Cardiac Nursing You Should Know!

Nursing KAMP's

Cracking the Code on Cardiac

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nursingkamp.com
Edition 3.0

Nursing Kamp's Cracking the Code on Cardiac Nursing!

I am a critical nurse educator. I teach what I believe are the secrets of critical thinking to make things easier for others. I base my theory of teaching mainly on the attempt to increase a nurse's value: a nurse's value comes from good practice and paying attention to the connection between the doctor, the patient, and the pathophysiology behind it. Being proactive in the nursing process and having methods of looking at the patient critically and catching things by asking critical thinking questions will increase your value as a nurse, and will in turn increase your nursing practice, making you a valuable asset to the medical team.

My method of teaching is Nurse to Nurse – with simple, clear understanding, you have the foundation of anatomy and physiology, so I get right to the point without extra data. You should get to this understanding and shape your practice and ultimately teach others - That is the art of nursing.

In my methods, I focus on what is acute and chronic. I categorize content and NCLEX questions. Using these two terms you can get to the core of the process.

Acute Means – The nurse should do something now, pay attention to trends, or call the doctor about it.

Chronic Means – The nurse still should assess, monitor, or identify what underlying chronic conditions are causing them, and explore the causative factors.

SEN- There is a Study Sheet relative to this content

A-Airway Concern B- Breathing Concern C- Circulation Concern

I teach around mnemonics, but do not use them to just memorize them. They are jars of trigger words, like the roof of the house. I teach what is in the rooms; the furniture, what is on the walls. I don't teach to memorize but to understand what you need to know.

I encourage you to work through this Book and use it as an adjunct to your learning and not as a replacement. You should always strive to be THAT nurse, not *that* Nurse. Nurseon!

Nursing KAMP- Kevin Pommenville RN MSN

Any corrections, errors or modifications please contact me at nursingkamp.com

PUBLISHING INFORMATION

Nursing KAMP's CARDIOVASCULAR BURN LIST

Cracking the Code FOR NCLEX AND SCHOOL

CARDIAC

Starting off, if you are in school and looking at exam questions, unless a patient is Diagnosed with a pathological condition (stating Admitted with Myocardial Infarction), assume the heart is functioning normally and reacting to normal changes in the body. Always look for the underlying cause and always ASSESS First. Vitals are First unless the situation is emergent, or the patient is in distress. The NCLEX will not ask you to give meds first. If you could do anything in the room right now, what will you do Nurse?

These are some terms used throughout this unit

TERM: "The Nurse Suspects, Observes" = Code for the nurse assesses, then does an Intervention

ACUTE = Do something now: Intervention or Assess, and/or notify MD. Always think "if I could do something in the room right now that will give me more data, what would I do?"

CHRONIC= Higher Maslow- education, not acute process, expected?

Hemodynamics- if questions mention hemodynamics, it is related to fluid. Whether dry or "wet" they should never be ignored; they are in the question for a reason

NCLEX Tip 1 : Time and the NCLEX - Time is always important, so pay attention to time in questions

- < 24 is looking for problems and complications, e.g. Bleeding, Blood pressure, perfusion requiring intervention
- > 24-72 is inflammation, process generally normal
- > 72 is infection- Infection is generally a distractor NCLEX focuses on

NCLEX Tip 2: Nursing Process is Assessment before Implementation. Always see if there is assessment in the question (or something you should do in the room) before calling the Doctor – while in the question think would you call the doctor up at 2 AM to wake them up for this concern, or is there something else you can do first.

NCLEX Tip 3: Bleeding is part of the 'circulation' assessment of the ABCDs in an emergent situation. Therefore, if airway and breathing are accounted for, a compound fracture requires assessment before Glasgow coma scale and a neuro check (D=disability, or neuro check)

NCLEX Tip 4: Eliminate band aids - NCLEX wants to see if you do something HERE & NOW, not in the future. Think "is this response dealing with the here and now, or a problem in the future (incentive spirometer for pneumonia versus high fowlers for shortness of breath)?"

NCLEX Tip 5: Recognize a Priority question by the words "Best, Most, First, Action, Next, Priority, Intervention, Immediate"

Some Terms in this book:

Higher Maslow means the focus will be on teaching or supporting

Lower Maslow Physiological Priority needs focus will be on protecting the patient

(A) Airway (B)Breathing (C) Circulation

The Boat means assessment data indicates that an acute condition is coming, so act now

CARDIAC WARM UP

This is the Preamble Cardiac, or a "Burn List" a quick overview on the finer points before we start on content

Blood pressure: normally it's 120/80 (higher in the elderly and lower in children) BP in questions are important

Anything over 140 systolic is hypertension, and anything under 90 systolic is considered low blood pressure.

We hold meds, Systolic <90-100 and MAP < 60 or HR < 60

Pulse is normally strong and regular. Weak and thread, pulse indicates shock. Irregular pulse is generally atrial fibrillation and absent pulse is always acute and the abnormal result of a procedure

Skin: normal skin should be pink, warm, and dry so these are good or expected findings. Though, shock or hypo perfusion is indicated by pale, cool and clammy skin and myocardial infarction.

Chest discomfort or pain that radiates to the shoulders, back, and jaw is acute, indicating MI, and woman and diabetics often have no symptoms

Unresponsive, not breathing, and no pulse: cardiac arrest – begin CPR. Unresponsive: check for a pulse

Sluggish pupils indicate hypoxia and poor perfusion, or medications. Unreactive is a glass eye or ACUTE

Jugular vein distension(JVD) indicates right sided congestive heart failure or cardiac tamponade.

Crackles when auscultating for breath sounds indicate fluid build-up in the lungs, which may have resulted from left ventricular heart failure

Edema Peripheral and presacral edema suggests heart failure, specifically right sided

Muffled or distant heart sounds = Cardiac tamponade

Rubbing sound = Pericarditis

S3. S4 = CHF or valve problems or fluid overload

Dyspnea and sudden onset of sweating are early warnings of Congestive heart failure, but might also indicate impending cardiac arrest

Anxiety, feeling of impending doom usually indicate myocardial infarction or Pulmonary Embolism

Nausea and/or vomiting are always acute. Never band aid with medications. May be potassium issues, digoxin toxicity, perfusion, vagal or myocardial infarction

Nitro can be self-administered. Assist patient with administering a dose (0.3-0.4 mg) of prescribed nitroglycerin sublingually. Reassess blood pressure after 2 minutes, and administer another dose after 5 minutes if needed, for a maximum of 3 doses. If after the 3rd dose the patient is still in pain consider Myocardial Infarction

- Do not administer if blood pressure is below 90 or drops more than 30 over the baseline.
- Do not administer to extreme bradycardia (<50) or tachycardia (>100).
- Do not administer to those on drugs for erectile dysfunction within 24 hours.
- Do not administer if you suspect head injury.
- Nitro Sublingual is under the tongue and never crushed or chewed. It is kept in a brown bottle away from light and replaced after 6 months
- Nitro Transdermal – is rotated sites, not on hairy areas, on 12 hours and off 12 hours to prevent tolerance

Medical conditions and mechanisms- Time is Muscle- Intervention needed with chest pain

Angina pectoris: pain in the chest, caused by inadequate oxygen to the heart.

- Chest pain, especially during exertion, that radiates to neck, jaw, arms, back, and shoulders.
- General discomfort, anxiety, and nausea / vomiting.
- Relief of pain if physical activity is stopped.
- ECG telemetry may show signs of ischemia or ST Depression
- Chest pain is always acute. Think myocardial infarction immediate intervention

Acute myocardial infarction: a portion of the heart muscle dies due to lack of oxygen.

- Chest pain and discomfort, similar to angina, that radiates to the neck, jaw, arms, back, and shoulders.
- Lasts longer than angina and the pain and discomfort is not able to be relieved.
- ECG telemetry may show signs of ST Elevation (STEMI)

Heart failure: inadequate pumping of the heart.

- Left ventricle failure: results in pulmonary edema, because blood is backing into the lungs. Shows up as crackles, or pink frothy sputum
- Right ventricle failure: peripheral edema, jugular vein distention, and liver enlargement, because blood is backing into the venous circulation.
- Congestive heart failure: heart failure that causes edema
- Ejection Fraction less than 60% will most likely exhibit signs and symptoms of heart failure

AED: Automated external defibrillators. Used to shock the heart back to normal.

- Only shock when rhythm analysis indicate that shock is advised. Ventricular tachycardia and ventricular fibrillation
- Do not shock asystole
- For patients with artificial pacemakers, do not place electrodes over where the pacemaker is implanted.
- VTach, Vfib is shockable
- Symptomatic Bradycardia can be paced

Electrocardiogram (ECG): graphical plot of the heart's electrical activity.

- Always monitor in lead 2 and v1

- P: corresponds to atrial contraction depolarization
- QRS: corresponds to ventricular contraction.
- T: corresponds to relaxation repolarization
- ST elevation equals Myocardial infarction
- ST depression equals cardiac ischemia
- Peaked T waves is High Potassium
- U wave previous MI
- QT Intervals – Are acute think Calcium or Potassium electrolytes

Ventricular fibrillation (V-Fib): chaotic rhythm, heart not pumping any blood. This occurs during a heart attack. V-Fib is the only rhythm where shock is advised for the AED.

Ventricular tachycardia (V-Tach): Rapid ECG rhythm. Very fast, but inefficient; can become V-Fib.

Asystole: no ECG activity of the heart at all. Dead patient; don't shock dead patients

- **Pulseless electrical activity:** The heart has an organized ECG electrical rhythm, but either the muscles are not pumping or there's no blood left to pump.
- **Arteriosclerosis:** Arteries become stiff and less elastic.
- **Atherosclerosis:** Fatty substances deposited on the inside of arteries.
- **Coronary artery disease (CAD):** Atherosclerosis of the coronary arteries.
- **Acute coronary syndrome (ACS):** Obstruction of coronary arteries with a sudden onset of symptoms. Includes unstable angina and myocardial infarction.
- **Fibrinolytic:** Drugs that dissolve early clots.

Cardiac ABCCDE order of cardiac meds of priority

- **A-** Acute medications
- **B-** Beta Blockers
- **C-** Calcium Channel Blocker
- **C-**Calcium Glycerides
- **D-** Diuretics – Ace Inhibitors ARB's
- **E-** Everything Else- Statins, Potassium, Magnesium Electrolytes

Cardiac Unit

Welcome to the Cardiac unit. This is a priority area with a large content area of comprehension and medications to understand with an abundance of assessment data.

Rule Number 1: Level of Consciousness, Restless, is ALWAYS acute, and the Patient should be assessed further because they are not perfusing. Perfusion is everything; the Heart is responsible for sending oxygenated blood efficiently through the body, and the nurse is assessing this action and questioning why the patient isn't perfusing. (Myocardial Infarction, CHF, Tamponade, Bleeding, Trauma)

In cardiac, there are generally 4 different Problems in the Heart. Identifying what core area being described is related to when answering questions will guide you closer to the problem

The Pump- The actual muscle structure of heart that can't pump. This can either be from Bad Valves, MI, or Modeling (cardiomyopathy, hypertrophy). This can be cardiogenic shock or long term problems

The Electricity- There is a problem in the electricity, SA, AV, Perkunje Fibers

Volume- Problem is outside the Heart (think bleeding). This is not a true cardiac problem but results in one, providing poor perfusion (starlings law= the greater the fill the greater the pump)

Perfusion- The vasculature before/after or the coronary vessels on the outside of the heart is impaired (CAD,PE,PVD)

VITAL SIGNS

Heart Rate(HR) : Though Normal is 60-100 Beats per minute, in questions it is related to the nurse's understanding of the underlying causes Tachycardia is >90. Since tachycardia is the Boat coming (acute situation) it is important to understand that the heart is functioning normally but is responding to a problem outside the heart.

RULE NUMBER 2: Never ignore heart rates in questions, since it is there for a reason. This DATA directs the nurse to assess or implement or acknowledge it as a normal process.

General Causes of Increased heart rate are below- If you see an elevated HR in a question or in practice THINK WHAT IS THE UNDERLYING CAUSE? OR ASSESS the patient to get more Data (Diaphoretic, Pallor)

In questions when the heart rate is presented with several other vitals, think, is there enough DATA to make a decision about what is going on with the patient? Is the patient in distress?

If they are in distress… the nurse should **IMPLEMENT**, or do an action, ie. High FOWLERS

In questions about whether the HR is High or Low - each has a reason as it is presented and should be evaluated.

These are some causes of tachycardia. Remember in tachycardia that the heart is functioning normally though it is reacting to something going wrong in the body.

"MOST PT WISH" – Other Underlying Causes of Tachycardia (LM) **(SEN)**

- Medication- Albuterol (Expected)
- Oxygen Deprivation – High fowlers (B) before vitals if you think your patient is SOB (A)

- Sepsis- Causes increased vasodilation (C) decreasing volume so pulse increases(Expected)
- Thyroid-HIGH Hyper- is the history in the question or a thyroid medication(Expected)
- Pain -Sympathetic Nervous System-Post-op(Expected)
- Trauma-Hypovolemia(c)-history in the question(Expected)
- Withdrawal-history
- Infection- Vasodilation Stress (c)
- Stress- Look at higher Maslow interventions
- Hemorrhage(c)

Bradycardia –Less than 60 is called "Blacks 3d Glass" (SEN) since these are causes of low heart rate

Bradycardia is different than Tachycardia since the body generally doesn't want the heart rate to slow down. This is because a low heart rate would cause poor perfusion. That's an important concept when looking at a low heart rate, since there are only a handful of actual problems causing it.

Healthy Heart- Athletes may have a natural lower heart rate so a low heart with an athlete is generally a normal finding. (ask is the Data in the question)

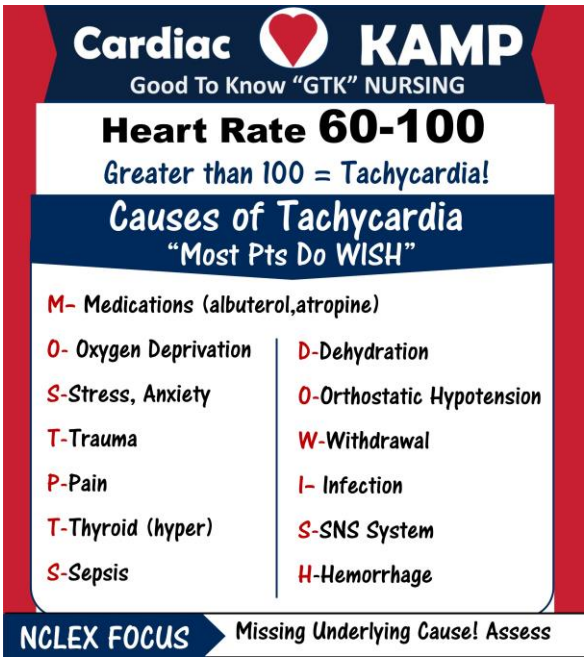
Broken electricity- Blocks, 2, 3 and 3rd degree is always acute and if symptomatic they need to be paced

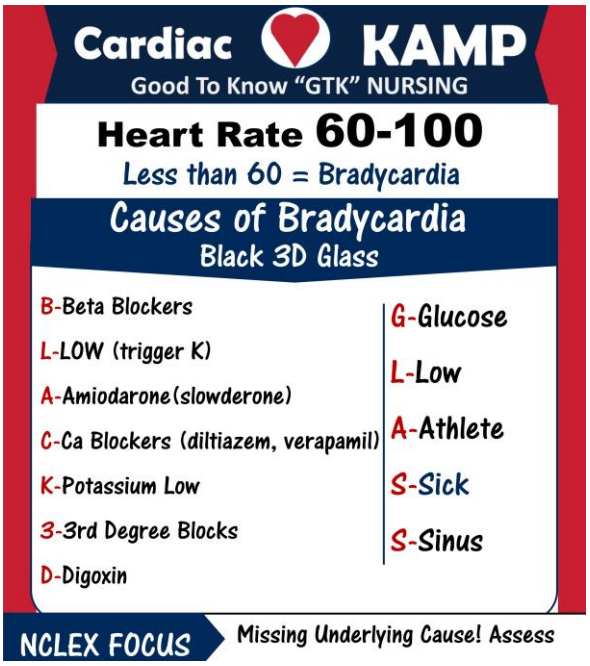
Medications- Beta Blockers, Ca Blockers and Digoxin can all cause a low heart rate.

Bradycardia in questions center around whether patients are symptomatic or not, so always look at patient and underlying cause and whether they are symptomatic.

Generally, high heart rate is telling you to look somewhere else as there is an underlying situation going on requiring further assessment or distress requiring immediate action of intervention.

Low heart rate is usually or most likely related to medications or a problem with electricity. The NCLEX focuses on a nurse's understanding of medications and their adverse effects. So, if the patient is symptomatic and there is a medication in the question, it is about the medication.



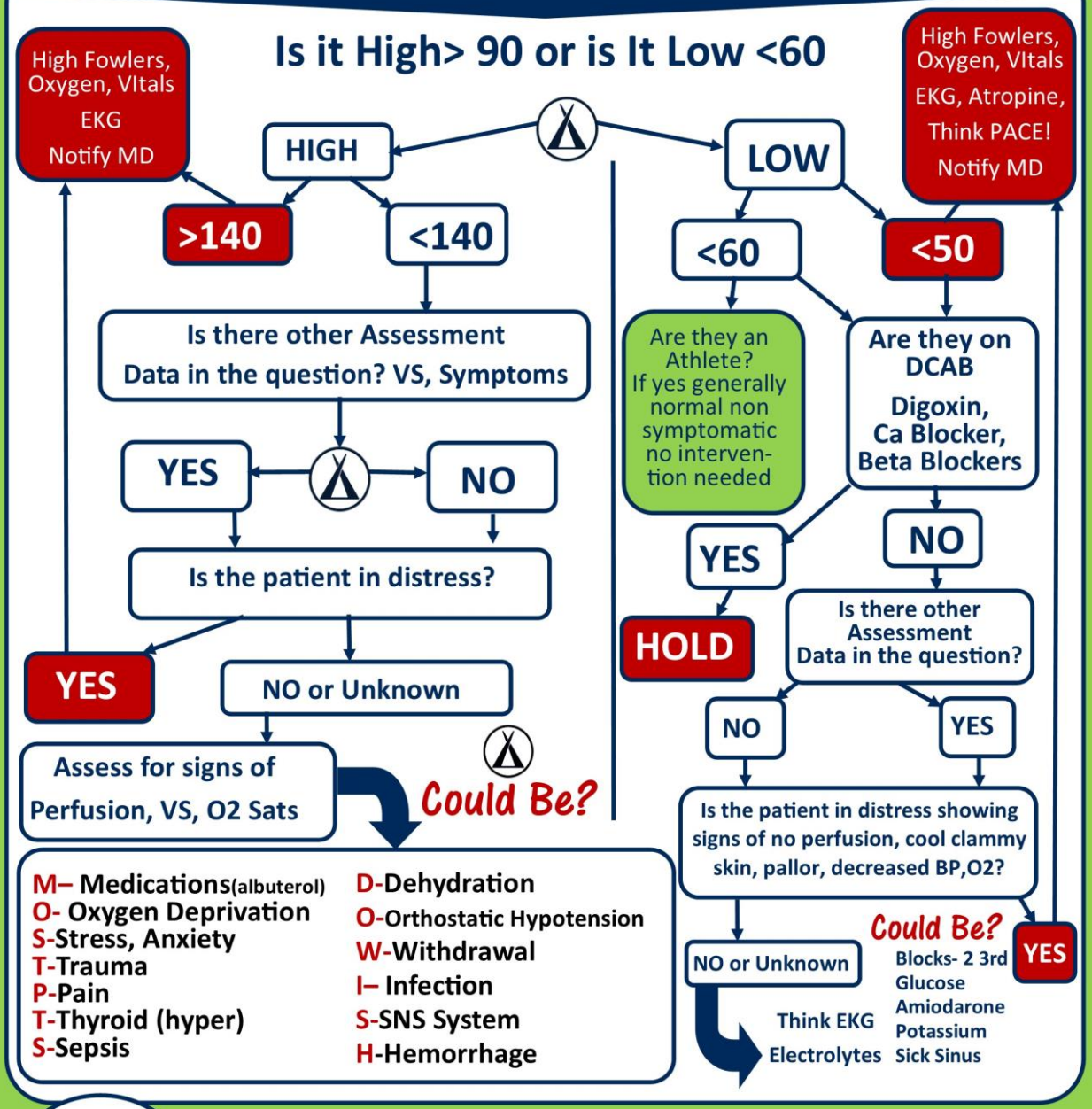


Cracking the Code

On the NCLEX and Nursing School

VITALS

When Heart Rate is in Question



All questions are unique this is merely a guide for studying

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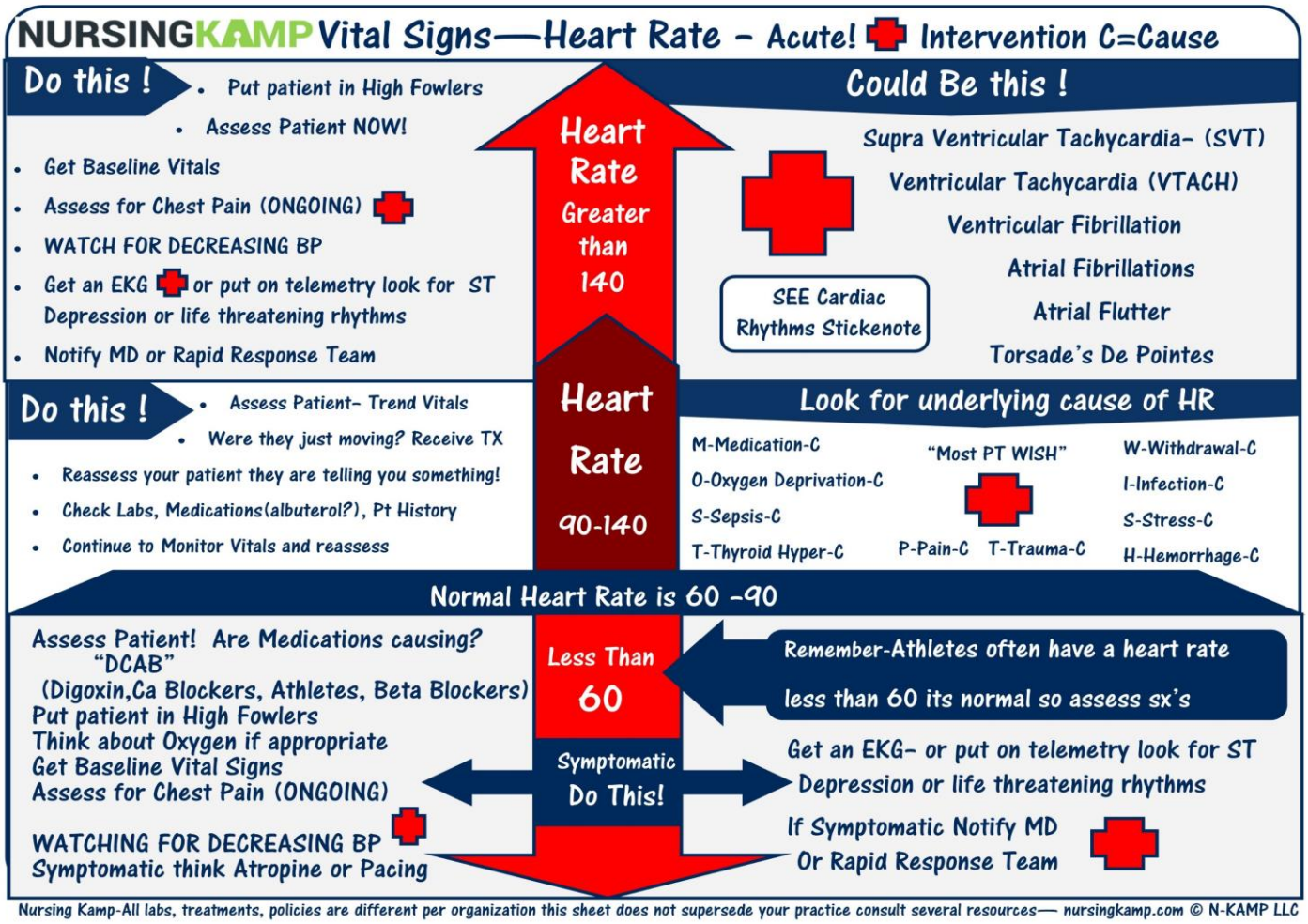


HEMODYNAMIC- Cardiac Output (C) is generally not in questions though a concept that should be understood. Cardiac output is an important part; as the body requires more oxygenation the heart meets this demand. This leads the assessment findings in the form of data to understand what is going on with the patient.

