Digital EKG Interpretation

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62 y/o TIA, palps

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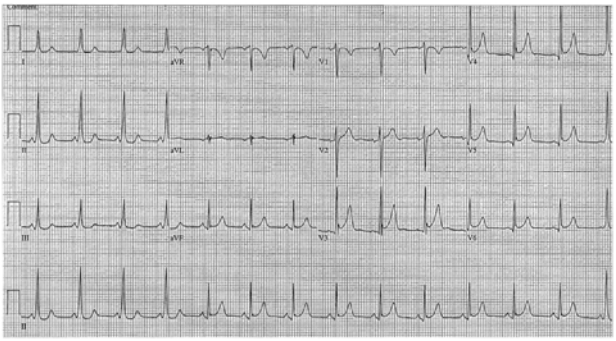
Premature Atrial Contractions with AV Block

- **Early PAC occurs when AV node is not yet refractory**
- **Look for "blocked" PAC in the T wave of the beat before the pause**

47 y/o syncope



Wolff-Parkinson White Syndrome

- **Short PR interval (< 0.12 sec)**
- **Fusion between early ventricular activation by bypass tract (preexcitation) and normal activation through AV node – delta wave**
- **Strong association with Ebstein's anomaly**
- **Watch for "pseudo myocardial infarction"**

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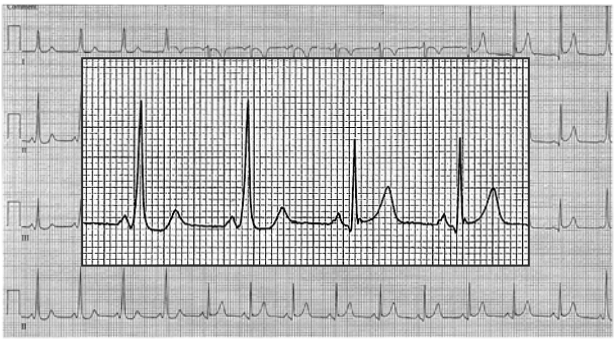
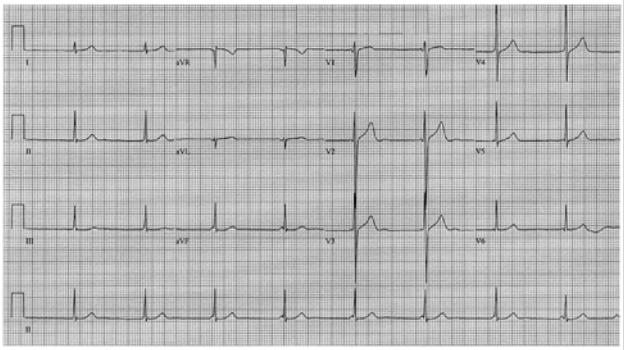


21 y/o "fatigue"



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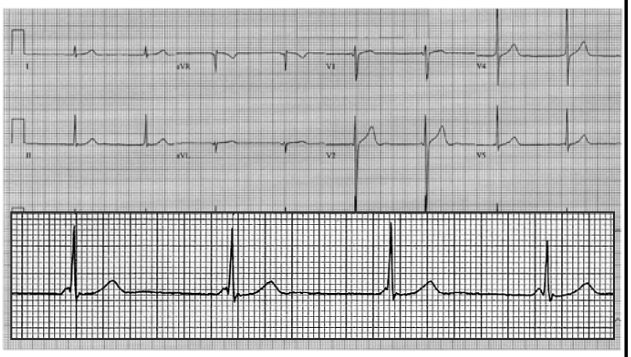
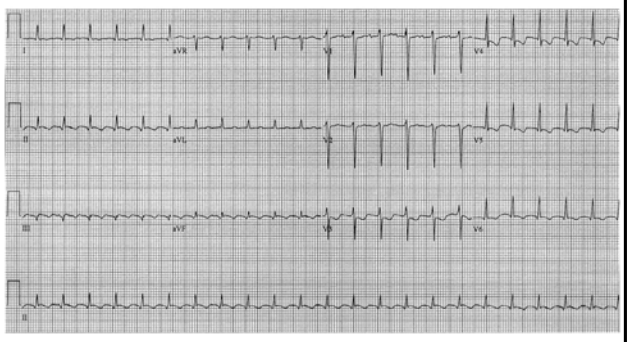


