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## REGIONAL ANESTHESIA IN PATIENTS WITH PARKINSON'S DISEASE

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### ABSTRACT

Parkinson's disease is a degenerative disease of the central nervous system, which occurs in 1% of the population over 60 years of age. This disease is caused by the loss of dopaminergic nerve fibers in the basal ganglia of the brain due to an immune response. Parkinsonism is the name given to a clinical syndrome consisting of disorders of voluntary movement (hypokinesia), stiffness, and tremors. The typical pathological picture is the destruction of nerve cells containing dopamine in the substantia nigra of the basal ganglia. The selection of anesthetic techniques in patients with Parkinson's disease plays an important role in minimizing complications and patient morbidity and mortality. Anesthetic concerns in patients with Parkinson's disease are the presence or absence of interactions with anti-Parkinson's drugs that the patient is taking, decreased organ function due to old age, such as decreased cardiovascular, respiratory, and autonomic nerve function. In this case, the patient with Parkinson's disease will undergo repositioning of the left femoral head due to the dislocation. We chose regional anesthesia because it has several advantages over general anesthesia. The results during and after surgery were good, there were no complications and the patient returned to the room.

### ABSTRAK

Penyakit Parkinson adalah penyakit degeneratif pada sistem saraf pusat, yang terjadi pada 1% populasi di atas usia 60 tahun. Penyakit ini disebabkan oleh hilangnya serabut saraf dopaminergik di basal ganglia otak akibat respon imun. Parkinsonisme adalah nama yang diberikan untuk sindrom klinis yang terdiri dari gangguan gerakan sukarela (hypokinesia), kekakuan, dan tremor. Gambaran patologis yang khas adalah penghancuran sel saraf yang mengandung dopamin di substansia nigra ganglia basal. Pemilihan teknik anestesi pada pasien penyakit Parkinson berperan penting dalam meminimalkan komplikasi serta morbiditas dan mortalitas pasien. Kekhawatiran anestesi pada pasien dengan penyakit Parkinson adalah ada tidaknya interaksi dengan obat anti Parkinson yang dikonsumsi pasien, penurunan fungsi organ karena usia tua, seperti penurunan fungsi kardiovaskular, pernapasan, dan saraf otonom. Dalam hal ini, penderita penyakit Parkinson akan mengalami reposisi kepala femoralis kiri akibat dislokasi. Kami memilih anestesi regional karena memiliki beberapa keunggulan dibandingkan anestesi umum. Hasil selama dan setelah operasi baik, tidak ada komplikasi dan pasien kembali ke ruangan.

## INTRODUCTION

Parkinson's disease is a degenerative disease of the central nervous system caused by loss of dopaminergic nerve fibers in the basal ganglia. This disease generally occurs in old age (geriatrics) ([Roberts & Lewis, 2018](#)), and about 1% is present in the population over 60 years of age ([Shaikh & Verma, 2011](#)). Parkinsonism is the name given to a clinical syndrome consisting of disorders of voluntary movement (hypokinesia), stiffness, and tremors. The typical pathological picture is the destruction of nerve cells containing dopamine in the substantia nigra of the basal ganglia ([Nicholson, Pereira, & Hall, 2002](#)). Patients with Parkinson's disease can also experience intellectual disorders such as dementia with a variety of complex causes ([Cummings, 1988](#)).

Parkinson's disease is usually treated with dopamine preparations, so the use of anesthetic agents should consider the interaction with the action of dopamine ([Bhidayasiri et al., 2015](#)). General anesthetic techniques are widely used in patients with Parkinson's, but these techniques can mask Parkinson's attacks during surgery ([Oğuz, Öztürk, Özkan, Ergil, & Aydın, 2014](#)) ([Muravchick & Smith, 1995](#)) even the use of anesthetic gas can trigger the appearance of Parkinson's symptoms ([Mastrangelo, Comiati, & Zamprogno, 2013](#)). In this paper, we will describe the technique of regional anesthesia or spinal anesthesia that is rarely used in patients with Parkinson's disease.

## METHOD RESEARCH

In this case, a 62-year-old male patient was confronted by the PKU Muhammadiyah Gamping Hospital, Jogjakarta with complaints of left back pain and difficulty moving after falling out of bed. Approximately 1 month ago, AMP was performed on the left femur. The patient was diagnosed by the surgeon with post AMP left femoral head dislocation and will be repositioned. The patient is consulted to an anesthetist for anesthesia. From the history, we obtained a history of Parkinson's disease since 2 years ago, and received routine treatment in the form of levodopa 100 mg 2x1 tablet, trihexyphenidyl 2 mg 2x1 tablet. Examination of vital signs in the form of blood pressure 137/88 mmHg, pulse 80x/minute regularly, respiratory rate 22x/minute, with normal breathing sounds. The examination of the abdomen was normal, the limbs acral were warm, and there was tremor in both hands. The results of routine blood tests were normal, blood sugar levels were normal. The anesthetic diagnosis of ASA 2 due to Parkinson's disease on medication. Anesthesia is performed using a regional spinal anesthetic technique, using bupivacaine 0.5% as much as 4 ml or 20 mg which is injected into the 3-4 lumbar vertebrae subarachnoid space. The drug dose for spinal anesthesia is bupivacaine hydrochloride 10-20 mg. Hemodynamics is normal during the operation until the end of the procedure and there was no flare up. The operation lasts about 30 minutes, and the patient returns to the room.

