Roseworthy Veterinary Hospital

Equine General Anaesthesia

General anaesthesia is often required to allow the veterinary team to carry out certain procedures, whether routine or emergency, in a manner that promotes safety and effectiveness, and reduces pain. For many horse owners, general anaesthesia may sound daunting. At the Roseworthy Veterinary Hospital, we recognise the complexity of anaesthesia and the need for specialist knowledge to minimise the risks of the procedure for our patients. Our large animal team works in partnership with our highly experienced, specialist anaesthesiologists to provide tailored anaesthetic and analgesic techniques to horses during surgery and throughout the post-operative period.
This brochure has been put together to provide you with further information about the process and risks of general anaesthesia when you provide your informed consent to the treatment.

Preparation

- This stage is to define the degree of what is called the level of risk of the patient for anaesthesia (anaesthesia risk).
- For non-emergency procedures, our veterinarians may ask you to withhold feed from your horse overnight to ensure they have an empty stomach, water can be provided up to one hour before the anaesthesia.
- On admission, your horse will have a complete examination to ensure they are fit to undergo general anaesthesia. Horses being admitted as an emergency patient might require stabilisation before anaesthesia is provided.
- Following the initial examination, the specialist anaesthesiologist may require blood analysis, the reason and additional cost of which will be discussed with you prior to further action being taken.
- An intravenous catheter is placed to administer medication and fluids.
- Depending on the surgery, your horse may receive painkillers and antimicrobials.

During Anaesthesia

- Injectable anaesthetic agents are administered to your horse, and they are assisted to lay them down to the floor as gently as possible.
- When we need to move horses onto the operating table, a winch (overhead hoist) is used to safely position them onto a padded surgical table and position them appropriately for their specific surgery.
- For more lengthy procedures, an ET (endotracheal) tube is placed into the horse's trachea (windpipe) through their mouth or nose and anaesthetic gas is used to keep the horse under anaesthetic treatment while providing oxygen to help enable breathing at the same time.
- During the general anaesthesia, the anaesthetist closely monitors your horse's vital parameters, including heart rate and normal electric activity, temperature, arterial blood pressure and blood gas parameters.

After Anaesthesia

- All our equine patients are assisted through recovery in a padded room by assisted rope recovery.
- In certain circumstances, the veterinary team may modify the system of recovery to include thick mat or even sling assistance. Given the urgency of recovery decisions, we may not have the opportunity to discuss this with you prior to implementation. However, the system of recovery adopted is made with the priority for the horse's safety as paramount.
- Once your horse has fully recovered, they will be moved to our day stalls (for day stay procedures) or the intensive care unit (ICU) barn and are monitored closely by our hospital veterinarians and nursing team.

Risks and complications during and after anaesthesia

This section is not intended to dissuade you from choosing a treatment necessitating general anaesthesia for your horse but is to inform you about potential risks related to having them anaesthetised.

Equine anaesthesia carries a higher mortality risk than in other species for unforeseen complications with a reported overall rate of up to 1 per 100 (0.9%) complications leading to death as compared to 0.2 percent in companion animals and 3.5 per 10,000 for human patients for non-emergency surgeries. Despite our best efforts, highly trained staff and utilisation of assisted recovery techniques, these heightened risks will remain and cannot be eliminated. The following list addresses most of the this far reported complications linked to equine general anaesthesia in the literature.

