ECG Coding

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**General Features**
- Normal ECG
- Normal variant
- Incorrect electrode placement
- Artifact

**P Wave Abnormalities**
- Right atrial abnormality/enlargement
- Left atrial abnormality/enlargement

**Atrial Rhythms**
- Sinus rhythm
- Sinus arrhythmia
- Sinus bradycardia (<60)
- Sinus tachycardia (>100)
- Sinus pause or arrest
- Sinoatrial exit block
- Atrial premature complexes
- Atrial tachycardia
- Atrial flutter
- Atrial fibrillation

**AV Conduction**
- AV block, 1°
- AV block, 2° Mobitz type I (Wenckebach)
- AV block, 2° Mobitz type II
- AV block, 2:1
- AV block, 3°
- Wolff-Parkinson-White pattern
- AV dissociation

**Abnormalities of QRS Voltage or Axis**
- Low voltage, limb leads
- Low voltage, precordial leads
- Left axis deviation (> -30°)
- Right axis deviation (> +100°)
- Electrical alternans

**Ventricular Rhythms**
- Ventricular premature complex(es)
- Ventricular parasystole
- Ventricular tachycardia (3 or more consecutive complexes)
- Accelerated idioventricular rhythm
- Ventricular escape complexes or rhythm
- Ventricular fibrillation

**Intraventricular Conduction**
- RBBB, complete
- RBBB, incomplete
- Left anterior fascicular block
- Left posterior fascicular block
- LBBB, complete
- LBBB, incomplete
- Aberrant conduction (including rate-related)
- Intraventricular conduction disturbance, nonspecific type

**Q Wave Myocardial Infarction**
- Age recent, age indeterminate probably old

<table>
<thead>
<tr>
<th>Location</th>
<th>Numbers</th>
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<tbody>
<tr>
<td>Anterolateral</td>
<td>51, 52</td>
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<tr>
<td>Anterior or anteroseptal</td>
<td>53, 54</td>
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<tr>
<td>Lateral</td>
<td>55, 56</td>
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<tr>
<td>Inferior</td>
<td>57, 58</td>
</tr>
<tr>
<td>Posterior</td>
<td>59, 60</td>
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</tbody>
</table>

**ST, T, U Wave Abnormalities**
- Normal variant, early repolarization
- Normal variant, juvenile T waves
- Nonspecific ST and/or T wave abnormalities
- ST and/or T wave abnormalities suggesting myocardial ischemia
- ST and/or T wave abnormalities suggesting myocardial injury
- ST and/or T wave abnormalities suggesting electrolyte disturbances
- ST and/or T wave abnormalities secondary to hypertension
- Prolonged Q-T interval
- Prominent U waves

**Clinical Disorders**
- Brugada syndrome
- Digitalis toxicity
- Torsades de pointes
- Hyperkalemia
- Hypokalemia
- Hypercalcemia
- Hypocalcemia
- Dextrocardia, mirror image
- Acute cor pulmonale including pulmonary embolus
- Pericardial effusion
- Acute pericarditis
- Hypertrophic cardiomyopathy
- Central nervous system disorder
- Hypothermia

**Pacemaker Function**
- Atrial or coronary sinus pacing
- Ventricular demand pacemaker (VVI), normally functioning
- Dual-chamber pacemaker (DDD), normally functioning
- Pacemaker malfunction, not constantly capturing (atrium or ventricle)
- Pacemaker malfunction, not constantly sensing (atrium or ventricle)
- Paced morphology consistent with biventricular pacing or cardiac resynchronization therapy
ABIM ECG Coding
Tips

• 3-4 major & minor Dx
• Do not overcode – more likely to lose points
• Be systematic & *speedy*
  – Atria, AV node, conduction system, ventricle, etc
  – Does this ECG pattern match a clinical scenario?
  – Don’t get stuck, move on, flag, come back
Tips

• STEMI coding
  – ST & T waves ~ myocardial injury
  – Localize injury pattern (anterior, inferior, etc)
51 yo woman presents with palpitations and chest pain
Pseudo R’ in V1 in Typical AVNRT
20 year old man with near syncope
57 year old man admitted with CHF
37 year old man with history of palpitations
36 year old man for pre-employment exam
64 year old man with dyspnea
42 year old woman with chest pain
45 year old man with dyspnea
64 year old man found down
65 year old man with wound infection
73 year old woman post-op ECG
AV Dissociation vs CHB

• CHB is present when the atrial rate is faster than the ventricular rhythm
  – identified by the presence of non-conducted $p$ waves when the AV node and ventricle are not refractory

• AV dissociation is present if the atrial rate is slower than the ventricular rate
66 year old man s/p TAVR
64 year old man with weakness & syncope
82 year old woman with nausea, fatigue, confusion, and visual disturbances
89 yo woman pre-op ECG for emergent surgery
80 year old woman unresponsive
72 year old man with fatigue
48 year old man with palpitations
44 year old man with near syncope
65 year old man with palpitations
What You Need to Remember

Brugada Criteria: Absence of precordial RS complex
RS > 100 ms

QRS Morphology:
  Right Bundle
  Lead V1 – monophasic, biphasic, atypical triphasic (R’ > R)
  Lead V6 – R : S < 1 (not helpful with left axis deviation)
  
  Left Bundle
  Lead V1 – R > 30 ms, RS > 60 ms
  Notching on S wave
  Lead V6 – Q wave

QRS Axis: Extreme left axis deviation (-90 to + 180 degrees)
  Right axis deviation during a left bundle morphology tachycardia

QRS Duration: > 140 ms with a right bundle morphology tachycardia
  > 160 ms with a left bundle morphology tachycardia

Precordial Concordance: Positive concordance stronger predictor than negative concordance

AV relationship: AV dissociation, VA block, capture or fusion beats

Clinical Criteria: Structural heart disease (prior MI).
73 year old woman for preop ECG