Sinus Dysrhythmias

Fast & Easy ECGs – A Self-Paced Learning Program
Identifying Dysrhythmias

• Examination of the ECG rhythm must be done in a systematic, organized way
Sinus Rhythms

- Rhythms originating from the SA node are called *sinus rhythms*. 

  - Sinus rhythm continues at 60 to 100 beats per minute.
  - Sinus bradycardia continues at less than 60 beats per minute.
  - Sinus tachycardia continues faster than 100 beats per minute.
  - Sinus dysrhythmia speeds up and slows down in a cyclical manner.
  - Sinus arrest is a pause in the heartbeat.
Normal Sinus Rhythm (NSR)

• During normal heart activity, the SA (sinoatrial) node acts as the primary pacemaker
• NSR has a heart rate of 60 to 100 BPM (in the average adult)
Sinus Bradycardia

• Has all the characteristics of NSR but the heart rate is < 60 BPM
## Sinus Bradycardia

### Table 8.1 Causes of Sinus Bradycardia

<table>
<thead>
<tr>
<th>Cause</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac diseases</td>
<td>Intrinsic sinoatrial node disease, cardiomyopathy, myocarditis, myocardial ischemia and/or infarction, and heart block</td>
</tr>
<tr>
<td>Use of certain drugs</td>
<td>Digoxin, beta-adrenergic blockers, calcium channel blockers, lithium, amiodarone, propafenone, and quinidine</td>
</tr>
<tr>
<td>Excessive vagal tone or decreased sympathetic stimulation</td>
<td>Carotid sinus massage, vomiting, Valsalva’s maneuver, deep relaxation, sleep</td>
</tr>
<tr>
<td>Noncardiac disorders</td>
<td>Hypothermia, hypoxia, hyperkalemia, increased intracranial pressure, hypothyroidism, sleep, and glaucoma</td>
</tr>
</tbody>
</table>
Sinus Bradycardia

- Often insignificant and the patient is asymptomatic
- Hypotension can result if the heart rate slows to the point where cardiac output drops sufficiently
  - Patients are less tolerant of rates < 45 BPM
Sinus Tachycardia

- Same characteristics as NSR but has a rate >100 BPM
# Sinus Tachycardia

## Table 8.2 Causes of Sinus Tachycardia

<table>
<thead>
<tr>
<th>Cause</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac diseases</td>
<td>Congestive heart failure, cardiogenic shock, and pericarditis</td>
</tr>
<tr>
<td>Use of certain drugs</td>
<td>Sympathomimetic drugs such as epinephrine; isoproterenol; dopamine; dobutamine; vagolytic drugs such as atropine; or other drugs such as alcohol, caffeine, nicotine, and amphetamines</td>
</tr>
<tr>
<td>Increased sympathetic stimulation</td>
<td>Exercise; pain; stress; fever; fear; anxiety; or as a compensatory mechanism in shock, respiratory distress, hypoxia, pulmonary embolism, anemia, sepsis, and hyperthyroidism</td>
</tr>
</tbody>
</table>
Sinus Tachycardia

• Often of no clinical significance
• Can increase myocardial oxygen consumption
  – which can aggravate ischemia (bringing on chest pain), and infarction, particularly in those with cardiovascular disease
Sinus Dysrhythmia

- Same as NSR except there is a patterned irregularity
- Described as a cycle of “slowing, then speeding up, then slowing again”

![Image of sinus dysrhythmia illustrating cycle of slowing, speeding up, and slowing again.](image-url)
Sinus Dysrhythmia

• The beat-to-beat variation produced by irregular firing of the SA node usually corresponds with the respiratory cycle and changes in intrathoracic pressure.

• Heart rate increases during inspiration and decreases during expiration.
Sinus Dysrhythmia

- Can occur naturally in athletes, children, and older adults
- Can also occur in:
  - Patients with heart disease or inferior wall myocardial infarction
  - Individuals receiving certain drugs such as digitalis and morphine
  - Conditions where there is increased intracranial pressure
Sinus Dysrhythmia

• Usually of no clinical significance and produces no symptoms
• In some patients and conditions it may be associated with palpitations, dizziness, and syncope
Sinus Arrest

• Occurs when the SA node transiently stops firing
• Causes short periods of cardiac standstill until a lower-level pacemaker discharges or the SA node resumes its normal function
Sinus Arrest

- Most prominent characteristic is a pause in ECG rhythm
- Produces an irregularity
- Rhythm typically resumes its normal appearance after pause unless an escape pacemaker resumes the rhythm
Sinus Arrest

Sinus arrest occurs when the SA node fails to initiate an impulse.