62 y/o SOB - COPD



Junctional Rhythm

- **Can be normal variant in healthy young patients**
- **P wave may/may not indicate sinus rhythm occurring simultaneously in dissociated fashion**
  - ✓ **In “competition” with the junctional focus**
  - ✓ **Retrograde p wave**

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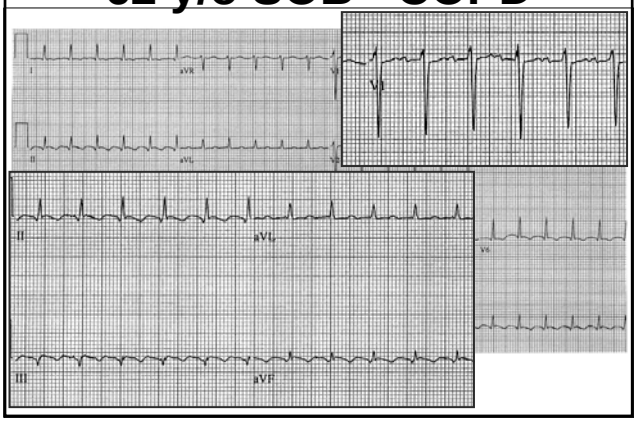

Atrial Flutter

- **Most common variant is reentrant circuit within right atrium with rate of 240-350 bpm**
- **Causes of atrial fibrillation and atrial flutter are the same**
- **Patients may also have atrial fibrillation, thus, atrial flutter is an indication for anticoagulation**

65 y/o post op

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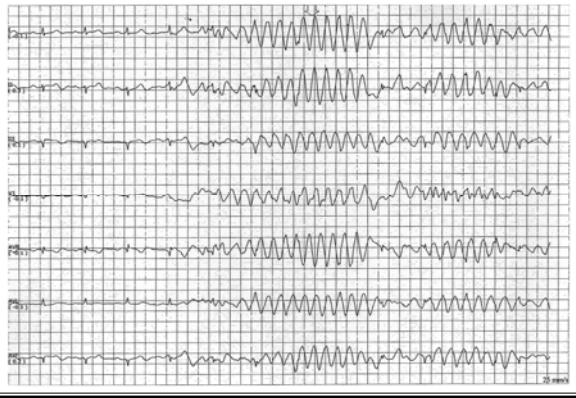
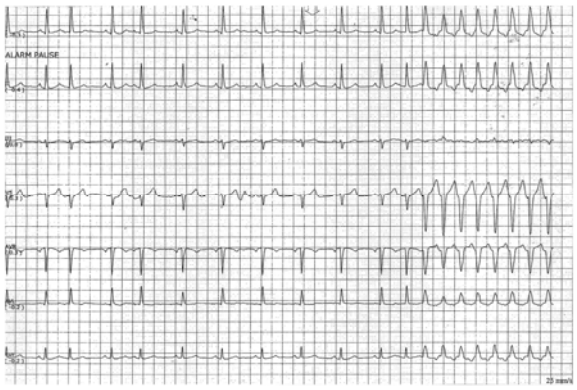


Artifact within EKG Tracings

- **Follow the regular QRS rhythm marching through the artifact**
- **Artifact can vary in contour and rate – starting and stopping with behavior different from the suspected rhythm**
  - ✓ **i.e. long run of VT reverting to sinus bradycardia instead of the sinus tach expected from the low BP and catecholamine surge**

60 y/o post op



PAC with SVT and Ventricular Aberration

- **Ventricle is refractory when PAC or PVC starts a supraventricular tachycardia run**
- **Can be either LBBB or RBBB**
- **Look for the premature beat on the ST/T wave of the preceding cardiac cycle**