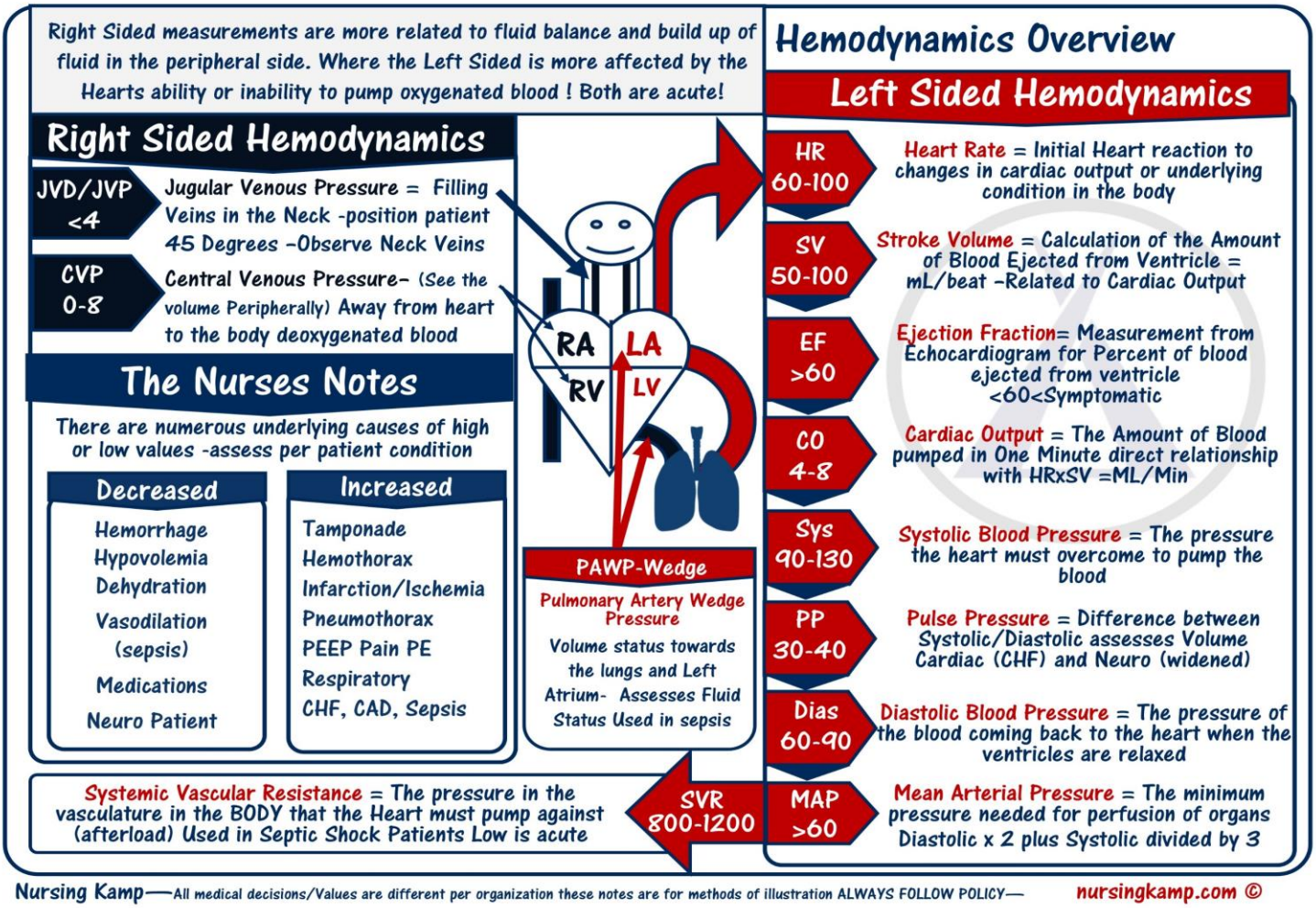
To Remember CO 4-8–write Co then add an "o" to get C8 Co → think o=4 then C8 = 8

Cardiac output is necessary for normal perfusion and it is through hemodynamics that we measure the perfusion of the organs and the body. If cardiac output is impaired the cells will become starved for oxygen leading to anaerobic metabolism. (The result is Lactic Acid or sepsis) This decreased output causes a lack of perfusion that may result in decreased urinary output and possible Pre-Renal Kidney Failure. (Pre Renal failure can be identified by looking at the BUN first if it is high look at the creatinine if it is normal this may be a prerenal concern called 20/1)

Cardiac Output is a formula CO=SV X HR

Normal Range = 4-8 Liters per Minute - this is the amount of blood pumped from the left ventricle in one minute. This is also related to the **Ejection Fraction** (EF)(C) which should be Greater than > 60%

Ejection fraction(EF) represents the volume of blood being ejected in one beat. This is determined by an **Echocardiogram or Echo.** This is a non-invasive ultrasound that looks at the hearts structure, valves and more importantly gives us the EF.



Ejection Fraction that is Less than <60 % will generally be symptomatic showing either Right or Left Sided Heart Failure symptoms.

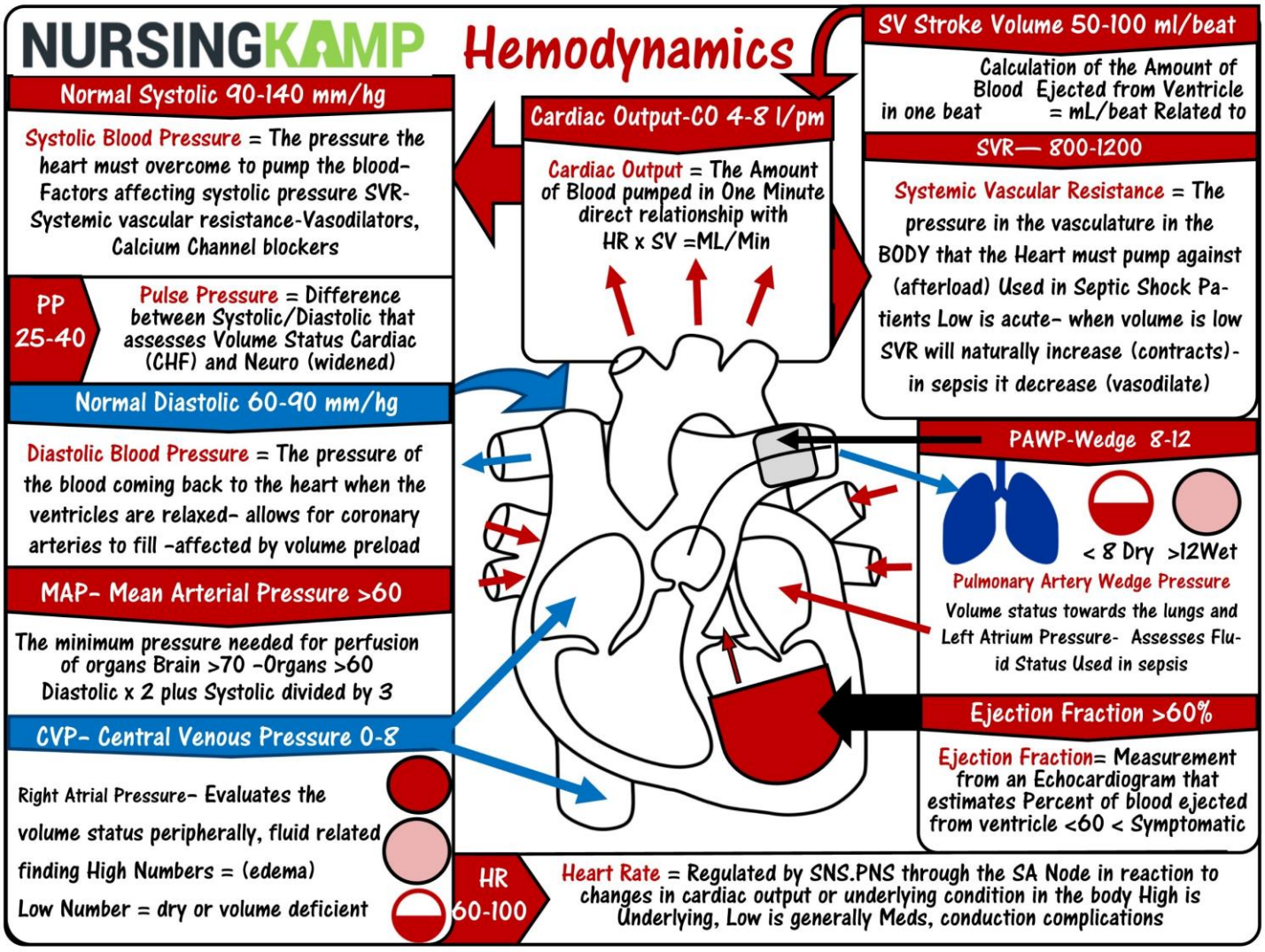
When a patient has a myocardial infarction, this can damage the heart wall resulting in a lesser ejection fraction. If this damage is significant it will result in a diagnosis of Heart Failure, requiring the nurse to monitor for signs and symptoms for a patient post MI. Generally, post-mi we are monitoring for cardiogenic shock and low cardiac output as an acute result of damage of the cardiac tissue. CHF is identified by an elevated BNP (brain natriuretic peptide)

These are causes of decreased cardiac output:

When a patient has these condition we are "looking for the boat" (decreasing cardiac output) and must act generally with a nursing intervention

- **Myocardial Infarction-** Actual damage to the heart making it unable to pump **(assess for CHF sx's post MI if these are happening MD might be notified since the patient is getting worse)**
- **Hypertension-** Over time this results in the heart to become Hypertrophic (BIG TROPHY HEARTS) since they are unable to fill and the result is that contract output becomes decreased. **(This presents new heart sound, s3, s4, murmur, CHF Symptoms; these require intervention with new onset)**
- **Valvular Heart Disease-** This is a chronic, over time condition that prevents the valves to build up the required pressure needed by Starlings Law (greater the fill the greater the pump). Since the blood swishes (bruit,

Murmur) it doesn't allow for a complete cardiac output to meet the needs of the organs and the body. This fluid build up leads to a valve sound **(Presents new heart sound, s3, s4, murmur, CHF Symptoms, SOB)**



- **Cardiomyopathy-** the heart no longer contracts and loses its elasticity (Big Floppy Hearts) resulting in the heart's inability to pump effectively. **(This Presents as a new heart sound, s3, s4, murmur, CHF Symptoms, SOB)**
- **Hypertrophy (big trophy heart)-** The heart's muscle is too big which doesn't allow enough blood to enter, making the cardiac output ineffective. **(Presents new heart sound, s3, s4, murmur, CHF Symptoms, SOB)**
- **Atrial Fibrillations-** Like the valves in valvular disease, the atria is fibrillating, resulting in the inability to build up pressure and contract effectively to provide cardiac output. **(Presents, Syncope, irregular pulse, palpitations)**
- **Dysrhythmias**- End result- Vtach , VFIB **(Presents, Syncope, PULSELESS, palpitations)**
- **Medications** DCAB-Digoxin, Ca Blockers, Beta Blockers **(Presents, Syncope, HR <60, MAP<60 <B/P)**
- **Fluid Overload-** Overloaded pump. **(Presents new heart sound, s3, s4, murmur, CHF Symptoms)**
- **Hypovolemia-** Not enough to fill the pump. **(Presents Thready Pulse, Tachycardia, HR Increased BP Low)**

RULE NUMBER 3: Never ignore new onset murmurs since it is there for a reason: to direct the nurse to assess using the BELL of the stethoscope turning to the left side while then isolating a s3 or s4 (too much fluid) heart sounds. Based on this finding, implement process.

All of these conditions if not treated can result in DECREASED OUTPUT this will cause a variation in B/P which may be temporarily increased because of compensatory vasoconstriction and increased heart rate.

It is important to note that this may work in the beginning but will eventually be decreased when compensatory mechanisms and pump fails.

These are Signs and Symptoms of **Decreased Cardiac Output** leading the nurse to further assess underlying

- **Tachycardia-** compensatory mechanism - first Look at the underlying- Most PT Wish or hemorrhage(c)
- **Presence of gallop rhythm**- this is the Fluid Building UP. Think since there is a problem in the pump Heart Failure S3,S4- sound is because the valves aren't closing at the same time
- **Fatigue and weakness**- This presents as early symptoms(assess), since the heart can't provide the pump to meet the demands of the body. Shortness of breath by walking upstairs should be evaluated and generally this is the first indicator there is a structural change of the heart sometimes related to valves, cardiomyopathy, hypertrophy or they are obese (chronic).
- **Dyspnea(a)(b), tachypnea-**These are Acute Interventions indicating there is either a problem with buildup of fluid as in CHF? This may be Left Sided heart failure, requiring (intervention), or may involve a DVT that migrated into the lungs that is differentiated based on symptoms and presentation.
- **Crackles** (rales)(A)(B)-this is Acute Left Sided CHF "Fine" (expected) bilateral crackles are fine in comparison with more emergent conditions of just crackles.
- **Restlessness (assess)** or a Change in mental status (assess) is always acute in the NCLEX and test world. Do not give them Alzheimer's, or being old. Restless should be seen first or evaluated
- **Dizziness-(c)** Look for underlying acute causes- chronic first dose blood pressure medication like Arbs(expected), or dehydration requiring orthostatic vital signs
- **Syncope-(c)** Look for underlying acute causes – chronic may be first dose arbs, blood pressure meds –
- **Diminished or absent peripheral pulses**-(c) Are they Post procedure Cath which would be Acute? This could be Compartment Syndrome, requiring implementation or Cardiac Tamponade
- **Cool extremities-(c)** Is there an Acute post procedure? Are there Pulses? Are they in Shock?
- **Pallor(c) or cyanosis(c)** of skin is always Acute and a sign of decreased perfusion
- **Capillary refill time (c)** greater than 3 seconds is always acute and result of decreased perfusion
- **Oliguria** – is the result of decreased blood pressure, volume or MAP not always considered Circulation evaluated may be a distractor or not and is it the result of a fluid problem NOW or in the future
- **Edema-** Right sided heart failure in questions is generally for evaluation of right sided heart failure, unless it is not bilateral that is acute or anasarca (generalized edema)
- **Jugular vein distention (JVD)** Generally Right Sided Heart Failure or cardiac tamponade - if presented in questions, is this the expected finding?

- **JVD –(**JV4 directions=<4 ideal) -This is a VISUAL nursing Assessment for fluid overload. Assess first- this is same as CVP in that it looks at the fluid away from heart (this is a nursing assessment when no CVP is available to evaluate heart failure or fluid status). CVP is an acute hemodynamic parameter for right sided fluid status (peripheral)
    - JVD>4 too much fluid (c)
    - JVD<4 not fluid overloaded(c)
- **CVP (uses the internal jugular vein pulsation method to estimate CVP if monitoring device not present)** These values will be low if hypovolemia is the cause of low cardiac output.
    - CVP- "See the volume peripherally"- done from a catheter indicating right atrial fluid (right sided)
    - CVP<4 – dry, too little fluid- requiring intervention**(c)**
    - CVP>8 - Too much Fluid, requiring intervention, usually anticipated diuretics**(c)**

RULE NUMBER 4: JVD/JVP is used when CVP is not available. If you have CVP measurements this is an acute question and a question about evaluation of fluid status. JVD is also evaluation of fluid status but is a visual assessment by the nurse, not by a machine like the CVP-

- **PCWP/PAWP Wedge** Pressure - Left Atrial Pressure used in SWANN catheters, think Sepsis, Shock**(c)**
  PAWP>12 too much fluid generally in questions regarding whether to use vasopressors(squeeze) since once the fluid status is sufficient the next intervention is for the vasopressors**(c)**
  PAWP<8 too little fluid – generally indicating that vasopressors shouldn't be administered and a fluid bolus intervention is indicated**(c)**

Chest x-ray in questions are usually only in relation to placement since the only true way to check placement of an Endotracheal Tube and Nasogastric Tube is an x-ray. However, in practice in regards to the cardiac system it will identify

- pulmonary edema(c)
- pleural effusion(c)
- Cardiomegaly

Blood Pressure Regulated by SNS/PNS of the ANS

Blood pressure in questions is usually about hemodynamics and perfusion and two blood pressures in a question evaluates whether this is a normal/expected outcome or acute. These parameters generally involve whether you should give the correct IV fluids hypertonic/isotonic colloid etc.

Blood pressure LOW is acute: look for the underlying perfusion problem

High Blood pressure is either evaluative, early stages, lifestyle stages, or long term. High is risk for Stroke

Blood Pressure is Broken down into two Parts

- **Diastole**- D for DUMPING into the ventricles or the filling of the heart while they are relaxed
- **Systole** – S for Spraying out oxygen blood. It's the period when the ventricle is contracting and pumping the blood; it is basically the pressure the heart needs to push to get the blood out. For example if there

is peripheral vascular disease (small arteries veins outside the heart in the body) it requires more pressure to go through, hence Higher Systolic

High blood pressure is generally concerning stroke and LOW is all about perfusion(c), volume, and dehydration. The way to check whether the patient is really perfusing their organs is by the mean arterial pressure or MAP(c)

Three factors affect Blood Pressure

- **Blood Volume** or **PRELOAD** – Before the heart the volume that enters the heart.
- **Pump-** The ejection fraction which is the heart's ability to pump
- **Blood Vessel Tone**- Is the action of the constriction or dilation of the vessels or **AFTERLOAD**

The Tone of the vessels is naturally responsive to variations of problems with volume. For example, if a person is dehydrated the vessels will automatically constrict to help increase perfusion, and in turn raise blood pressure. This Squeeze is call the **Systemic Vascular Resistance or SVR.**

Mean Arterial Pressure(MAP)(c) is most important to understand since it is truly about perfusion and that needs to be greater than 60-65. To be perfusing their vital organs the requirement of the brain's mean arterial pressure is at least 70 MAP. If MAP is inadequate the patient will most likely start to get "restless" FIRST, showing signs of poor perfusion of the vital organs resulting in pallor, diaphoretic, decreased urine output.

We should always be calculating mean arterial pressure in every question that shows up since it is about perfusion of the body.

The calculation is Diastolic x 2 plus systolic divided by 3 = 120/80 normal blood pressure = MAP 93 (c)

(I like to think 2 dice in a game – so 2 x's diastolic + systolic divided by 3)

This is a perfusing B/P which could be shown in adequate urine output, alert, oriented, skin normal

If skin is clammy, diaphoretic, or pallor this is an acute situation requiring action

RULE NUMBER 5: Blood pressure numbers in questions should not be ignored and MAP should be calculated <65 the patient is not perfusing, as in Heart failure, Shock, Head Injuries, or when using IV Vasoactive medications affecting preload and afterload.

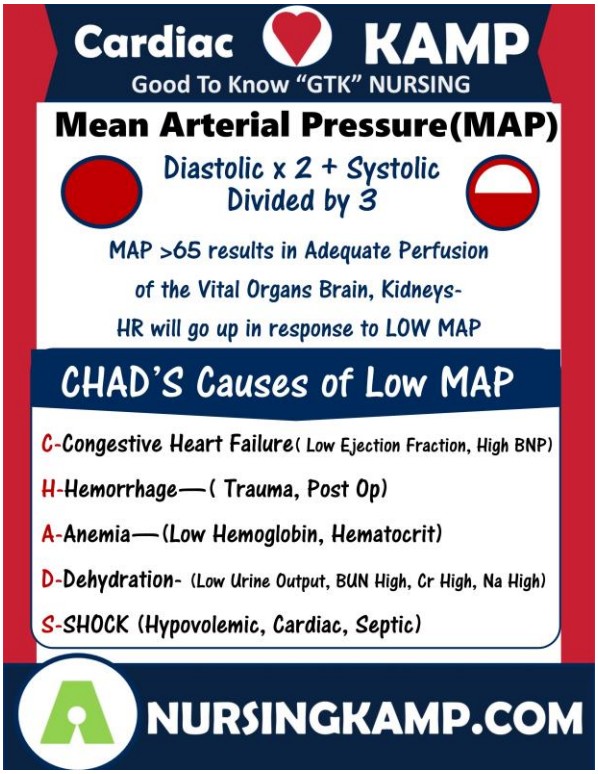
There are 4 types of blood pressure classifications.

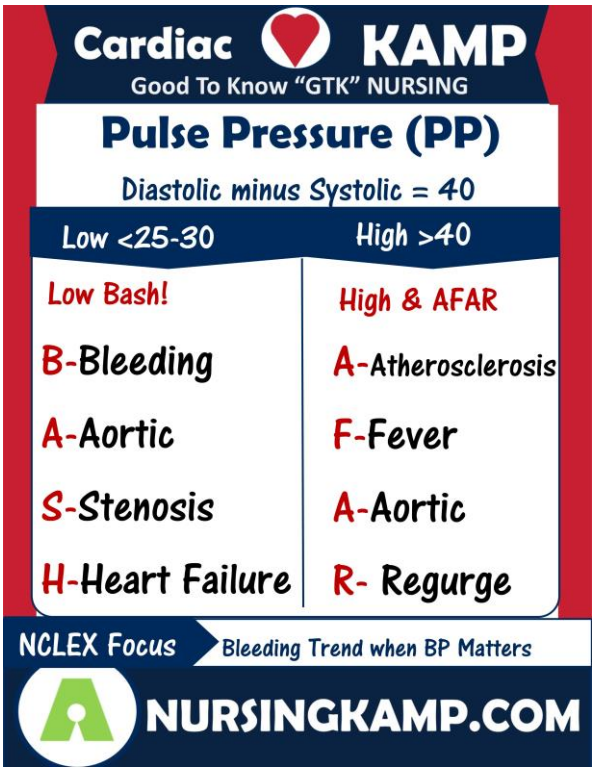
- **Essential:(**primary, idiopathic) caused by arteriosclerosis or CAD
- **Benign:** a gradual onset over a prolonged course of aging
- **Malignant:** Higher than 150 Systolic acute immediate intervention required
- **Secondary:** The result of another disease process, like renal, Cushing's, adrenal concerns

Plan:

Diet modifications first (low Salt, lifestyle exercise, cessation of smoking)

Then Medications





An indication of perfusion is urinary output. If the organs are being perfused there should be urine output.

