Anaesthesia in rabbits

Introduction

Rabbits have become a popular pet nowadays. Surgical procedures like spay and neutering are more commonly carried out under general anaesthesia. The anaesthetic procedures in rabbit are very much similar to dogs and cats, with a few additional considerations.

Pre-anaesthetic consideration

- Check:
  Weight of the rabbits should be obtained to calculate the dose for pre-medication and induction.

  Perform a full clinical exam to check the cardiac, respiratory and neurological function before anaesthesia. Temperature, pulse rate, respiratory rate should be evaluated. Treat or manage other diseases before anaesthesia if possible.

  For emergency procedure, it would be more ideal to stabilise the patients first, such as offer analgesia, correct fluid and electrolyte deficit, gastrointestinal motility and nutritional support.
    - Fluid maintenance rate: 4ml/kg/hr
    - Analgesia: see 'pre-medication'
    - Nutritional support: high-fibre, critical care product
    - Gastrointestinal motility support (i.e. gut stimulant) such as: ranitidine, metoclopramide

- Environment:
  Ideally the rabbits should be hospitalised in area without any stimulation, e.g. scent from predator species. Basic need such as hide box, water bowl, hay, pellet, litter tray should be catered while they are waiting for the anaesthetic procedure. The room should be quiet as well.

- Fasting:
  No fasting is required as rabbits cannot vomit. Hay can be removed 10 minutes before induction and clear the oral cavity from food as much as possible before intubation.

- IV assess:
  Clip fur when necessary and apply EMLA cream before IV cannulation. IV assess can be obtained from marginal ear vein, or lateral saphenous vein.

- Emergency drug, e.g. adrenaline, reversal agent, e.g. atipamezole or naxolone, have been drawn up before procedures.

Pre-medication

There are several different protocols of pre-medication and sedation for rabbits. In general, they include ketamine, alpha 2 agonist, opioid and benzodiazepine.

- Ketamine: NMDA antagonist. It creates fewer effects on cardiovascular system but it causes muscle rigidity.
- Alpha 2 agonists: They offer sedation, muscle relaxation and analgesia. It may cause cardiovascular and respiratory depression. They can be reversed by atipamezole.
- Opioids: They are analgesic but may cause respiratory depression.
- Benzodiazepines: They has sedative effects and provide muscle relaxation but do not provide analgesia. They have a minimal cardiovascular effect. They can be reversed by flumazenil.

Examples of drugs combination:
- Ketamine + dexmedetomidine IM, buprenorphine SC
- Ketamine, medetomidine, butorphanol IM or SC
- Fentanyl/fluanisone IM + midazolam IM
- Midazolam + buprenorphine IM or SC – for sedation

For specific drug doses please refer to exotic animal formulary. It is advised that there is no specific or recommended pre-medication protocols among all different combinations. Confidence and experience on the specific drugs combination and patients health status would be helpful to decide which one to use.

Analgesia

Pre-emptive analgesia is recommended in all operations. Analgesics can be used alone or in combination. Examples of analgesic are listed below:
- Opioids: butorphanol, buprenorphine, morphine
- Ketamine
- NSAID: meloxicam, carprofen, ketoprofen. Avoid NSAID if the patients are dehydrated or with compromised kidney.
- Local anaesthetic: bupivacaine, lidocaine

Pre-oxygenation

Rabbits can be pre-oxygenated via mask or flow-by oxygen before induction and intubation.

Induction

Intravenous induction has been recommended over mask induction due to the irritant nature of anaesthetic gases and the associated stress. In addition, rabbits can breathe-hold so mask induction is not advisable.

For intravenous induction, the common agents used are propofol and aflaxalone. Inject the agent slowly into veins over 30 – 60 seconds and titrate to effect (i.e. reach the desired plane of anaesthesia without overdose). Apnoea may occur during induction, especially when the injection is carried out in a quick manner. When there is apnoea during induction, toe pinch or lifting the rabbit back end up and down gently may help stimulate spontaneous breathing. Offer oxygen via mask as well.

For specific drug doses please refer to exotic animal formulary.

Intubation

It is recommended to intubate the rabbit if the practice has enough expertise and experiences. Ways to intubate a rabbit include but not limited to: blind, otoscope, V-gel, endoscope and laryngoscope. The more common techniques are blind, otoscope and V-gel.

Uncuffed ET tube with 2-3.5 mm suits majority of the rabbits. Check the tube length before intubation. More than 3-4 attempts of intubation may result in laryngeal damage or haemorrhage.

- Otoscope:

Rabbit should be positioned as sternal recumbency with neck full extended. Larynx, trachea and oral cavity should be aligned. Otoscope can be useful to visualise the glottis. Once the glottis is visualised, local anaesthetic spray is applied to the glottis. The rabbit is left pre-oxygenated for 1-2 minutes before attempting intubation with the help of otoscope again.

- Blind:

Pass the ET tube over tongue and gently advance. Successful intubation is often indicated by condensation of air in the tube.

- V-gel:

The use of V-gel is straightforward which slide it over the tongue and position it over the larynx. V-gel is more likely to be moved out of position than intubation. It is advised to use V-gel with capnography as capnography can detect if the V-gel has been moved or not.

Maintenance

- Oxygen supply and gaseous anaesthetic agent
  Intubation is preferred over mask if there is adequate equipment and experiences.

  Anaesthesia can be maintained by isoflurane or sevoflurane. The preferred systems for rabbits are Ayres-T piece or Bain.

  Since non-rebreathing systems are recommended, the fresh gas flow rate is based on minute volume (250ml/kg/min), multiply by body weight and circuit factor (i.e. 2 – 3).

- lubrication for eyes
- fluid:
  - Maintenance rate is 4ml/kg/hr, if CRI
  - Can offer bolus if preferred

Monitoring

- Cardiovascular system
  - Heart rate: 180 – 300/min, using stethoscope over heart or doppler over a vessel
  - ECG
  - Mucous membrane: should be pink and CRT less than 2 seconds

    - Blood pressure: pulses (e.g. medial metatarsal artery) or Doppler
    - Oxygen saturation: pulse oximetry on ears
        - May not be very accurate when the machine is designed for dogs and cats

- Respiratory system
    - Respiratory rate: 20 – 30/min
    - Capnography: shape of the curve and ETCO2 at 35 - 45mmHg
- Depth of anaesthesia
    - Toe pinch
    - Jaw tone (lateral movement)
- Temperature
    - Rectal or oesophageal thermometer
    - Minimise heat loss with:
        - Only clip and prep area needed
        - Use of heat mat, bear-hugger, warmed fluid, bubble wrap, 'hot-hands' etc

Recovery

- Switch off the inhalation anaesthetic and continue with oxygen supply
- Extubate when there is cough or jaw or body movement
- Administer reversal agents
- Recover in an incubator or warm area, with regular temperature check
- Monitoring until fully conscious
- Analgesia, nutritional support and prokinetics can be helpful in recovery period

Risk and post-operative complication

- General anaesthetic risk as in other species, from changes in respiratory and cardiac parameters during procedure, to respiratory or cardiac arrest.
- Post-operative gut stasis
- Hypothermia

References

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