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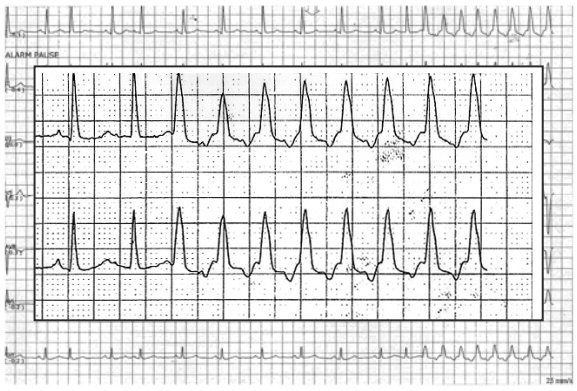
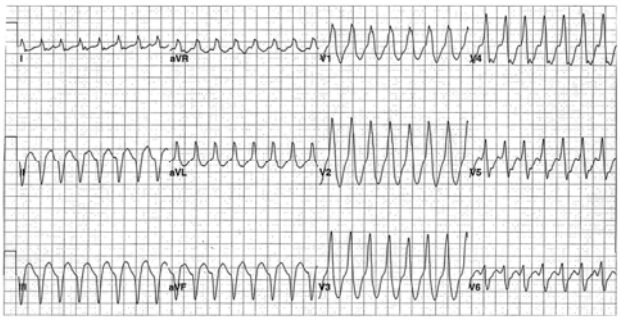


75 y/o post op SICU



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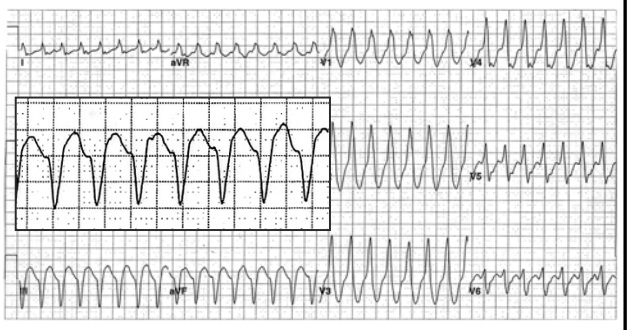
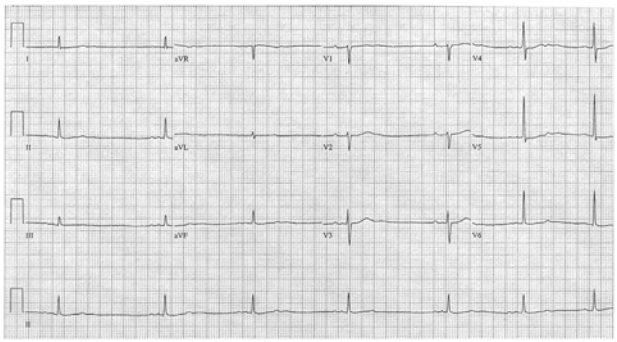


79 y/o light-headed



Wide Complex Tachycardia

- **Unstable patients require resuscitation**
- **Structural heart disease – LVH, prior MI, dilated LV with dysfunction – equals VT**
- **Concordance, extreme axis deviation, very wide QRS complexes, dissociated p waves equal VT**

