RIMINI 1st-3rd June 2007
PALACONGRESSI DELLA RIVIERA DI RIMINI

INFORMATION
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Rabbits have a reputation as a poor anaesthetic risk. Often the anaesthetic agents are blamed for perioperative deaths yet the drugs that are used are safe. It vital to perform a post-mortem examination on rabbits that die in the peri-operative period rather than speculate about the cause of death. It is often a combination of factors that causes problems, notably stress, hypoxia and pre-existing disease.

**Stress:** Rabbits are easily stressed. Stress can be caused by pain, disease, unfamiliar surroundings, transport, rough handling or proximity of potential predators such as dogs, cats or ferrets. Many rabbit patients are already stressed by their underlying disease. Stress has a number of life-threatening effects:

- Catecholamine release increases the risk of cardiac arrhythmias, especially if the animal is hypoxic.
- Stress in rabbits causes a marked decrease in urine flow, renal plasma flow and filtration rate. Oliguria can last from 30 to 120 minutes.
- Stress can cause gastric ulceration in rabbits.
- Stress affects carbohydrate metabolism. Handling alone can cause an increase in blood glucose to the order of 8-10mmol/l. Blood glucose levels can be very high (20-30mmol/l) in association with intestinal obstruction or other stressful diseases.
- Stress causes anorexia that, in combination with reduced gut motility and disruption to normal carbohydrate metabolism, can lead to hepatic lipidosis, liver failure and death
- Stress is immunosuppressive. Rabbits suffering from dental disease have significantly lower lymphocyte counts than healthy rabbits.

**Hypoxia:** Rabbits are prone to hypoxia due to their small lung capacity and restricted nasopharynx. Their tidal volume is 4-6mls/kg. Hypoxia can be caused by anaesthetic agents that cause a drop in oxygen tension (e.g. medetomidine), respiratory depression, breath holding, occlusion of the airway caused by poor positioning, increased weight of viscera on diaphragm, pre-existing lung disease or firm restraint around chest.

**Pre-existing disease** such as renal disease or undiagnosed cardiomyopathy increases anaesthetic risk. Dental disorders can cause pain, stress, malnutrition or salivation that increase anaesthetic risk. Pre-existing respiratory tract disease increases the risk of hypoxia.

**Anaesthetic safety can be improved by:**

- Providing food until a few of hours before anaesthesia. Rabbits cannot vomit.
- Providing a quiet secluded environment with familiar bedding material (hay)
- Quiet, gentle handling
- Induction of anaesthesia with injectable agents to avoid breath holding in response to the smell of anaesthetic vapours
- Gradual introduction of volatile agents to prevent breath holding.
- Careful positioning to ensure an unobstructed airway and to take the weight of the viscera off the diaphragm.
- The administration of oxygen throughout anaesthesia.
- Routine use of effective analgesia for ALL rabbits undergoing surgery.
- Careful anaesthetic monitoring
- **Endotracheal intubation**
- Careful nursing and observation in the post-operative period. Tempting foods and warmth are essential. Syringe feeding and prokinetic therapy may be required.
It is vital that owners are advised to make certain that their rabbit is eating and passing hard faeces within 24 hours of surgery. The rabbit must be brought back for treatment if it not. It is often beneficial to hospitalise rabbits overnight after an anaesthetic to ensure that it is eating and to administer further analgesia and any other medications that are required.

**Induction of anaesthesia**

There are many ways of inducing anaesthesia is rabbits. The author uses one of 3 methods:

1. **Masking down with isoflurane after premedication.** This method is slow but recovery is fast. Fentanyl/fluanisone (Hypnorn, Janssen) was the premedicant of choice but is currently unavailable in UK. Instead a combination of acepromazine (0.2mg/kg) and butorphanol (1mg/kg) mixed in the same syringe and given subcutaneously is used instead.
2. **A combination of medetomidine (0.2mg/kg), ketamine (10mg/kg) and butorphanol (0.5mg/kg) mixed in the same syringe and given subcutaneously.** This combination can be used as the sole agent for short procedures. It also has the advantage of reversal with atipamezole (1mg/kg)
3. **Intravenous propofol (approx 5-10mg/kg)** The advantages of this method are rapid induction and recovery. Disadvantages are apnoea and limited time for intubation. This method is the author's least favourite.

Barbiturates are not recommended for anaesthesia in rabbits.

**Endotracheal intubation**

Endotracheal intubation is difficult in rabbits due to the difficulty of visualising the larynx. The rabbit's mouth does not open widely and the base of the tongue that occupies most of the nasopharynx obscures the view. But it is possible to intubate rabbits without visualising the larynx. After induction of anaesthesia, the rabbit is placed in sternal recumbency and neck extended so there is a straight line from the mouth to the larynx. Lignocaine hydrochloride is sprayed as far back into the mouth as possible so the liquid trickles over the tongue on to the larynx. An uncuffed endotracheal tube is measured against the rabbit to estimate the length required to reach the larynx, which can be palpated. Uncuffed 2.0-3.0mm tubes are required. A water soluble lubricant is applied to the end of the tube before inserting it over the tongue and advancing it to the entrance to the larynx. The position of the end of the tube can be ascertained by listening for breath sounds. Once breath sounds are heard, the tube is slowly advanced during each inspiration. Breath sounds are loudest when the tip is situated at the entrance of the larynx. If breath sounds are lost the tube has almost certainly entered the oesophagus. If the tube goes into the larynx, the rabbit will often cough and breath sounds can be heard through the tube. Condensation from the end of the tube confirms correct positioning.

Endotracheal intubation can also be performed by visualising the larynx through an auriscope, laryngoscope or endoscope. The author finds this more difficult than blind intubation.

Alternatives to endotracheal intubation are maintenance of anaesthesia with a mask or nasal tube. Nose masks and laryngeal masks have been described. Nasal intubation is possible. A small tube is used to deliver anaesthetic gases into the nasal passages. This technique requires a high flow rates to create positive pressure and force the anaesthetic mixture into the nasopharynx to be successful.

**Anaesthetic monitoring**

Pulse oximetry, electrocardiography, respiration monitors, blood pressure monitors and capnographs can all be used for rabbits anaesthesia although they are not essential for every case. The most important part of anaesthetic monitoring is vigilance and observation. The colour of the mucous membranes can be assessed by looking at the nose, lips or tongue. The heart beat can be felt by placing a finger on either side of the chest. A pulse can often be detected by gentle palpation of the central auricular artery. Parameters that are used to assess the depth of anaesthesia in dogs or cats are variable in rabbits.

For example, absence of a corneal reflex denotes a dangerous depth of anaesthesia in rabbits unless they have been anaesthetised with medetomidine combinations. The palpebral reflex cannot be relied upon to give a correct assessment of the depth of anaesthesia. The toe pinch, leg withdrawal reflex is more reliable using the hind rather than the fore feet. Rate, depth and pattern of respiration are the most useful indicators of anaesthetic depth. Resuscitation techniques are often successful if they are performed promptly.

**Post-operative medication**

Analgesia is essential for all rabbits undergoing any surgical procedure. NSAIDs such as carprofen 3mg/kg) or meloxicam (0.3mg/kg). Opioids, such as buprenorphine (0.03mg/kg) can be used in conjunction with NSAIDS.
Fentanyl patches are useful animals in severe pain. Prokinetic therapy such as metoclopramide (0.5mg/kg, s/c or oral) should be give to rabbits that do not eat post-operatively. This can be combined with anti-ulcer medication, such as ranitidine (5mg/kg orally).

Reference: