

Peribulbar Block for Cataract Surgery in Patient with Nystagmus and Chronic Kidney Disease

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ABSTRACT

Background: Management of presenile cataracts with nystagmus and chronic kidney (CKD) disease is a separate problem in anesthetic procedures. The risk of anesthesia in patients with chronic kidney disease is accumulation of nephrotoxic metabolites, unstable hemodynamic during intraoperative, and fluid overload.

Case: A 43-year-old man with a diagnosis of immature presenile cataract with nystagmus and comorbid CKD was planned for phacoemulsification and intraocular lens. The anesthetic technique used was regional anesthesia with peribulbar block. Site injections in the inferotemporal and medial canthus with local anesthetic drugs levobupivacaine 0.5% 5 ml and lidocaine 2% 3 ml.

Discussion: Combination of peribulbar block and mild sedation provides effective analgesic and anxiolytic effects. Peribulbar blocks in nystagmus besides sensory blocks can also block motoric function so that the position of the eyeball is in center.

Conclusion: The peribulbar blockade anesthetic technique can be considered as an alternative safe anesthetic technique for cataract surgery with nystagmus and CKD.

Keywords: anesthesia; block peribulbar; chronic kidney disease; nystagmus; regional anesthesia

INTRODUCTION

Cataract is one of the problems caused decrease visual acuity. Prevalence of cataract in developing countries is higher. In some cases, cataract can be accompanied by other diseases such as nystagmus.¹ Nystagmus is a condition in which the eyes move involuntary. This becomes a problem in eye surgery and considerations for selection of regional or topical anesthesia techniques.²

Patient cataract with chronic kidney disease (CKD) as comorbidity need intervention to maintain visual function. That intervention can be done with topical anesthesia. However, nystagmus become risk of eye trauma during the surgical procedure. The choice of anesthesia technique often chosen is with general anesthesia, regional, or a combination of general-regional anesthesia. Patient with nystagmus in CKD patients have risk cardiopulmonary complication and regional anesthesia block become a safe choice.³

Patients with CKD may be at a higher risk for specific perioperative and post operative complications related to surgery and anesthesia. Regional anesthesia with CKD comorbidities have advantages due to minimal drug use, shorter duration, good post-operative analgesia, and faster recovery.⁴ This case report outlines the successful anesthesia management in a patient with cataracts and nystagmus who also has comorbid CKD, undergoing Phaco IOL aimed at preserving vision function.

CASE

A 43-year-old with immature subcapsular posterior oculi dextra presenile cataracts with nystagmus undergoing phacoemulsification and intraocular lens implantation. Other medical conditions include chronic kidney disease (CKD).

The patient is routinely hemodialyzed twice a week and takes amlodipine 10 mg, furosemide 40 mg, amlodipine 10 mg, folic acid 1 tablet, and bicnat 500 mg three times a day.

Physical examination revealed the patient's general condition was compos mentis. The vital signs examination showed an increase in blood pressure up to 168/88 mmHg, general examination was within normal limits, and laboratory findings showed anemia with Hb 8.2 mg/dl, an increase in urea 48 mg/dl, creatinine 5.07 mg/dl, and kalium 5.4 mg/dl. Ophthalmologic examination before surgery revealed right eye visual acuity 1/60 and left eye visual acuity 1/300. Both eye positions were difficult to assess due to nystagmus in both eyes. The patient has an ASA III physical status. The patient was planned to undergo peribulbar anesthesia on the right eye in the supine position with nasal oxygen supplementation at a rate of 3 liters per minute.

Hemodynamic monitoring before injection showed blood pressure 162/84 mmHg, pulse 87 beats per minute, respiratory rate 20 breaths per minute, and oxygen saturation 99%. The patient was given 2% tetracaine hydrochloride eye drops in the right eye. Aseptic technique was performed with povidone iodine, and the regional anesthesia technique used was peribulbar block with 2 injections. The first injection was in the inferotemporal area with a 25 G needle, 25 mm long, with a mixture of 3 mL of levobupivacaine 0.5% and 2 mL of lidocaine (Figure 1A). The second injection was in the medial canthus using a 26 G, 13 mm long needle with a mixture of 2 mL of levobupivacaine 0.5% and 1 mL of lidocaine, making the total volume of the administered drug 8 mL (Figure 1B). Digital pressure was applied to the

injection site for 5 minutes. After digital pressure for 3-5 minutes, the success rate of the block was assessed using the Cicendo Akinesia Score to assess post-

injection eye movement (Table 1). The patient's eye akinesia score was 3, indicating total akinesia (Figure 1C).



Figure 1. (A) Peribulbar block at inferotemporal, (B) Peribulbar block at medial canthus, (C) Total akinesia

Table 1. Cicendo Akinesia Score (CAS)

| Score | Clinical |
|-------|---|
| 0 | Free movement of the eyeball in all four quadrants (no block) |
| 1 | The eyeball can move more than one quadrant (partial block) |
| 2 | Slight movement of the eyeball (partial block with flickering eye movement) |
| 3 | Total akinesia (complete block) |

Reference: Boesoeri A⁵

Hemodynamic monitoring during the surgery was performed using non-invasive blood pressure measurement, a pulse oximeter, and electrocardiogram (EKG). During the surgery, the systolic blood pressure ranged from 144 to 152 mmHg and the diastolic blood pressure ranged from 72 to 81 mmHg. Electrocardiogram (EKG) showed sinus rhythm with heart rate range 68 to 78 beats per minute and oxygen saturation of 99% with 3 liters per minute using nasal cannula. Phacoemulsification and intraocular lens placement were performed on the right eye. The surgical procedure lasted for 45 minutes. Postoperatively, the patient was observed for 30 minutes in the recovery room, then transferred to the ward with a postoperative pain score assessment of 0/10 on the visual analog scale (VAS). No complaints of nausea or vomiting were

reported postoperatively in either the recovery room or the ward.