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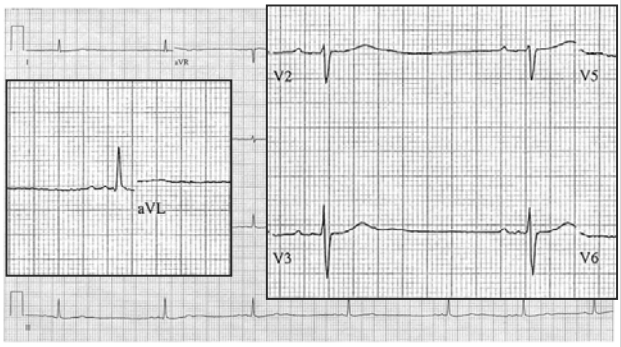
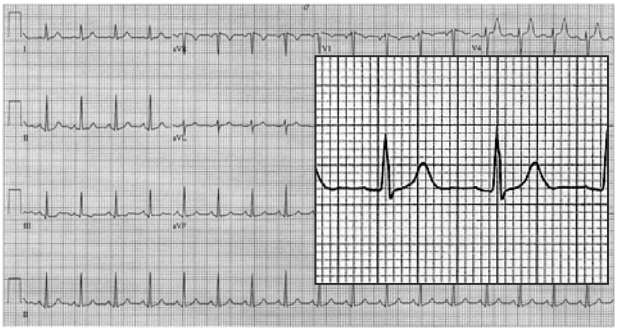


Symptomatic Bradycardia

- Screen for responsible medications
- Assess hemodynamic status
- Patients may need exercise stress to test for chronotropic incompetence
- Pacemaker is indicated when:
  - ✓ Symptoms are clearly attributable to bradycardia
  - ✓ Rate-slowing medications are needed (B-blockers for heart failure, angina)
  - ✓ Pauses are noted on monitoring

33 y/o headache



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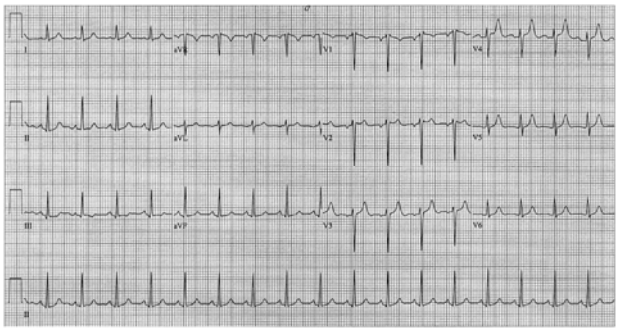
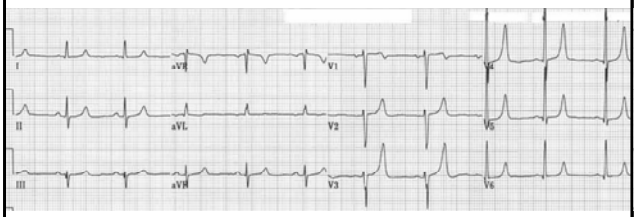


Electrolyte Disturbances: Hypercalcemia

- Normal QT interval should be less than ½ of the R to R interval
- No standardized criteria to judge short QT
- Amount of calcium is inversely proportional to QT duration
- ECG should be interpreted in overall clinical scenario

55 y/o weak in ED



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Electrolyte Disturbances: Hyperkalemia

- **EKG evolution:**
  - ✓ **Tall, peaked T waves**
  - ✓ **Lengthening of PR interval, QRS duration**
  - ✓ **QRS widens into "sine wave"**
  - ✓ **Progresses to ventricular fibrillation**

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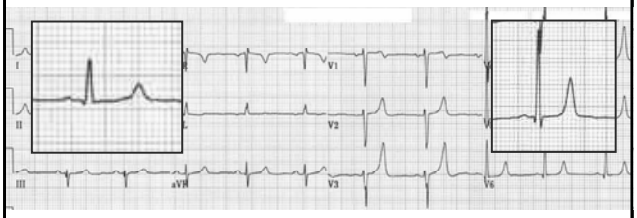

