# OPHTHALMIC PATIENTS, NEUROMUSCULAR BLOCKERS, C-SECTION & ANESTHESIA

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**be ensured**

Vomiting, coughing, and excitement at the time of induction or recovery will increase intraocular pressure

Most ophthalmic patients are old and may have some degree of compromise in differe organ systems

Patients may have residual neuromuscular blockade

## *Anesthetic plan*

Uneventful preanesthetic, induction and recovery period should be accomplished.

Benzodiazepine and opioid combination (neuroleptanalgesia) is useful as preanesthetic medication

Opioid will provide better degree of sedation in the presence of tranquilization and additional analgesia.

Neuroleptanalgesic combination induces varying degree of sedation depending on the dose rate, drug choice and temperament of the animals, but provide good cardiovascular stability.

Morphine tend to cause meiosis and vomiting which increases intraocular pressure and must be carefully assessed before routine use in ophthalmic patients.

Oxymorphone induces vomiting much less commonly than morphine and thus could be a better choice in this patient group to provide analgesia. Alternatively, butorphanol can be used, but analgesia may be less predictable.

Induction is best achieved using intravenously administered ultrashort acting agents such as thiopental and propofol. Ketamine can increase intraocular pressure so better to avoid in this patient group.

Inhalation anesthetic maintenance using isoflurane or sevoflurane is commonly employed for ophthalmic procedures

Use neuromuscular blockers for optimal surgical condition when needed.

To ensure there is no residual neuromuscular blockade, patient should be closely monitored and use of pulse oximetry is recommended throughout the recovery period.

Slow and smooth recovery from anesthesia is preferable than rapid and rough recovery.

Unnecessary stimulation at the time of recovery should be avoided.

The recovery room should be kept quiet.

Acepromazine can be administered postoperatively at 0.02 mg/kg IV if signs of rough recovery are seen.

Protection of eyeball from hitting the wall of cage or animal's paw should be better managed by placing an E-collar or manual restraint at the time of recovery.

## Neuromuscular blockers (NMBs) & its use in anesthesia

Classified into depolarizing and non-depolarizing NMBs (refer to CNS and anesthesia lecture notes for further details)

Indications

- To produce central fixation of eyeball for ophthalmic procedures.
- As part of balanced anesthesia so that concurrent anesthetics, particularly inhalants, can be reduced for better cardiovascular stability (most useful in sick and geriatric patient).
- To assist reduction of dislocated joints and displaced fractures.
- To relax skeletal muscle for better surgical condition.
- To completely overtake ventilation when initiating intermittent positive pressure ventilation (IPPV) using a mechanical ventilator.
- To prevent reflex movement in delicate surgeries

### *Commonly used NMB*

*Atracurium*

Non-depolarizing

Few cardiovascular effect, however histamine release when given rapidly and in larger doses may cause transient fall in blood pressure and increase in heart rate.

Metabolized in plasma by the Hoffman elimination process (depend on body temperature and pH) and to a lesser extent by ester hydrolysis, and thus safer in hepatic/renal diseased patients

## *Techniques of relaxant anesthesia*

Muscle relaxant is commonly administered just prior to the start of surgery to best utilize the period of paralysis, IPPV is instituted as soon as relaxant takes effect

In balanced anesthesia muscle relaxant is given as soon as at the time of induction to spare concurrent maintenance anesthetic drugs

Muscle relaxant is usually given by slow IV injection using the indicated dosage.

Under neuromuscular blockade, typical indices can not be used, as animals will be absent of jaw tone, palpebral reflex, limb withdrawal reflex, and breathing, and eyeballs remain central. However, animals may not be fully anesthetized and feel pain.

Possible signs of awareness of pain in not fully anesthetized patient include tachycardia, hypersalivation, tear formation, curling of the tip of the tongue, pale mucous membrane and severe hypotension from pain, hypermetabolism manifested as increased end tidal $CO_2$.

Animal's anesthetic depth should be deepened in these patient group by giving additional intravenous anesthetics (eg.,thiopental, propofol), increasing vaporizer setting, or administering analgesics.

## *Monitoring neuromuscular blockade*

A peripheral nerve stimulator is commonly used to monitor the degree of neuromuscular blockade.

A group of skeletal muscles will move in response to an electrical stimulus in a patient without neuromuscular blockade.

In the presence of neuromuscular blockade the transmission of nerve impulses will not initiate the paralyzed muscles.

Two electrodes are placed along the peripheral nerves such as ulnar, peroneal or facial nerve.

**Train of four (TOF)** is the most commonly used method. Four impulses at every 0.5 seconds (2 Hz) are fired, and if the blockade is present and complete, there will be no muscle twitching. As the muscle blockade wanes, the twitches reappear. For surgical purposes, it is considered optimal if the fourth twitch is absent while the other twitches are present.

The presence of spontaneous ventilation does not necessarily indicate that the animal has fully recovered from NMB.

The chest movement may not be adequate and hypoventilation may occur due to residual blockade.

Ventilation must be controlled or supported if there is a sign of cyanosis at this point.

Alternatively reversal agent (**antiacetylcholinesterase**) can be given to reverse non-depolariz

# Cesarean section & anesthesia

## *Anesthetic goals*

Deliver viable newborns with minimal depression both to the mother and offspring
Provide adequate analgesia or anesthesia to perform the operation
Return the mother and newborn to their environment as quickly as possible.

## *Physiologic changes during parturition*

The mother have increased respiratory rate (hyperventilation) due to distress and pain
Tidal volume could be decreased due to anterior displacement of the diaphragm by the gravid uterus
Heart rate and cardiac output may be increased as a result of pain and catecholamine release

## *Management of newborns*

Deliver the fetus as quickly as possible
Fetal oropharyngeal cavities must be cleaned to avoid any upper airway obstruction
Opioid antagonist/alpha 2 antagonist should be administered to the newborn if agonists were included in the anesthetic protocol.
Naloxone is preferred opioid antagonist and readily absorbed from mucous membrane by placing a drop or two in under the newborn's tongue.
Analeptic such as doxapram can be used to stimulate respiration in the newborn administered sublingually.
Vigorously rub the newborn to stimulate breathing and movement.
Supplement with oxygen using face mask or in oxygen chamber.
Atropine and glycopyrrolate can be given to treat severe bradycardia.
The newborn must be kept warm and return to the mother to get nursed as soon as possible.