

Lecture 3 • Mark Klimek • 111:11

Calcium Channel Blockers

CCBs (Calcium channel blockers) are like Valium for the heart

- **They relax and slows down the heart**
- In other words, CCBs have negative inotropic, chronotropic, dromotropic effects on the heart

(+) Inotropy, Chronotropy, Dromotropy

Positive inotropy

- Increase cardiac contractile force →
Ventricles empty more completely →
Cardiac output improved

Positive chronotropy

- Increase rate of impulse formation at SA node → Accelerate heart rate

Positive dromotropy

- Increase speed that impulses from SA node travel to AV node (increase conduction velocity)

(-) Inotropy, Chronotropy, Dromotropy

Negative inotropy

- Weaken/decrease the force of myocardial contraction

Negative chronotropy

- Decrease rate of impulse formation at the SA node → decelerate heart rate

Negative dromotropy

- Decrease speed that impulses from SA node travel to AV node (decrease conduction velocity)

When do you want to relax and slows down the heart? ... To treat “A, AA, AAA”

- Antihypertensive
- AntiAnginal drugs (decreasing oxygen demand)
- AntiAtrialArrhythmia

Side Effects

Headache and hypotension

Name: ends in “dipine” ... Not “pine”

- Also, verapamil, Cardizem (diltiazem)
- Cardizem (diltiazem) is given continuous IV drip

What are the parameters to assess before putting a pt on CCBs?

- Assess for BP
- Hold if SBP <100

Cardiac arrhythmias

- Knowing how to interpret rhythm
- Must know the following 4 cardiac rhythms by sight

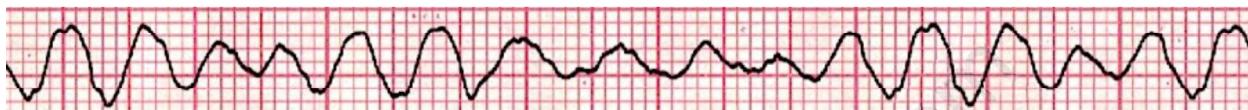
Normal Sinus Rhythm

- There is a P wave, followed by a QRS, followed by a T wave for every complex
- Peaks of the P wave is equally distant to the QRS, and fall within 5 small boxes



Ventricular Fibrillation

- No pattern



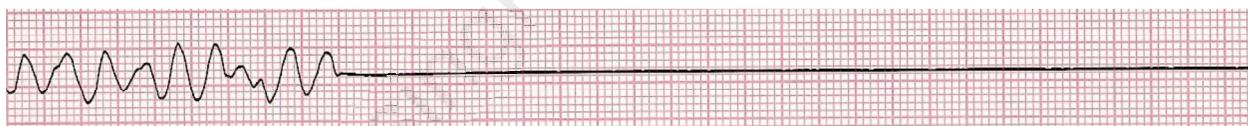
Ventricular Tachycardia

- Sharp peaks with a pattern



Asystole

- A flat line



If the question mentions

- QRS depolarization = Ventricular
- P wave = Atrial

The 6 rhythms most tested on the NCLEX

1. A lack of QRS complexes is **asystole**—a flat line
2. P waves (atrial) in the form of **saw tooth wave** = atrial **flutter**
3. **Chaotic P wave patterns** = atrial **fibrillation** (a-fib)
(Chaotic: word used to describe fibrillation)
4. **Chaotic QRS complexes** = ventricular **fibrillation** (v-fib)
5. **Bizarre QRS complexes** = ventricular **tachycardia** (v-tach)
(Bizarre: word used to describe tachycardia)
6. **Periodic wide bizarre QRS complexes** = **PVCs** (Salvos of PVCs = A short runs of v-tach)

There are 3 levels of nursing knowledge

1. Stuff you need to know
2. Stuff that is nice to know
3. Stuff that is nuts to know

PVCs (premature ventricular contractions) are **usually low priority**

- However, **elevate them to moderate priority** if under the following 3 circumstances
 - There are 6 or more PVCs in a minute
 - More than 6 PVCs in a row
 - R on T phenomenon (a PVC falls on a T wave)
- PVCs after an MI is common and is a low priority

Lethal arrhythmias are **high priority** and will kill a pt in 8 minutes or less. They are:

- **Asystole and V-fib** (ventricular fibrillation)
- Both rhythms produce **low or no cardiac output (CO)**, without which there is inadequate or no brain perfusion. This may lead to confusion and death

Potentially Lethal Cardiac Arrhythmia

- V-tach (ventricular tachycardia) is a potentially lethal cardiac rhythm but it **has a CO**

How would a pt with or without CO presents?

