Unisvet meeting in Milan
The rabbit, an interesting "client" for the anaesthesiologist

Anaesthesia in exotic animals is undeniably riskier compared to that of routine anaesthesia in domestic animals such as dogs or cats: rabbits mortality risk is 5 times higher and therefore, for many veterinarians, remains taboo.
On 20 September, in Milan, the Unisvet organized a day of rabbit medicine, in which Dario Ovid, a graduate of the European College of zoological medicine (Eczm-small mammals), presented six interesting talks on anesthesia and pain management in the rabbit.

What are the risks and how do we face them?
The rabbit is a difficult patient to cannulate and intubate, the handling and restraint is stressful and often the owner does not know the health of the pet (including signs of discomfort, stress, behavioral issues) so the history is incomplete, making it difficult to perform a proper pre-anesthetic check. In addition, rabbits are often poorly fed and can be overweight or even obese. Owners are often reluctant to have preoperative tests including blood count, biochemistry and radiographs of chest-abdomen. The role of the veterinarian is to offer good advice: educating the owner on the potential risks of anesthesia and surgery but also on the necessity of the procedure to be performed. For example: the un-sterilized female rabbit has an 80% risk of serious uterine adenocarcinoma, a substantially higher risk than that of anaesthesia. These issues can be addressed and resolved with experience, practice and the right tools.

Patient assessment and protocol choice
Prior to premedication, each patient must be evaluated with a pelvic examination. Rabbits are prey species and therefore tend to mask diseases. You need to take your time to examine and evaluate the basic physiological parameters of the rabbit:

- weight (fundamental to calculate correct dosages and predict complications such as hypoventilation and reduced cardiac reserve in obese patients),
- resting cardiac and respiratory parameters (continuing this during anesthesia)
- state of nutrition and hydration (Sometimes detectable only with blood tests)
- A radiograph of chest and abdomen can highlight bronchial injuries which would affect the ventilation and exchange of gas during anesthesia, or a gastrointestinal stasis that could postpone sedation until the problem is solved.
- The serological tests performed could reveal Encephalitozoon which could predispose the patient to seizures in anesthesia.

The anesthetic protocol (see table) must be planned carefully assessing data collected, experience and proper knowledge of anaesthesia and sedation drugs. The ideal protocol must respect the physiological state and / or pathological condition of the animal, minimizing the impact on cardiorespiratory and metabolic system. for example, Drugs Antagonizzabili (benzodiazepines,opiates and alpha2 agonists) reduce the anaesthesia risks, cardiovascular effects, hypothermia and can speed up post-operative recovery.

TABLE 1. anesthesia protocols drawn from LITERATURE

DRUGS	DOSE IN MG / KG	VIA	NOTES (2)
Ketamine / diazepam	10-25 / 1-5	iv	Poor analgesia requires venous access and animal cooperative
Ketamine / medetomidine	5-35/ 0.25-0.5	im	Classic Protocol.(1) Effective for short procedures of about 30 min.
Ketamine / medetomidine/ butorphanol	5-15 / 0.1-0.5 / 0.4-0.5	im	Good analgesia
Ketamine / medetomidine/ Buprenorphine	15 / 0.08 / 0.03	im	Great Protocol, slow onset for buprenorphine (inject it 30 minutes in advance)
Ketamine / midazolam	30 / 0.2	im	sedation for diagnostic procedures
Ketamine / midazolam	5 / 0.25 -1	Im / iv	Poor analgesia
Dexmedetomidine / midazolam	0.025 / 0.2	im	sedation for diagnostic procedures
Medetomidine / fentanyl/ midazolam	0.25 / 0.02 / 1	im	Excellent analgesia, need for intubation marked respiratory depression
Xylazine / ketamine	4/50	im	Not recommended in cardiac and renal
Tiletamine zolazepam		im	Not recommended: the tiletamine is nephrotoxic
Midazolam / butorphanol	2 / 0.3	im	hypoxemia
Midazolam / buprenorphine	2 / 0.03	im	hypoxemia

1. This combination ensures already analgesia, although not as powerful as the next which contains butorphanol.
2. All combinations can also be associated with inhalation anesthesia

The induction and intubation of the rabbit

During the induction phase it is important to ensure the rabbit is calm, reducing stress to a minimum. Keep the patient in its covered carrier, keeping lights dimmed, away from noise or odours that could cause fear. After induction, oxygenation is recommended for a couple of minutes using a mask or induction chamber to prevent the risk of hypoxemia during intubation and patient preparation for surgery.

The anaesthetic induction can be obtained using injectable drugs such as Propofol, or by anaesthetic gases, such as isoflurane or sevoflurane, used then to maintain anesthesia.
The airway management, allowing administration of the anaesthetic gases, can be obtained by face mask (see photo 1), endotracheal tubes or laryngeal mask (see photo 2, 3, 4 and 5). The latter is a device developed in human surgery and recently introduced to veterinary anaesthesia. The device closes the oesophagus and sits over the larynx, making breathing easier with the passage of gas directly over the trachea. It can be a good solution if the endotracheal intubation it is impossible or impracticable.