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42 y/o ED

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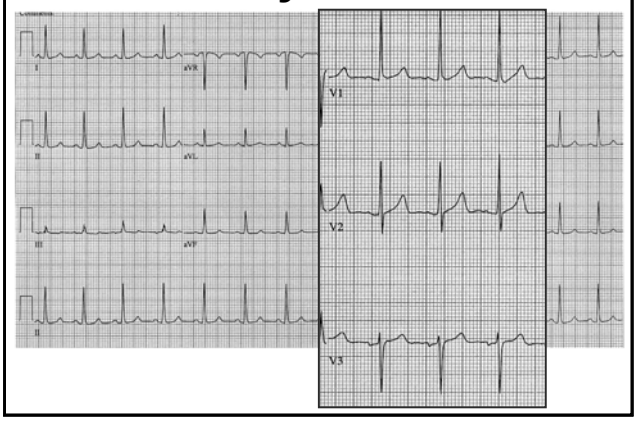
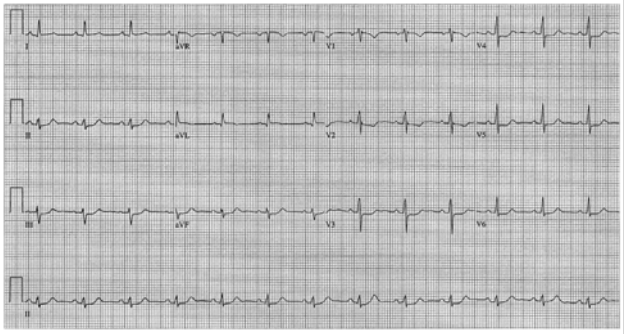


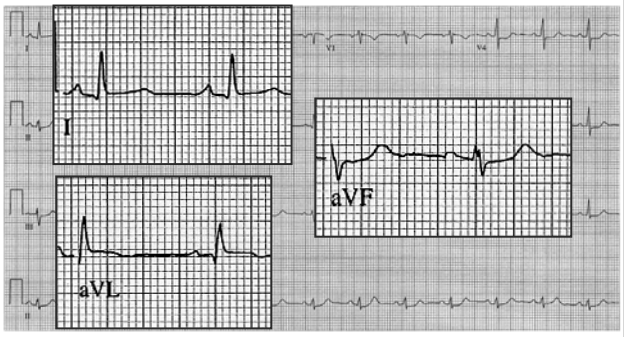
76 y/o SOB



EKG Lead Reversal

- **Typical examples include:**
  - ✓ **Switched R and L arm leads (I, AVL inverted while AVR upright)**
  - ✓ **Mixed unipolar leads (V1-6 with variation in R wave progression)**

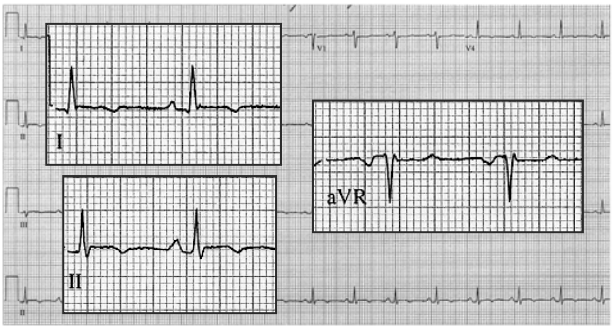
76 y/o SOB



ST Segment Elevation

- **Differential includes:**
  - ✓ **Injury or infarction (+/- Q wave)**
  - ✓ **Pericarditis**
  - ✓ **Myocarditis**
  - ✓ **Early repolarization variant**
  - ✓ **LV aneurysm from previous MI**
  - ✓ **LBBB**
  - ✓ **Pulmonary embolism**

64 y/o chest pain



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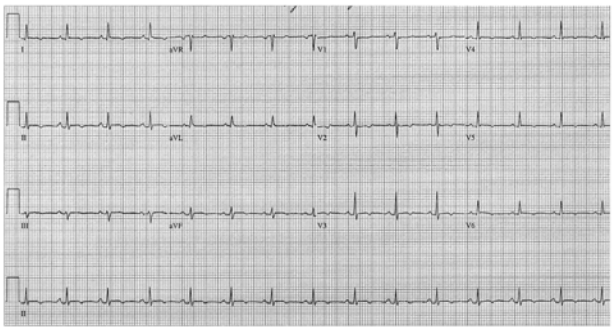
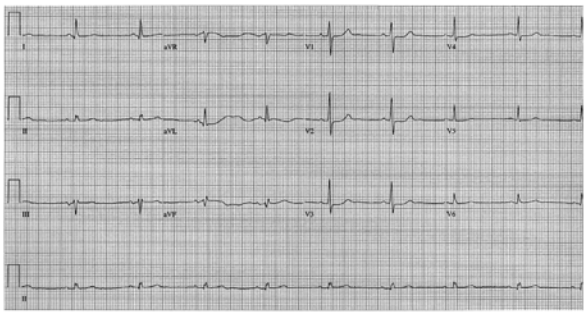


