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INTRAOPERATIVE TREMOR RE-EMERGENCE IN A PARKINSONISM PATIENT DURING CATARACT SURGERY: A CHALLENGE IN ANESTHETIC CHOICE

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ABSTRACT

Parkinsonism is a neurodegenerative disorder characterized by bradykinesia, resting tremor, rigidity, and postural instability. These motor symptoms, especially tremors, can be unpredictable and fluctuate with changes in emotional or physical state, posing unique intraoperative challenges. In ophthalmic surgery—where precision and patient stillness are critical—managing Parkinsonian symptoms becomes particularly important. We report the case of a 68-year-old female with a known diagnosis of Parkinsonism who was scheduled for cataract extraction under local anesthesia. Her tremors were well-controlled preoperatively, and she had no other systemic comorbidities or anesthetic contraindications. However, upon being positioned for surgery and administration of local anesthesia, she developed re-emergent, severe tremors that significantly impaired surgical visualization and jeopardized intraocular safety. Despite attempts at verbal reassurance and supportive measures, the motor instability persisted. A prompt decision was made to convert to general anesthesia, which resulted in effective tremor suppression and allowed the procedure to be completed without complication. Such scenarios are not uncommon in ophthalmic operating rooms, particularly among elderly patients with neurological disorders. This case highlights the importance of understanding the pathophysiology of Parkinsonism, recognizing the potential for intraoperative motor fluctuations even when preoperative control seems adequate, and being prepared to adjust anesthetic strategy accordingly. General anesthesia may be a safer primary option in selected Parkinsonism patients where motor unpredictability can interfere with

surgical outcomes. Through this case, we emphasize the need for close preoperative evaluation, anesthetic adaptability, and multidisciplinary planning between ophthalmologists and anesthetists. Understanding the clinical features, behavioral triggers, and perioperative risks of Parkinsonism is crucial for delivering safe and effective ophthalmic care.

Introduction

Parkinsonism is a progressive neurodegenerative syndrome characterized by bradykinesia, resting tremor, muscular rigidity, and postural instability. These motor symptoms arise primarily from dopamine deficiency in the basal ganglia and are often accompanied by non-motor symptoms such as autonomic dysfunction, cognitive impairment, and mood disturbances. The prevalence of Parkinsonism increases with age, making age-related ocular conditions—particularly cataracts—common comorbidities in this population.

Cataract surgery is typically performed under local or regional anesthesia due to its safety, rapid recovery, and reduced systemic risk, especially in elderly patients. However, in patients with Parkinsonism, intraoperative management can become challenging. Resting tremors, though often well-controlled with medication, may re-emerge in response to stress, anxiety, fatigue, or suboptimal pharmacologic timing. Intraoperative tremors not only impair patient cooperation but also compromise the precision required for microsurgical techniques such as phacoemulsification.

While most Parkinsonism patients tolerate local anesthesia well, there are situations where unanticipated re-emergence of motor symptoms can jeopardize surgical safety. In this report, we present a case of a patient with Parkinsonism who developed significant intraoperative tremors despite good preoperative symptom control, requiring an urgent shift in anesthetic strategy. The case underscores the importance of individualized anesthetic planning and the need for multidisciplinary preparedness when managing neurologically vulnerable patients in ophthalmic surgery.

Case Presentation

A female patient between 65 and 70 years of age with a known diagnosis of idiopathic Parkinsonism presented for elective phacoemulsification cataract surgery at Al Qasim Eye Care, Dera Ghazi Khan. She had no known systemic comorbidities, and her Parkinsonian motor symptoms were reportedly well-controlled on regular anti-parkinsonian therapy. No preoperative neuroimaging or recent neurologic evaluation was available in the medical record.