DISCUSSION

Cataract surgery is the most common intraocular procedure and is most frequently performed using local anesthesia. In this patient, there are 2 issues: chronic kidney disease (CKD) and nystagmus, which pose a high risk for general anesthesia. In this patient, there are two issues: cataracts with nystagmus and comorbid CKD. The presence of this comorbidity poses a high risk if general anesthesia is administered.⁶

Anesthesia for phacoemulsification and intraocular lens surgery usually involves 2% tetracaine hydrochloride eye drops. Patient with nystagmus refer to repetitive eye movements that are uncontrollable and unconscious.⁷ This causes a risk of

eye injury and becomes a problem in eye surgery. Therefore, cataract patients with comorbidity CKD and nystagmus are considered in the selection of anesthesia during phacoemulsification and intraocular lens surgery. Most of ophthalmic surgeons are close to prefer general anesthesia for their comfort during the operation. A rare part of surgeons prefers peribulbar anesthesia, which stabilize the globe and block eye movements by causing the cranial nerves paralysis for a period of time for the cataracts with nystagmus.⁸ Peribulbar blocks in nystagmus besides sensory blocks can also block motoric function so that the position of the eyeball is in center.⁹

Patients with CKD increase the risk of surgical morbidity, such as hyperkalemia, cardiovascular complications, and fluid overload. General anesthesia in hypertension and CKD can lead to accumulation of nephrotoxic metabolites, hemodynamic changes during intraoperative period, and increased cardiorespiratory complications. Therefore, the chosen anesthesia procedure should have minimal cardiac depression effects and rapid recovery, for example with block anesthesia techniques.^{10,11} The advantages of block anesthesia include minimal airway manipulation, better postoperative analgesia effects, lower stress response, minimal cardiopulmonary effects, and faster recovery.^{3,4}

Therefore, the chosen anesthesia procedure should have minimal cardiac depression and rapid recovery, such as using a block anesthesia technique. The advantages of block anesthesia are minimal airway manipulation, better postoperative analgesia, lower stress response, and minimal cardiopulmonary effects and rapid recovery.⁴

The CKD patient is at risk of fluid status disorders such as venous congestion, sympathetic nervous system dysfunction, renin-angiotensin-aldosterone system imbalance, and hypothalamic-pituitary axis disorders that can cause fluid overload. The principle is to maintain fluid at euvolemic levels. If hypotension persists after fluid administration, vasopressor administration may be considered. General anesthesia in CKD patients can lead to increased stress response, hemodynamic instability, potential drug interactions, residual muscle relaxation, respiratory depression during the postoperative period, and poor postoperative pain management.⁴

The administration of topical ocular anesthesia, specifically 2% tetracaine hydrochloride eye drops before peribulbar block, aims to provide comfort and reduce pain during injection in the medial canthus area. Patient cooperation is also an important consideration in selecting regional anesthesia techniques because intraoperative eye injuries due to patient head or eye movement can be problematic in eye surgery.¹²

The peribulbar regional anesthesia technique, with a combination of long-duration effect levobupivacaine and fast-onset lidocaine, is expected to provide a combined effect of rapid anesthesia onset and long duration. Akinesia assessment for motor block on nerves III, IV, and VI was achieved well, characterized by patients who cannot move the eyeball in the fourth quadrant. Pressure at the injection site reduces the spread of local anesthetics to the lower and upper palpebral fat tissue, thus helping the spread of local anesthetics to the intracoon area, and can also help reduce bleeding if vascular injury occurs by the needle.^{13,14}

Surgery using regional blocks may induce psychological stress due to associated discomfort. After ensuring that the block is working, monitored anesthesia care (MAC) technique with mild sedation is performed, involving intravenous administration of 25 mcg fentanyl and 10 mg propofol before the incision. MAC anesthesia during the procedure with the goal of safe conscious sedation, action to relieve patient anxiety, and effective pain control as the 3 basic principles of MAC, with sedation depth assessment obtained Ramsay score 2 in this patient.¹⁵

The combination of peribulbar block and mild sedation provides effective analgesic and anxiolytic effects. Administering sedatives and opioid analgesics during MAC procedures yields anti-anxiety and analgesic effects, resulting in favorable outcomes. A combination of propofol (10-30 mg) and fentanyl (10-50 mcg) can be used in phacoemulsification surgery for cataracts, achieving an ideal Ramsay score, significant blood pressure reduction, minimal side effects, and satisfactory levels of patient satisfaction.¹⁶ In this case, the intraoperative systolic blood pressure drops to 144-152 mmHg, and the diastolic pressure ranges between 72-81 mmHg.

During surgery, stable hemodynamics and postoperative VAS pain assessment score of 0/10. A combination of regional peribulbar anesthesia, topical anesthesia, and MAC anesthesia can maintain hemodynamic stability and provide adequate akinesia and analgesia effects during surgery and postoperatively. Postoperatively, the patient was not given additional analgesics because the block performed for anesthesia was also used as postoperative analgesics, considering the

pain scale in this type of eye surgery 1 and proved by patient's postoperative pain scale assessment of 1/10. The patient was monitored in the recovery room and then underwent postoperative follow-up in the care room with stable hemodynamic conditions, no allergic reactions were found, and the pain scale of 1/10 was felt with the block effect began to disappear approximately 2 hours postoperatively.

CONCLUSION

Peribulbar block anesthesia technique can be considered as a safe alternative for immature presenile cataract surgery with nystagmus and comorbid chronic kidney disease.

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