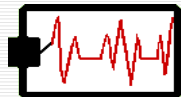


HTEC 91

Medical Office Diagnostic Tests

Week 5

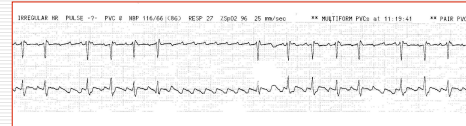


Topics for Today

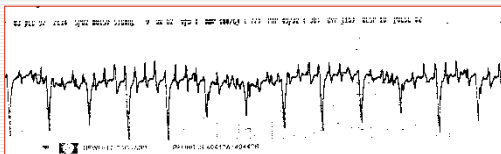
- ☐ Ventricular Rhythms
 - PVCs: Premature Ventricular Contractions
 - VT: Ventricular Tachycardia
 - VF: Ventricular Fibrillation
 - Asystole
- ☐ Study Guide for Midterm Exam

Review of Quizzes

Guess That Rhythm...



Guess That Rhythm...



Premature Ventricular Contractions (PVCs)

- ☐ PVCs are ectopic beats originating low in the ventricles, occurring earlier than the normally expected beat.
- ☐ A "compensatory pause" usually follows the t wave.
- ☐ T wave is often in the opposite direction from the QRS.



PVCs: 8 Steps...

1. P wave: no related p wave seen.
2. Atrial rhythm: irregular as a result of the PVC; underlying rhythm may be regular.
3. Atrial rate: that of the underlying rhythm.
4. PR interval: N/M (no p wave)

PVCs: 8 Steps...

5. Ventricular rhythm: irregular or regularly irregular as a result of the PVC; underlying rhythm may be regular.
6. Ventricular rate: varies according to the underlying rhythm.
7. QRS complex: early, wide (>0.12), bizarre shape, increased amplitude.
8. QT interval: N/M

Significance of PVCs

- ☐ Can lead to decreased cardiac output, especially if frequent or sustained.
- ☐ Can precipitate another cardiac dysrhythmia.

Causes of PVCs

- ☐ Hypokalemia
- ☐ Hypoxia
- ☐ Digoxin toxicity
- ☐ Caffeine
- ☐ Tobacco
- ☐ Alcohol



PVCs: Interventions

- ☐ PVCs may not require treatment if infrequent or the patient is asymptomatic.
- ☐ Eliminate the offending cause; treat the underlying cause.

PVCs: Interventions

- ☐ If of cardiac origin, medications to suppress ventricular irritability:
 - calcium channel blockers
 - amiodarone
 - flecainide
- ☐ If bradycardia also exists, may give atropine.



Assessing PVCs

- How often do they occur?
 - 6 or more/minute may require treatment
- What is their pattern?
 - Uniform/Unifocal (same ectopic focus)
 - Multifocal (different foci)

Unifocal PVCs (trigeminy)



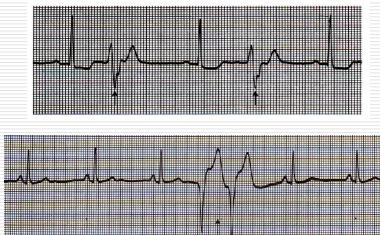
Multifocal PVCs



Assessing PVCs

- Are there couples? Bigeminal PVCs? Trigeminal PVCs?
- Are there 3 or more in a row? (VT)
- Are they ventricular escape beats instead of PVCs?
 - looks like a PVC but occurs LATE
 - Safety mechanism to prevent ventricular standstill

Bigeminy and pair (couple)



3 in a row ("burst" of VT)

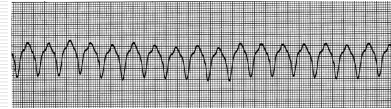


Ventricular Escape

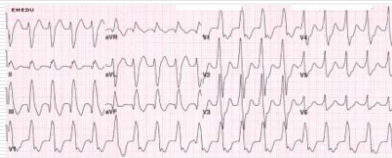


Ventricular Tachycardia (VT)

- Three or more PVCs in a row.
- Indicates myocardial irritability.
- Usually preceded by a PVC that occurs during the vulnerable period of ventricular repolarization ("r on t phenomenon").



12 Lead ECG showing VT



□ http://en.wikipedia.org/wiki/Ventricular_tachycardia

VT: 8 Steps...

1. P wave: usually absent or not visible; retrograde p waves may be present.
2. Atrial rhythm: cannot be determined.
3. Atrial rate: cannot be determined.
4. PR interval: cannot be determined.

