



Dedicated to bringing the best in Anesthesia and Pain Management services to veterinary patients throughout the Colorado Front Range

Frequently Asked Questions Veterinary Anesthesia

For Information or Appointments Contact:

**Kurt Grimm, DVM, MS, PhD
Veterinary Specialist Services, PC
PO Box 504
Conifer, CO 80433
303-918-1321**

www.VeterinarySpecialistServices.com

How often do dogs and cats die during anesthesia?

Statistics for veterinary medicine are difficult to compile. There are no systematic methods for reporting anesthetic complications and objective independent assessment of the clinical course of events leading to anesthetic morbidity and mortality are virtually non-existent. Several retrospective studies have been performed over the last 50 years documenting the anesthetic death rate in dogs and cats. In 1955, one study reported that at a single institution the death rate was 1.1% in dogs and 1.8% in cats.¹ The same institution was re-evaluated in 1979 and the death rate decreased to 0.43% in dogs and 0.25% in cats. In a similar study of 10,000 feline anesthetics, the death rate was similar (0.3%).²

A 1990 study in the United Kingdom reported mortality rates in dogs and cats of 0.23% and 0.29% respectively.³ This study stratified patients based on the presence of preexisting pathology and when analysis was complete the death rate increased to 3.12% for dogs with preexisting disease (0.11% for healthy dogs). Cats also had increased risk with pathology (3.33%) and decreased risk when healthy. Subsequent studies have provided similar results.⁴⁻⁶ These studies suggest that as the patient population ages, and more animals with concurrent diseases are anesthetized, anesthetic care must improve in order to reduce or even maintain current mortality rates.

It is imperative to recognize that death, while easy to define, is a catastrophic outcome. Many other risks of anesthesia such as respiratory depression, low blood pressure, and adverse drug reactions may not cause death, but can seriously complicate patient recovery and long term health.

What is a monitor and why does it cost more to have my pet monitored?

Simply put, patients vary. This truth emphasizes the need for patient monitoring. Monitoring is simply the process of collecting data. These data are used by the anesthetist to formulate or modify the anesthetic plan to avoid or minimize risks to the patient similar to the way an airline pilot uses the cockpit instruments to monitor the functions of the aircraft and respond to abnormalities.

Obviously, anesthetic risk is directly related to the adequacy and accuracy of data collection and the knowledge and skill of the anesthetist to utilize the information. Automated monitoring (pulse oximetry, ECG, arterial blood pressure, end tidal CO₂, arterial blood gases) provide more complete information and usually facilitate earlier detection of problems than manual monitoring alone (pulse palpation, mucous membrane color, respiration rate). Specialized situations often require specialized monitoring techniques and as veterinary surgery advances, so must veterinary anesthesia monitoring.

Patient monitors are a considerable investment for a veterinary practice. They will typically cost from \$2000 to \$20,000 depending on the number of parameters measured. In addition there are ongoing maintenance and disposable equipment costs.

Can't my veterinarian do the anesthesia? What is a Board Certified Veterinary Anesthesiologist?

Veterinarians are responsible for administering sedatives and anesthetics, either through the supervision of a veterinary technician who administers the drugs, or by administering the drugs personally. Historically, this has been an effective way to provide humane and timely veterinary care.

A Board Certified Veterinary Anesthesiologist differs from a general practice veterinarian in several ways. An anesthesiologist has received up to 3 years of additional training in an anesthesia residency. This extra training is focused on anesthetic administration and monitoring of different veterinary species. Upon completion of a residency, an examination is given by the American College of Veterinary Anesthesiologists which tests the knowledge of the person. Successful completion of the process results in certification. A Board Certified Veterinary Anesthesiologist usually focuses solely on administering the anesthetics and managing the inherent risks. They don't perform surgery, give vaccinations, or do other general veterinary procedures. When you pay extra for an anesthesiologist, you are paying for the anesthesiologist's time and experience similar to the way you would be paying for an anesthesiologist's time and

experience if you, or a member of your family, were to have anesthesia and surgery at a human hospital.

What is Pulse Oximetry?

Pulse oximeters provide continuous information about heart rate and hemoglobin saturation. The monitor does not tell about respiratory depression until respiratory function has deteriorated to the point hemoglobin desaturates. This occurs very near lethal respiratory failure when inspiring high concentrations of oxygen and may be accompanied by apnea. Pulse oximeters are extremely useful for monitoring patients at risk of hypoxia.

What is an ECG?

The electrocardiogram provides a measure of heart rate and a picture of the electrical activity of the heart muscle. The ECG allows the person monitoring anesthesia to recognize intraoperative arrhythmias and the veterinarian to treat them when they occur.