- Rate is typically between 80 and 100 beats per minute
- Rhythm is irregular where there is a pause
- P waves are normal and all look alike; one precedes each QRS complex (but absent where there is a pause in rhythm)
- QRS complexes are normal and all look alike (but absent where there is a pause in rhythm)
- PR intervals are normal (but absent where there is a pause in the rhythm)
# Sinus Arrest

## Table 8-3  Causes of Sinus Arrest

<table>
<thead>
<tr>
<th>Cause</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinus node disease</td>
<td>Fibrosis, idiopathic degeneration</td>
</tr>
<tr>
<td>Cardiac disorders</td>
<td>Chronic coronary artery disease, myocardial ischemia or infarction, acute myocarditis, cardiomyopathy, hypertensive heart disease</td>
</tr>
<tr>
<td>Use of certain drugs</td>
<td>Digoxin, procainamide, quinidine, salicylates (particularly in toxic doses), excessive doses of beta-adrenergic blockers such as propranolol and metapronol, or calcium channel blockers</td>
</tr>
<tr>
<td>Increased vagal tone</td>
<td>Valsalva’s maneuver, carotid sinus massage, vomiting</td>
</tr>
<tr>
<td>Others</td>
<td>Hyperkalemia, hypoxia</td>
</tr>
</tbody>
</table>
Practice Makes Perfect

• Determine the type of dysrhythmia

Rate: ______________ (atrial) ______________ (ventricular)  Regularity: _____________
P waves: ______________  QRS complexes: ______________  PR intervals: ______________
QT intervals: ______________  Dysrhythmia: ______________
Practice Makes Perfect

- Determine the type of dysrhythmia

Rate: ____________ (atrial) ____________ (ventricular)
P waves: ____________ QRS complexes: ____________
QT intervals: ____________ Dysrhythmia: ____________

Regularity: ____________
PR intervals: ____________
Practice Makes Perfect

- Determine the type of dysrhythmia

Rate: ___________ (atrial) ___________ (ventricular)
P waves: ___________ QRS complexes: ___________
QT intervals: ___________ Dysrhythmia: ___________

Regularity: ___________
PR intervals: ___________
Practice Makes Perfect

• Determine the type of dysrhythmia

Rate: ___________ (atrial) ___________ (ventricular)
P waves: ___________
QRS complexes: ___________
QT intervals: ___________
Dysrhythmia: ___________

Regularity: ___________
PR intervals: ___________
Practice Makes Perfect

- Determine the type of dysrhythmia

Rate: ___________ (atrial) ___________ (ventricular)
P waves: ___________ QRS complexes: ___________
QT intervals: ___________ Dysrhythmia: ___________
Regularity: ___________
PR intervals: ___________
Practice Makes Perfect

• Determine the type of dysrhythmia

Rate: ____________ (atrial) ____________ (ventricular)
P waves: ____________ QRS complexes: ____________
QT intervals: ____________ Dysrhythmia: ____________
Regularity: ____________
PR intervals: ____________
Practice Makes Perfect

- Determine the type of dysrhythmia

Rate: ____________ (atrial) ____________ (ventricular)
P waves: ____________ QRS complexes: ____________
QT intervals: ____________ Dysrhythmia: ____________
Regularity: ____________
PR intervals: ____________
Practice Makes Perfect

• Determine the type of dysrhythmia

Rate: __________ (atrial) __________ (ventricular)  
P waves: __________  QRS complexes: __________  
QT intervals: __________  Dysrhythmia: __________  
Regularity: __________  
PR intervals: __________
Practice Makes Perfect

- Determine the type of dysrhythmia

Rate: ___________ (atrial) ___________ (ventricular)
P waves: ___________ QRS complexes: ___________
QT intervals: ___________ Dysrhythmia: ___________
Regularity: ___________
PR intervals: ___________
Summary

• A dysrhythmia is an ECG rhythm that differs from normal sinus rhythm (NSR).

• Examination of the ECG rhythm must be done in a systematic, organized way.

• Rhythms originating from the SA node are called sinus rhythms.
Summary

• Normal sinus rhythm has a heart rate of 60 to 100 BPM (in the average adult).

• Sinus bradycardia has all the characteristics of normal sinus rhythm but the heart rate is less than 60 BPM.

• Sinus tachycardia has the same characteristics as normal sinus rhythm but has a rate of greater than 100 BPM.
Summary

• Sinus dysrhythmia is the same as sinus rhythm except there is the presence of a patterned irregularity. It can be described as a cycle of “slowing, then speeding up, then slowing again.”

• With sinus arrest the ECG rhythm looks like normal sinus rhythm except there is a pause in the rhythm or an absence of the P, QRS, and T waveforms until a pacemaker site reinitiates the rhythm.