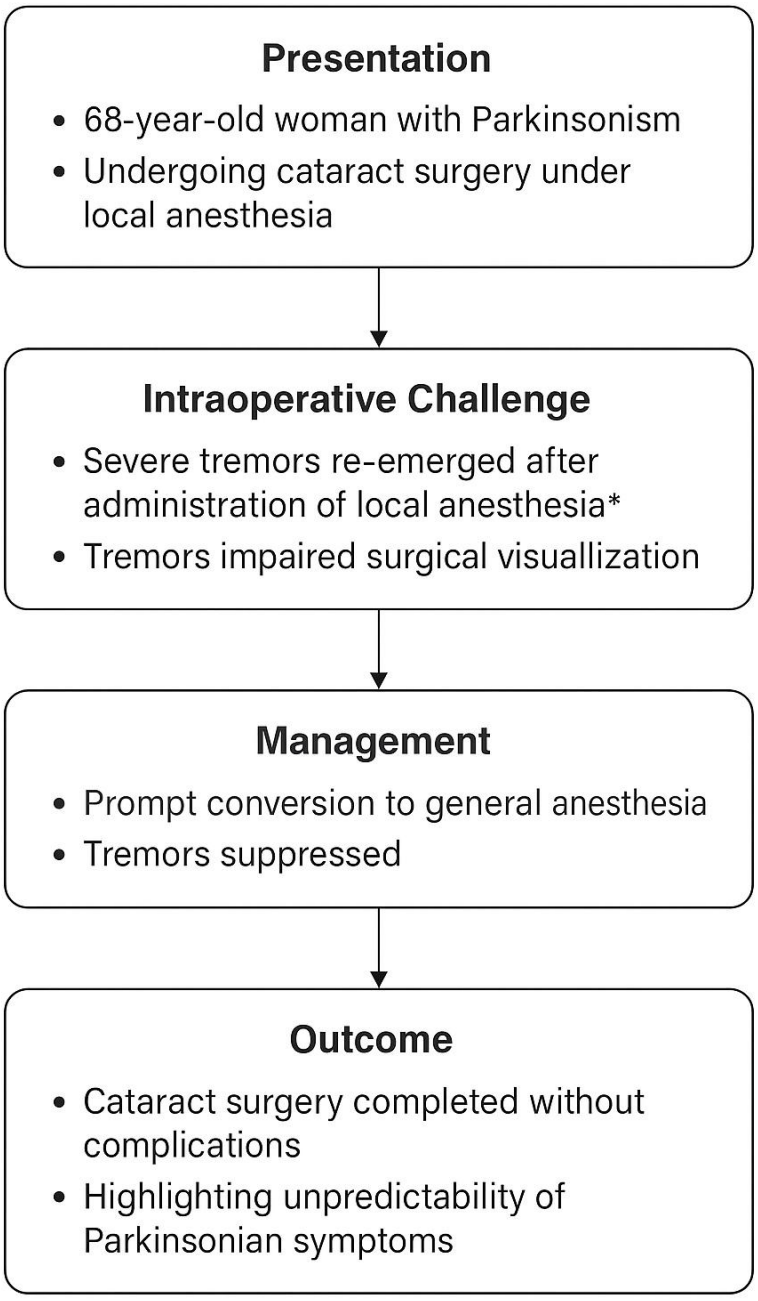
Preoperative ophthalmic evaluation revealed visually significant lens opacity in the right eye with reduced best-corrected visual acuity. Intraocular pressure was within normal limits. Routine pre-anesthesia assessment found no contraindications to local anesthesia, and the patient remained stable with no visible tremors during the preoperative holding period.

The surgery was initially planned under local (peribulbar) anesthesia. However, upon positioning on the operating table and preparation for the block, the patient developed sudden, pronounced upper limb and truncal tremors. These re-emergent motor symptoms significantly interfered with

surgical readiness, compromising ocular stability and making safe intraocular manipulation unfeasible.

Verbal reassurance and adjustment of positioning failed to alleviate the tremors. The anesthesia team was immediately consulted, and in view of the persistent involuntary movements and risk to surgical safety, a decision was made to convert to general anesthesia.

Following induction, the tremors resolved completely. The cataract extraction proceeded uneventfully, and intraocular lens implantation was completed successfully. The patient was extubated without complication and transferred to the postoperative recovery unit in stable condition. Her postoperative course remained uneventful.



Discussion

Parkinsonism poses unique challenges for ophthalmic surgeons and anesthetists due to the unpredictability of its motor symptoms, particularly tremors. While many patients can undergo cataract surgery under local anesthesia, the possibility of intraoperative motor exacerbation—despite apparent preoperative control—requires careful preoperative planning and adaptability.

In Parkinsonism, tremors are typically present at rest and tend to improve with voluntary movement. However, a subtype known as **re-emergent tremor** can occur after brief postural holding, particularly under emotional stress, fatigue, or altered medication timing. This phenomenon is clinically distinct from essential tremor and may be unmasked during positioning or surgical preparation—even in patients whose tremors appear well-controlled preoperatively.

