Objectives

- Recognize the location and complications of cardiac muscle injury based on changes seen on 12 lead ECG.
- Analyze actual 12 lead ECG’s depicting acute and evolving changes.

What is a 12 lead ECG?

- Records the electrical activity of the heart (depolarization and repolarization of the myocardium)
- Views the surfaces of the left ventricle from 12 different angles
Why do a 12 lead ECG?

- Monitor patients heart rate and rhythm
- Evaluate the effects of disease or injury on heart function
- Detect presence of ischemia/damage
- Evaluate response to medications
- Obtain baseline recordings before, during and after surgical procedures

If Only, Right?
Anatomy of a 12 Lead ECG
Chest and Limb Leads

- Limb leads
  - 3 Bipolar leads (I, II and III)
  - 3 Unipolar Augmented leads (aVr, aVI, aVF)
- Chest or Precordial leads
  - 6 Unipolar leads (V₁-V₆)
Normal 12 Lead ECG

Now what does it mean?

Surfaces of the Heart

<table>
<thead>
<tr>
<th>SITE</th>
<th>FACING</th>
<th>RECIPROCAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPTAL</td>
<td>V1, V2</td>
<td>NONE</td>
</tr>
<tr>
<td>ANTERIOR</td>
<td>V3, V4</td>
<td>NONE</td>
</tr>
<tr>
<td>ANTEROSEPTAL</td>
<td>V1, V2, V3, V4</td>
<td>NONE</td>
</tr>
<tr>
<td>LATERAL</td>
<td>I, AVL, V5, V6</td>
<td>II, III, aVF</td>
</tr>
<tr>
<td>ANTEROLATER</td>
<td>I, AVL, V3, V4, V5, V6</td>
<td>II, III, aVF</td>
</tr>
<tr>
<td>INFERIOR</td>
<td>II, III, aVF</td>
<td>I, AVL</td>
</tr>
</tbody>
</table>
Ischemia, Injury or Infarction?
Inferior Wall

Leads: II, III and AVF
Injury/infarct area: RCA, posterior descending branch
Area of damage: Inferior wall of LV; posterior wall LV
Associated complications: Hypotension

Anterior Septal Wall

Leads: V1-V4
Injury/infarct area: LAD: septal branch and diagonal branch
Area of damage: Septum; His Bundle; bundle branches; Anterior wall
Associated Complications: Infranodal and BBBs, CHB; LV dysfunction; CHF

Inferior MI

Anteroseptal MI
### Septal Wall

**Leads:** V1 and V2  
**Infarct/Injury area:** LCA, septal branch  
**Area of damage:** Septum, His bundle, bundle branches  
**Associated Complications:** Infranodal & BBBs

### Anterior Wall

**Leads:** V1 and V2  
**Infarct/Injury area:** LAD, diagonal branch  
**Area of damage:** Anterior wall of LV  
**Associated Complications:** LV dysfunction, CHF, BBBS, CHB, PVCs

### Lateral Wall

**Leads:** V5–V6; Lead 1 and AVL  
**Infarct/Injury area:** Circumflex  
**Area of damage:** High lateral wall of LV  
**Associated Complications:** LV dysfunction, AV nodal blocks in some

### Lateral MI

<table>
<thead>
<tr>
<th>Name</th>
<th>D</th>
<th>LVL 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td>0.10s</td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Ht</td>
<td>160</td>
<td></td>
</tr>
</tbody>
</table>

### Anterior MI

[ECG trace]
Septal Wall MI

Practice
Questions?
References

• ECG Interpretation Made Incredibly Easy, 2nd Ed. (2002). Springhouse Publishing Company
• “Learning about 12 Lead ECGs” Power Point module: University of Detroit/Mercy. Accessed September 2014
  http://urbanhealth.udmercy.edu/ekg/learn.html