

# Dysrhythmias and Conduction Problems

Dr. Rexi Thomas

---

---

---

---

---

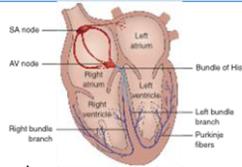
---

---

---

## Normal Electrical Conduction

- ❖ SA node (sinus node)
- ❖ AV node
- ❖ Conduction
- ❖ Bundle of His
- ❖ Right and left bundle branches
- ❖ Purkinje fibers
- ❖ Depolarization = stimulation = systole
- ❖ Repolarization = relaxation = diastole



Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

---

---

---

---

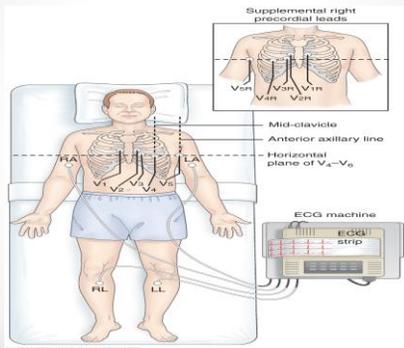
---

---

---

---

## 12 lead ECG



---

---

---

---

---

---

---

---

## The Electrocardiogram (ECG)

- ❖ Electrode placement
  - Electrode adhesion
- ❖ Types of ECG
- ❖ ECG interpretation
  - P wave
  - QRS complex
  - T wave
  - U wave
- PR interval
- ST segment
- QT interval
- TP interval
- PP interval

Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

---

---

---

---

---

---

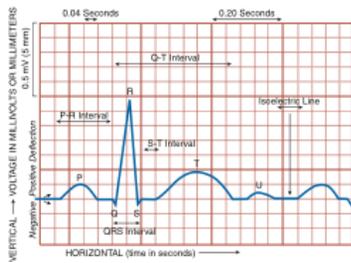
---

---

---

---

## ECG Graph and Commonly Measured Components



Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

---

---

---

---

---

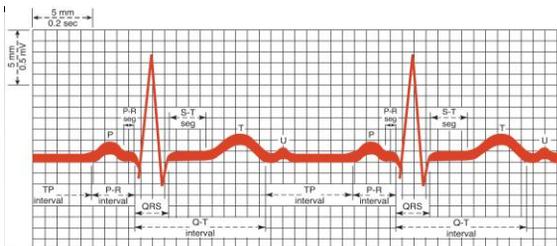
---

---

---

---

---



- P wave
- QRS
- PR interval
- T wave
- ST segment
- U wave
- QT interval
- PP interval
- RR interval

---

---

---

---

---

---

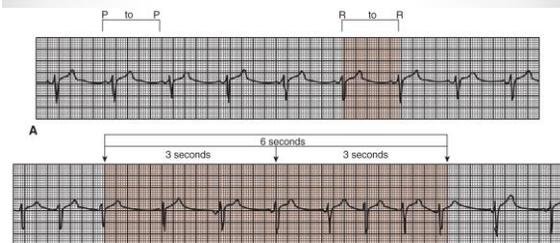
---

---

---

---

## Ventricular and Atrial Rates




---

---

---

---

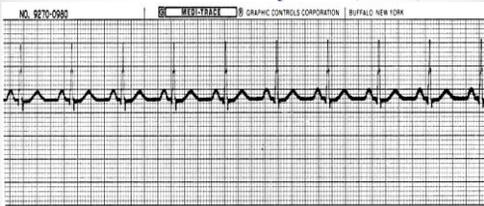
---

---

---

---

## Normal Sinus Rhythm (NSR)



- Rate: 60-100
- Rhythm: regular
- QRS shape: usually normal; can be regularly abnormal
- P wave: normal shape, in front of QRS
- PR interval: 0.12- .20
- P:QRS ratio: 1:1

---

---

---

---

---

---

---

---

## Sinus Bradycardia



- Rate: < 60
- Rhythm: regular
- QRS shape: normal
- P wave: normal
- PR interval: 0.12 – 0.20
- P:QRS ratio: 1:1