Deep brain stimulation (DBS) helps manage motor complications in patients with Parkinson's disease [5]. Evidence suggests that phacoemulsification performed under topical anesthesia is a safe and feasible procedure in patients with active DBS devices, with no observed interference between the ultrasonic energy used in cataract surgery and the internal pulse generator [1]. Recent findings in DBS surgery suggest that general anesthesia not only offers a less burdensome experience for patients with Parkinson's disease—with no significant compromise in clinical outcomes—but also reduces perioperative complications and anxiety, supports faster recovery, and aligns more effectively with Enhanced Recovery After Surgery (ERAS) principles compared to local anesthesia. **[4,11,12].** A meta-analysis found no significant difference in clinical outcomes between general and local anesthesia for STN-DBS in Parkinson's patients, but highlighted the need for high-quality randomized trials to confirm equivalence [6]. Intravenous dexmedetomidine and Remifentanil, a short-acting opioid, in low-dose infusion may effectively suppress Parkinson's disease-related dyskinesia during delicate ophthalmic procedures, enabling safer surgical outcomes. [2,3]. A study comparing sevoflurane general anesthesia to local anesthesia during STN-DBS found altered brain oscillations under anesthesia but no impact on electrode targeting accuracy or clinical outcomes, supporting its feasibility as a surgical option [7].

Several studies have reported safe outcomes using regional or topical anesthesia in Parkinsonism patients; however, these cases assume stability of symptoms throughout the procedure. In our case, despite initial stability, the patient developed significant upper body tremors upon positioning, which compromised the safety of intraocular microsurgery. The patient's lack of tremor in the preoperative area highlights how **stress-induced physiological changes or gaps in dopaminergic medication coverage** may trigger symptom recurrence intraoperatively.

Conversion to general anesthesia resulted in complete suppression of tremors, allowing safe and effective cataract extraction. While general anesthesia is not routinely preferred in ophthalmic surgery due to its systemic risks, it can offer superior motor control in neurologically complex cases. Some authors advocate for upfront general anesthesia in Parkinson's patients with moderate to severe tremor, poor medication adherence, or known variability in motor control. A meta-analysis of 15 studies concluded that

STN-DBS under general or local anesthesia yields similar clinical outcomes and complication rates, with slightly better motor improvement seen in the GA group using intraoperative imaging, suggesting GA may be a suitable alternative for patients unable to tolerate awake procedures [8,10]. **A meta-analysis found no significant differences in outcomes between awake and asleep DBS for Parkinson's disease, suggesting that anesthesia choice should prioritize patient comfort, clinical status, and surgical team expertise [9].**

This case underscores the importance of anticipating motor fluctuation in Parkinsonism, particularly during ophthalmic procedures that demand absolute stillness. A multidisciplinary approach—incorporating neurologic history, timing of dopaminergic medication, and intraoperative anesthesia flexibility—is crucial in optimizing surgical outcomes.

Summary Table: Intraoperative Tremor Re-Emergence in a Parkinsonism Patient Undergoing Cataract Surgery

Parameter	Details
Patient Age/Sex	68-year-old Female
Diagnosis	Idiopathic Parkinsonism
Systemic Comorbidities	None
Surgical Procedure Planned	Phacoemulsification cataract surgery
Anesthesia Planned	Local anesthesia (peribulbar)
Preoperative Status	Stable with well-controlled tremors; no visible symptoms at rest
Intraoperative Event	Sudden re-emergence of upper body and truncal tremors upon positioning
Initial Management	Verbal reassurance, adjustment of position
Anesthetic Intervention	Urgent conversion to general anesthesia
Outcome of Conversion	Immediate suppression of tremors; surgery completed uneventfully
Postoperative Course	Stable; no complications; routine recovery
Key Clinical Challenge	Unpredictable motor fluctuation despite preoperative control
Learning Point	Importance of anesthetic adaptability and considering GA in selected Parkinsonism cases
Relevance to Practice	Encourages preoperative neurologic assessment and multidisciplinary planning

Conclusion

Cataract surgery in patients with Parkinsonism requires careful anesthetic planning due to the potential for unpredictable motor fluctuations, including re-emergence of tremors during the procedure. While local anesthesia is generally preferred, it may not be suitable in all cases—particularly when even brief postural changes or stress can trigger tremor recurrence. Our case highlights the importance of anticipating such challenges, maintaining intraoperative flexibility, and considering general anesthesia as a safer alternative when surgical precision may be compromised. Close collaboration between ophthalmologists, anesthetists, and neurologists is essential to ensure optimal outcomes in this vulnerable patient population.

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