

ANESTHESIA IN PATIENTS WITH CARDIAC DISEASE

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Patients with murmurs and cardiac disease will often need to be anesthetized or sedated for routine procedures, and sometimes urgently. While there may be some concern regarding destabilization of cardiac disease with anesthesia, in most cases, this can be done safely with simple planning and precautions.

Diagnostic testing to determine presence of cardiac disease:

- **Auscultation**
- Thyroid testing if cat >7 yrs
- Blood pressure
- Chest radiograph
- ECG if arrhythmia
- NT proBNP (Snap for cat vs Quantitative)
- Genetic testing
- Send for echocardiogram

Monitoring of this patient should include blood pressure monitoring, heart rate (ideally ECG), and patient oxygenation. Oxygenation can be measured non-invasively by pulse oximetry or can be measured by serial blood gas measurements. Additionally, capnography can help optimize ventilation.

Drugs that create excessive tachycardia or excessive vasoconstriction (ketamine, xylazine dexmedetomidine, anticholinergics) may create excessive work for the heart and tip a patient with moderate to severe heart disease into congestive heart failure or cause serious arrhythmias. Anticholinergics for bradycardia (if needed) it should be used at lowest effective dosage. Likewise, excessive fluid administration may decompensate an already volume loaded heart. A fluid pump is a good way to accurately measure volumes being delivered.

Commonly used medications for sedation/induction:

- Acepromazine
- Butorphanol
- Buprenorphine
- Morphine
- Hydromorphone
- Methadone
- Diazepam
- Midazolam
- Alfaxalone
- Etomidate

Arrhythmias can occur before, during, or following anesthesia. Recognizing the arrhythmia is essential with electrocardiogram.

Treatments for bradycardia:

- Decrease depth (if possible)

- Anticholinergic
- External pacing
- Check temperature (external warming)

Treatments for tachycardia:

- Ventricular premature complexes (lidocaine, procainamide, amiodarone, or esmolol)
- Supraventricular premature complexes (diltiazem, procainamide, amiodarone, or esmolol)

Hypotension can be secondary to cardiac disease, anesthesia drugs, or volume contraction (dehydration). Treatment consideration for hypotension:

- Volume resuscitation (be careful)
- Decrease depth (if possible)
- Check temperature (external warming)
- Anticholinergic (if bradycardia)
- Dobutamine (pos inotrope)
- Dopamine (dose dependent pos inotrope or vasoconstrictor)
- Norepinephrine (vasoconstrictor)
- Vasopressin (vasoconstrictor)
- Phenylephrine (vasoconstrictor)

What other precautions to consider?

The overall health of the patient will affect drug choices. Geriatric patients and patients with comorbidities such as renal or hepatic disease will have slower drug metabolism. It is best to start with lower drug calculations. In general, it is easier to titrate up. If hypotension or bradycardia is encountered during anesthesia, consider adjusting anesthetic depth. Pressors or a low dose of atropine may be utilized if needed. Fluids should be administered cautiously in patient with large atria or poor contractile function (e.g., dilated cardiomyopathy) to avoid decompensating congestive heart failure.