- CO is absent = there is no pulse
- CO is present = there is a pulse

Treatment of PVCs and V-tach

- Ventricular = Lidocaine
- Both are ventricular rhythms
- Treat with Lidocaine
- Amiodarone is eventually the NCLEX board will want as answer

Supraventricular arrhythmias are Atrial arrhythmias (supra = above)

Treatments are “**ABCDs**”

- Adenocard (Adenosine) ... Fast IV push (push in less than 8 seconds and 20 mL NS flush right after) ... These pts will go into asystole for about 30 seconds and out of it
- Beta-blockers (end in -olol)
- CCBs
- Digitalis (digoxin), **Lanoxin** (another digitalis analog)

Beta-blockers have negative inotropic, chronotropic, dromotropic effects on the heart.

They treat “A, AA, AAA”

- Antihypertensive
- AntiAnginal drugs (decreasing oxygen demand)
- AntiAtrialArythmia
- Side Effects = Headache and hypotension

Treatment of V-fib and Asystole

- Defib for V-fib (Defib = defibrillate = Shock em!)
- Epinephrine and Atropine for Asystole

Tx: Atrial arrhythmias

- Adena
- Beta
- Calcium
- Dig

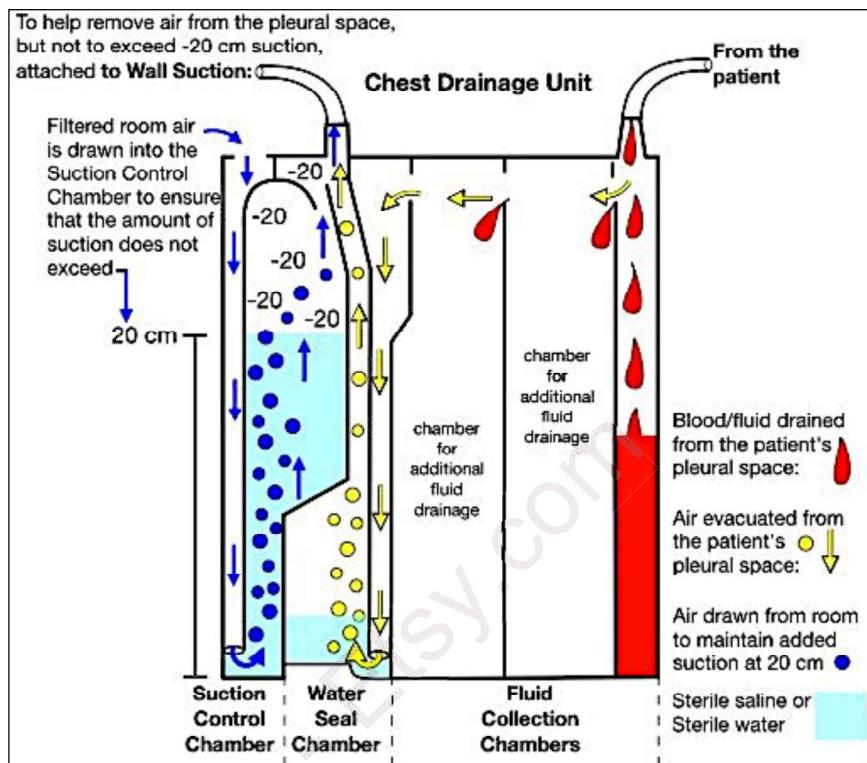
Tx: Ventricular arrhythmias

- Lidocaine
- Amiodarone

Chest Tubes

Purpose: to reestablish negative pressure in the pleural space ... Negative pressure in the pleural space makes things stick so that the lung expands when the chest wall expands

- Pleural space is the space between the lung (visceral pleura) and the chest wall (parietal pleura)
- In a **pneumothorax**, chest tube removes air
- In a **hemothorax**, chest tube removes blood
- In a **hemopneumothorax**, chest tube removes air and blood



Question

A chest tube is placed in a pt for a hemothorax (blood). What would you (the LPN) report to the nurse? Or, what would you (the RN) report physician?