---

---

---

---

---

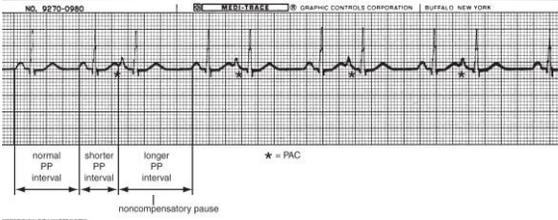
---

---

---



## Premature Atrial Complexes (PAC's)



- Irregular PP intervals

---

---

---

---

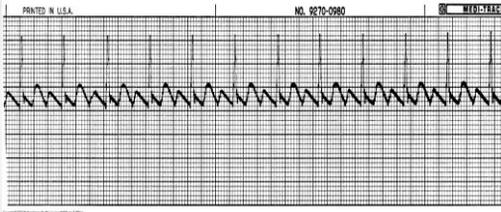
---

---

---

---

## Atrial Flutter



- Atrium rate 250-400
- Atrium faster than AV node conduction
- P wave: sawtooth

---

---

---

---

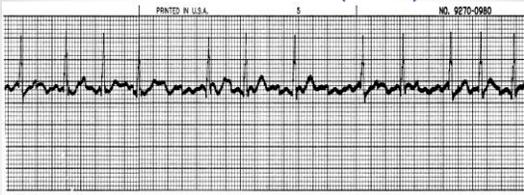
---

---

---

---

## Atrial Fibrillation (A-fib)



- Twitching of atrium
- Rate: Atrial 300-600; Vent 120-200
- P wave: ?
- PR interval: cannot measure
- P:QRS ratio: many:1

---

---

---

---

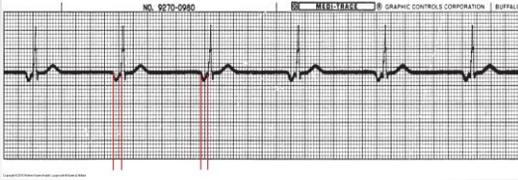
---

---

---

---

### Junctional Rhythm



- Rate: 40-60
- P wave: may be absent
- PR interval: if P < 0.12 sec
- P:QRS ratio: 1:1 or 0:1
- 

---

---

---

---

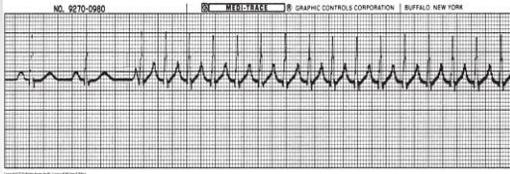
---

---

---

---

### AV Nodal Reentry



- Rate: Atrial 150-250; Vent 120-200
- P wave: difficult to discern
- PR interval: < 0.12 sec
- P:QRS ratio: 1:1, 2:1
- 