Perfusion and urine output (c) is called

30/400 - this is = 30 cc an hour or >400 in 24 hours is an indicator of adequate urine output

If Urine output shows up in question it is either a distractor or a perfusion question.

The term "Monitoring urine output" in questions is not absolute, quantifiable or specific enough, and is usually a distractor in questions, since a lot of factors influence it. In order for urine output to qualify as a valid response you will need actual values.

If in questions you see Urine output is 150cc/ hour you should be calculating 24 hours which would mean 3600 out in 1 day, which is too much urine, and at risk for dehydration. This is an important factor when distinguishing correct IV fluid, Lasix administration, PAWP, CVP, vasopressors

A statement like "Monitor urine" = is too vague as NCLEX is specific to time and volume

Urine output 50cc last 2 hours (<24 hours= complication of perfusion): that is NCLEX Specific

RULE NUMBER 6: Monitor urine output in answers are generally distractors. In the question they are generally are indicative of perfusion problems or expected with an underlying condition like BPH. Urine 30cc is the normal per hour but should be calculated per 24 hours. >400 cc in 24 hours is adequate. Urine output can be an expected response with mannitol, Lasix, bumex since they work on the kidney and diuresis.

When MAP is low, always assess underlying causes for MAP and generally never give vasopressor meds unless fluid is adequate AEB: PAWP>8 CVP>4

ORTHOSTATIC VITAL SIGNS

Orthostatic (c) are 3 sets of blood pressure—Lying, Sitting, and Standing—and called 20/10/10 for the diagnostic changes that happen. If a patient is truly volume deficient orthostatic 20 systolic/ 10 diastolic they are generally ordered to assess the patient's fluid status before discharge (also pulse changes of 10)

Changes greater than 20/10 from lying to sitting or sitting to standing is acute and considered orthostatic. Hypotension: look for underlying causes

- Systolic <20 Diastolic <10 (Pulse>10)

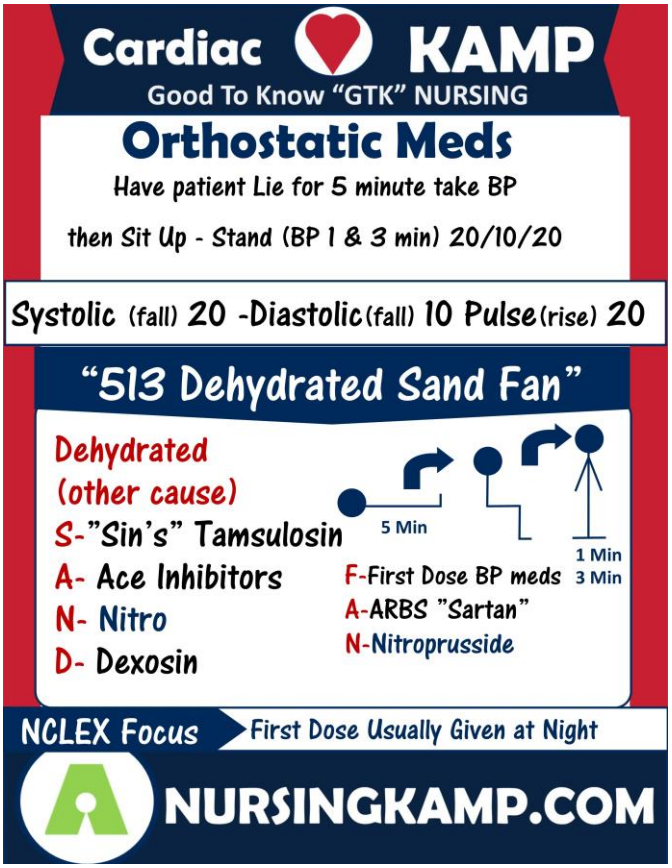
Orthostatic when it's Normal- all patients who take blood pressure meds should rise slowly from lying to sitting at the edge of the bed before getting up. Dizziness(c) feeling faint may be expected if moving too quickly

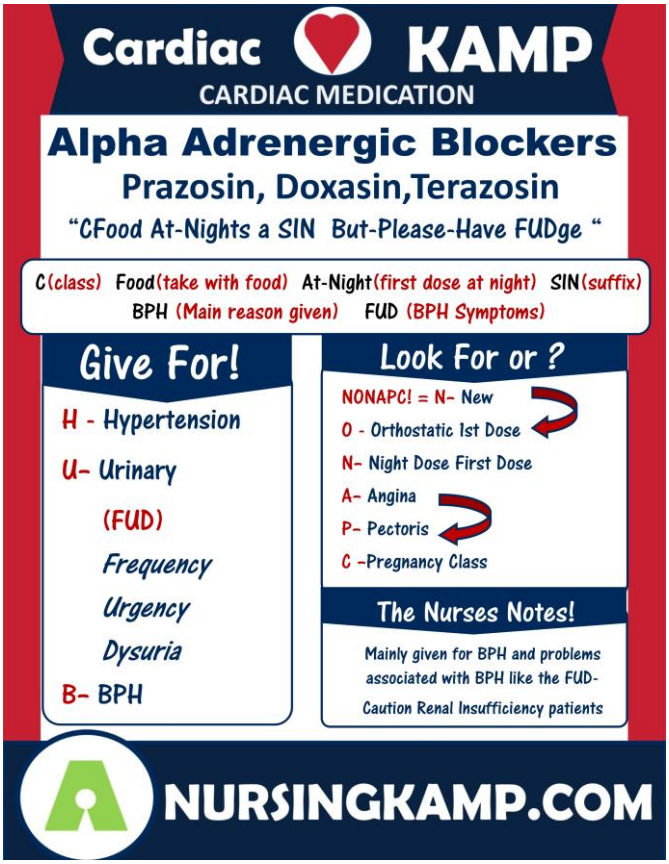
- Expected orthostatic symptoms are with Nitrates, Nitroprusside, First Dose Blood Pressure Meds, ARBS(sartans) and dexosin or SIN's. ACE inhibitors first dose administration should be given at night

ABNORMAL Orthostatic >20/10 Sys/Dias

- Dehydration(c) should be evaluated. If this is the underlying concern then is the correct fluid ordered for the patient (isotonic, hypotonic or hypertonic)?
- Med Contraindication to hold- vasopressors, beta, ca blockers (assess, Intervention)

RULE NUMBER 7: If there are two Blood Pressures in a question it is an orthostatic question about evaluating fluid status or a normal response to first dose blood pressure medications.





PULSE PRESSURE - PP= DP-SP

Stroke Volume: 50-70 amount of blood ejected at each heart beat= preload/afterload and contractility

Pulse Pressure: Is the difference between Systolic – Diastolic and should be = >40(assess)

- Low = <25 mnemonic -BASH - Bleeding, Aortic Stenosis Heart Failure(assess)
- High = >40 mnemonic -AFAR - Atherosclerosis Fever Aortic Regurgitation (assess)

Pulse pressure is another indication evaluating fluid status and perfusion problem it is the difference between Systolic and Diastolic and should be 40. For example, blood pressure 120/80 normal = Pulse pressure 40

RULE Number 8: >40 Widened Pulse Pressure + Bradycardia +Systolic HIGH is a Neuro Question Called "Cushing Triad" and most likely in NCLEX world

A newly-diagnosed hypertension patient should have BP assessed in both arms to assess baseline. If it is high they are Assessed for 3 months, encouraged to change diet, exercise, stop smoking, and lose weight. If no changes they start on Meds, but medications are never the front line unless it is malignant hypertension.

Blood pressure management deals with three areas:

Fluid (away from the heart) Vessels (volume capacity) Organs(suppression of system responses)

CARDIAC MEDICATIONS DEALING WITH BLOOD PRESSURE

All blood pressure pills should not be abruptly stopped. Change positions slowly due to hypotension. Have a low salt diet, and do not drive or operate machinery after first dose until medication is established.

ACE Inhibitors- DEAL with the FLUID Control of Blood Pressure or outside the Heart

Aces (April is ACE king High) or **Ace Inhibitors** are frontline medications if diet and other health modifications do not work. These medications work on the Renin Angiotensin System and we monitor for First Dose Hypotension and Captopril is an ACE inhibitor that I like to call "Craptopril" since it leaves a bad taste in your mouth. Give one hour before meal, 1st does cause orthostatic hypotension(expected) so give at night time first dose. Patients should have normal renal functioning.

To remember Ace Inhibitors, think "April is Aces King HIGH" = April (pril) Class ending Lisinopril, captopril, enapril. Things to Assess along with a sore throat:

A-Angioedema(assess) anticipate epinephrine 0.5 ml 1:1000 SC

C-Cough A cough that's annoying- they are generally switched to ARB's

E-Electrolyte Monitor potassium

K-Potassium(assess) high if these happen they can be switched to an Arbs (anticipate)

RULE NUMBER 9: If an ACE inhibitor is in a question, think ACE King HIGH. The question is evaluating whether you know signs and symptoms of Hyperkalemia, Nausea, Vomiting, Weakness, or ACUTE

Angioedema(AIRWAY PROBLEM) or general annoyance of a cough(that patient needs to be switched to an ARB. Captopril (craptopril) causes a bad taste, so take with food. No salt substitutes with these meds.

RULE NUMBER 10: If the Blood Pressure Systolic is less than <90 we hold meds.

ARB's Angiotensin 2 Blockers are another Class that deals with the hypertension like "Losartan"

The mnemonic for arbs is "**Ortho Sartan"** with "Arbs." These medications have a risk for angioedema up to one year, so swelling in lips, face, and throat and are always acute with these meds. The first dose is administered at night since it can cause Orthostatic hypotension. This happens because it interrupts a process already in action. Think of a train that is already moving and trying to stop immediately. It can't because it rebounds pressure (orthostatic). That is why ace inhibitors work more effective on the natural action of the Renin Angiotensin system since the train isn't started yet it just inhibits it from starting. However, ARB's interrupt this process in motion (Angiotensin "2" Inhibitor) causing rebound, or orthostatic hypotension.

RULE NUMBER 11: If an ARB is in a question think first dose orthostatic take at night, also the risk of angioedema- This is not a frontline medication; it is recommended if the patient can't tolerate Ace Inhibitors due to a cough.

Blood Pressure Medications – Affecting outside the heart in the vascular beds resulting in most common side effect Orthostatic Hypotension

First the Fluid Portion or effect on the vascular

ACE Inhibitors – end in "pril" Lisinopril, Captopril, Enalapril- ACE -K High

Alpha 2 Blockers "Arbs" Losartan, Valsartan - Ortho- Sartan

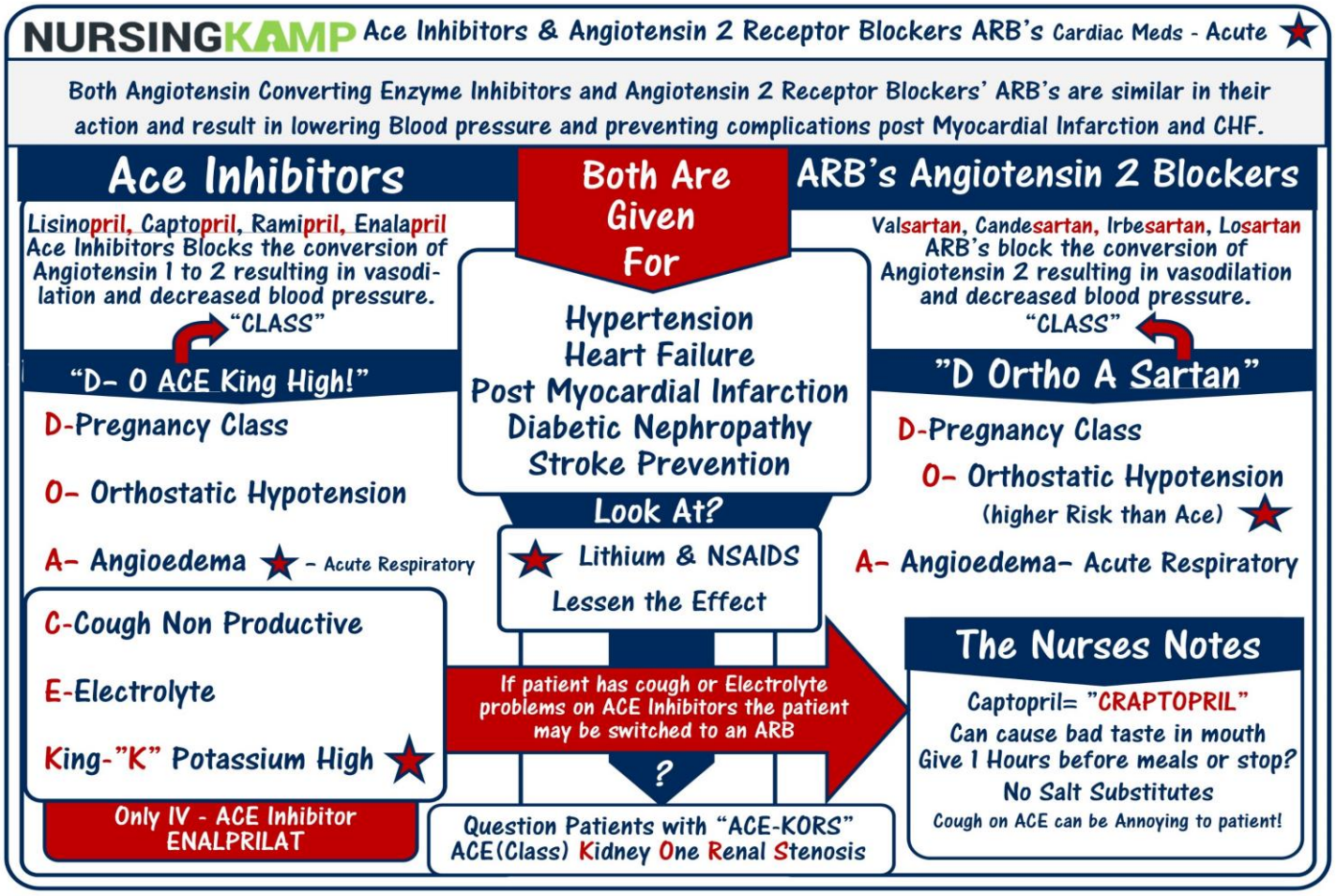
Alpha 2 Agonist and Blockers mainly affect the vasculature, either vasodilating or constricting. More importantly resulting in orthostatic hypotension. Clonidine (catapress) works on the brain's sympathetic reactions affecting the heart, the vessels and contractility. This may affect sexual dysfunction, urinary retention and chf.

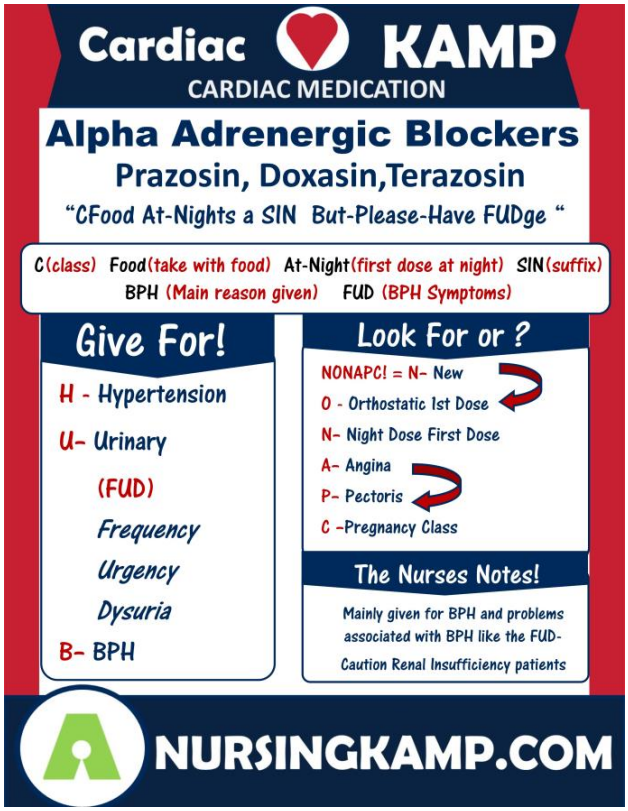
Clonidine can be PO or transdermal and both of these medications should never be abruptly stopped due to rebound hypotension putting the patient at risk.

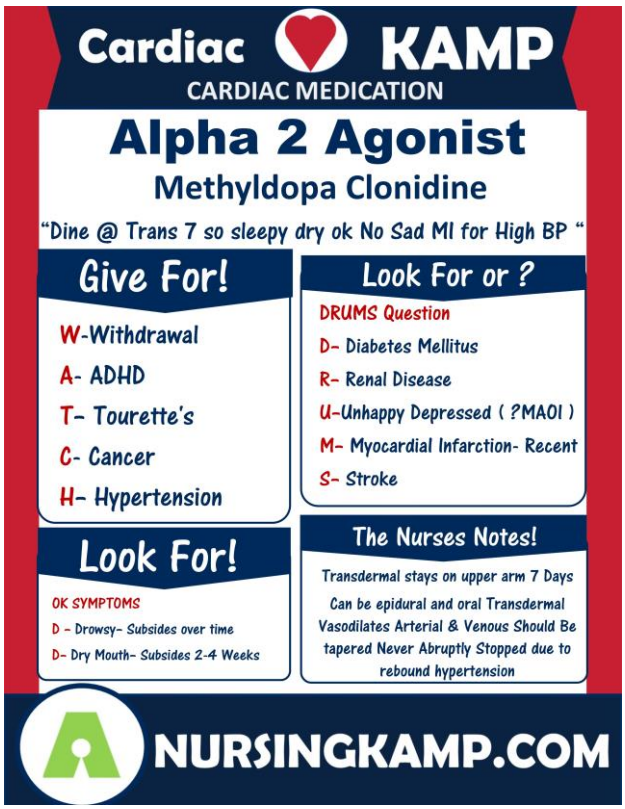
Clonidine patches should remain on and be rotated for 7 days which is different than transdermal Nitro, which is 12 hours on 12 hours off (due to increase tolerance). There is no increased tolerance for clonidine.

Can be used in hypertensive crisis and severe cancer pain

The "sins" alpha agonist treat BPH given to alleviate symptoms of dysuria, urgency and frequency and is generally given at night, also with food, because of orthostatic hypotension.







Beta Blockers- Think Beta Belly Laugh out Loud(LOL) =LOL is the ending of the class metoprolol, labetalol

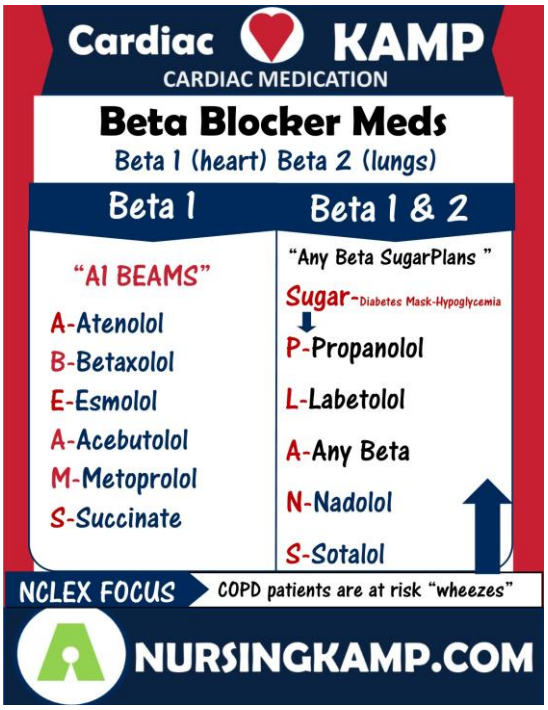
In the body, beta receptors are responsible for heart rate, contractility, conduction and relaxation. Beta1 Receptors are located in the Heart (Think 1 heart = Beta 1). If stimulated, as in AGONIST, it will increase contractility. Dobutamine is an example of a beta 1 agonist. Beta Blockers block this effect, resulting in decreased heart rate, causing a decrease in blood pressure. There are Beta 2 Receptors located in the lungs as well (think 2 lungs- Beta 2). If an agonist (stimulated) medication is administered, as in albuterol, it causes increased heart rate (Beta 1) as well as opens the airways(Beta 2). However, Blocking Beta 2 can cause constriction. This is problematic since patients who have COPD should be questioned if they are put on beta blocker because of the risk of constriction.