- Chest tube is not bubbling
- Chest tube drains 800 mL in the first 10 hours
- Chest tube is not draining
- Chest tube is intermittently bubbling

What is the chest tube not supposed to do? The chest tube is supposed to drain instead of bubbling

- Therefore answer (c) is the right answer.

Question

A chest tube is placed in a pt for a pneumothorax (air). What would you (the LPN) report to the nurse? Or, what would you (the RN) report physician?

- Chest tube is not bubbling
- Chest tube drains 800 mL in the first 10 hours
- Chest tube is not draining
- Chest tube is intermittently bubbling

With a pneumothorax, bubbling is expected

- Therefore, (a) is a good answer choice

- Since this is a pneumothorax, not too much blood is expected
- Consequently, 800 mL of blood over 10 hours (80 mL per hour) is too much blood and needs to be reported to the nurse or the physician

Also, pay attention to the location the tube is placed

- **Apical** (top) or **Basilar** (base)
- Apical chest tube removes Air
- Basilar chest tube removes Blood or fluid (due to gravity)

Examples

- An apical chest tube is draining 300 mL the first hour is bad ... Bubbling (air) is expected
- A basilar chest tube is draining 200 mL the first hour is expected
- An apical chest tube is not bubbling ... This is a bad sign because bubbling (air) is expected
- A basilar chest tube is not bubbling ... This is a good sign because bubbling (air) is not expected

Example

Pt presents with a unilateral **hemopneumothorax**. How to care for this pt?

- Place an *apical* chest tube for the *pneumothorax* and a **basilar** for the **hemothorax**

Bilateral **pneumothorax** needs apical chest tube one on the right and one on the left

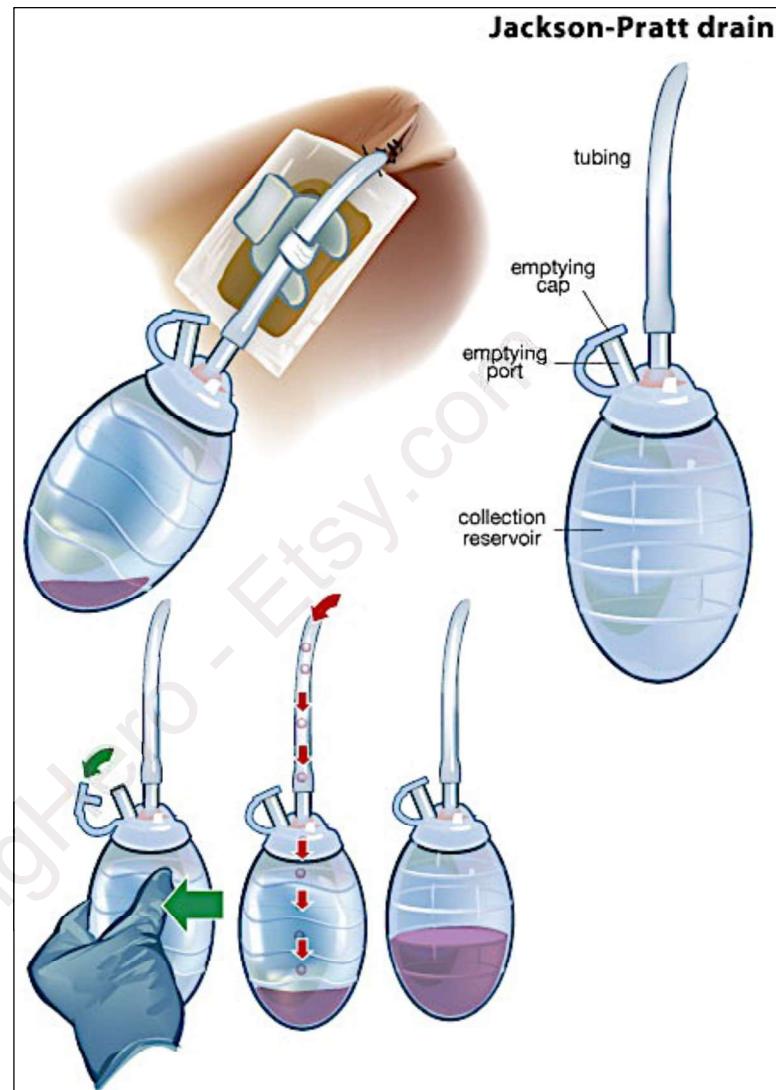
- Air tube = Apical = Top, on both sides

Posttrauma or postsurgical pt needs

- Pt presents with a unilateral hemopneumothorax. How to care for this pt? ... Place an apical and a basilar chest tube on the side of the problem ... Always assume trauma and surgery is unilateral unless otherwise specified

Trick question

Where would you place a chest tube for a postop right **pneumonectomy**?