Photo 1. a respiratory mask must be well attached to the muzzle in order to ventilate and resuscitate

Photo 3. v-gel laryngeal mask

Photo 2. Rabbit with laryngeal mask placed for diagnostic procedure (broncho-alveolar lavage); note the heating pad to prevent hypothermia and the extended head to allow easier passage of gas. Below: the correct placement of a laryngeal mask in a sedated rabbit

Photo 4. Cross sectional picture showing anatomical placement of the laryngeal mask.

Photo 5. X-ray showing the correct position of the ETT

Endotracheal tube placement is not impossible, but good anatomical knowledge is required for its success. There are essentially two techniques commonly used: blind or by the visualization of the glottis using aids.
Blind technique is made with movements of the ETT backwards and forwards, rotating to release the soft palate and exposing the glottis until the tube can be introduction into the trachea, shown by the flow of air and steam that is seen inside the transparent tube or heard with the use of an oesophageal stethoscope connected to the ETT. These two methods require lots of practice, a good dexterity and an experienced anaesthestist. The ETT must be positioned within 2-5 minutes to minimize trauma to the trachea and hypoxia. The recommended method however is that of visual intubation, whereby the glottis is seen through an otoscope, endoscope or fiberscope. In this way

laryngeal trauma can be avoided on repeated attempts to insert and you are able to visualise mucus, saliva, blood and food, thus avoiding the risk of pushing this into the trachea with the ETT. The ETT but be of the correct size and uncuffed so as not to create ischemia in the tracheal mucosa. It should not be too rigid, preferably sterile or disinfected well but rinsed carefully of chemical residues (see photo 6).

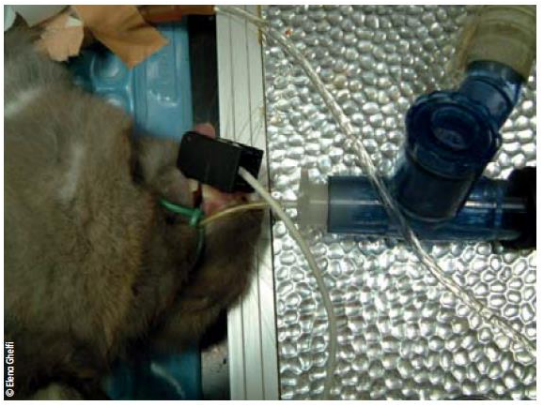

Photo 6. Rabbit intubated with pulse oximeter lingual probe

Photo 7. oximeter measuring saturation and pulse rate

Monitoring and emergencies

Monitoring allows the anaesthetist to correct and maintain the patient's vital functions which can be altered by the anaesthetic, diseases, or by the operation procedure itself, whilst also detecting any potential errors within the monitoring equipment. The anaesthetist should be evaluating: muscle tone, respiratory function and heart rate, core temperature, the capillary filling time, pulse, blood pressure, oxygen saturation and ventilation/exchanges gaseous. This can be all be completed with the use of a multi-parameter monitors, pulse oximetry, capnography, temperature rectal probes, doppler and blood pressure monitors (see photo 7). In this way, by combining experience, attention and technology, we may intervene promptly on emergencies that may occur during a surgical intervention reducing the mortality or complications (see box 1).

Box 1. ASSESSING PARAMETERS

- Colour of the mucous membranes
- Respiratory frequency, depth and pattern
- Peripheral pulse: frequency, rhythm, quality

Pain management: analgesics and local anesthetics

Pain is the perception of processing receptive stimulus at a cortical level. The conditions that cause the most pain in rabbits are those affecting

- the gastrointestinal tract (Stasis, obstruction, neoplasms, laparotomy),
- urogenital (Lithiasis, cystitis, uterine cancer),
- dental diseases, jaw abscesses and maxillary diseases
- musculo-skeletal trauma.

Owners often do not know how to evaluate pain in their pet; it is therefore important for the vet to know and educate the owners on the symptoms and signs shown by the rabbit.
A rabbit in pain presents with sensory depressed, reluctance to move with mobility problems, reduction appetite, altered breathing patterns, a change in faecal production, abnormal muscle contraction, excessive licking of a limb or of a body part, loss of fur or behavioral changes. (i.e. aggression in a normally sociable rabbit).

Box 2. PERIOPERATIVE TREATMENT

- Meloxicam: 0.5 - 1 mg / kg orally every 12-24 hours
- Carprofen: 1.5 to 5 mg / kg orally every 12-24 hours
- Ketoprofen: 1-3 mg / kg orally every 12-24 hours
- Tramadol: 2-5 mg / kg orally every 4-8 hours
- Butorphanol: 0.2 to 2 mg / kg subcutaneously or intramuscularly every 4-6 hours (impact on intestinal motility)
- Buprenorphine: 0.01- 0.05 mg / kg subcutaneously or intravenously every 6 to 12 hours (good for visceral pain but slow onset and a plateau effect)
- therapy side: prokinetics, gastric protectors, Antiacids
- Well-being and environmental enrichment: moving, walking, and attendance of the owner, games and stimuli