- **Allergies to drugs** are extremely rare in horses and can remain undetected until the horse has recovered from anaesthesia. It is very important that owners report any known allergies to the veterinary team to prevent usage of drugs or material (rubber, latex, etc…) their horse could have an allergic reaction to. Antihistamine drugs will be used to control allergies that present during anaesthesia or recovery.
- **Adverse drug reactions**, although exceptional and very difficult to prevent, can result from the combination of drugs used to induce and maintain anaesthesia. One possible result is an uncontrolled rise of the body temperature (also known as malignant hyperthermia). Adverse drug reactions are managed by the discontinuation of the drugs that may be causing the issue at their origin, and then potentially using alternative drugs to lower the increased temperature (fever) as well as the implementation of cooling strategies (such as ice packs, cold shower, fans).
- **Post-anaesthetic myopathy**, although now a rarer complication (coming from 6% in the late eighties down to less than 1% nowadays), is the consequence of low blood pressure during anaesthesia. To prevent this from occurring, our patients will be treated with sophisticated anaesthesia monitoring and our specialist anaesthesiologists use a combination of drugs or anaesthetic agents to maintain appropriate blood pressure levels during treatment. This, however, can be particularly difficult to achieve during long procedures or in debilitated patients.
- **Cardiac arrest** during anaesthesia or recovery is extremely rare in horses but can still occur and account for up to 33% of the mortality cases associated with anaesthesia. CPR (cardio-respiratory-resuscitation) techniques are applied in such circumstances to horses but unfortunately have a low success rate.
- **Bruises and skin abrasions**: Patients often develop a small bruise at the site of insertion of the intravenous catheter, or to exposed body parts when attempting to stand up. These lesions can become painful and may take a week or so to heal.
- **Fractures and joint luxation**: despite a close monitoring and the implementation of adapted recovery assistance methods, fractures and luxation of the head, neck or a leg is possible during equine recovery. This is also a rare event, but it can lead to direct mortality or the necessity to euthanasia if the fracture is unrepairable. Catastrophic fractures account for up to 26% of the causes of mortality associated with equine anaesthesia.
- **Eye problems**: Various types of eye damage may occur. The cornea or surface of the eye may be scratched when the eyelids are not completely closed, particularly if the face is covered with drapes or towels. Some anaesthetists choose to secure the eyelids closed with tape – although certain patients may develop skin irritation. Other anaesthetists choose to insert a lubricating ointment into the eyes. However, corneal damage may occur even if the eye is lubricated and taped shut.
- **Blindness** after both general and regional anaesthesia is rare, but it can occur. Loss of vision may result from pressure on the eye. It may be that the arteries at the back of the eye (retina) become compressed, thus depriving the eye of oxygen.
- **Nerve damage**: Almost any nerve can be damaged. Nerves of the face may be damaged by pressure from the anaesthetic breathing circuit or from pressure on the surgery table. The most common nerve injuries are to the facial, femoral, obturator, peroneal and the radial nerves from compression against a hard surface. In general, the prevention of nerve damage is by careful positioning and padding of the patient during anaesthesia. Neuropathies account for approximately 2% of equine anaesthesia morbidities.
- **Spinal cord injury (myelopathy)**: 33 cases have been reported in the literature since 1979. This is an extremely rare complication but is irreversible and has required euthanasia in all published cases.
- **Complications linked to venous or arterial cannulation.** Blood vessel (vein or artery) inflammation or thrombosis can develop after their cannulation (catheter) for injections of drugs and fluids, and for the collection of blood samples during anaesthesia. Catheters will be placed into one or multiple veins and arteries (face, ear, leg). The placement is performed after scrupulous disinfection and precise manipulations. It is still possible that one of these vessels react to the procedure or the presence of a foreign object and develops a haematoma, a thrombus or an inflammation. Thrombophlebitis (infection/inflammation of a vein) is reported in about one in a hundred of non-abdominal surgeries and up to one in thirteen colic surgeries. In very rare instances, the catheter can fragment and a portion of it may be lost in the blood stream. While most of the time these complications are very limited or only transitory, some horses develop very aggressive reactions necessitating additional care and treatments. Air embolism or exsanguination has been encountered after the cannulas had a dislodged cap or had disconnected from a fluid line.
- Anaesthetic drugs can reduce **bowel motility** which can increase the risk of **colic**. Colic is the most frequently reported peri-anaesthetic complication in horses, ranging from 1 in 33 to 1 in 10 pending the definition of colic. Most of the cases are mild or moderate and resolve with medical therapy. However, some more serious conditions may necessitate surgery. Orthopaedic surgery patients appear to be at particular risk. For routine in/out interventions, owners are advised to monitor their horse for any signs of colic in the days following general anaesthesia and to make sure they are passing appropriate amount and consistency of manure (7 to 8 regular piles per day of well-formed and moist faeces for an average 550 kg adult horse).

- **Pneumonia** is another rare complication. Lung infection is sometimes dormant, especially in younger horses and the stress and effect of certain drugs on the immune system can reduce the body's defences and facilitate the development of a more active infection. Also, the placement of an endotracheal tube (ET) to provide oxygen and anaesthetic gases through the mouth into the trachea induces a risk of introducing food particles or other foreign elements. During anaesthesia, the content of the stomach can also reflux backwards through the oesophagus and being aspirated into the airways. Most of the lung infections related to general anaesthesia are localised and generally responding well to treatment but in extremely rare cases, the infection can become very severe with vital consequences for the patient.
- **Nose bleeding:** in certain situations, instead of passing the endotracheal tube through the mouth, it is passed through the nasal cavities. As it is necessary to pass an as large tube as possible to provide the best respiratory support, some blood vessels from the nasal cavities can be damaged in the process which results often in copious bleeding. While very impressive, these bleedings are most of the time self-limiting. In extremely rare situations, they require the administration of blood clotting promoting drugs, blood transfusion or even the temporary ligation of one of the main arterial supplies of the corresponding side of the head (common carotid artery).

We acknowledge that this can be a very confronting information and invite you to discuss any point with our staff if anything is unclear or concerns you. Please feel very comfortable to question us in person or by contacting the Roseworthy Veterinary Hospital 08 8313 1999 or vet.reception@adelaide.edu.au

Reference: Deutsch J., Taylor P.M. Mortality and morbidity in equine anaesthesia. Equine vet. Educ. (2022) 34 (3) 152-168