12 Lead ECGs:

Ischemia, Injury & Infarction
Part 2

McHenry Western Lake County
EMS
Localization:
Left Coronary Artery
Localization:
Left Coronary Artery (LCA)

- Left Main (proximal LCA) occlusion
  - Extensive Anterior injury
- Left Circumflex (LCX) occlusion
  - Lateral injury
- Left Anterior Descending (LAD) occlusion
  - Anteroseptal injury
Localization Practice ECG: Anterior/Septal Wall
Localization Practice ECG
Localization Practice ECG: Lateral Wall
Localization Practice ECG
Localization Practice ECG: 
**Septal, Anterior and Lateral** commonly referred to as Extensive Anterior
Localization: Extensive Anterior MI

- Evidence in septal, anterior, and lateral leads
- Often from proximal LCA lesion
- “Widow Maker”
- Complications common
  - Left ventricular failure
  - CHF / Pulmonary Edema
  - Cardiogenic Shock
Localization: Definitive Therapy for Extensive AWMI

- Normal blood pressure
  - Thrombolysis may be indicated

- Signs of shock
  - PTCA: Percutaneous transluminal coronary angioplasty
  - CABG: Coronary Artery Bypass Graft
Coronary Artery Bypass Graft
Localization: LCA Occlusions

- Other considerations
  - Bundle branches supplied by LCA
  - Serious infranodal heart block may occur
Localization:
Right Coronary Artery

- Left Coronary Artery
- Lateral Wall
- Left Ventricle
- Right Coronary Artery
- Posterior Descending Artery
- Posterior Wall
- Inferior Wall of left ventricle
Localization:
Right Coronary Artery (RCA)

- Proximal RCA occlusion
  - Right Ventricle injured
  - Posterior wall of left ventricle injured
  - Inferior wall of left ventricle injured

- Posterior descending artery (PDA) occlusion
  - Inferior wall of right ventricle injured
Localization Practice ECG
Localization Practice ECG:
IWMI – RCA is occluded. Unknown if proximal or distal
Localization: Proximal RCA Occlusion

- Right Ventricular Infarct (RVI)
  - 12-lead ECG does not view right ventricle
  - Use additional leads
    - V3R - V6R
  - Right precordial leads
    - same anatomical landmarks as on left for V3 - V6 but placed on the right side
Note: “R” designation manually placed on this ECG for teaching purposes
Localization Practice ECG:

V4R, V5R and V6R show elevation
The proximal RCA must be occluded

Note: “R” designation manually placed on this ECG for teaching purposes
Localization: ECG Evidence of RVI

- Inferior MI (always suspect RVI)
- Look for ST elevation in right-sided V leads (V3-V6)
Localization:
Physical Evidence of RVI

- Dyspnea with clear lungs
  - Due to failure of the right ventricle during an acute RVI
  - Dyspnea is caused by the decrease of pulmonary perfusion from the failing RV.
Localization: Physical Evidence of RVI

- **Jugular vein distension**
  - Backup of blood waiting to enter the failed RV

- **Hypotension**
  - Relative or absolute
  - *(the left heart gets all its blood for ejection from the right heart, and the right heart has failed.)*
Localization:

Treatment for RVI

- Use caution with vasodilators
  - Small incremental doses of MS
  - NTG by drip
- Treat hypotension with fluid
  - One to two liters may be required
  - Large bore IV lines
Localization: Posterior Wall MI (PWMI)

- Usually extension of an inferior or lateral MI
  - Posterior wall receives blood from RCA & LCA
- Common with proximal RCA occlusions
- Occurs with LCX occlusions
- Identified by reciprocal changes in V1-V4
  - May also use Posterior leads to identify
    - V7: posterior axillary line level with V6
    - V8: mid-scapular line level with V6
    - V9: left para-vertebral level with V6
Localization Practice ECG
Localization: Left Coronary Dominance

- Approximately 10% of population
  - LCX connects to posterior descending artery and dominates inferior wall perfusion
- In these cases when LCX is occluded, lateral and inferior walls infarct
  - Inferolateral MI
Localization Practice ECG: Infero-Lateral Wall MI
Localization Summary

- Left Coronary Artery
  - Septal
  - Anterior
  - Lateral
  - Possibly Inferior

- Right Coronary Artery
  - Inferior
  - Right Ventricular Infarct
  - Posterior
Evolution of AMI

- **Hyperacute**
  - Early change *suggestive* of AMI
  - Tall & Peaked
  - May precede clinical symptoms
  - Only seen in leads looking at infarcting area
  - Not used as a diagnostic finding
Evolution of AMI

- **Acute**
  - ST segment elevation
  - Implies myocardial injury occurring
  - Elevated ST segment presumed acute rather than old
Evolution of AMI

- **Acute**
  - ST segment Elevated
  - Q wave at least 40 ms wide = pathologic
  - Q wave associated with some cellular necrosis
Evolution of AMI

- **Age**
  - Undetermined
    - Wide (pathologic) Q wave
    - No ST segment elevation
    - Old or “age undetermined” MI
AMI Recognition

A normal 12-lead ECG **DOES NOT** mean the patient is not having acute ischemia, injury or infarction!!!
Please continue to part 3 of this presentation

Thanks!!