- Postop right pneumonectomy does not need a chest tube ... Since the right lung was removed, there is no need for a chest tube
- Chest tube will however be used for lobectomy (removal of a lobe of the lung), or wedge resection

Closed chest drainage devices

- Types: Jackson-Pratt, Emissor, pneumovac, hemovac, etc.
- What happens if one of those drainage devices is *knocked over*?
 - Ask pt to take a deep breath and set the device back up
 - Not a medical emergency ... No need to call the physician

Knock someone or something over: to push or strike someone or something, causing the person or the thing to fall

If the water seal of the chest tube breaks

- **Clamp**
 - Clamping, unclamping, and placing the tube under water must be done in 15 seconds or less
- **Cut** the tube away
- **Submerge** (stick) the end of the tube under sterile water
 - **The most important step**
- **Unclamp** the tube if it was initially clamped, (clamping the tube prevent air to get into the chest but does not allow anything from the chest to get out)

Note

If for whatever reason the chest tube breaks, clamp, unclamping to placing the tube under water must be done in 15 seconds or less

Question

The water seal chamber of the chest tube in a pt with a pneumothorax/hemothorax breaks. What is the **first** course of action for the nurse?

- a. Clamp the tube
- b. Cut the tube away
- c. Submerge (or stick) the end of the tube under sterile water
- d. Unclamp the tube if it was initially clamped

In this case, the first course of action is the clamp the tube

Question

The water seal chamber of the chest tube in a pt with a pneumothorax/hemothorax breaks. What is the **priority** (best) action of the nurse?

- a. Clamp the tube
- b. Cut the tube away
- c. Submerge (or stick) the end of the tube under sterile water
- d. Unclamp the tube if it was initially clamped

In this question, the priority action for the nurse is to submerge the end of the tube under sterile water because doing so prevents air from getting into the chest. At the same time, this allows air or blood from the chest to get out

- This solves the problem by reestablishing the water seal

Note

Clamping, unclamping, and placing the tube under water must be done in 15 seconds or less

Question

You notice on the monitor that a pt has v-fib. Pt is unresponsive and there is no pulse. What is the **first** step in the management of this pt?

- a. Place a backboard under pt's back while pt is supine
- b. Start chest compression

The first step is to place the backboard under pt's back. "First" is about order.

Question

You notice on the monitor that a pt has v-fib. Pt is unresponsive and there is no pulse. What is the **best** step in the management of this pt?

- a. Place a backboard under pt's back while pt is supine
- b. Start chest compression

"Best" is about what is the priority. Chest compression is the priority action.

If a chest tube gets pulled out ...

1. Take a **gloved hand** and cover the opening (**first step**)
2. Take a **sterile Vaseline gauze** and tape 3 sides (**best step**)

Chest tube is bubbling ... Ask (1) **where** it is bubbling, and (2) **when** it is bubbling?

Ask the following 2 questions

- Bubbling ... Where? In the **water seal chamber**
 - If it is **intermittent**, it is **good** (document it)
 - If it is **continuous**, it is **bad** and indicates a break/leak in the system (find it and tape it)
- Bubbling ... Where? In the **suction control chamber**
 - If it is **intermittent**, suction pressure is **too low** (increase it at the wall until it is continuous)
 - If it is **continuous**, it is **good** (document it)

Analogies

- A **straight catheter** is to a **Foley catheter**, as a **thoracentesis** is to a **chest tube**
 - A **straight catheter** goes **in and out** ... A Foley goes in, secure it, and continuous drainage
 - **Thoracocentesis = go in and out** ... Chest tubes = go in, secure it, and leave it in place
- A Foley has a higher risk of infection than a straight cath
- A chest tube has a higher risk of infection than thoracocentesis

Rules for clamping tubes

- Do not clamp a tube for more than 15 seconds without a physician's order
- Use rubber tooth (will not puncture tubing), double clamps
- Therefore, when the water seal breaks, the nurse has no more than 15 seconds to clamp, cut the tube, submerge it under sterile water, and then unclamp it