What is Arterial Blood Pressure Monitoring?

Several methods of measuring arterial blood pressure are available. Arterial catheterization is routinely performed by many anesthesiologists. Arterial catheterization is associated with a small risk of infection and requires training before use. Catheterization can provide essential information about cardiac function and tissue perfusion pressure as well as allow easy access for intraoperative blood gas analysis. Non-invasive methods of blood pressure monitoring include oscillometric and Doppler methods. These methods are usually less accurate than arterial catheterization and only provide intermittent readings, but are easier to perform. Low blood pressure is a common complication of anesthesia and may lead to poor tissue perfusion.

What is End-tidal CO₂?

End-tidal CO₂ measurement allows non-invasive measurement of the ability of the respiratory system to excrete carbon dioxide (usually indicative of respiratory function). Most anesthetics are respiratory depressants and end-tidal CO₂ allows early detection of respiratory impairment so appropriate intervention can occur before the problem becomes life threatening.

Should intravenous fluids be given during anesthesia?

Intravenous fluid therapy is warranted in most patients. Proper fluid selection will depend upon underlying abnormalities. Preoperative blood work may be useful to guide fluid selection.

Are intravenous catheters necessary?

Indwelling intravenous catheters are almost always warranted. They do add a small cost and can be associated with a small risk of infection or venous thrombosis; however the ease and speed with which they allow administration of emergency drugs, additional anesthetics, and intravenous fluids almost always outweighs the risk of catheter placement.

Is endotracheal intubation necessary?

Maintaining a patent airway is essential to safe anesthesia. When airway obstruction occurs, hypoxemia will rapidly develop. Aspiration of saliva or gastric contents is another possible risk, especially if the animal was not fasted prior to anesthesia. One of the leading causes of anesthetic morbidity and mortality in humans has historically been airway obstruction and/or hypoxia. Attention to airway management and respiratory monitoring has improved human patient safety and would probably improve veterinary patient safety as well.

Are preanesthetic medications necessary?

Patient stress is probably a contributing factor in some cases of adverse patient outcome. Stress and anxiety can lead to increased doses of anesthetic agents resulting in excessive anesthetic depth once the patient is anesthetized. Premedication with a tranquilizer or sedative will help reduce anxiety and stress during the perioperative period. Use of analgesics prior to surgery (preemptive analgesia) may also be beneficial. Opioids (such as morphine) are commonly incorporated into preanesthetic protocols to facilitate sedation and analgesia. When opioids are used, anesthetic drug associated respiratory depression may be enhanced, but adequate patient monitoring will facilitate early detection of significant respiratory depression and allow appropriate management.

What are the safest anesthetic drugs to use on my pet?

The risks and benefits of different anesthetic drugs are often the focus of much discussion, but many of the risks can be minimized and the benefits maximized if adequate patient monitoring and supportive care are utilized no matter which protocol is selected. Which anesthetic is best depends upon the patient's health, disposition, and the requirements of the surgery.

Are analgesic drugs safe and are they necessary?

Just as surgery should not be performed without anesthesia, surgery should not be performed without analgesia. All drugs have potential side effects and decisions about which drugs to administer have to be made on a case-by-case basis. Veterinarians select drugs that have the most beneficial effects and the fewest risks.

Conclusions

Good anesthesia is probably best defined as anesthetic protocols and practices which reduce patient morbidity and mortality risk to the lowest level that is reasonably possible while minimizing patient stress and pain. Anesthetic risk will likely never be eliminated, but there are many things that can be done to reduce it.

References

1. Lumb W, Jones E. Veterinary Anaesthesia, 2nd Edn Philadelphia: Lea and Febiger 1973; 611-29.
2. Dodman N. Feline anesthetic survey. J Small Animal Practice 1977; 10: 653-8.
3. Clarke K, Hall L. A survey of anaesthesia in small animal practice. AVA/BSAVA report. J Ass Vet Anaesth 1990; 17: 4-10.
4. Dodman N, Lamb L. Survey of small animal anesthetic practice in Vermont. J Anim Hosp Ass 1992; 28: 439-45.
5. Gaynor J, Dunlop C, Wagner A, Wertz E, Golden A. Complications and mortality associated with anesthesia in dogs and cats. J Anim Hosp Ass 1994; 35: 13-7.
6. Dyson D, Maxi M. Morbidity and mortality associated with anesthetic management in small animal veterinary practice in Ontario. J Anim Hosp Ass 1998; 35: 325-35.