
Patients who usually receive levodopa can be given dispersible co-beneldopa via a nasogastric tube during lengthy surgery. A patient with severe Parkinson’s disease undergoing liver resection was maintained without apparent exacerbation of his condition using this approach. Previous operations had resulted in marked rigidity and inability to swallow secretions in the same patient.

This technique is unsuitable when evidence indicates paralytic ileus. Two cases of worsening parkinsonism have been reported in patients whose recovery was complicated by ileus despite receiving orally disintegrating co-careldopa.

When switching from controlled release levodopa to dispersible co-beneldopa a dose reduction of around 30% is suggested due to lower bioavailability in controlled release form.

Using alternative Parkinson’s drugs in the perioperative period
Enteral medication would not be appropriate for a patient in whom post-operative ileus or delayed gastric emptying is expected. The choices for this patient are suboptimal treatment with its associated risks, or a parenteral drug (apomorphine or rotigotine).

Apomorphine is a highly potent dopamine agonist which is delivered subcutaneously. Switching a patient from oral treatment to apomorphine for the duration of surgery would avoid the problems of drug absorption seen with paralytic ileus. Due to its high potency, even patients on large doses of treatment are likely to get effective control of their symptoms from apomorphine. The main disadvantages are emetogenesis (which necessitates concomitant use of domperidone), neuropsychiatric side-effects such as hallucinations, and hypotension.

Rotigotine is a relatively new agent. It is also a dopamine agonist and is delivered transdermally with a patch. In an open label study, 14 patients were switched from their usual treatment to rotigotine the day before they underwent surgery. The switchover was felt by clinicians and patients to be easy and only one patient had a side effect (transient hallucinations and nausea) that was likely to have been caused by their medication. Its advantages are ease of use and tolerability but it may not be sufficiently potent to provide adequate treatment for patients on higher dose treatment regimens.

Switching to apomorphine or rotigotine
A number of articles have proposed levodopa equivalent doses for the various treatments. By using these data and head-to-head studies of rotigotine and ropinirole, it is possible to construct an estimated dose equivalent table for all the currently available drugs (see figure). In this situation our practice is to initially prescribe a lower than equivalent dose to reduce the risk of side effects but early review and adjustment of the dose is recommended.

Advice from a specialist
Even with an agreed advance plan or a written protocol, patients who do not rapidly regain the ability to take their usual Parkinson’s medication should be seen by a Parkinson’s disease specialist nurse or movement disorder consultant at the earliest opportunity. This allows the treatment plan to be adjusted according to the initial response.

Review of Parkinson’s patients by a neurologist following knee replacement has been shown to reduce length of
stay. Further research is required to establish whether this benefit can be transferred to Parkinson’s patients undergoing different types of surgery.

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