---

---

---

---

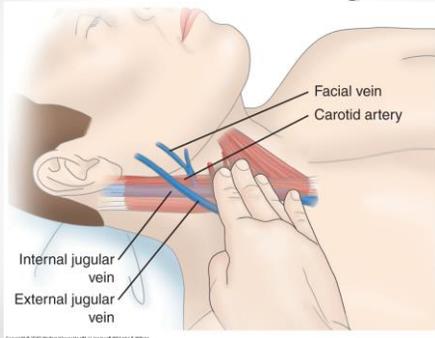
---

---

---

---

### Carotid Sinus Massage



---

---

---

---

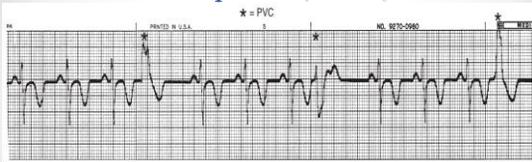
---

---

---

---

## Multifocal Premature Ventricular Complexes (PVC's)



Ventricular impulse

---

---

---

---

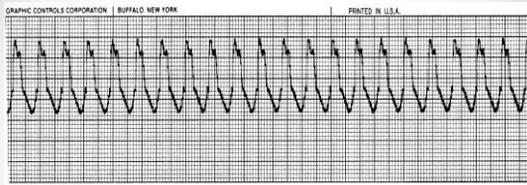
---

---

---

---

## Ventricular Tachycardia



- Ventricular Rate: 100-200
- Rhythm: regular
- P wave: difficult to identify

---

---

---

---

---

---

---

---

## Ventricular Fibrillation



- Irregular
- Unrecognizable QRS

---

---

---

---

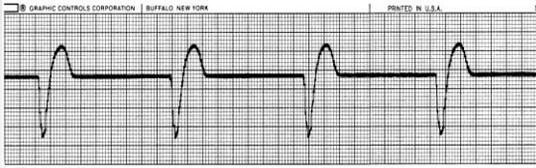
---

---

---

---

### Idioventricular Rhythm



- Ventricular Rate: 20-40
- Rhythm: regular
- QRS shape: bizarre, abnormal shape

---

---

---

---

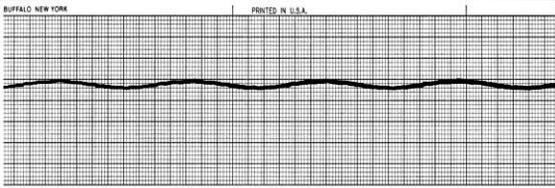
---

---

---

---

### Asystole



---

---

---

---

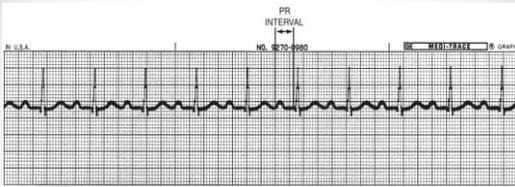
---

---

---

---

### Sinus Rhythm with First Degree AV Block



- PR interval: constant but  $> 0.20$  seconds

---

---

---

---

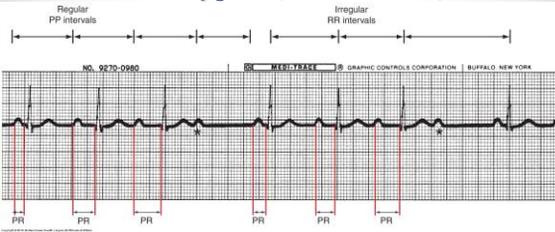
---

---

---

---

### Sinus Rhythm with Second Degree AV Block Type 1 (Wenckebach)



- Longer PR duration then no QRS after P wave

---

---

---

---

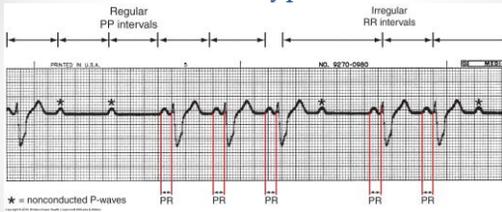
---

---

---

---

### Sinus Rhythm with Second Degree AV Block Type II



- More P waves than QRS

---

---

---

---

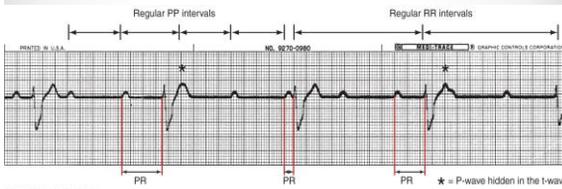
---

---

---

---

### Sinus Rhythm with Third Degree AV Block



- Irregular PR intervals

---

---

---

---

---

---

---

---

## Cardioversion and Defibrillation

- ❖ Treat tachyarrhythmias by delivering electrical current that depolarizes critical mass of myocardial cells
  - When cells repolarize, sinus node is usually able to recapture role as heart pacemaker
- ❖ In cardioversion, current delivery is synchronized with patient's ECG
- ❖ In defibrillation, current delivery is unsynchronized

Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

---

---

---

---

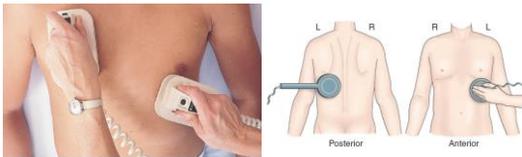
---

---

---

---

## Paddle Placement for Defibrillation



Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

---

---

---

---

---

---

---

---

## Safety Measures for Defibrillation

- ❖ Ensure good contact between skin, pads, and paddles
  - Use conductive medium, 20 to 25 pounds of pressure
- ❖ Place paddles so they do not touch bedding or clothing and are not near medication patches or oxygen flow
- ❖ If cardioverting, turn synchronizer on
- ❖ If defibrillating, turn synchronizer off
- ❖ Do not charge device until ready to shock
- ❖ Call "clear" three times; follow checks required for clear
  - Ensure no one is in contact with patient, bed, or equipment

Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

---

---

---

---

---

---

---

---

## Pacemakers

- ❖ Electronic device that provides electrical stimuli to heart muscle
- ❖ Types
  - Permanent
  - Temporary
- ❖ Pacemaker generator functions
  - NASPE-BPEG code for pacemaker function

Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

---

---

---

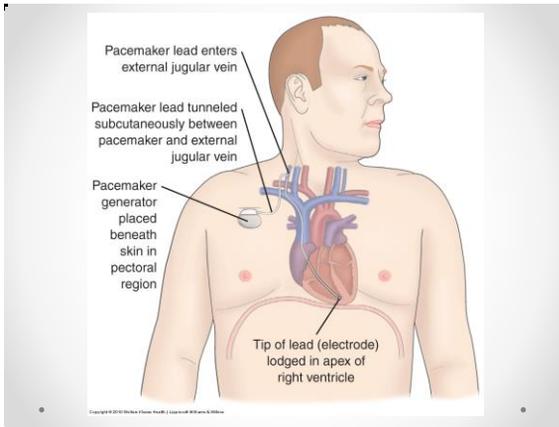
---

---

---

---

---



---

---

---

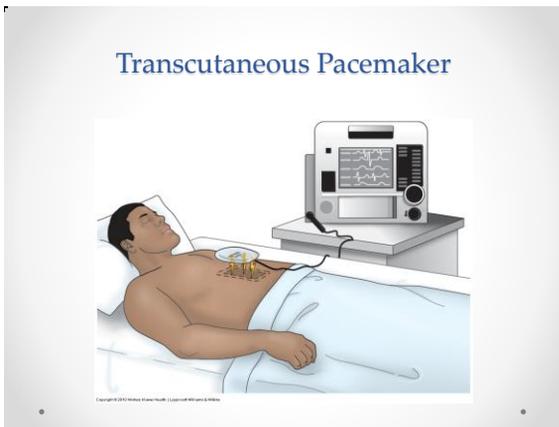
---

---

---

---

---



---

---

---

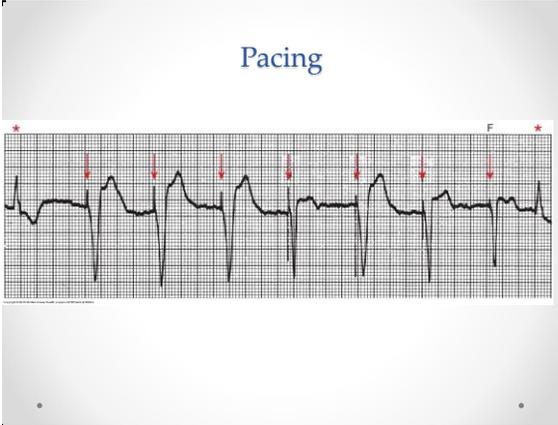
---

---

---

---

---



---

---

---

---

---

---

---

---

### Complications of Pacemaker Use

- ❖ Infection
- ❖ Bleeding or hematoma formation
- ❖ Dislocation of lead
- ❖ Skeletal muscle or phrenic nerve stimulation
- ❖ Cardiac tamponade
- ❖ Pacemaker malfunction

---

---

---

---

---

---

---

---

Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

### Implantable Cardioverter Defibrillator (ICD) #1

- ❖ Device that detects and terminates life-threatening episodes of tachycardia and fibrillation
- ❖ NASPE-BPEG code
- ❖ Antitachycardia pacing

---

---

---

---

---

---

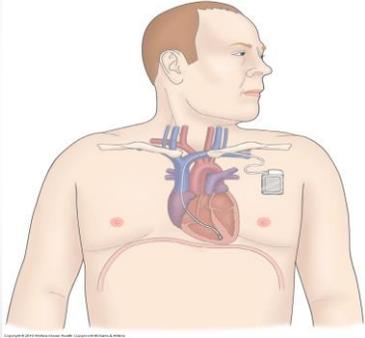
---

---

Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

## Implantable Cardioverter Device (ICD)



---

---

---

---

---

---

---

---

## Nursing Management of the Patient with a Permanent Electronic Device

- ❖ ECG assessment
- ❖ CXR
- ❖ Nursing assessment
  - CO and hemodynamic stability
  - Incision site
  - Signs of ineffective coping
  - Level of knowledge and education needs of family and patient

Wolters Kluwer

Copyright © 2022 Wolters Kluwer - All Rights Reserved

---

---

---

---

---

---

---

---

## Wolff Parkinson White Syndrome



---

---

---

---

---

---

---

---