

ANESTHESIA FOR FELINE PATIENTS WITH HEART DISEASE

Hypertrophic cardiomyopathy (HCM) is the most common cardiac disease in cats. One study found prevalence to be ~16% (Paige C, et al. Prevalence of cardiomyopathy in apparently healthy cats. JVIM 2011;25:1010-1016). The presence or absence of a murmur is not a good predictor of heart disease in cats. Plasma NT-ProBNP is a useful test for identifying occult HCM and the author recommends this for pre-anesthetic screening in mature and senior cats, and cats with murmurs. Arrhythmias are more often associated with underlying heart disease in cats and should prompt further evaluation if they are noted prior to or during anesthesia.

Principles of Anesthetic Management for Cats with Heart Disease:

- 1. Minimize stress**
 - a. Stress leads to increased HR, arrhythmias and increased myocardial oxygen demand.
- 2. Consider NT-ProBNP as routine pre-anesthetic screening for occult HCM in cats**
- 3. Review the benefits and risks of interrupting cardiovascular support medications prior to anesthesia**
 - a. For some medications, there is a risk of rebound hypertension or arrhythmias with acute interruption of therapy. Please contact a cardiologist if you have questions.
 - b. Be aware that antihypertensive & antiarrhythmic medications predispose patients to hypotension.
 - c. As a general rule, I recommend that patients stay on their cardiac meds, even on the morning of anesthesia.
- 4. Pre-anesthetic radiographs recommended if moderate to severe cardiac disease**
 - a. These radiographs can serve as a baseline in the event that post-operative respiratory distress develops and acute cardiac failure with pulmonary edema is suspected.
- 5. Premedication is important for every patient**
 - a. Opioids like morphine, hydromorphone, oxymorphone, fentanyl and buprenorphine are useful for providing analgesia and reducing anesthetic requirements. Butorphanol provides better sedation than the full-mu opioids, but has little analgesia activity. Butorphanol may be used initially with additional full-mu opioid therapy administered at the time of induction or during anesthesia.
 - b. Midazolam may contribute to sedation if used in geriatric and/or ill cats.
 - c. Use caution with anticholinergics to avoid tachycardia. Anticholinergics may be appropriate in patients whose cardiac output is heart-rate dependent (example: valvular insufficiency).

6. Pre-oxygenate cardiac patients for 3 – 5 minutes prior to induction of anesthesia**7. Monitor blood pressure and ECG**

- a. Whenever possible begin monitoring blood pressure and ECG prior to anesthesia
- b. A Doppler blood pressure monitor provides continuous audible signal of blood flow
- c. Doppler more reliable in small patients (<5 kg)
- d. Monitoring respiratory function (ETCO₂) is recommended
- e. Monitor SpO₂ and temperature; hypoxemia and hypothermia compromise heart function

8. Supportive care includes cautious fluid administration and temperature support

- a. IV fluid rates for cats with cardiac disease: 2 – 3 ml/kg/hr

9. Intravenous catheters critical for fluid and emergency drug administration

- a. If patient is stressed, consider IV catheter in medial saphenous vein

10. Intravenous induction options:

- a. Propofol + benzodiazepine or Alfaxan + benzodiazepine are appropriate for induction of anesthesia in many patients with heart disease – the cardiac and respiratory depressant effects of propofol and alfaxan are similar
- b. Etomidate + benzodiazepine reserved for debilitated patients or unstable heart disease
- c. Avoid mask or box inductions in cardiac patients
- d. Avoid Ketamine and Telazol® due to increased myocardial oxygen consumption, tachyarrhythmias and potential hypertension

11. Prevention is best approach to treatment of hypotension

- a. Reducing inhalant anesthetic requirements in a priority for cardiac patients. Adequate premedication and use of local anesthetic techniques, intra-operative analgesic CRIs are recommended.
- b. Dopamine (preferable) or dobutamine can be used to support blood pressure but need to be used cautiously in cats with HCM because increased contractility can potentially exacerbate diastolic dysfunction and outflow obstruction.

12. Minimize anesthesia time and consider staging the procedure

- a. Keep it short!
- b. Better to have two short procedures than one long procedure

13. Drugs to avoid in cardiac patients: xylazine, dexmedetomidine, ketamine and Telazol®

- a. These medications are associated with decreased cardiac output, increased myocardial oxygen demand, arrhythmias, increased contractility and hypertension

14. Consider having an anesthesiologist manage and monitor anesthesia