VT: 8 Steps...

5. Ventricular rhythm: usually regular
6. Ventricular rate: usually rapid (100 to 250 beats / minute)
7. QRS complex: wide (>0.12 second) and bizarre looking; increased amplitude. (T wave: opposite direction of QRS)
8. QT interval: N/M

Significance of VT

- Life-threatening
- Cardiac output dramatically reduced
- No relationship between atrial and ventricular activity
- Sustained VT often deteriorates into VF

Causes of VT

- ☐ Acute MI
- ☐ CAD
- ☐ Rheumatic heart disease
- ☐ Mitral valve prolapse
- ☐ CHF
- ☐ Cardiomyopathy
- ☐ Pulmonary embolism
- ☐ Electrolyte imbalance
- ☐ Drug toxicity (digoxin, procainamide, quinidine)

VT: Interventions

- ☐ If patient is conscious:
 - antiarrhythmic medication
 - ☐ amiodarone
 - ☐ lidocaine
 - ☐ procainamide
 - ☐ sotalol
 - Synchronized cardioversion
 - ☐ Recurrent: AICD or ablation therapy



VT: Interventions

- ☐ If patient is unconscious:
 - Immediate defibrillation / AED
 - CPR if defibrillator unavailable

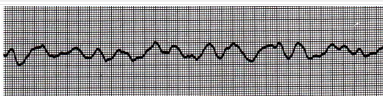


Ventricular Fibrillation (VF)

- ☐ Rapid, disorganized depolarization of the ventricles.
- ☐ Wavy, undulating baseline.
 - Large waves: coarse VF
 - Fine waves: fine VF

Ventricular Fibrillation (VF)

- ☐ Coarse VF



- ☐ Fine VF



VF: 8 Steps...

1. P wave: N/M
2. Atrial rhythm: cannot be determined
3. Atrial rate: cannot be determined
4. PR interval: N/M
5. Ventricular rhythm: chaotic, no pattern
6. Ventricular rate: cannot be determined
7. QRS complex: N/M
8. QT interval: N/M

Significance of VF

- ☐ Life-threatening
- ☐ Always check patient first!
- ☐ Ventricles "quivering:" no cardiac output.
- ☐ Leads to ventricular standstill.

Causes of VF

- ☐ Acute MI
- ☐ Untreated VT
- ☐ Electrolyte imbalance
- ☐ Acid-base imbalance
- ☐ Epinephrine or quinidine toxicity
- ☐ Electrical shock
- ☐ Hypothermia
- ☐ R on T phenomenon

VF: Interventions

- ☐ Defibrillation!
- ☐ While awaiting defibrillation:
 - CPR
 - Antiarrhythmic medications (similar to VT meds)



Asystole (Ventricular Standstill)

- ☐ Total absence of ventricular activity.
- ☐ Flat line visible on the ECG



Asystole: 8 Steps...

1. P wave: N/M
2. Atrial rhythm: cannot be determined
3. Atrial rate: cannot be determined
4. PR interval: N/M
5. Ventricular rhythm: none
6. Ventricular rate: none
7. QRS complex: absent
8. QT interval: N/M

Significance of Asystole

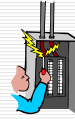
- ☐ Life-threatening arrhythmia.
- ☐ No ventricular electrical activity.
- ☐ No ventricular contraction.
- ☐ No cardiac output.

Causes of Asystole

- Any condition that leads to inadequate blood flow
 - Pulmonary embolus
 - Air embolus
 - Hemorrhage

Causes of Asystole

- Ineffective cardiac contractility
 - MI
 - Heart failure
 - Cardiac rupture
 - Cardiac tamponade
- Insufficient conduction
 - Hypokalemia
 - Electrical shock
 - Severe acidosis
 - Ventricular dysrhythmias
 - Progression of AV blocks
 - Hypoxemia
 - Cocaine overdose



Asystole: Interventions

- CPR / ACLS
 - Defibrillation
 - Intubation / airway management
 - Medications
- Pacemaker
 - External
 - Temporary



Study Topics for Midterm Exam

- Definition of Terms
- Electrical Conduction System
- Structures in the Heart
- Chest Lead Placement
- Identification of Leads (terminology)
- Identification of Different Types of Artifact
- Causes of each type of artifact
- Identification and description of the parts of the ECG cycle
- Various Multiple-choice questions related to the chapter in your Bonewit-West text