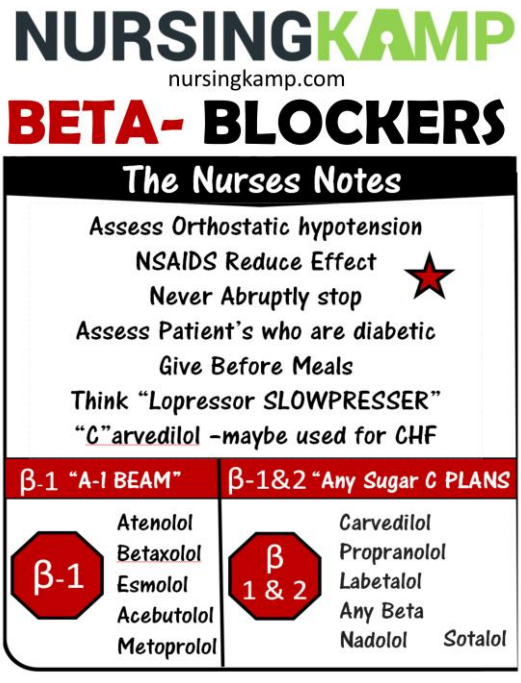
There are 4 things to monitor with beta blockers, called the 4 B's,

- Bradycardia- due to beta 1 blocking slowing the HR, so we hold beta blockers for apical heart rate less than 60.
- Blood Pressure- Slowing heart decreases contractility lowering blood pressure. Hold Systolic Less than 90
- Bronchoconstriction- Wheezes COPD since it affects Beta 2 are generally contraindicated with beta Blockers
- Blood Glucose- Since blocking the beta receptors it blocks reuptake of glucose. Also symptoms of low blood sugar are like symptoms of poor perfusion, so low blood sugar could be "masked" by beta blockers Propranolol

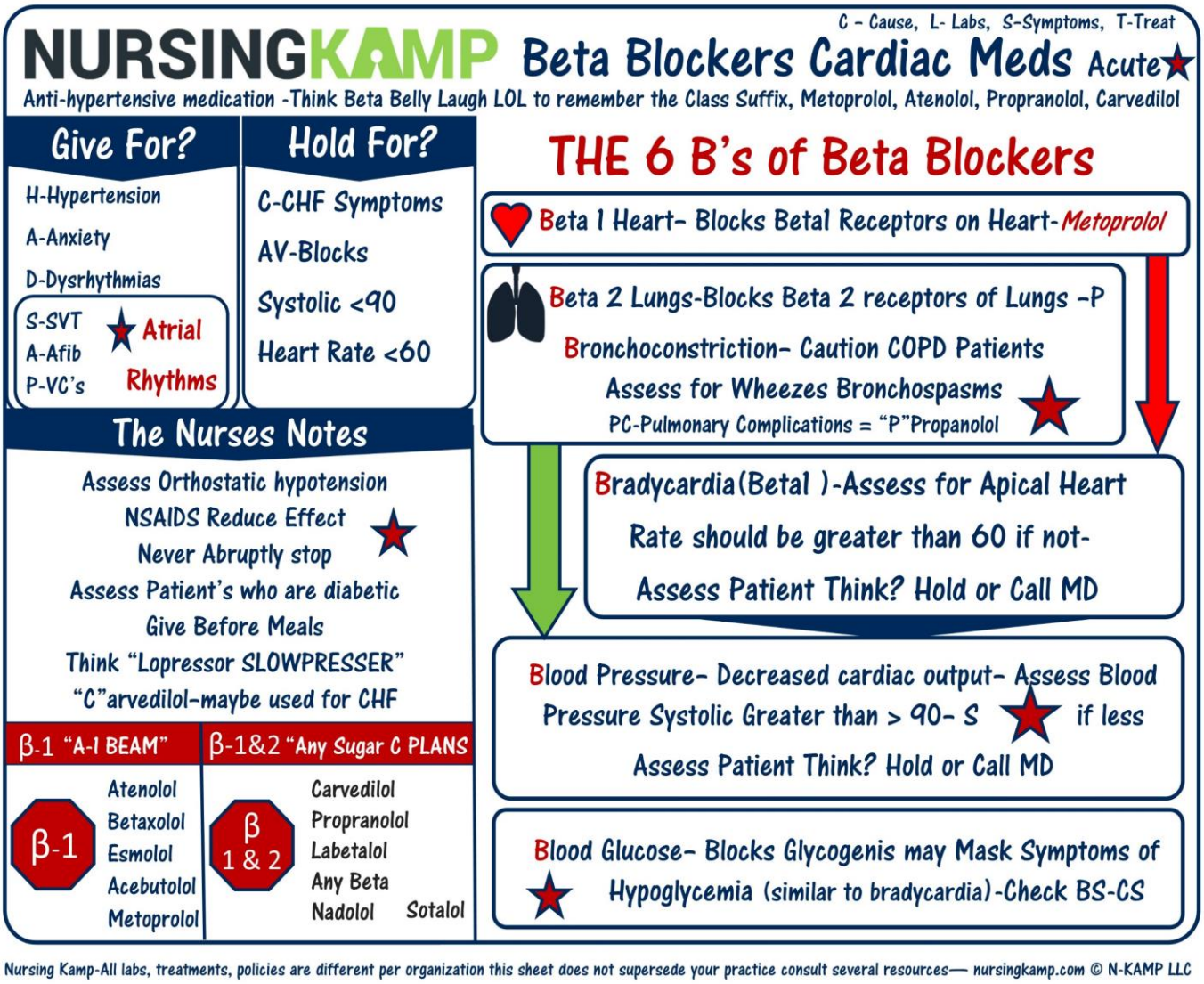
RULE NUMBER 12: NO LABETOLOL & LASIX IV

Beta blockers should also be questioned if they are on a calcium channel blocker; more important"DV -AV" Diltiazem and Verapamil both of these calcium channel directly affecting the rate; also Calcium Glycurcerides



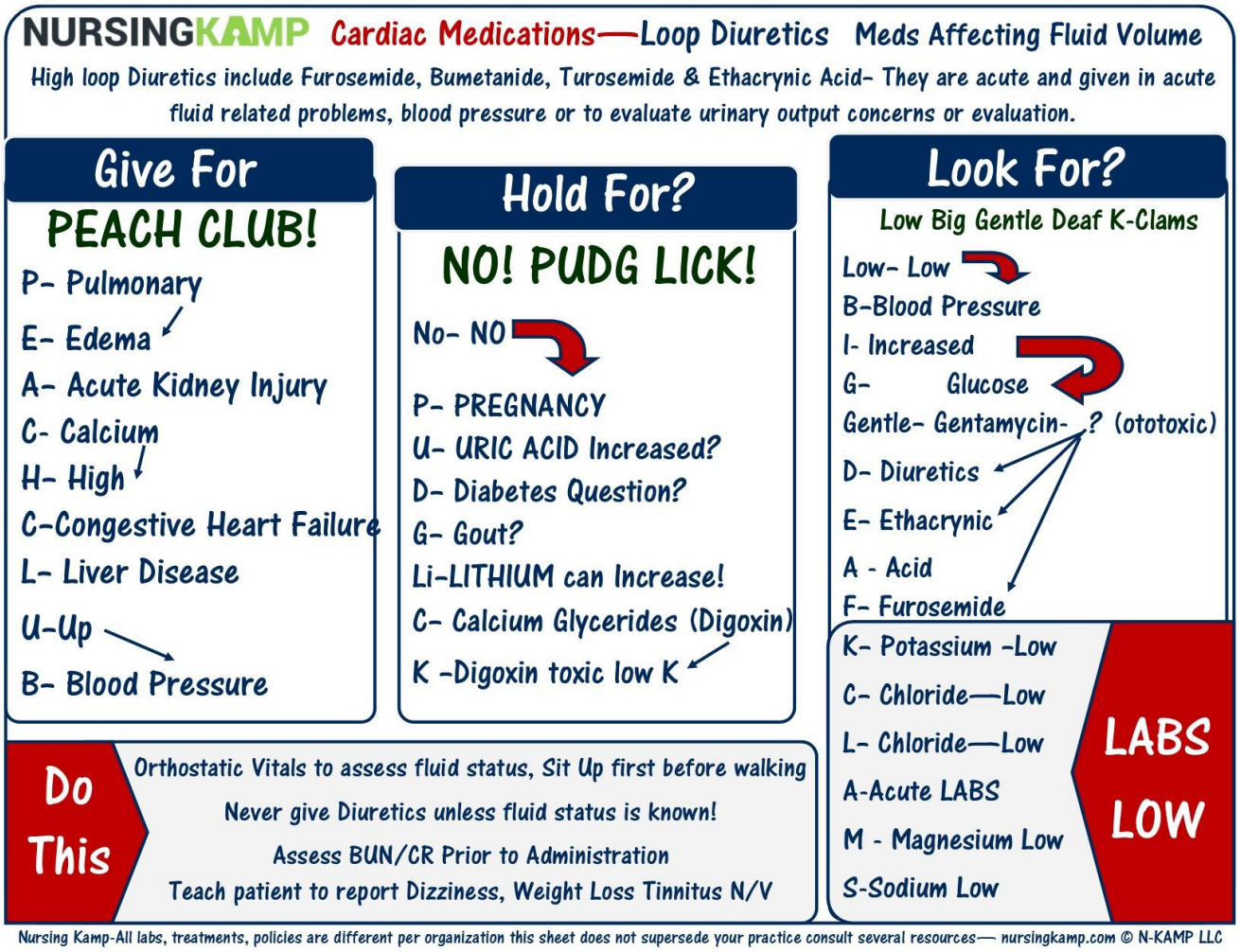


If a patient is on both a Calcium channel blocker and digoxin beta blockers, these should be questioned. Because the patient who is receiving both medications suddenly becomes bradycardic or hypotensive it is difficult to figure out which medication is causing it, whether beta blocker or calcium channel blocker



Blood pressure medications that work on the volume entering the heart result in a decrease workload of the heart muscle. The term **PRELOAD relates to the volume before the heart. To remember "Preload be the load before the heart "** Medication classes that affect preload include diuretics- Since these affect the overall fluid volume by decreasing volume in the vascular bed, which decreases the blood pressure. Usually, there needs to be something structurally wrong with the heart, like Heart Failure, or a previous MI, in order for these medications to be ordered. Once on diuretics we monitor the electrolyte Potassium going down <3.5 (assess) since LASIX is a loop diuretic increasing urine output. It is important to note that Bumex is another diuretic that is 4 times greater than lasix.

RULE NUMBER 13: If a diuretic is in a question think first is this potassium sparing (spironolactone) or depleting (Lasix, bumex)? Understand signs and symptoms of Hyperkalemia and Hypokalemia along with other medications that affect potassium like digoxin.

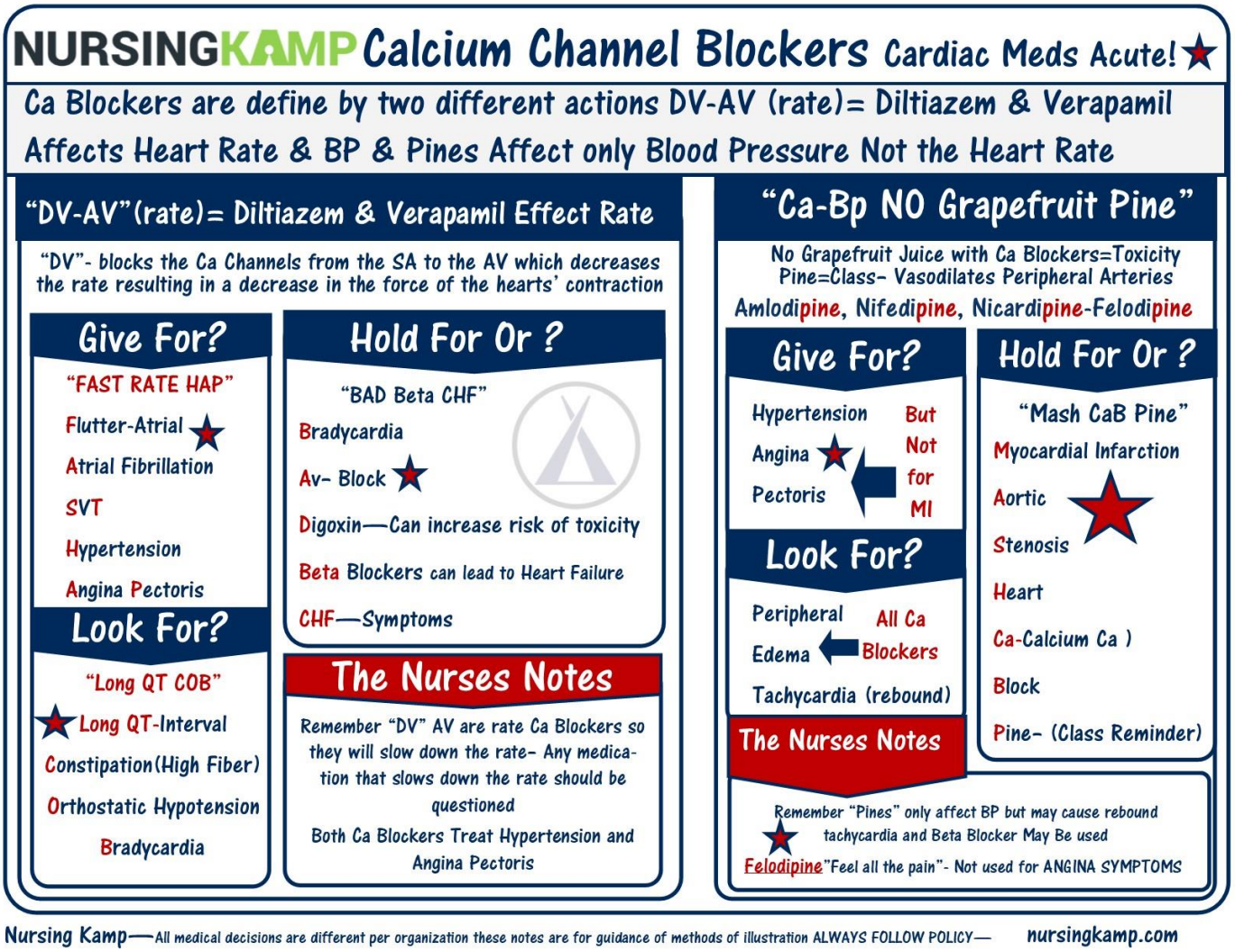


Calcium channel blockers, mainly the Pines like amlodi**pine,** affect the Afterload (Ca=See the AFTERLOAD). This term afterload is related to pressure AFTER the HEART that it pumps against. Ca Blockers are unique, in that these medications divided into those that affect Heart Rate (Diltiazem Verapamil), a term "chronotropic," and Blood Pressure, or antihypertensive, which mainly affects the peripheral blood pressure. (amlodiPINES).

RULE NUMBER 14: Always no Grapefruit with calcium channel blockers since the Calcium Channels on the heart affect the flow of potassium and any excess can cause further dysrhythmias and disrupt the action of the Ca- Blocker

RULE NUMBER 15: Diltizaem(Cardizem) and Verapamil are Called "DV-AV," since they affect the rate of the heart primarily, but still affect blood pressure but not the mostly choice when discussing these medications.

RULE NUMBER 16: Calcium Channel Blockers consist of two different Types: those ending in PINE, like amlodipine (think "P" for peripheral)- dealing with blood pressure on the arteries, relaxing them, therefore decreasing blood pressure. (think calcium is hard (like bones) and this blocks Calcium, softening the vessels, relaxing them, resulting in less pressure and decreased afterload.)



HYPERTENSION

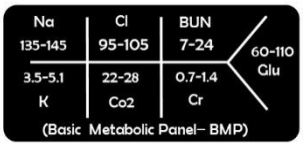
Since Hypertension causes a Risk for Stroke, preventing Complications are Priority (assess, implement)

Apresoline (hydralazine)- is given for uncontrolled hypertension

- Patient should report flu-like symptoms
- Rise slowly from sitting/lying position orthostatic and Take with meals

Clevidipine butyrate is a calcium channel blocker that comes only in IV form and is administered using a pump.

Hypertension long term can cause Organ Dysfunction (elevated **creatinine**>1.4(assess) **AST** >40 & **ALT**>50(assess liver), so monitoring the organs are important.



PRELOAD VS AFTERLOAD

Preload and Afterload are concepts that a nurse should understand since the underlying causes and treatments are in relation to medications and expected findings. This is also seen with complications resulting from underlying causes since it represents circulation factors.

Preload- Preload is how much the heart is filling during Diastole– Once filled ("starlings law" states the greater the fill the bigger the pump!) and as it fills and ejects, that is called Ejection Fraction (EF). This should be Greater than 60 % for perfusion and over one minute the Cardiac Output(CO) should be 4-8 if everything is working well. This will result in the systems and organs being perfused so no changes in LOC (assess), SOB(a). Decreased urine output(C) or other body abnormalities labs and skin should be happening.

Test questions are related to understanding of this concept as it relates to hemodynamics, symptoms and medications.

Elevated PRELOAD – Is too much fluid going into the heart (due to build up or heart not working)?

Assess For Signs of Fluid Overload: The Fluid Before the heart Starts to Pool in the extremities and Lungs

SOB(a) Crackles(a) Edema Pitting>4 = no more fluid!(c), JVD> 4(c) CHF Right & Left Sided Symptoms

Assess for Fluid Overload hemodynamics CVP>8 PAWP>12 Bounding Pulses, Jugular vein Distension, Ascites

Increased PRELOAD is Caused by"CAPS"Cause!

- C-CHF – Ejection Fraction <60 Right or Left Sided Fluid Build Up
- A-Aortic
- P-Pulmonic
- S-Stenosis

Treat increased preload with the "V" by vasodilating; this will create wider vessels, in turn decreasing the volume and pressure on the heart.

Patients with a propensity for increased preload like CHF will often be given Lasix, or in acute situations Bumex (which is 4 times greater than Lasix). Diuretics will decrease the overall fluid volume in the body if kidneys are working as evidenced by the Creatinine <1.4 GFR greater than 60

Nitro also works on an Increased Preload by vasodilating or opening the vascular bed to increase space in vessels therefore decrease volume-Morphine is given during an MI to not only treat the pain but decreases **Preload** coming into the heart

DECREASED PRELOAD – Not Enough fluid going into the heart from the Body(vascular) may be due to vasodilation from Sepsis or just a fluid volume deficit, blood. It is important to note that all medication that are used to treat increased Preload can also cause a decreased preload, resulting in less perfusion so Blood pressure assessment is warranted.

Assess Triple D's when there is a question in regards to Decreased Preload

- **Decreased LOC-** With decreased preload there is decreased volume, therefore decreased perfusion.

  The brain needs a minimum MAP of 75 to maintain perfusion. That is why patients showing

restlessness and confusion is an acute problem related to perfusion.

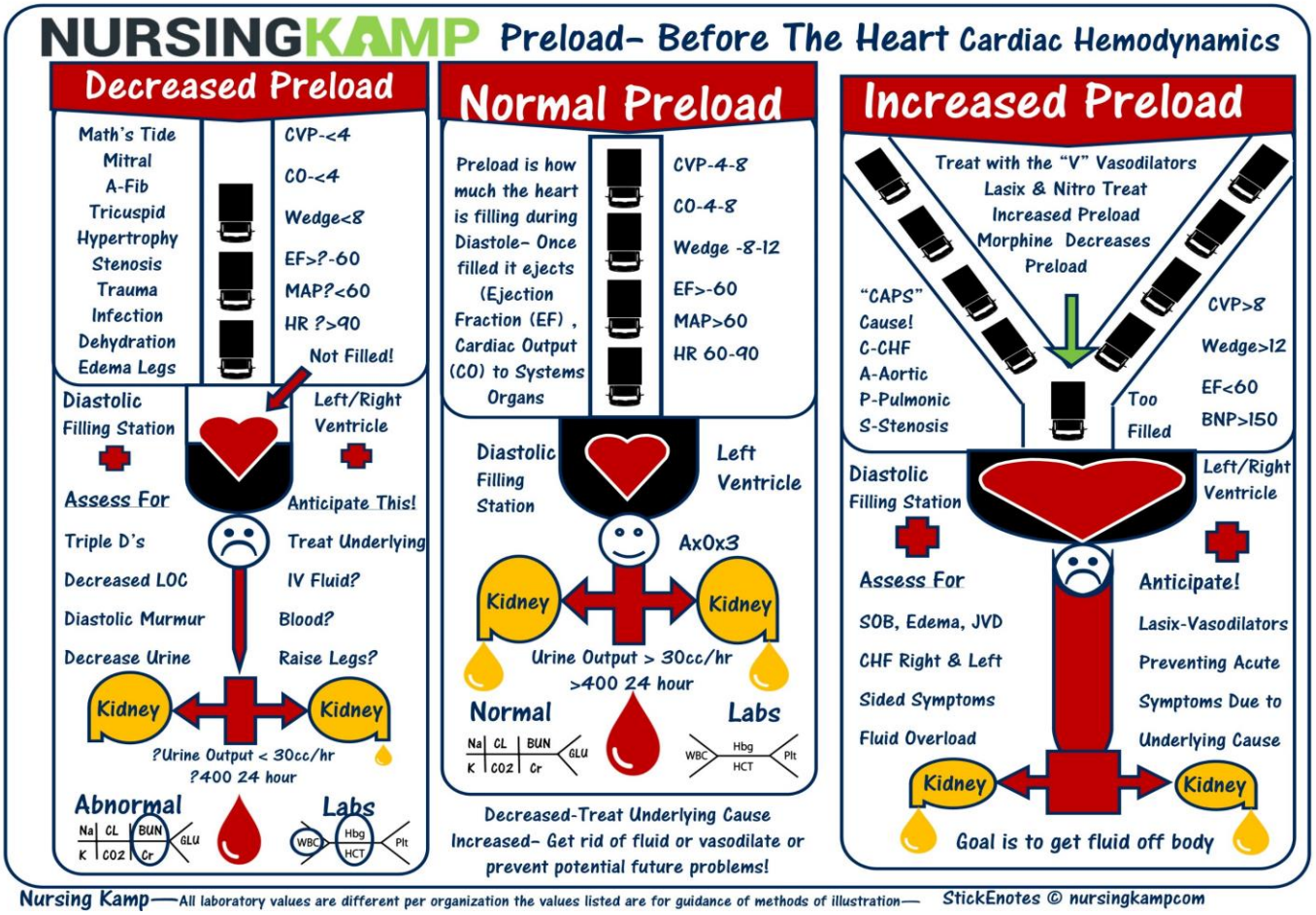
- **Diastolic Murmur-** New onset murmurs especially during diastole point to problems in preload
- **Decrease Urine-** As with brain perfusion, the Kidneys need a minimum MAP of 65. If they are not perfused the first indicators are decreased urine output, then elevated BUN & Creatinine then decreased Glomerlular Filtration Rate GFR.

Preload=MathsTriad are the causes of problems with Preload

- **Mitral-Causes** regurgitation doesn't allow for pressure into the ventricle to provide adequate EF
- **A-Fib-**Causes preload difficulty since NO atrial Kick to allow starlings law filling
- **Tricuspid**-Causes- Regurg doesn't allow the kick like Mitral into the ventricle to increase stretch
- **Hypertrophy-**Big Trophy BIG Heart- too big to fill and have adequate volume entering
- **Stenosis-** Causes the inability to have the blood freely move through the heart
- **Trauma**-Decreased Blood volume (assess) underlying cause deficit
- **Infection-**Vasodilated (assess) underlying cause deficit
- **Dehydration-**Decreased Volume(assess) underlying deficit
- **Edema** Legs-Right Sided Failure- Fluid Building up in the interstitial Spaces not vascular space.

Treatment for Preload is focused on correcting the underlying cause or preventing further problems

RULE NUMBER 17: "DAMPreload" - Diuretics and Morphine Decrease Preload



Afterload – Think "After" the Heart. This represent the volume outside the heart or resistance it must encounter during systolic pumping.

Decreased Afterload may be the result of

- Vasodilation in the body Infection (resulting in decreased circulating volume)
- Actual loss of Body Fluids, Blood from trauma (resulting in decreased circulating volume)
- Medications (Lasix, Nitrates, Hydralazine) (N200) Causes vasodilation

RULE Number 18: Never hang vasopressors until fluid volume is assessed and adequate- PAWP, CVP, JVD –This is termed " Fill the pump, before you squeeze"

Alpha Squeeze is a term that describes contraction of the peripheral vasculature, and medication that cause "A" Alpha Squeeze are specific to Afterload and SVR (Systemic Vascular Resistance)

- V-Vasopressors- Levophed (alpha Squeeze)
- E-Epinephrine(Alpha)
- N-Neosynpherine (alpha Squeeze)
- D-Dopamine>10mcg/kg (alpha Squeeze)

These "alpha" meds are caustic to the tissues, so central line is preferred. Assess for infiltration! Always stop drip and get regitine, which is used to reverse the effects of caustic critical drips

Increased Afterload is identified by its symptomology, which often requires interventions.

Increased Afterload may be caused by CARV

- **CHF-Ejection Fraction** < 60% When this happens, the normal process of the body is to constrict when there is not enough perfusion or CO
- **Atherosclerosis**-Increased Tension in the vessels that they are unable vasodilate stretch causing increased tension
- **Rheumatic fever**- Patient presents with a past history which causes valve abnormalities
- **Valve disorders** –Usually congenital resulting in problems over time.

