Post-Anesthesia Complications with the Small Animal Patient
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- The recovery period is not always regarded as a vital component of an anesthetic procedure.
- In veterinary anesthesia the majority of adverse events occur during recovery.

Anesthetic recovery
- Anesthetic recovery is the interval from the cessation of anesthetic drug delivery to the point at which the patient is extubated and has voluntary motor control.
- Factors that affect the length of recovery include patient health, length of the anesthetic procedure, anesthetic protocol, and patient, post-anesthetic body temperature.
- According to a Brodbelt, et al., study in 2007, greater than 50% of the canine and feline anesthetic related adversities occur during recovery.
- Thorough planning of the anesthetic event, anticipating problems, and keeping good anesthetic records during the pre-, intra-, and post-operative periods is essential.
- All anesthetic patients have the potential for poor recoveries. Difficult anesthetic recoveries can be due to multiple factors, including emergence delirium, dysphoria, inadequate analgesia, and general patient discomfort. In these cases, it is often advisable to delay the recovery to avoid further stress or injury to the recovering patient.

Anesthetic recovery: patient monitoring
- In the 2008, Brodbelt, et al., article, the authors speculated that inadequate patient monitoring may have been the primary factor behind anesthetic recovery periods being over represented by increased mortality rates in small animal anesthetic procedures.
- Anesthetic monitoring should NOT end at recovery; instead, it should continue until the patient is extubated and has returned voluntary muscle control.
- The degree of monitoring, and parameters evaluated, depend on the procedure performed and the patient’s health. Patient monitoring should include at least cardiovascular and respiratory status, body temperature, analgesia, and patient (dis)comfort. Post anesthetic, patient monitoring parameters should be included within the patient’s anesthetic records.

Anesthetic recovery: extubation
- Indications for patient intubation include decreasing the risk of aspiration, securing the patient’s airway, and providing a means for assisted ventilation. Patient intubation should be included with any procedure that involves a level of sedation or anesthesia in which the patient has lost motor control and therefore the ability to guard the larynx.
- Extubation should be performed when the recovering patient has regained laryngeal or pharyngeal sensation and reflexes, such as gagging, swallowing and chewing.
- Brachycephalic breeds have an increased risk of post-extubation, upper airway obstruction. During sedation and anesthesia excessive peri-laryngeal tissues and hypoplastic tracheas predispose these patients to pharyngeal obstruction. Ventilatory function should be monitored closely with brachycephalic breeds during pre-operative sedation and post-operative recovery, and it is prudent to have induction agent, a laryngoscope, and an endotracheal tube immediately available in case of upper airway obstruction.

Anesthetic recovery: other breed/species issues
- Alaskan malamutes, Siberian huskies and Labrador retrievers have a genetic polymorphism that predisposes these breeds to a high incidence of opioid-related dysphoria. Problems related to opioid use in those breeds tend to be individualistic; however, it is advisable to use lower doses, especially in Nordic breed dogs. Opioid dysphoria in any breed (or species) can be reversed using naloxone.
- Post-anesthesia related feline blindness (deafness) was reported as early as 2001. Unlike the dog, which has two arterial blood supplies to the brain (internal carotid and basilar arteries), cats have only one cerebral blood supply (maxillary artery). Spring-loaded mouth gags, used during procedures requiring mandibular extension (dentals), in cats can result in obstruction of the maxillary arterial blood flow causing cerebral ischemia, central blindness, and/or deafness.

Anesthetic recovery: supplemental oxygen
Post-operative oxygen supplementation is most beneficial in patients with compromised respiratory function, sick patients, obese and pregnant patients, and brachycephalic breeds.

Anesthetic recovery: patient welfare
- Post-anesthetic monitoring goes beyond recording a patient’s physiological and analgesic parameters. Post-anesthetic monitoring, more importantly, includes observing the patient’s general welfare.
- Post-anesthetic patient welfare considerations encompass the entire patient-condition during recovery, including physiological, analgesic, patient comfort, body temperature, and human interaction.
- Human touch and voice have a calming effect on animal patients recovering from general anesthesia. It is important that an individual remain with the recovering animal patient in order to maintain post-anesthetic monitoring and provide patient comfort.

Anesthetic recovery: body temperature
- Post-anesthetic patient hypothermia is the number one complication related to general anesthesia in human and veterinary medicine. The combination of dose dependent depression of the thermoregulatory centers, due to anesthetic drugs, and a cold surgical environment can result in significant loss of body heat.
- In human medicine, the discomfort of post-anesthetic hypothermia and uncontrollable shivering is well documented.
- Hypothermia can predispose to bradycardia, delayed recovery, and post-operative shivering.
- It is imperative to mitigate patient hypothermia throughout the entire anesthetic event, including recovery, by employing external heat sources such as warm water circulating blankets and forced warm air blowers.
- Intra- and post-operative patient hyperthermia is uncommon in veterinary medicine. Primary causes of anesthesia-related hyperthermia in animal patients include preoperative fever and iatrogenic sources such as excessive external heating.
- Malignant hyperthermia-like syndrome (MH) has not been proven to be a genetic condition in dogs or cats; however, there have been documented cases involving grey hounds and a Siberian husky that demonstrated a clinical condition similar to MH in humans.

Anesthetic recovery: reversal agents
There are times when it is beneficial to reverse anesthetic drugs and hasten recovery; however, judgment is necessary weighing the advantages of drug reversal versus allowing slower recoveries. When reversing the sedative effects of some anesthetic drugs, opioids and alpha 2 agonists for example, analgesic properties will be reversed also.

References