**Bradyarrhythmia & Tachyarrhythmia**

**BRADYARRHYTHMIA** (dogs, <60–70 bpm; cats, <120–140 bpm)

1. **P waves present?**
   - No
   - Yes
   - **Atrial standstill**
     - **Diagnosis**
       - Determine serum electrolytes in dogs and treat underlying causes
       - Artificial pacing (atrial standstill secondary to idiopathic disease/AV myopathy)
     - **Treatment**
       - Atropine or other anticholinergics
     - **Results**
       - May resolve with exercise, excitement, atropine

2. **P wave for every QRS complex?**
   - No
   - Yes
   - **Sinus arrest may represent SSS (variable with presence/absence of supraventricular or ventricular escape foci; sinus pauses often present)**
     - **Diagnosis**
       - Rule out electrolyte imbalances, metabolic disease (e.g., GI, respiratory, CNS), athleticism
       - Atropine response test may be indicated
       - If symptomatic and heart rate does not ↑, may require temporary pacing
     - **Treatment**
       - CRI isoproterenol or temporary pacing for short-term emergency treatment
     - **Results**
       - May resolve with exercise, excitement, atropine

3. **Associated QRS complex for every P wave?**
   - No
   - Yes
   - **Second- or third-degree AV block**
     - **Diagnosis**
       - Often idiopathic
       - Pacemaker likely indicated
       - Withdraw offending drugs (e.g., digoxin)
     - **Treatment**
       - Correct identifiable underlying causes
     - **Results**
       - ↑ heart rate with anticholinergics, sympathomimetics, or artificial pacing (rare)

4. **Sinus bradycardia (uncomplicated by AV block)**
   - **Diagnosis**
     - Often idiopathic
   - **Treatment**
     - Withdraw offending drugs
     - Correct identifiable underlying causes
     - ↑ heart rate with anticholinergics, sympathomimetics, or artificial pacing (rare)

AV = atrioventricular, SSS = sick sinus syndrome, SVT = supraventricular tachycardia, VT = ventricular tachycardia
TACHYARRHYTHMIA (dogs, >160 bpm; cats, >220 bpm)

Regular rhythm?

No

- Atrial fibrillation
  - ↓ heart rate with agents (digoxin, calcium-channel blockers, β-blockers) that ↑ refractoriness of AV node and number of impulses reaching ventricles
  - Consider rhythm control (conversion to sinus rhythm) via transthoracic electric cardioversion

Yes

- Supraventricular or ventricular complexes?
  - Supraventricular complexes
    - P waves are visible (or less commonly embedded in preceding T wave)
    - Progressive ramp up/slow down of arrhythmia
  - Ventricular complexes
    - P waves abnormal or not visible; abrupt onset and termination of arrhythmia
  - Ventricular tachycardia
    - Immediate therapy indicated:
      - If VT rapid, multiform, and produces clinical signs—IV lidocaine or procainamide (bolus, may require CRI)
      - Identify and treat underlying heart disease
      - Treat underlying systemic diseases
      - Withdraw possible offending drugs (eg, digoxin)
      - Correct electrolyte imbalances
      - Sotolol, mexiteline, or less commonly amiodarone for long-term maintenance therapy
      - 24-hour Holter monitoring to determine therapeutic efficacy

- Sinus tachycardia
  - Treat underlying causes

Acute termination:
  - Vagal maneuvers (carotid sinus massage, ocular pressure, precordial thump)
  - IV boluses of procainamide, diltiazem, esmolol (less commonly digoxin, amiodarone)
  - (Less commonly) IV vasopressors (phenylephrine, methoxamine) to ↑ blood pressure, augment vagal tone
  - Transthoracic electrical cardioversion

For heart rate control or prevention of recurrence: Attempt prophylaxis with oral digoxin, diltiazem, atenolol, sotalol, or amiodarone