Treat INCREASED AFTERLOAD with Medications that VASODILATE

- **Nitroprusside –** "nightpride" is a critical drip that should be in brown bag away from sunlight(n200)-
  - Monitor thiocyanate (cyanide)(assess) Normal value should be <10 >12 toxicity
- Vasodilators-Nitrates

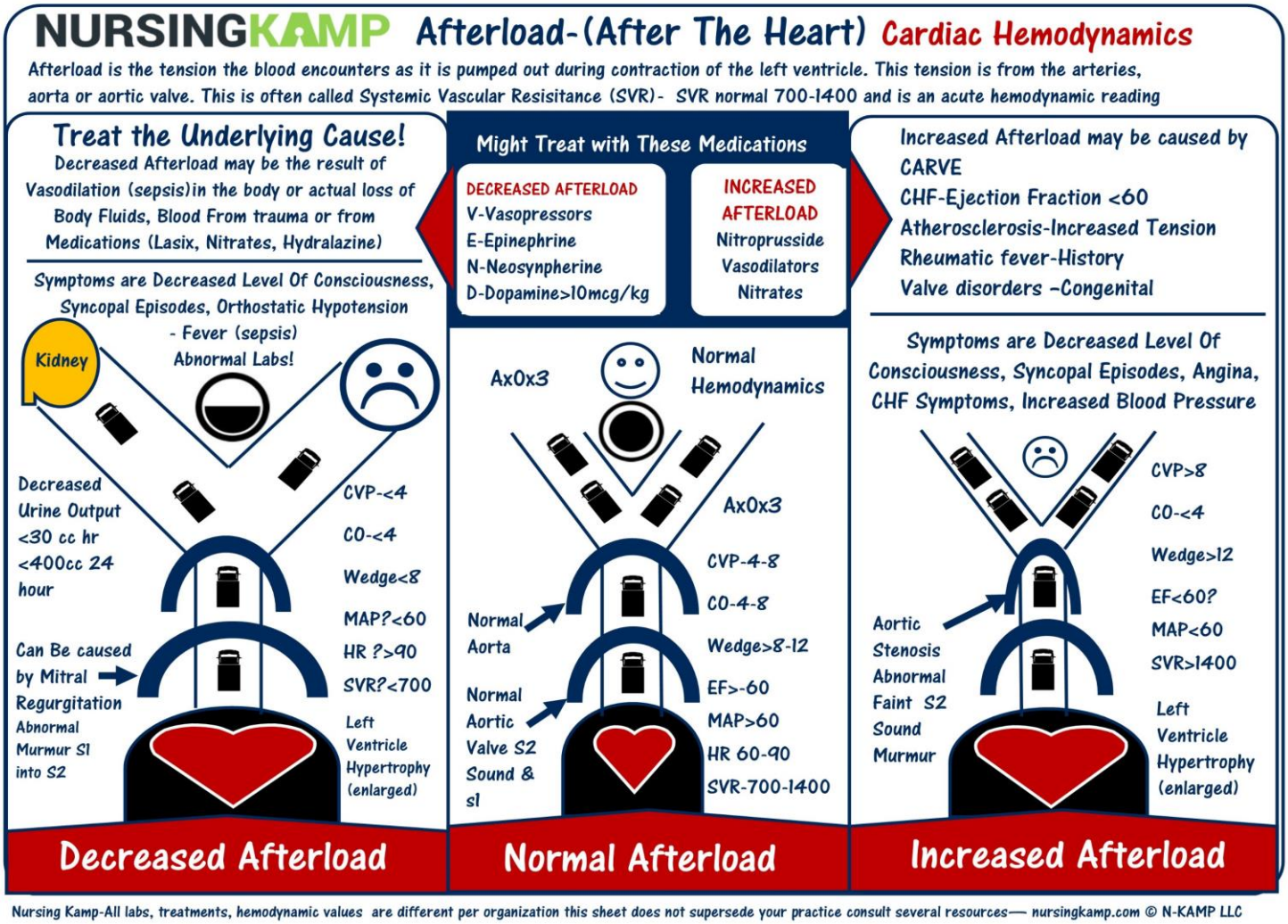
Summary

Preload is Before the heart the volume, so medications that affect the fluid coming into the heart by slowing it or affecting the volume are Beta Blockers, Diuretics, Morphine and nitrates. If things restrict the flow coming in it is most likely on the right side, like the tricuspid valve problems or atrial fibrillation. This is different with the pulmonic valve; though it is right side it causes tension in the lungs, forcing the fluid to build up on the right side.

Characteristic Right side presents as diastolic murmurs. JVD and peripheral edema are generally preload issues showing fluid or edema build up.

Afterload is after the heart so we generally treat the tension after the heart to allow the heart not to work so hard resulting in hypertrophy and further complications.

Nitro and nitroprusside along with calcium channel blockers all work on the afterload of the heart by vasodilating or relaxing the vascular bed



Higher Maslow are Risk Factors for Cardiovascular Disease

Hyperlipidemia- First test evaluates Total cholesterol if it is greater than 200 then a Fasting Lipid Profile is completed - which evaluates LDL-HDL-Triglycerides

- Total Cholesterol > 200 (assess)
- Triglycerides >200(assess)
- LDL >150(assess)

Meds are not initially the intervention for Hyperlipidemia but the Lifestyle Modification like smoking cessation, weight loss and exercise is recommended. This represents a Higher Maslow Teaching

Lifestyle Modifications and Evaluation

- Diet and exercise, Weight, Sugar control prior to meds- then re-eval
- Heart Healthy Diet= fresh fruits, vegetables, and fiber in the diet are tried before medications
- **C=reactive protein (CRP) -Lab Marker for -Cardiac** Inflammation >3 Inflammation cardiac risk for CAD
- **Calcium Score** – If Positive the patient is at risk – This is achieved by a Noninvasive CT Scan that checks for Calcium deposits on the arteries, which indicates the initial progression of CAD

e Changes that Decrease Cardiac Disease Risk

Hypertension is defined by

- >120 Systolic >90 Diastolic

Excess weight BMI = (Weight in Pounds / (Height in inches x Height in inches)) x 703

- BMI > 30 is obese

Physical inactivity-

- Recommended exercise is 3 times a week 20 Minutes Per Routine

Smoking – Encourage Smoking cessation

- Example: One pack-year is the equivalent of 365.24 packs of cigarettes or 7,305 cigarettes. (assess)

Number pack-years = (packs smoked per day) × (years as a smoker)

Psychological stress

Positive family CAD history = Can't change, Non-Modifiable

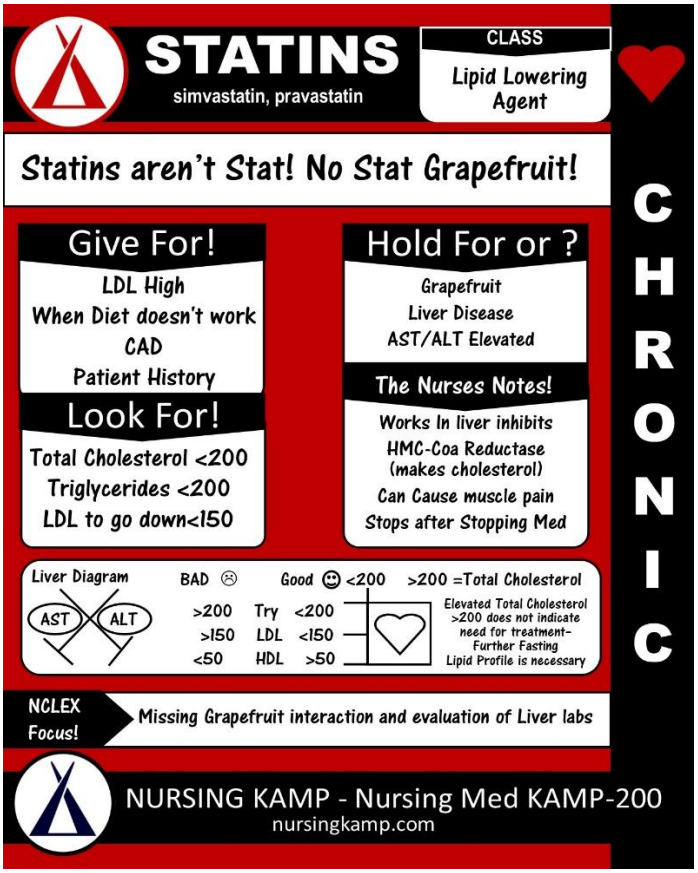
Diabetic- assess hemoglobin a1c should be less than 7 – to remember this think" less than 7 or they go to heaven"

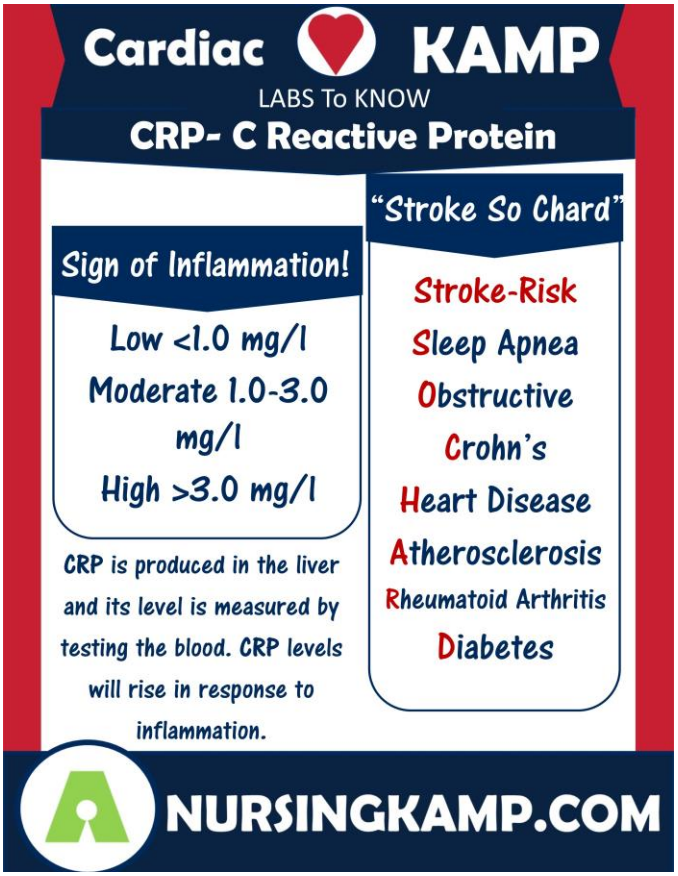
Assess the patient's Non-Modifiable – So, Choose your parents wisely ;)

- Age >55 >65 Females
- Female-present symptoms fullness, fatigue SOB (SOB may be only symptom)
- Gender- Males, Females Post-menopausal
- Ethnic origin- African Asian
- Chronic disease or illnesses.
- Family History- First degree level Parents

Simvastatin (N200) or statins are not Stat and are given for hyperlipidemia and not given with grapefruits. Think a grapefruit is not stat neither is a statin. Statins are always questions or stopped if the following is reported

- unexplained muscle pain, tenderness, or weakness
- confusion, memory problems
- fever, unusual tiredness, and dark colored urine
- chest pain
- increased thirst, increased urination, hunger, dry mouth, fruity breath odor, drowsiness, dry skin, blurred vision





Mevacor (anticholesterol med) must be given with evening meal

Take 2-4 Hours after other cholesterol lowering medications Prolongs bleeding with Warfarin.

Rule Number 16: Patients complaining of Muscle cramps are generally acute, and liver enzymes AST/ALT should be evaluated when started on statins

Patients with CAD are usually asymptomatic but will need CHEST PAIN teaching to report if any signs or symptoms of *discomfort, indigestion, squeezing, heaviness,* and *viselike* are common terms used to describe chest pain of cardiac origin.

Cardiovascular Physical assessment

When assessing the cardiovascular system in regards to the patient's cardiac symptoms it is important to not overlook the nuances of the little things which are the big indicators of acute symptoms. Patients often minimize symptoms leading the nurse to recognize and intervene.

Skin color in questions is generally about perfusion and is generally a late sign showing an intervention is necessary – Pallor Diaphoretic Is a late sign (c)

Flushed-Generally caused by Vasodilation, and Hypernatremia, some medications cause it to include Morphine, Nitrates, (stress test Dobutamine, hydrochloride(Dipyridamole), generally not an acute finding more expected with those meds unless it relates to Hypernatremia

Pallor Pale – lack of perfusion(c) is always acute requiring high fowlers. The nurse should assess and look at presenting history or time. This always a late SIGN requiring interventions -think MI, Hemorrhage, shock

Changes of Level of Conscious – is always acute and the nurse should look at the underlying causes of perfusion- restless is generally first then agitated.

Remember, if the MAP Falls below 75 they will not be perfusing the brain, which results in changes

Shortness of breath- (a,b) High Fowlers- look at underlying DATA. Assess lung sounds and the patient's history, is it a PE, Cardiac Tamponade. SOB is always acute unless it is patient reports history of SOB with exertion which is generally related to new onset of CHF, obesity, cardiomegaly.

Heart Valves sounds are generally acute in NCLEX and Studying. Since it is looking for the underlying cause they can be as well a chronic finding.

When approaching the cardiac unit Assessment is Key in Cardiac and it is done with our "Nursing Ears" or a stethoscope.

There are two parts of a stethoscope and they are used in questions in relationship to Heart Sounds.

To isolate heart sounds, flip the stethoscope turn the patient to the left to hear S3, S4 or High Fluid CHF

The larger "Diaphragm" is Chronic for Apical and S1, S2 or lub, dub

The BELL is Acute for S3, S4

New Onset Murmur heart sounds are ALWAYS ACUTE

STRUCTURE VALVES

Location of valves go in order of blood through the heart

"Try Pulling My Aorta" is the order of valves blood encounter starting with Tricuspid Then Pulmonic Then Mitral and out the Aortic

Valves are separated by right and left side. Right is chronic and left is Acute, and listening to heart sounds are in the intercostal spaces. To remember spaces, write 12345 for the intercostal spaces in which the sounds are heard. Then remember – One happy erb tries apex mountains

1-Heart to Listen to

2-Intercostal–All -(Aortic)People(Pulmonic)

3-Intercostal—EAT– ERB's Point

4-Intercostal -TOO –Tricuspid

5-Intercostal -Much—Mitral

•

RULE 17: When isolating heart sounds we flip the Bell. Listen closely left side lying

There are 2 Sounds we listen for, s1 & s2 or "lub dub," and these are sounds of the Valves closing. If there is an abnormal sound it is generally a structure problem or fluid related.

The First of heart sounds are called "S1" which are the Atrioventricular(AV) Valves; they are called that since they sit in between the atria and ventricle.

To remember more about the valves, think of the term S1 = Baseball Mit = **BSMIT**

BS-Mit is heard "B"efore "S"ystolic and is the "M"itral" and T"ricuspid Valves or AV valves CLOSING

The Mitral is also called the Bicuspid. You can remember its location by saying **Try before you buy!**

- Try(tricuspid) *right side* before you Buy(bicuspid)*left side* to recall sides of the valves.

RULE 18: When isolating heart sounds, if the valves are right sided it is generally chronic or episodic and left sided is always generally acute, though NCLEX focuses on the assessment aspect of new heart sounds being acute since the MD should be notified. Sometimes the history or DATA presented in the questions are alerting the nurse that this is why there is an abnormal heart sound.

The Second Set of heart sounds are called the S2, which are the Semilunar valves

To remember more about the valves and S2, think of the term S2= BaD-P

BAD P = BADP it is Heard "B"efore "A"ortic "D"iastolic "P"ulmonic Valves

Assessment of Valve Abnormalities and Complication

Whenever you are approaching valves and assessment, it is important to identify new heart sounds which are usually indicators of underlying problems. Heart sounds and the NCLEX doesn't get so specific, just a general understanding of new heart sounds are examined.

Right Sided or Tricuspid Complications are generally chronic or episodic problems from drug use or bacteria.

Right side S1- of BSMIT - Tricuspid(chronic) = Mnemonic is "Tries Drugs and gets heart problems with BREAD"

The mnemonic for causes of Right Sided Valve Problems are

"Have BREAD before your meal"

- B-Bacteria
- R-Regurge (assess)
- E-Endocarditis (Infective)
- A-Aureus(Cause)
- D-Drugs IV (Cause)

Right Sided Pulmonic Complications are generally too specific for NCLEX and generally not tested on, since left sided and new onset is most likely.

Right Sided Pulmonic S2= Bad P(CHRONIC) Right

Causes of Pulmonic Valve abnormal sounds

- CRASH 30– PUBBB
- C-CHF
- R-Right Sided
- A-Aortic
- S-Stenosis(Cause/Results)
- H-Hypertension
- 30-Assess at 30-40 position
- Pu-Pulmonic(stenosis)
- BBB-Bundle Branch Blocks (cause)

Left sided Heart sounds are ACUTE and should be addressed and consist of either the Mitral or

Left sided Mitral Valve Abnormalities

BS "M"IT Mitral Valve (it is heard before systolic and is the Mitral and Tricuspid)

Abnormal Mitral Valve Sounds

"Mitral I Praise"

- Infective(endocarditis) Assess
- Prolapse
- Rheumatic (assess Cause)
- Apex Location (heard best)
- Ischemic Heart Disease
- Stenosis
- Endocarditis (assess cause)

Abnormal S2 BadP sounds are Left Sided Aortic Valve Abnormal Sounds

SCARLET MARS CAUSES

- Scarlet – Scarlet Fever
- M-Marfan Syndrome (cause)
- A– Aortic Stenosis
  R-Rheumatic Fever (cause)
  S-Strep Causes

New onset Murmurs are acute and Further heart sounds should be assessed though the DATA is generally put as in questions.

For Example:

The nurse is caring for a patient with a recent history of rheumatic fever. What would alert the nurse to a complication of this condition?

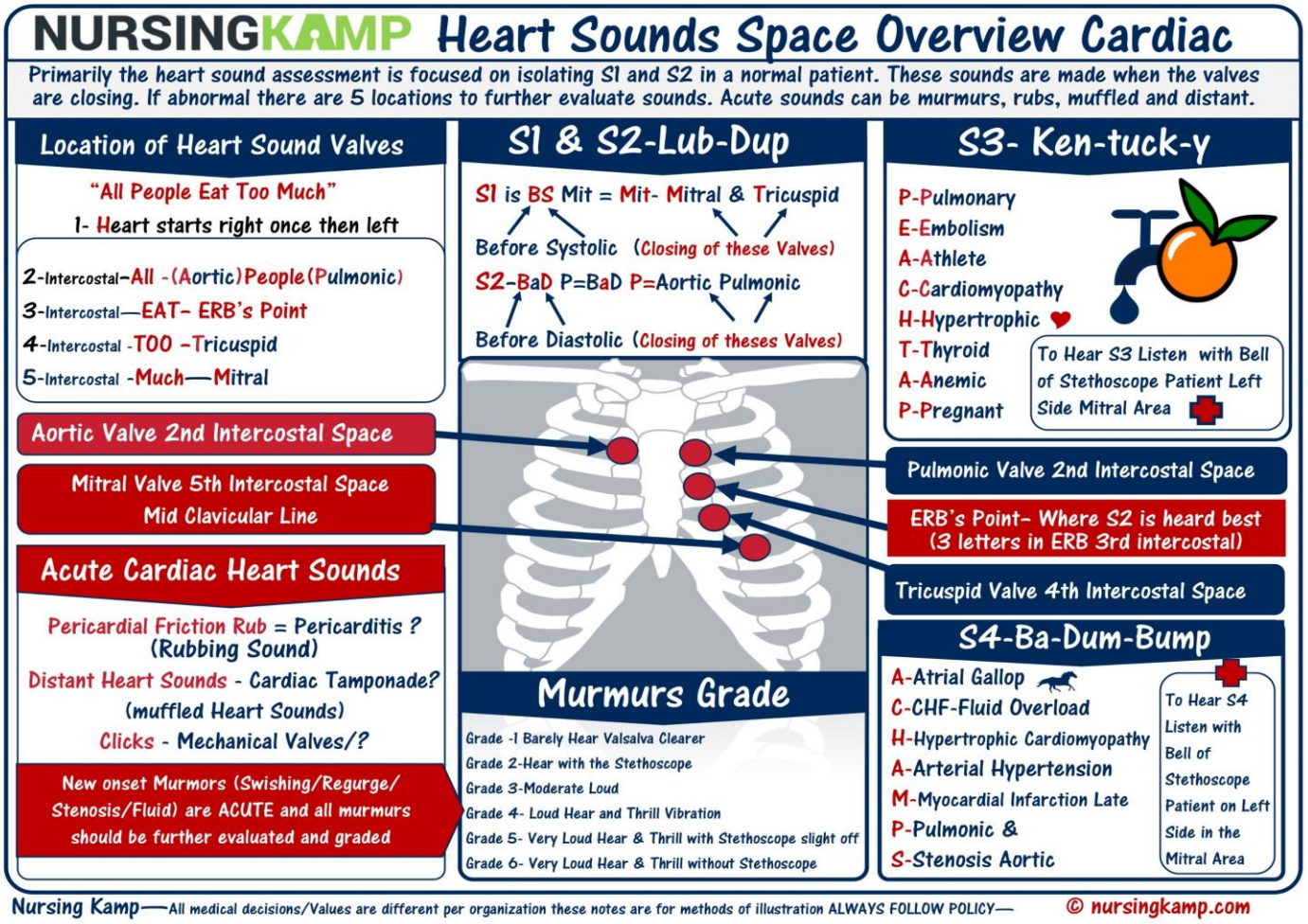
RULE 19: Patient history of illness, rheumatic fever, strep, and scarlet fever are generally not to be ignored. Always assess heart sounds for complications, don't give a Band-Aid like Tylenol for the fever

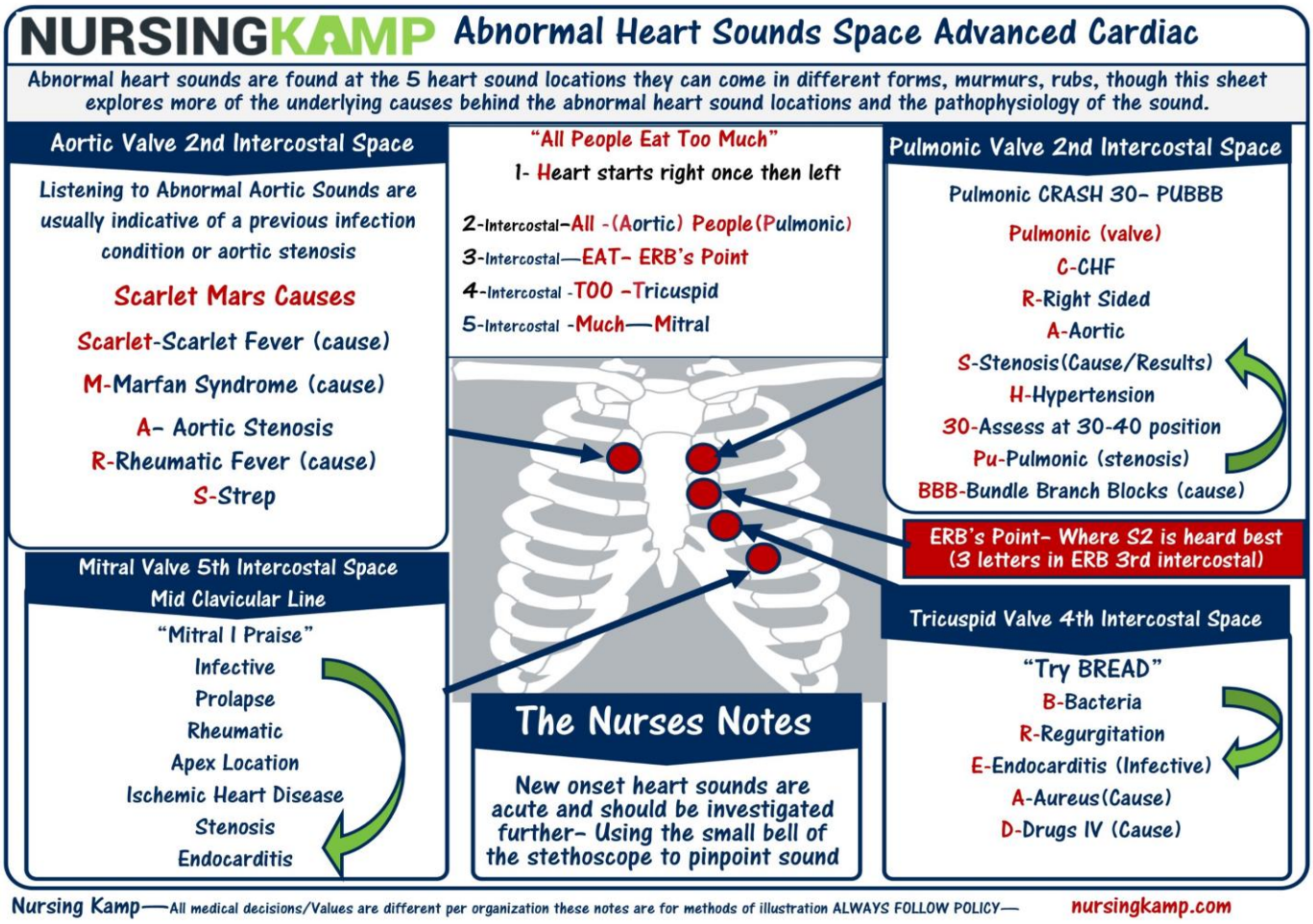
Heart sounds are often graded, though generally not universal in NCLEX, as they are generally related to most likely acute and not chronic. Murmurs are graded in orders of 1234 and 4 is heard at the door meaning the loudest.