## RESULT AND DISCUSSION

Parkinson's disease is caused by reduced dopaminergic neurons in the substantia nigra basal ganglia, which function to control conscious movement and mood regulation ([Klockgether, 2004](#)). The reduction of these dopaminergic neurons can be due to the response of the inflammatory process to anesthesia and the response to surgery ([Hwang, Joo, & Joo, 2020](#)). In Parkinson's disease, dopamine deficiency causes an imbalance in the dopamine:

acetylcholine ratio, which aggravates the symptoms of Parkinson's disease. Dopamine deficiency can be caused by increased activity of the nucleus inhibitor in the basal ganglia, which causes pressure on the cortical motor system, resulting in akinesia, rigidity, and tremor ([Triarhou, 2013](#)).

In patients with Parkinson's who will undergo surgery and anesthesia, anesthetists need to pay attention to the administration of anti-Parkinson's drugs in the perioperative period, the possibility of adverse interactions of anesthetic drugs with anti-Parkinson's drugs, and the possibility of systemic complications such as aspiration pneumonitis, respiration depression, myocardial depression, and postural hypotension ([Triarhou, 2013](#)).

The choice of anesthetic technique to be administered depends on the need for the surgery or surgical procedure, the anesthesiologist's ability, the patient's consent, the patient's condition, and risk factors. Some of the advantages of using regional or spinal anesthesia in patients with Parkinson's disease are: ([Shaikh & Verma, 2011](#)) ([Nicholson et al., 2002](#)).

1. The patient is still conscious so that he can convey the complaints he feels during surgery, so it can be given appropriate and fast treatment.
2. Myopotential events, which are an early sign of an intra-operative Parkinson's exacerbation, can be recognized immediately, because spinal anesthesia does not use muscle relaxants that can mask myopotential events.
3. Routine oral therapy for anticholinergic drugs / levodopa can be given before, during, or after surgery is over.
4. Can avoid the use of inhalation anesthetics in combination with intravenous opioids that can trigger Parkinson's disease symptoms.
5. The use of regional anesthesia can facilitate postoperative pain management and suppress the stress response.
6. Coughing and swallowing reflexes in patients are maintained, thereby reducing the risk of lung infection before and after surgery, due to difficulty removing lung secrets when performed under general anesthesia.
7. In regional anesthesia, the incidence of postoperative nausea and vomiting (PONV) is less common, so it does not hinder the administration of postoperative Parkinson's therapy.

Although there are advantages using regional anesthesia compared to general anesthesia, there are several disadvantages, namely: ([Shaikh & Verma, 2011](#)) ([Nicholson et al., 2002](#)).

1. Patients with Parkinson's disease are difficult to position.
2. Tremors and rigidity cannot be relieved by regional anesthesia, which can interfere and complicate the work of the monitoring equipment.
3. The patient is conscious of frequent movements that can interfere with surgical procedures.

In the procedure under general anesthesia, it is necessary to anticipate the possibility of difficulty in the airway, hypersensitivity reactions, and aspiration of secretions that arise due to the administration of general anesthetic agents. The use of postoperative mechanical ventilation also needs to be prepared. The use of fentanyl, an opioid analgesic agent, needs to be considered, because it can cause rigidity and even postoperative confusion and hallucinations ([Shaikh & Verma, 2011](#)).

In this case, the use of regional anesthesia found no complications or obstacles before, during, and after surgery. The patient was still continuing levodopa therapy so that there were no Parkinson's symptoms. This result is in accordance with the research of (Hani et al., 2020) which shows that Parkinson's patients who are given spinal anesthesia have fewer complications than general anesthesia (Hani et al., 2020). The case carried out by (Holyachi, KaRajagi, & BiRadaR, 2013) in a Parkinson's patient who underwent a laparotomy, also showed safe results using regional anesthetic techniques (Holyachi et al., 2013). Spinal anesthesia is a fairly safe regional anesthetic for patients with Parkinson's (Triarhou, 2013) (Ward, 2018).

## CONCLUSION

The choice of regional anesthesia in this case is appropriate because it has several advantages over general anesthesia. During surgery and after surgery there were no complications.

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