Digital EKG Interpretation

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62 y/o TIA, palps

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
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”

47 y/o syncope

21 y/o “fatigue”
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

62 y/o SOB - COPD
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

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

75 y/o post op SICU
75 y/o post op SICU

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

79 y/o light-headed
### 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 (β-blockers for heart failure, angina)
  - Pauses are noted on monitoring

### 33 y/o headache

- 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
Electrolyte Disturbances: Hyperkalemia

- EKG evolution:
  - Tall, peaked T waves
  - Lengthening of PR interval, QRS duration
  - QRS widens into “sine wave”
  - Progresses to ventricular fibrillation
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)
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

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
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