Graded 1-4> Heard at the door

CLICKS are generally artificial valves. Assess if they are adequately coagulated or not.

RULE 20: For patients who are on anticoagulants and have a valve, the therapeutic range for their INR is generally 3-4, since they require more coagulation than a patient who may have Atrial Fibrillation





Looking at the arteries and assessment

Arteriosclerosis: Arteries become stiff and less elastic.

Atherosclerosis: fatty substances deposited on the inside of arteries.

Coronary artery disease (CAD): atherosclerosis of the coronary arteries.

Acute coronary syndrome (ACS): obstruction of coronary arteries with a sudden onset of symptoms. Includes unstable angina and myocardial infarction.

Fibrinolytic: drugs that dissolve early clots and Heparin does not break up clots

Screenings for CAD Problems first with presenting history or any actual ACS problems. A person may get a calcium screening (noninvasive CT scan to see if there are calcium deposits on the vessels) or an angiography, an invasive actual inside look at the vessels.

Angiography of the arterial vessels, or arteriography, an invasive diagnostic procedure, used when

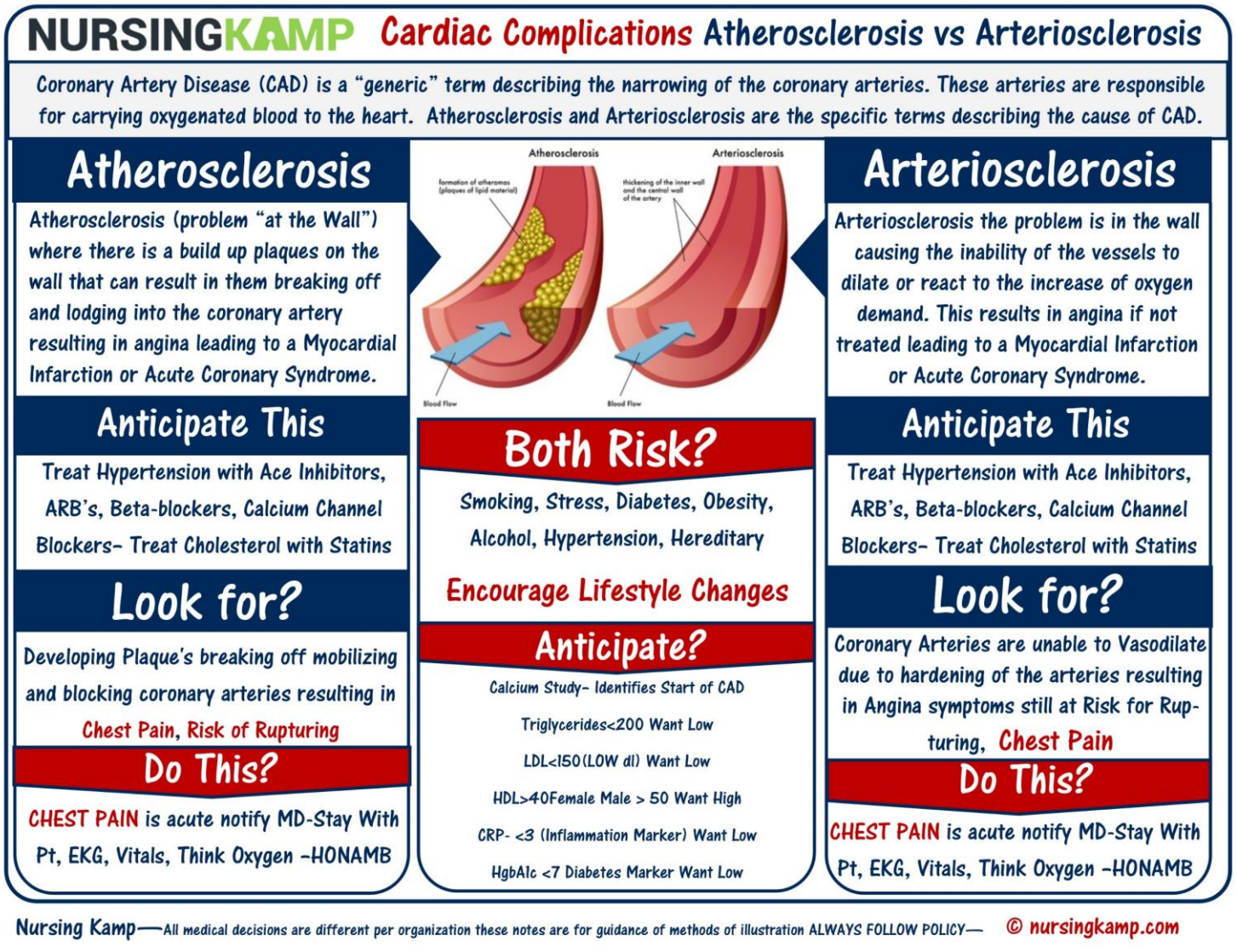
- arterial obstruction- MI angina symptoms (assess - intervention)
- narrowing – Angina Stable Chronic or Acute
- aneurysm is suspected- Acute or Chronic

Assess allergies to shellfish and iodine-based contrast media before having diagnostic tests also assess Creatinine and BUN as well. Fluids should be encouraged post angiography and metformin should be held.

<u>The mnemonic for contraindications or questioning with CT Contrast Dye is</u>

No CAKEMAN

- Cyclosporine's
- Ace Inhibitors
- Keppra
- Erythromycin
- Metformin
- Amphotericin
- NSAIDS



Two types of Electrography Monitoring to look at the heart

RULE 21: CAKEMAN Medications in the question should be given attention, since the patient is receiving DYE. If given it can result in Acute Kidney Injury (INTRARENAL). Monitor the patient's BUN/Creatinine prior to administration of CAKEMAN

ECG- Telemetry monitor (walking ECG) is monitored in lead 2(assess) on a telemetry floor and is an acute ongoing evaluation to monitor for ST Elevations(infarctions), Depressions(ischemias) or Dysrhythmias(acute). Patients are put on telemetry if there is suspected MI, chest pain and medications evaluation and electrolyte imbalances K, MG, Ca. Patients are also monitored during a cardiac stress test or transport.

EKG- 12 Lead EKG EKG is different than telemetry since it is not continuous but diagnostic. It is completed as a baseline assessment or during acute chest discomfort or a change in a patient's condition. EKG takes twelve views of the ventricle, where Telemetry only looks at three "generic" views. EKG is done whenever chest pain is reported or a diagnostic baseline is required.

Cardiac Rhythms are covered in the ECG KAMP edition and NCLEX coverage on this is concept and identification, but not advance practice.

Stress Test: Test to evaluate Chest Pain

Patients with a Significant Cardiac History or recent history of angina or cardiac like symptoms are usually scheduled for a cardiac stress test. The purpose of this test is to validate or further investigate and elicit the previous symptoms in a controlled environment.

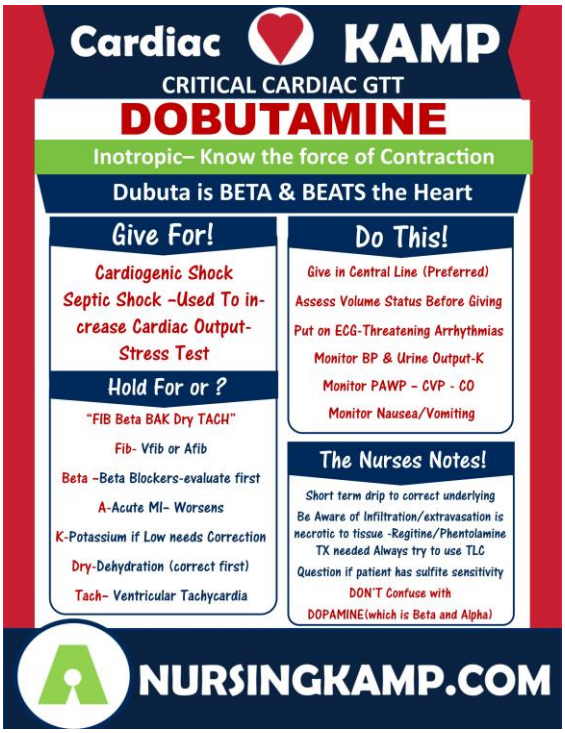
If symptoms are replicated or other cardiac symptoms like chest pain, ST Elevations or Depressions are experienced, the test is called POSITIVE and discontinued immediately.

Post further invasive evaluation like a CABG is usually ordered after positive Stress Test.

Patients who are unable to walk on a treadmill or bicycle but require evaluation are given Dobutamine (IV gtt). This is Beta Agonist. Realize this is caustic to the veins, so any infiltration is acute and it is preferred TLC delivery. The patient may receive adenosine as well.

In the resting stress test, the patient is placed in supine position and connected to a cardiac monitor and blood pressure then echo performed at targeted HR.

Dobutamine (N200) May cause flushing, headache, dyspnea, and chest tightness for a few moments after injection. (n200) Patients should be aware (expected)



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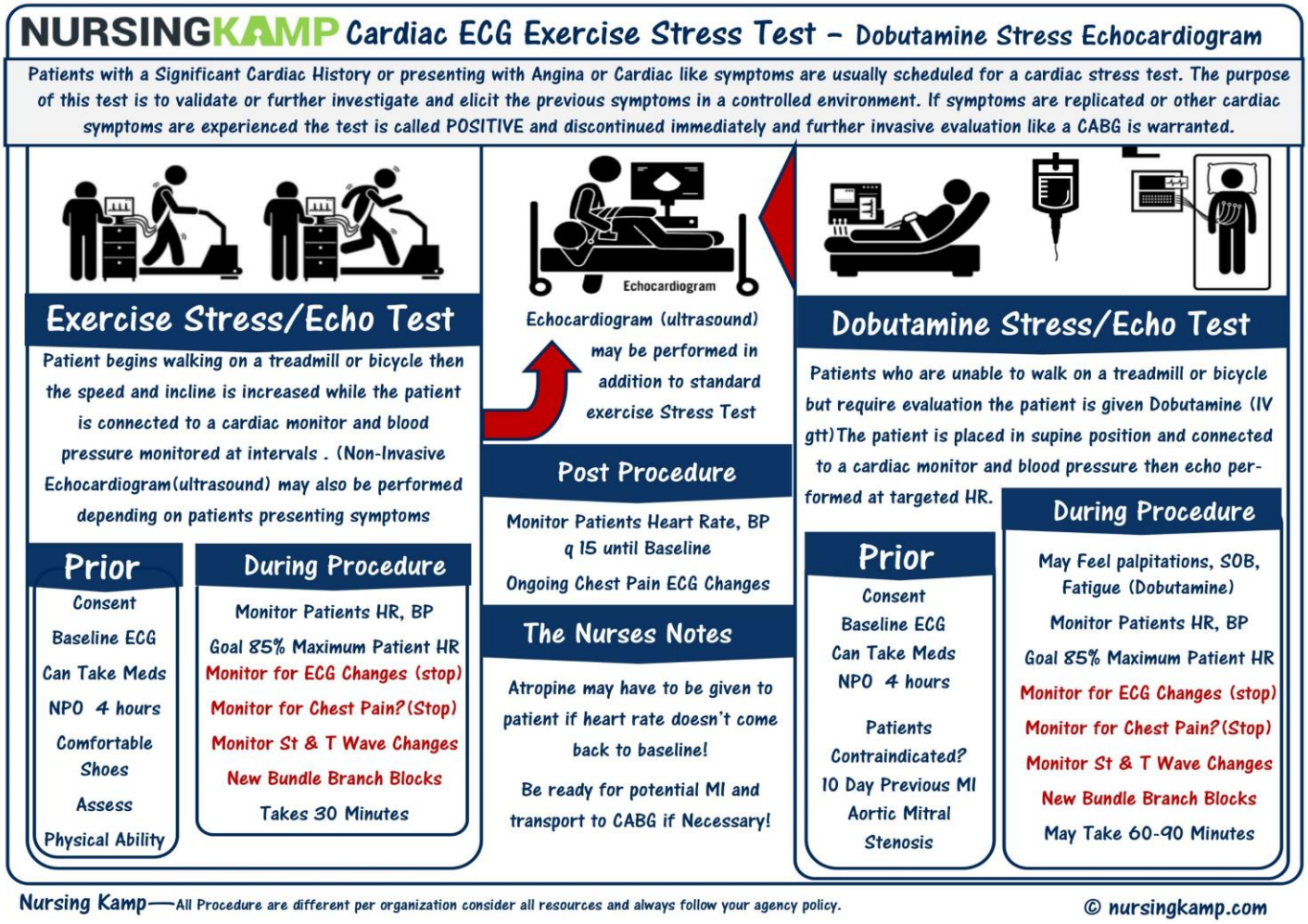


Mainly an Acute medication that is strictly Beta and Given in Cardiogenic Shock but is given during a cardiac stress test when the patient is unable to run on a treadmill.

ECHO- EVALUATEs The structure of the heart and the Valves

There are two types of Echo's: Bedside Echocardiogram (chronic) and Transesophageal Echo (acute)

Bedside Echocardiography, "echo" (assess) uses ultrasound to assess cardiac structure & valves looking for Ejection Fraction, and this should be greater than 60 %. If it is less than 60 % the patient will become symptomatic, showing symptoms of Right Sided Heart Failure (rest of the body) or Left Sided Heart Failure (Left Lungs acute)

The most important finding of an Echo is the Ejection Fraction, which is the amount of blood expelled by the ventricle in one beat similar to Cardiac output which is over one minute 4-8 lpm

Ejection fraction is in one beat, and is related to the total stroke volume

TEE Echo= Transesophageal echocardiography is ACUTE and airway should be assessed after procedure never give anything to eat or drink post procedure. This procedure provides a clearer picture but is more invasive since an ultrasound transducer placed in the esophagus

RULE 22: MRI to assess soft tissue, and you should assess whether the patient is claustrophobic. Always no metal, and assess if they have a pacemaker.

CABGS PCI's and Angios

Cardiac Catheterization and the NCLEX focuses more on the general concepts of prep prior or after, not during, since NCLEX focuses on Basic Nursing and Safety

2 Types

Coronary Angioplasty- When a catheter is inserted into the coronary artery and a balloon is inflated to press the cholesterol against the wall, or to remove ("atherectomy") the cholesterol.

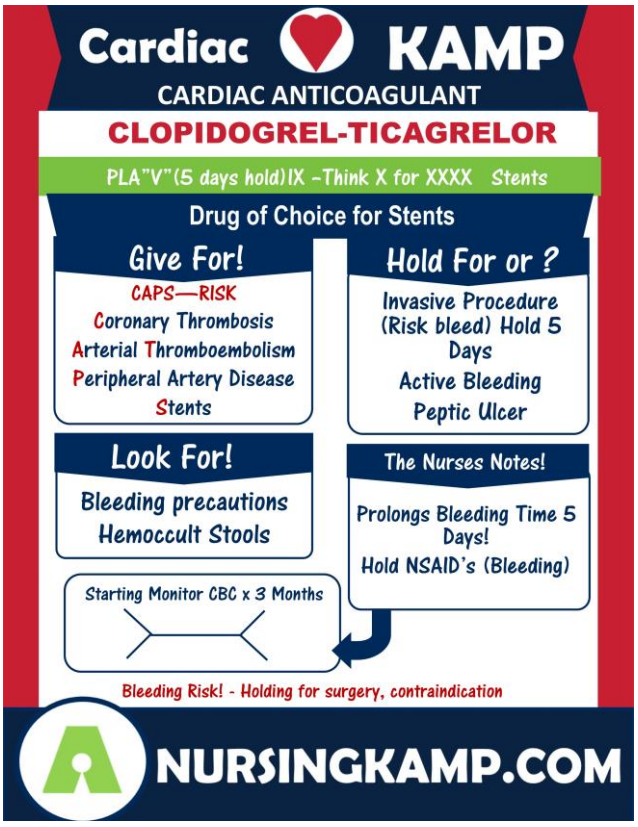
Coronary Stenting- is performed during a Cath, where a mesh like device is left in place to prevent further occlusions. Patients on stent will generally be placed on Clopidegral (Plavix)

Prior to Cath

- NPO 6 Hours Prior
- Consent
- Femoral or radial location
- Mark Distal Pulse site if femoral get baseline
- Procedure may give the patient a metallic taste and feel flushed with the dye
- Assess for shellfish allergies

Any Post Catheter CABG Invasive studies patients will be

- Empty Bladder
- Assess pulses to monitor Occlusion
- Apply pressure at least 15 minutes to stop bleeding and hematoma
- Monitor for Bleeding looking at the dressing (NOT REMOVING DRESSING OR SAND BAG: though bands are more frequently used they are not evaluated generally in the NCLEX)
- Hematoma
- Tell patient they may feel heat, palpitations, or desire to cough with dye injection. That is EXPECTED
- Post- Vital signs every 15 minutes x 2 hours-4 hours. Keep leg straight, no elevations
- Bedrest 6-8 hr.
- Keep fluids going



Cerebral Angio prep

- Well hydrated
- Lie flat
- Pulses marked
- Post- keep flat 12-14hr
- Check site
- Pulse
- Force fluids to remove circulation dye

Always monitor the insertion site for bleeding- do not remove dressing or sand bag

Observe for hematoma formation – check pulses change in circulation distal to insertion site

Assess vital signs, and have patient remain on the monitor in lead 2 to Monitor St Elevation, depression new dysrhythmias

Patients may be on a Heparin Drip. Follow agency policy in regards to Heparin Gtt

Heparin Drips Normal Process

Get Baseline Ptt/aptt The goal is a PTT- 1.5-2 times the normal

Have available Protamine Sulfate Antidote

When a patient is on a Heparin drip, we Monitor Triple H & SOGI-PAIN

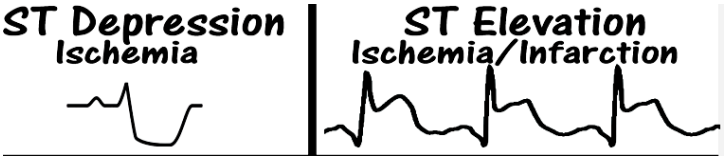
- Hematuria
- Hemoptysis
- Heparin Induced Thrombocytopenia
- Stools
- Occult Blood
- GI-Pain

RULE 23: Patient on anticoagulant in the hospital or at home: Check for the herbs that may inhibit coagulation, or "quadruple GI Bleed!" Ginseng, Garlic, Ginger, Gingko

Quadruple GI Bleed all contraindicated with Anticoagulant-Hold and Educate

- Ginseng – Gingko – Garlic - Ginger

Post catheterization, angio PCI, we monitor in Lead 2 for Dysrhythmias ST Elevation, or Depression or other life threatening dysrhythmias.



PTCA is interventional. During a Cath this may place a STENT or an atherectomy (take clot out). The problem is that this might re-occlude, so monitoring for chest pain and bleeding is priority post Cath and cardiac tamponade.

Coronary artery bypass is done when all other interventions fail or complications are imminent.

MID Cab is a minimal invasive CABG used for 2 or less vessels.

Complications post Cath are

- dysrhythmias, fluid and electrolyte imbalance
- hypotension, hypothermia, hypertension
- decreased level of consciousness.

Patients may have a mediastinal tube, which needs to be monitored for kinks and clots. If it gets blocked it may result in cardiac tamponade, which is an acute finding requiring immediate intervention.

Cardiac Tamponade happens as the blood or fluid is built up in the Pericardium. The Heart Sounds are generally Distant or muffled.

- Caused BY Invasive procedures around the heart, Trauma, or MVA

As fluid builds up, these are the characteristic assessments

"Triple D"
- Distended Neck, since the fluid is backing up and the heart can't pump
- Distant heart sound or MUFFLED, since too much fluid built up around the heart
- Decreased Blood Pressure

RULE 24: Triple D is mostly the assessment findings in a patient with Cardiac tamponade. Distended neck veins, Distant or muffled heart sounds, and Decreased Blood pressure. THIS AN IMMEDIATE ACUTE FINDING post Cath or on assessment

Treatment for tamponade is generally a drain or peri cardiocentesis, which is a procedure where they stick a needle into the pericardium and drain the fluid.

Always, continue to monitor for recurrent tamponade with

Cardiovascular Disorders

The Overview from CAD going to MI

CAD = ARTERIOSCLEROSIS AND ATHEROSCLEROSIS(chronic) until it becomes

ACS Acute coronary Syndrome(Angina, MI, Symptoms of MI)

Coronary Arteries are damaged by Smoking, Stress, Diabetes, Obesity, Alcohol, Hypertension, Hereditary

CAD -Is diagnosed by Labs and Diagnostic Procedures as patients are often asymptomatic prior to Myocardial Infarction.

- **Calcium Study**– Identifies Start of CAD as calcium deposits happen before hardening
- **Triglycerides** <200 We want that value low since circulatory cholesterol can bind to the sides of the arteries since they are inflamed or damaged. Inflammation is identified by an elevate CRP greater than 3
- **LDL<150**(LOW DL (DOW LOW) Want Low- Additional circulatory cholesterol
- **HDL>40 Female Male > 50** This is the good cholesterol (want high) that helps remove the bad (LDL) cholesterol
- **CRP- <3** (Inflammation Marker) Want this value Low

HgbA1c <7 Diabetes Marker. We want Low if they are diabetic

Arteriosclerosis is a Hardening, preventing dilation of the arteries. During exercise, the arteries would normally dilate to allow for more perfusion. If they have Arteriosclerosis the cardiac muscle requires more oxygen and they can't dilate to meet the demand, and chest pain or angina is the result.