EKG Changes in Pericarditis

- **Normal evolution over time:**
  - ✓ **Diffuse (sometimes localized) ST elevation and PR depression**
  - ✓ **Normalization of ST and PR**
  - ✓ **Development of diffuse T wave inversion**
  - ✓ **Full normalization (most patients) or persistent T wave inversions ("chronic" pericarditis**

60 y/o ED – arm pain



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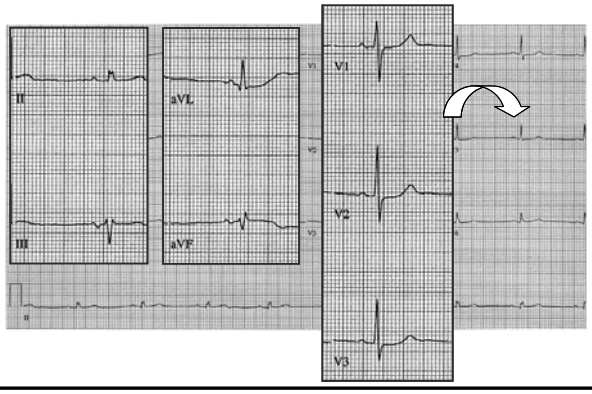

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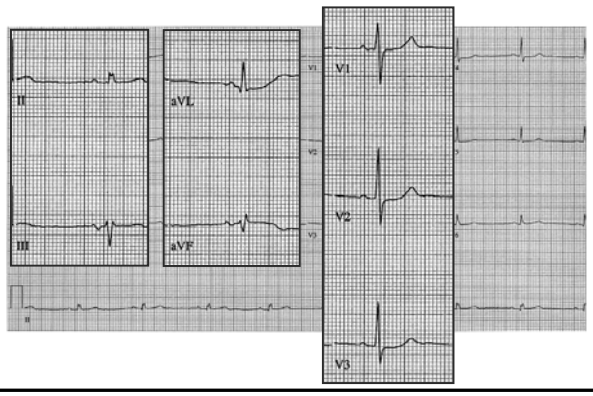

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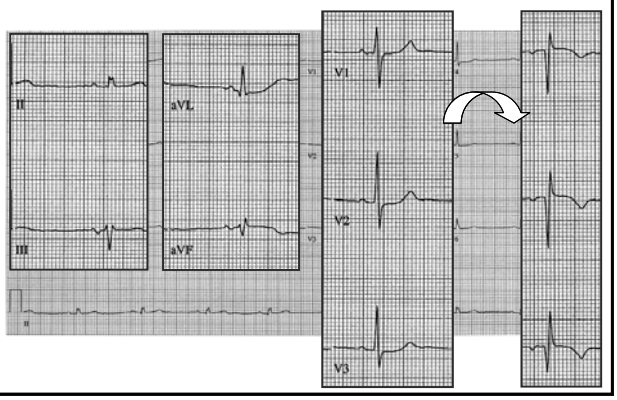

Posterior Myocardial Infarction

- Early R wave progression
- ST depression in leads V1-3
- Evidence of inferior wall injury or ischemia
- Appearance of Q waves with ST elevation when held upside down

Acknowledgments

- Dennis Mathias

Reference Sources

- Braunwald's Heart Disease, 7th Ed.
- UpToDate Online, version 17.1