Congenital Heart Defects

- It's either they cause a lot of trouble or no trouble
 - But nothing in between
- **Memorize one word: "TRouBLE"** with the lower case vowels because congenital heart defects are either:
 - "TRouBLE"
 - or
 - Nothing to worry about

A pediatric pt with "TRouBLE" as congenital heart defect

- Needs surgery now/soon to live
- Has slowed/delayed growth and development (failure to thrive)
- Has a shortened life expectancy
- Parents will experience a lot of grief, financial and emotional stress
- Pt is likely to be discharge home on a cardiac monitor
- After, birth, pt will be in the hospital for weeks
- Pediatrician or pediatric nurse will likely refer pt to a pediatric cardiologist

Question

The nurse is teaching the parent of an infant born with Tetralogy of Fallot. Which of the following should the nurse talk to the parents about in the teaching session?

- The nurse should teach the newborn's parents all of the choices listed above

A "TRouBLE" congenital heart defect

- "TRouBLE" shunts blood Right to Left
- "TRouBLE" is Blue (cyanotic)
- All "TRouBLE" start with the letter "T"
 - Tetralogy of Fallot
 - Truncus arteriosus
 - Transposition of the great vessels
 - Tricuspid atresia
 - Totally anomalous pulmonary venous drainage (TAPV)
 - **Except, Left ventricular hypoplastic syndrome**

These are examples if No TRouBLE congenital heart defects

- Ventricular septal defect (VSD)
- Patent ductus arteriosus (PDA)
- Patent foramen ovale

- Atrial septal defect
- Pulmonic stenosis

All children with a congenital heart defect, whether TRouBle defect or No TRouBle defect, have

- A Murmur
- An echocardiogram need to be done to find out the cause of the murmur

4 defects of Tetralogy of Fallot — “PROVe”

- Pulmonary artery stenosis
- RVH (right ventricular hypertrophy)
- Overriding aorta
- VSD (ventricular septal defect)
- No need to know what they are ... Just need to spot them as answer choices on the board

Infectious Disease and Transmission-Based Precautions

There are 4 transmission-based precautions

- Standard or universal
- Contact
- Droplet
- Airborne precaution

Contact precautions

- Anything **enteric** (GI, or fecal/oral)
 - *C. diff.*, Hepatitis A, *E. coli*, cholera, dysentery
- **Staph**
- **RSV (droplets)** fall onto object then pt touches object or put it in mouth)
Do not cohort 2 RSV pts unless culture and symptoms say that have the same disease
- **Herpes**

PPE (personal protective equipment) for **contact** precaution

- Private room is preferred
- Can be in the same room if **cohort based on culture and not symptoms**
- Hand washing → Gown → Gloves
- Disposable supply (gloves, paper plates, plastic utensils)
- Dedicated equipment (stethoscope, BP cuff) and toys stay in the room

Droplet precautions

- For bugs travelling on large particles through Coughing, Sneezing to less than 3 feet
- Meningitis
- *H. influenza b*
 - Example: epiglottitis (nothing in the throat)

PPE (Personal Protective Equipment)

- Private room is preferred
- Can be in the same room if cohort based on culture and symptoms
- Hand washing → Mask → Goggle or Face shield → Gloves
- Disposable supply
- Dedicated equipment

Airborne precautions “Air MTV”

- MMR
- TB
- Varicella (chickenpox)

PPE

- Private room is preferred
- Can be in the same room if cohort based on culture and symptoms
- Hand washing → Goggle or Face shield → Gloves
- Wear mask when living the room
- Keep door closed
- Disposable supply (not essential)
- Dedicated equipment (not essential)
- Negative airflow

PPE (Personal Protective Equipment)

- Order to **put in on** ... The “Gs” are in reverse alphabetical order and “Mask” comes 2nd
 - Gown
 - Mask
 - Goggle
 - Gloves
- Order to **take it off** ... Do so in alphabetical order
 - Gloves
 - Goggle
 - Gown
 - Mask

Math Problems

Dosage calculation

IV drip rates = Volume × Drop factor / Time

- Micro/Mini drip = 60 drops per mL
- Macro drip = 10 drops per mL

Pediatric dose (2.2 lbs = 1 kg)