Atherosclerosis (at the wall) involves the formation of plaques within the arterial wall. Once these plaques grow they develop deposits of calcium resulting in a positive calcium study. These plaques can rupture, migrate or become lodged in a coronary artery causing an MI.

Angina results from several conditions. A patient can have a history of Coronary artery that has deteriorated to the point of no longer having the ability to vasodilate and meet the demands of the cardiac muscle. Or the patient can have a ruptured plaque that blocks a coronary artery, causing ischemia or chest pain. Angina can also be the result of a patient with a long history of cardiac problem, like cardiomyopathy.

Whenever arterial blood flow is impaired it will present as two conditions

Angina (low oxygen to heart tissues) = oxygen deprived but no dead heart tissue

MI - Myocardial Infarction = prolonged oxygen deprivation leading to dead heart tissue

Prior to MI chest pain is called Ischemia, which shows up as an ST depression on an ECG. This occurs when there isn't enough oxygen to meet the requirements of the heart.

RULE 25: ST Depression is Ischemia, an indicator that there is a lack of perfusion to the myocardium if not treated immediately it can result in an Infarction.

Infarction is the result of cell death, showing up at ST Elevation on the ECG, or Elevated Cardiac Enzymes on the labs. This occurs when ischemia is prolonged, causing irreversible damage to tissue.

Angina is classified into 3 Types

Stable - Chest discomfort that most often occurs with physical activity or emotional stress, cold, heavy meals and smoking. Chronic stable angina presents on exertion and the intensity remain the same over time. Stable angina resolves with rest or nitro.

This type of angina results in only slight limitation of activity and is usually associated with a fixed atherosclerotic plaque. Stable angina is relieved by nitroglycerin or rest and managed with drug therapy but rarely requires aggressive treatment.

- Relieved with Nitro & Rest

Variant or Prinzmetal- This type of chest discomfort happens at rest, while sleeping at night, or sometimes caused by coronary artery spasm(like a metal cymbal).

- Relieved with Nitro and longer acting nitro like imdur(isosorbide), since treatment is required while they sleep and these patients are generally on calcium Channel Blockers

- **RULE 26:** Ischemia is monitored in Lead 2 and will show up as ST depressions on an ECG

If ischemia is prolonged for a period of time, Infarction or cell death will result showing up as ST Elevation on the ECG

Lifestyle Changes Higher Maslow Teaching for patients with Angina

- Avoid constipation: these patients may be on stool softeners
- Avoid excessive exercise in cold weather
- Low Sodium, Low Fat diet
- Healthy BMI
- Rest after meals
- Promote tobacco cessation

Nitroglycerin: Nitro Patient Teaching

Nitrates are used during angina attacks or chest pain episodes. Often this medication will relieve pain through vasodilation of the coronary vessels. Headache is an expected response since the head is a controlled space with a limited cerebral area and the vasodilation causes increased pressure. Blood pressure would be expected to drop, as well, as the vessels dilate.

Nitro is given IV as a drip, sublingual and transdermal. It is contraindicated in patients with Increased Intra Cranial Pressure due to vasodilating the vessels in the brain, which can lead to further increased cranial pressure, leading to infarction.

Nitro is also contraindicated in patients taking erectile dysfunction medication like tadalafil (Cialis)

It is important to note that they are at greater risk for Hypotension with IV Nitro requiring a necessary ongoing assessment of blood pressure every 15 minutes.

Nursing Administration of Nitro includes:

- Do not shake Nitro Bottles
- Wear Gloves when handling nitro due to absorption
- Do not massage or rub paste into area
- Cover with Clear plastic Wrap or tape
- Gradually reduce dose and frequency over 4-6 weeks
- Optimal Location for patches- Upper Chest, side of pelvis or inner upper arm
- Rotate sites 12 hours on and off to decrease tolerance

Some patient teaching on nitro:

- Take every 5 minutes at onset and up to 3 doses, if pain is not relieved after 1st tablet notify 911
- Store in dark, dry spot and replace every 6 months
- Patients that are taking nitro daily as a patch need 12 hours on 12 hours off to prevent tolerance
- Apply patch in morning and take off in evening
- Take tablets while sitting down
- Erectile meds are contraindicated with nitro

Nitrates

Given for Acute & Chronic Chest Pain
Dilates Arteries, Veins decreasing
Preload & Myocardial Oxygen Demand

Sublingual Tablet-Nitro-Stat
Translingual Spray-Nitrolingual

RAPID onset- Short Duration is used during an Acute/Chronic Angina Part of "ONAMB"

Do This ?

Stop Activity At first sign of chest pain
Take 1 Tablet let dissolve -Rest 5 minutes
If pain not resolved Call 911 then
Take 2nd Tablet let dissolve rest 5 Minutes
If Pain not resolved
Take 3rd tablet Still Pain think MI!
DO NOT TAKE/GIVE MORE THAN 3 TABLETS

Translingual Spray in Oral Mucosa
Store Tablets in
Dark-Cool Bottle Replace every 3 months
Don't Crush -Chew-Swallow

Nitro Drip

Used for Angina Not Responding to Other Meds
Heart Failure Resulting from Acute MI
Use Tubing Provided- Glass Bottle
Continuous Acute Drip- Put On Monitor
Assess Blood Pressure- ANGINA

Look For ?

Dry Mouth—Blurred Eyes
Syncope
Reflex Tachycardia- ? Beta Blocker
Dizzy- Orthostatic Risk
Headache- Tx ASA -Tylenol?

Hold For or ?

"Nitro- C-ICP BAR-DV-Fil"
C-Class ICP Risk (vasodilation)
Beta Blockers
Anemias Severe
Renal Disease
Diltizem Verapamil
Fil- Sildenafil-Vardenafil
(Viagara)

Topical Ointment-Nitro-BID
Transdermal Patch-Nitro-Dur

SLOW Onset-Long term Prophylaxis for angina attacks (chronic stable angina, Variant Prinzmetal angina)

Do This ?

On Skin - Cover with clear plastic wrap
Do not Touch with bare hands!
Rotate Patch -No Patch At Night
Patch on Patch Off 12 hours on 12 hours off
Don't Cut Patch- Look for Tolerance

Imdur-Isosorbide="bide"

"abide the long time &
swallow with water & metal "
Abide= "bide"= Class
Long time=Long Acting
Swallow- Empty stomach with
Water- with water
Metal For Prinzmetal or variant

Nursing Kamp—All medical decisions/Values are different per organization these notes are for methods of illustration ALWAYS FOLLOW POLICY— nursingkamp.com

Nursing KAMP Cardiac Complications Angina Classifications Level 1

Angina Pectoris is or chest pain is the result of poor blood flow through the coronary arteries. All Angina types should be viewed as potential warning signs that can result into Myocardial Infarction so MD should be notified & EKG.

Chronic Stable Angina

Chest discomfort that most often occurs with activity or emotional stress. Relieved with Nitro & Rest

Do this! Angina!

Stop Activity- Think EKG?
Oxygen? Stay With Patient!
Assess for Chest pain
Chest Pain Continues? Yes?
Give 1 Nitro Re-Assess
5 Minutes
Chest Pain Continues? Yes?
Give 2nd Nitro Re-Assess
5 Minutes
Chest Pain Continues? Yes?
Give 3rd Nitro
Unrelieved!

Anticipate ?
Myocardial Infarction!

Prinzmetal (metal vibrates) "Variant" Angina

Chest discomfort happens at rest while sleeping at night or same time caused by coronary artery spasm.

Do this! Angina

The Nurses Notes

Chronic Stable angina and Variant are NOT associated with
DANDESTE
and relieved with NITRO and last less than 15 Minutes
Diaphoresis
Anxiety
Nausea
Dyspnea
Ecg Changes ST Elevation

Acute Unstable Angina

Chest Pain that Occurs without Cause or Chest Pain Lasting longer than 15 Minutes
Follow Myocardial Infarction Protocol (Level 2)

Myocardial Infarction Protocol

O-Oxygen
N-Nitroglycerin Sublingual
A-Aspirin 81 x 4
M-Morphine
B-Beta Blockers

The Nurses Notes

Any Chest Pain is an Acute Event patient should be placed in the High Fowlers position, Assess PAIN ongoing PQRST— Vital Signs
Look for Standing Orders
Oxygen, EKG, MEDS, Notify MD- Cardiac Enzymes

All Angina Monitor in Lead 2 Monitor For?

ST Depression
Ischemia

ST Elevation
Ischemia/Infarction

Nursing Kamp—All medical decisions are different per organization these notes are for guidance of methods of illustration ALWAYS FOLLOW POLICY— nursingkamp.com

Unstable Angina: Both stable and variant angina can become unstable angina. This is the result of plaques rupturing or a blood clot forms that impedes blood flow to the area of the heart below the occlusion. This results in chest pain. If it is unrelieved by nitro or rest it is Unstable Angina. Unstable can occur without Cause or is Chest Pain that is lasting longer than 15 Minutes; this results in ACS, or Acute Coronary Syndrome.

Myocardial Infarction Manifestations:

- Severe chest pain, unrelieved by nitro
- Crushing Quality, Radiates to Jawline, left arm, neck of back
- Diaphoresis
- Nausea, vomiting, anxiety and fear
- Tachycardia
- Hypotension
- Dyspnea
- Dysrhythmias

- **RULE 27:** Women and diabetics often report no pain with Myocardial Infarction, so presenting data history is important

Follow Myocardial Infarction Protocol in this order

"HONAMB PT order of Priority"

H– High Fowlers- Expands lungs allows for oxygenation

O-Oxygen– 2-3 Liters NC- Allows for perfusion of the myocardium (though current guidelines optional)

N–Nitroglycerin (N200) Sublingual – Vasodilates coronary arteries to allow for perfusion and potential passage of potential blockage

Give 1 Nitro Re-Assess 5 Minutes Chest Pain Continues? Yes?

Give 2nd Nitro Re-Assess 5 Minutes Chest Pain Continues? Yes?

Give 3rd Nitro THINK MI!

A-Aspirin 81 x 4– Assess HX prevents platelet aggregation at the site of injury and if there is a clot

M–Morphine –IV Decreases Preload causing the heart to work less

B–Beta Blockers? Decreases preload causing the heart to work less

P-PCI Notify Team?- This may happen depending on facility and finding

T-Telemetry ECG lead 2 is Ongoing and monitoring for ST depression, elevation and dysrhythmias and a 12 lead EKG

Generally, MI's in NCLEX and testing are based around recognizing the complications of presentation and the main hallmark signs of assessment and indicators

When the Patient is on an ECG, Telemetry

- Are they being monitored in Lead 2?

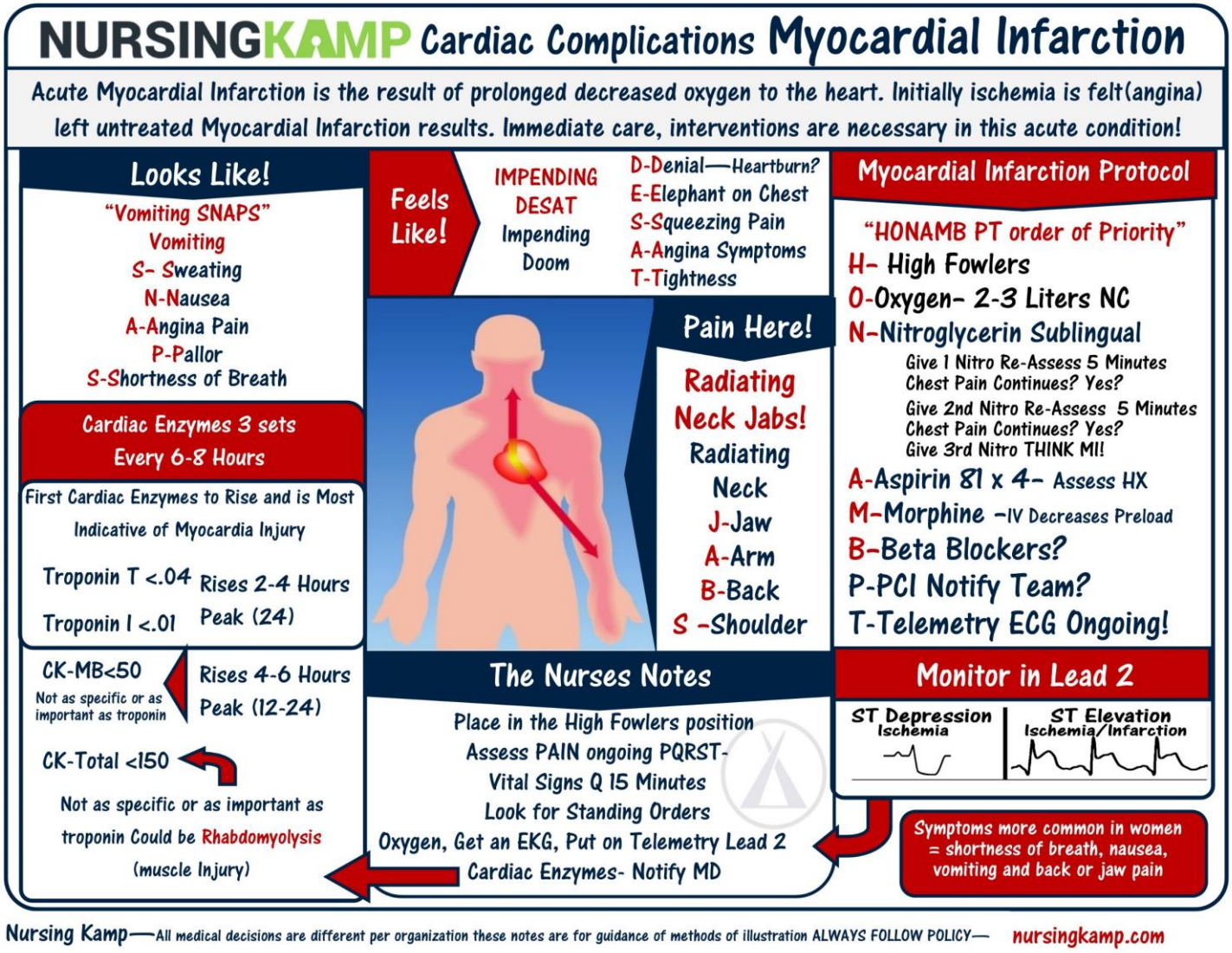
- ST Elevations present equal MI (note if a patient is admitted with an MI this is expected)
- ST depressions = Ischemia or infarction may happen if not treated
- U or Q Waves- previous MI

Patient symptoms

- Denial or Heartburn
- Elephant of the chest feeling
- Squeezing pain tightness
- Radiating neck, jaw, left arm back shoulder
- Diaphoretic, Clammy
- Pale or Pallor

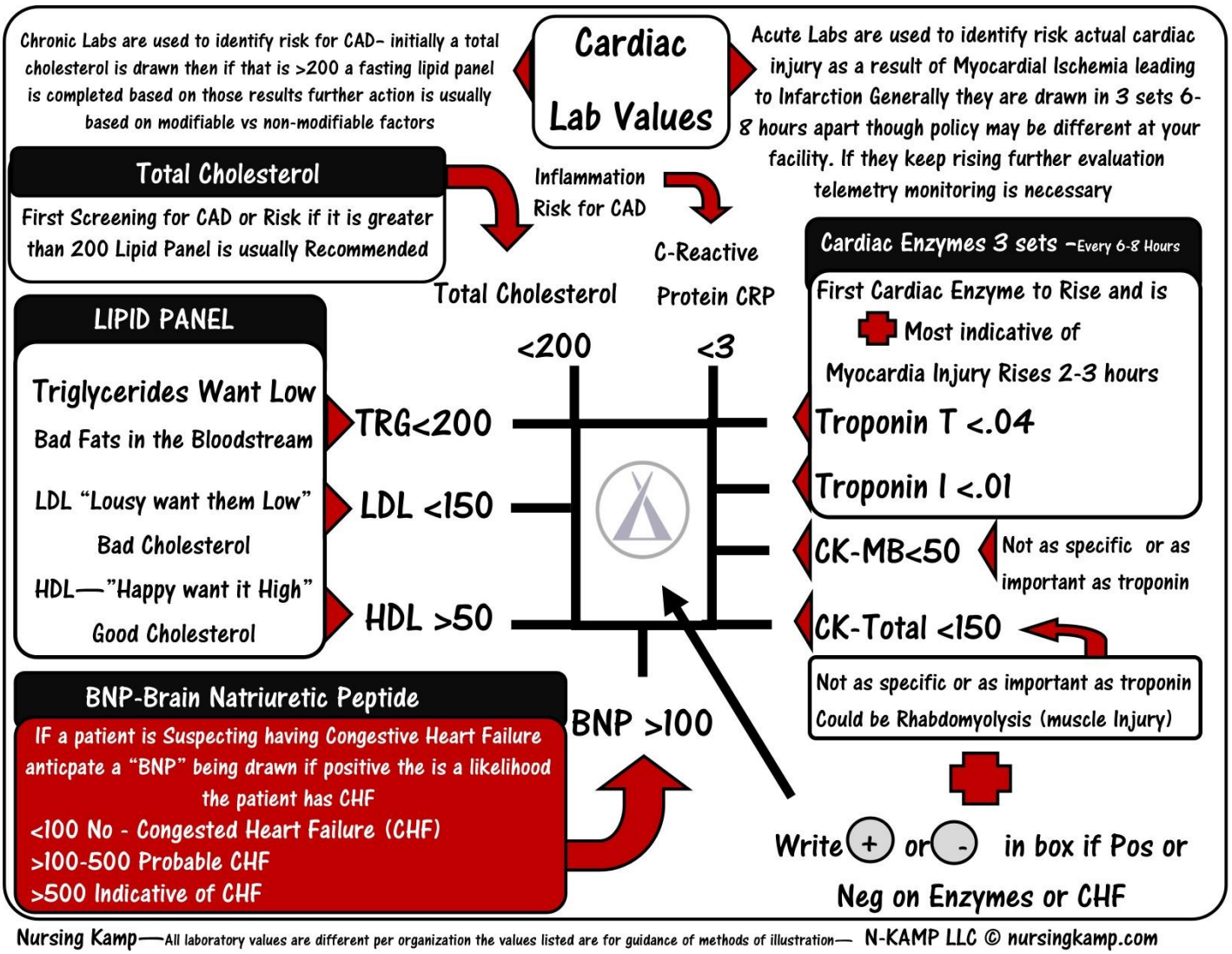
Females may present with no chest pain

- Labs Troponin rises first and angina that is not relieved by nitro is considered MI



- **RULE 28:** CK total labs reflect muscle injury not necessarily cardiac in nature. This can be the result of trauma. When the total CK is elevated in places the patient is at risk for rhabdomyolysis, which can result in acute kidney injury. Always look for the differentiated CK-MB, which is related to Cardiac specifically.

Cardiac Enzymes on the labs occur when there is damage to tissue.



Chronic stable angina is different, as it occurs only on exertion and the intensity remains the same over time and resolves with rest or nitro. Though it does cause some limitations on activity, it is usually predictable. It is usually associated with a fixed atherosclerotic plaque that is relieved by nitroglycerin or rest.

Chronic stable angina can become Acute coronary syndrome, or ACS, which is a presentation of unstable angina or an acute MI. Termed unstable angina or chest pain, it occurs either at rest or with exertion and is always Acute and HONAMB should be evaluated, MD notified, and EKG completed

There are other causes of Chest Pain that are not Cardiac. These may be confused with a cardiac event though enzymes may be negative.

NON CARDIAC CHEST PAIN CAUSES- Remember NCLEX will not try and trick you, it will provide the history before the symptoms so look at the data in the question when chest pain is involved

- Thoracic Dissection (acute surgical intervention needed)
- Pericarditis (Presents specifically as "intermittent" chest pain aggravated by swallowing, food or supine position(assess) RELIEVED BY LEANING FORWARD (Intervention)
- Esophageal Rupture- Post Endoscopy- Sharp pain is acute and any red bleeding from mouth is acute!
- Pancreatitis – Upper gastric pain, Elevation of Amylase Lipase (assess Labs)
- Peptic Ulcer- Discomfort relieved with FOOD, antacids(Assess)
- Biliary Disease- May radiate to back right shoulder blade
- Pulmonary Embolism – Pain on inspiration the result of Virchow's triad- three things that can cause a clot, trauma, stasis and hypercoagulability
- Pleuritis- Pain with breathing (question pneumonia)

RULE 29: Do not jump to the conclusion that chest pain is a myocardial infarction. Look at the assessment DATA in the question when it is coupled with chest pain.

Remember that any Chest Pain is acute despite its underlying cause. Generally, a nurse will have time for interventions in cardiac since **"TIME is Muscle."** An Infarction is a dynamic process that does not occur instantly; rather, it evolves over a period of several hours.

Post MI Teaching

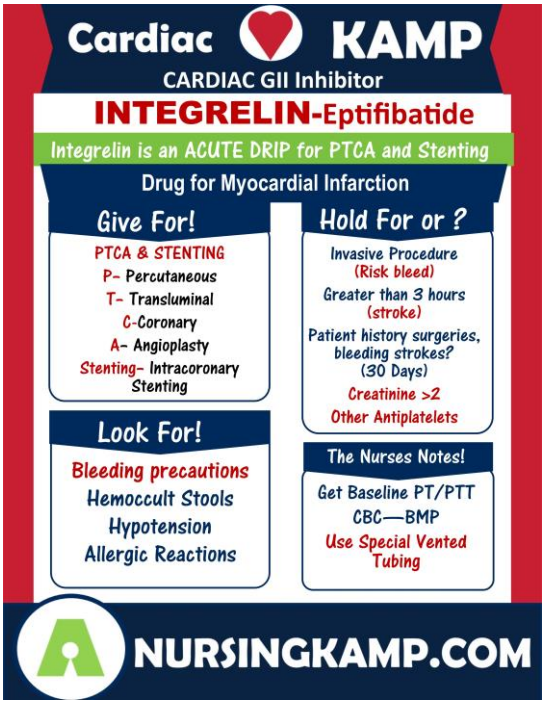
- Stool softener may be given
- Low fat- low Salt- Low Cholesterol Diet
- Use a bedside commode vs a bedpan (requires more energy and straining)
- Stress Management

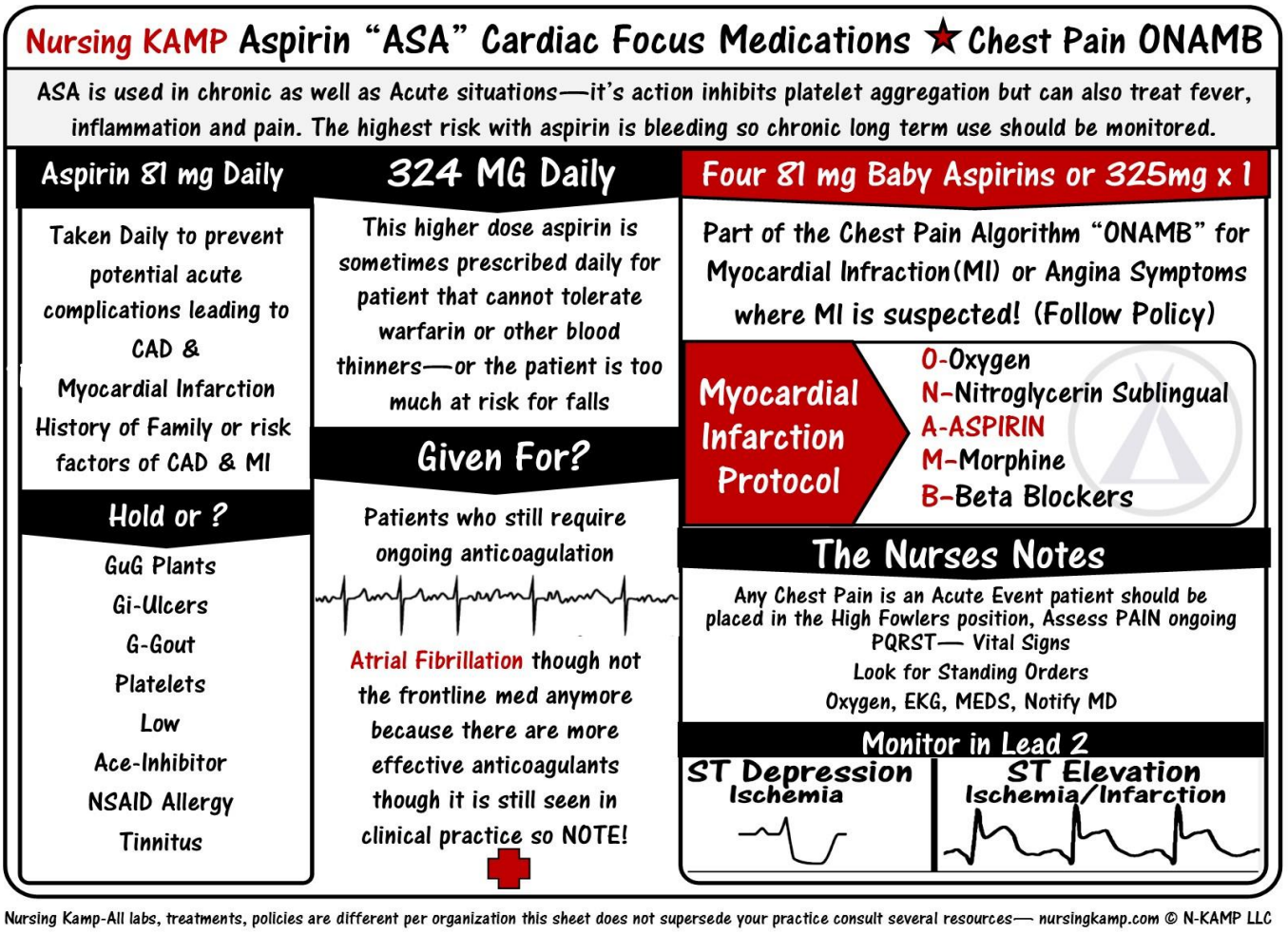
Try to encourage the client to work on modifiable factors

Aspirin 81mg is generally taken daily to prevent clots that further block coronary arteries and platelet aggregation or more ACUTE 324, or four baby aspirins in the MI protocol HONAMB.

Integrellin- Is an acute drip given during a PCA or Stenting. It prevents clots forming and the patient will be at risk for bleeding. Baseline Pt/Ptt is necessary and monitor renal labs. Special tubing is required for administration.

Ateplase- Thrombolytic critical drip given to break up clots thrombosis for ischemic strokes less than 3 hours. High risk for bleeding Pt/PTT CBC should be monitored. Can be given with heparin.





Deep Vein Thrombosis(DVT's) and Pulmonary Embolisms (PE's) are Acute as they are episodic, requiring immediate action

Reasons behind a clot called Virchow's Triad: These are things that will cause a clot or arterial occlusion and these are acute. This is a concept to be understood in the NCLEX, since clots can happen anywhere to normally healthy individuals.

Thrombus (caught in vein) Embolus is moving

- P– Pregnancy- Weight, displacement, obesity, and increased estrogen
- E– Estrogen Therapy- **Increases activity of clotting factors (7) and platelets activity**
- D– Dehydration- Increased viscosity of the blood less plasma
- S- Sepsis- DIC affects the clotting cascade
- I– Immobility- Long trips, sitting for a long time
- F– Fibrillation – Atrial fibrillating; the thick blood increases clot formation
- V– Valve-Artificial- platelet aggregation
- A– Atherosclerosis- Plaques break away

- T– TLC's –IV Lines – Invasive platelet aggregation
- S- Surgeries – Mass tissue damage

Clots can show up in two forms. If new or suspected DVT is observed, you should always NOTIFY MD.

Expect Diagnostic testing to confirm DVT. Depending on location and severity of presentation, treatments vary. (follow policy)

ALWAYS Monitor for PE!
Look for (assess)

- C– Calf Pain
- H– Homan's Sign +
- E– Erythema
- W-Warmth
- S- Swelling

When the clot migrates, it can show up in the brain or lungs and cause a change of LOC, weakness; this results from a clot being lodged in the Pulmonary artery or branch, partially obstructing it. If new suspected PE is observed, NOTIFY MD immediately and assess patient.

- D– DVT History (Assess)
- P– Pain (do not band aid give pain medications for "suspected undiagnosed" dvt PAIN)
- ↓
- I- Inspiration (characteristic of PE and Acute)
- T- Tachycardia (see the BOAT and underlying cause)
- SSS- SOB,S3,S4 – (NEW HEART SOUNDS ARE ACUTE NOT ALWAYS FLUID)
- Blood-Blood in Sputum (BOAT HERE)
- Petechia on chest(red spot)

Monitor for the 6 Ps: pain, pallor, pulselessness, paresthesia, paralysis, and poikilothermic.

Patients with DVT's PE's are usually started on Heparin drip, and follow protocol

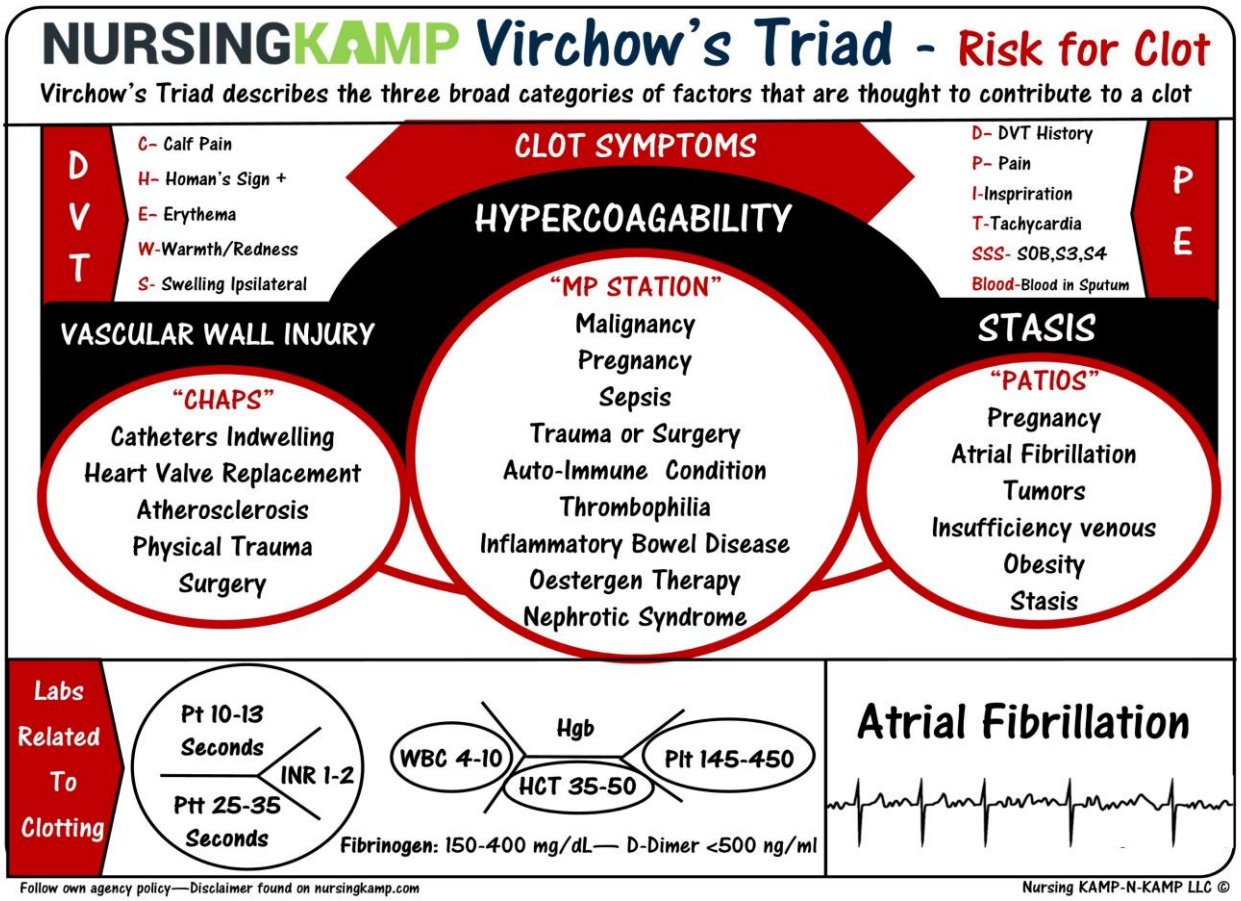
RULE 30: Never ignore symptoms like Petechia (red spots): they are always an indicator of potential complications and should be investigated.

Anticoagulants: Anticoagulants are ordered when there is a risk for potential clotting. This can be in relation to atrial fibrillation, DVT or procedural CABG, CATH. The main risk is bleeding with these medications.

Initially they are started on heparin drip. This is different than subcutaneous heparin that is often given to inpatients with risk for DVT due to stasis. Order of procedure may vary per institution but generally the process is as follows.

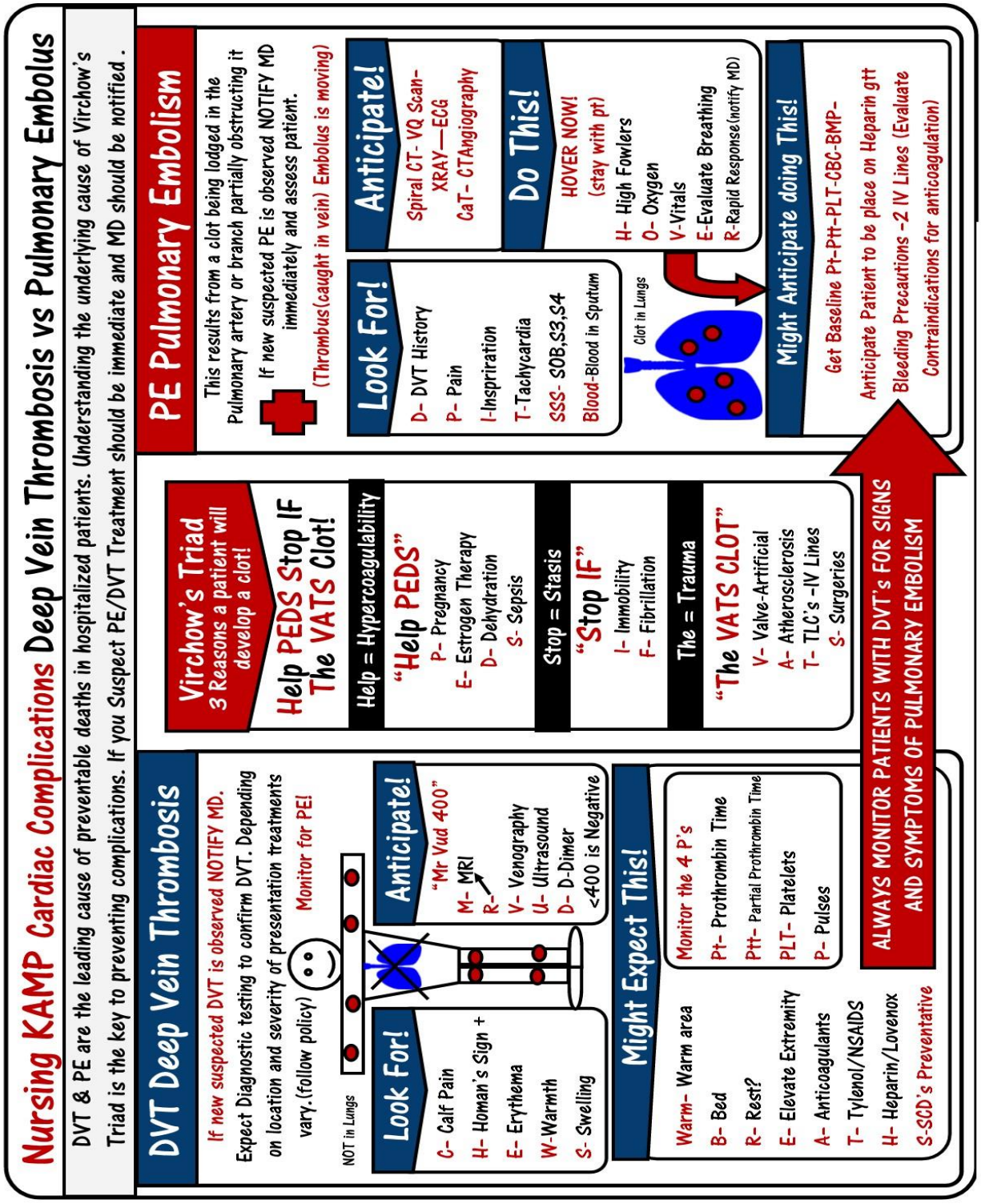
First the nurse needs to be aware of the antidotes prior to administration, in case reversal is needed in the event of excessive bleeding.

Protamine Sulfate is the antidote for heparin & **Vitamin K** is the antidote for Coumadin/Warfarin



Patient is at risk for a clot

- Dr orders a heparin gtt.
- PTT (Partial Prothrombin Time) is drawn to check baseline and this should equal 25-35 seconds
- Patient is generally bolused on heparin (following procedure)
- Additional Ptt is drawn to check if the patient is therapeutic (adequately) anti-coagulated. The range is generally 1.5-2 times the normal
- Depending on that value, the heparin drip is either raised or lowered and Ptt continues to be monitored.
- Once patient is therapeutic, the decision is made if they need to be on long term anticoagulants. If yes they are "Bridged" to next anticoagulant, usually coumadin.
- Pt (Prothrombin Time) and INR(International Ratio) is drawn to see what is the normal
- Both are given and both Pt INR are monitored until it gets therapeutic; INR -2-3 for normal coagulation, and 3-4 if they have a valve
- Once the patient is therapeutic the heparin is generally stopped.



- **RULE 31 :** Pt/INR is necessary for coumadin >4 is generally hold coumadin and anticipate possible Vitamin K administration

RULE 32: Ptt is for Heparin and signs and symptom or greater than 2 times > 80 the normal heparin is generally at a high risk for bleeding. Anticipate administration of protamine sulfate.

NURSINGKAMP Coagulation Labs PT-Prothrombin Time & Partial Prothrombin Time -HEPXA

If a patient is on Coumadin or Heparin or there is unexplained bleeding these labs are often drawn to evaluate patient status to include heparin drips which would provide a baseline- Some facilities use HEPXA instead of PTT always follow agency policy

HIGH PT CAUSES

"Licked the PT"

L- Von Willi brand's

I-Increased Bleeding

C-Coumadin to HIGH

K-Vitamin K Antidote

E-Eating Deficiency

D-DIC

Affects Extrinsic Clotting Factor 7

HIGH PTT CAUSES

"Willi DIC Heparin HELPS"

W- Von Willi brand's

D-DIC

Heparin

H-Hemophilia

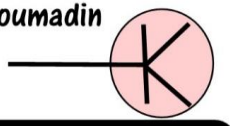
E-Eight (factor deficiency)

L-Liver Failure

P-Protamine

S-Sulfate(Antidote)

Reminder Vitamin K is the Antidote for Coumadin



If on Coumadin Look at INR for Therapeutic Range

PT—Prothrombin Time 10-13 seconds

PTT—Partial Prothrombin Time 25-35 seconds

INR 1-2

If on Heparin PTT should be 1 .5 -2 Times normal

Protamine Sulfate- Antidote

2 IV Lines with Heparin Drips

Affects Clotting Factors 8-9-11-12

INR	
1-2	Normal Range Not on Coumadin
2-3	Therapeutic For Being on Coumadin
3-4	Therapeutic For Patients with Valves
>4	ACUTE Think Vitamin K! Bleeding!

Monitoring with the HepXa allows for the ability to achieves coagulation quicker therefore is being used more than PTT (follow agency policy)

HepXA Level 0.3-0.7

FOODS HIGH IN VITAMIN K

BECKS Canola CABS

B-Broccoli
E-Endive
C-Cauliflower
K-KALE
S-Spinach
Canola-Oil
C-Collard Greens
A-Any Dark Green
B-Brussel Sprouts
S-Soy Bean

Meds that Affect Bleeding

No Chance Quadruple G

C-Clopidogrel (Plavix)
H-Heparin
A-ASA
N-NSAIDS
C-Coumadin (warfarin)
E-Escitalopram

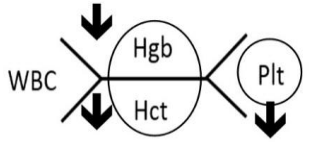
HERBS
G-Garlic
G-Ginger
G-Ginko
G-Ginseng

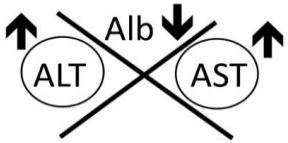
RISK BLEEDING!

Observe and monitor for Signs and Symptoms of Bleeding- PPS

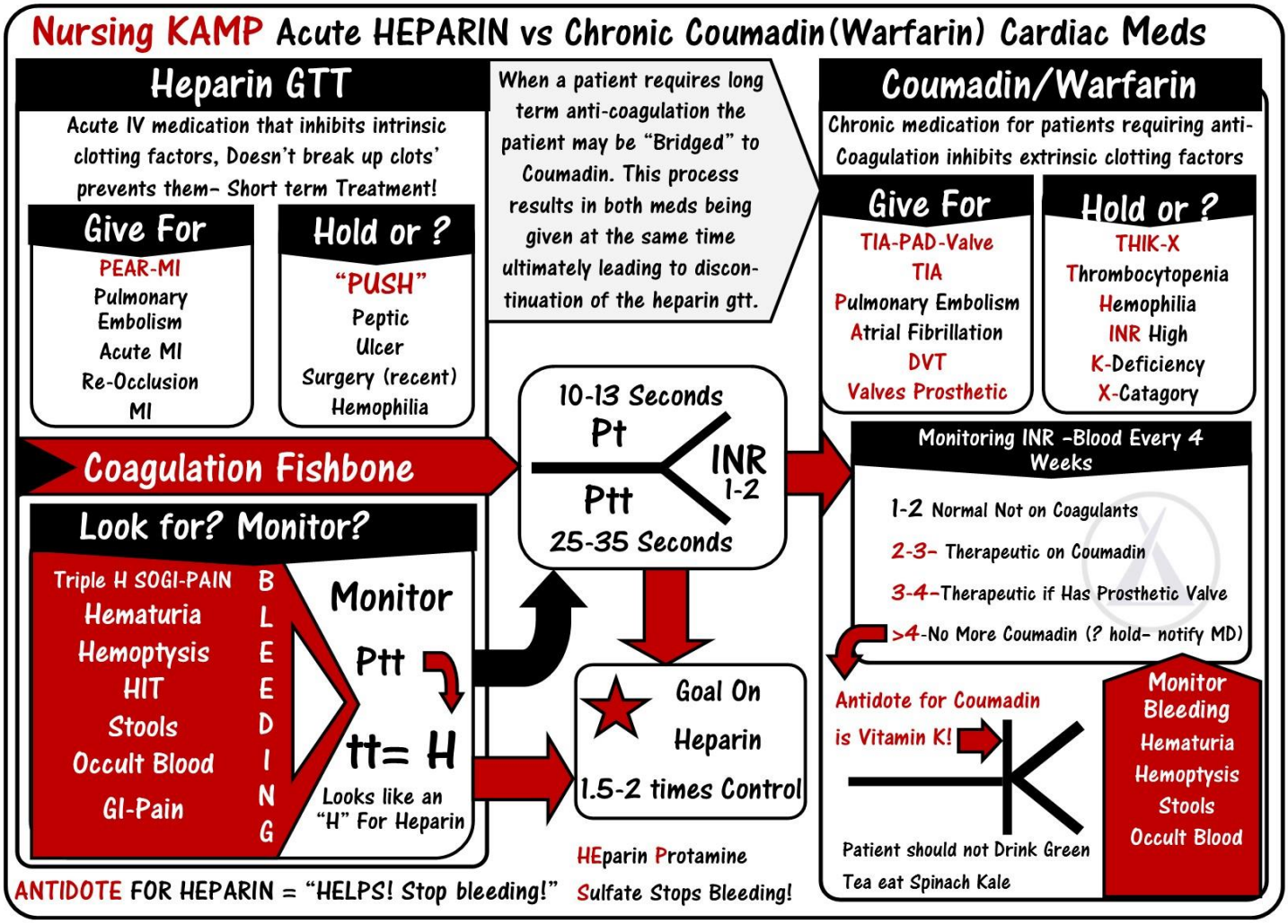
Petechiae, Purpura- Stools ⊕ Hemoccult

Look at Other Labs





Nursing Kamp—All laboratory values are different per organization always follow own agency policy —



ANEURYSMS OF CENTRAL ARTERIES

An aneurysm is a permanent localized dilation of an artery in the Thoracic or Abdominal area. Called a triple AAA for the abdomen, generally intervention is necessary since rupture is a major complication of this disorder.

Atherosclerosis, Syphilis, hypertension, hyperlipidemia, cigarette smoking, genetics, so choose your parents wisely

RULE 33: ACUTE- Any Ripping pain with history of AAA or pulsation of abdomen is acute. Aneurysms are like a ticking time bomb; risk for hemorrhagic shock! This patient needs immediate surgery.

Two Major Bleeding Signs and Assessment results in an immediate ACUTE! Though referred to Cullen and Turners sign, recognizing the symptoms as acute bleeding is more important than memorization of the term

- Cullen's sign – ecchymosis in umbilical area, seen with bleeding in the abdomen
- Turner's sign – flank grayish blue (turn around to see your flanks), bleeding in the abdomen

Aneurysms are generally asymptomatic other than a pulsing presence which shouldn't be palpated. Patients should be monitored for a symptomatic rupture which is acute and surgery should be anticipated.

Symptoms of rupture are Diaphoresis, Nausea, vomiting, pallor, hypotension, tachycardia, severe pain, and decreased level of consciousness or a pulsating abdominal mass.

- Do not palpate the aneurysms, as they may rupture.

Aneurysms may be seen incidentally on x-ray first, leading to a diagnostic CT to confirm diagnosis.

Assessment will be ongoing until it is >5cm; then surgical intervention is often warranted

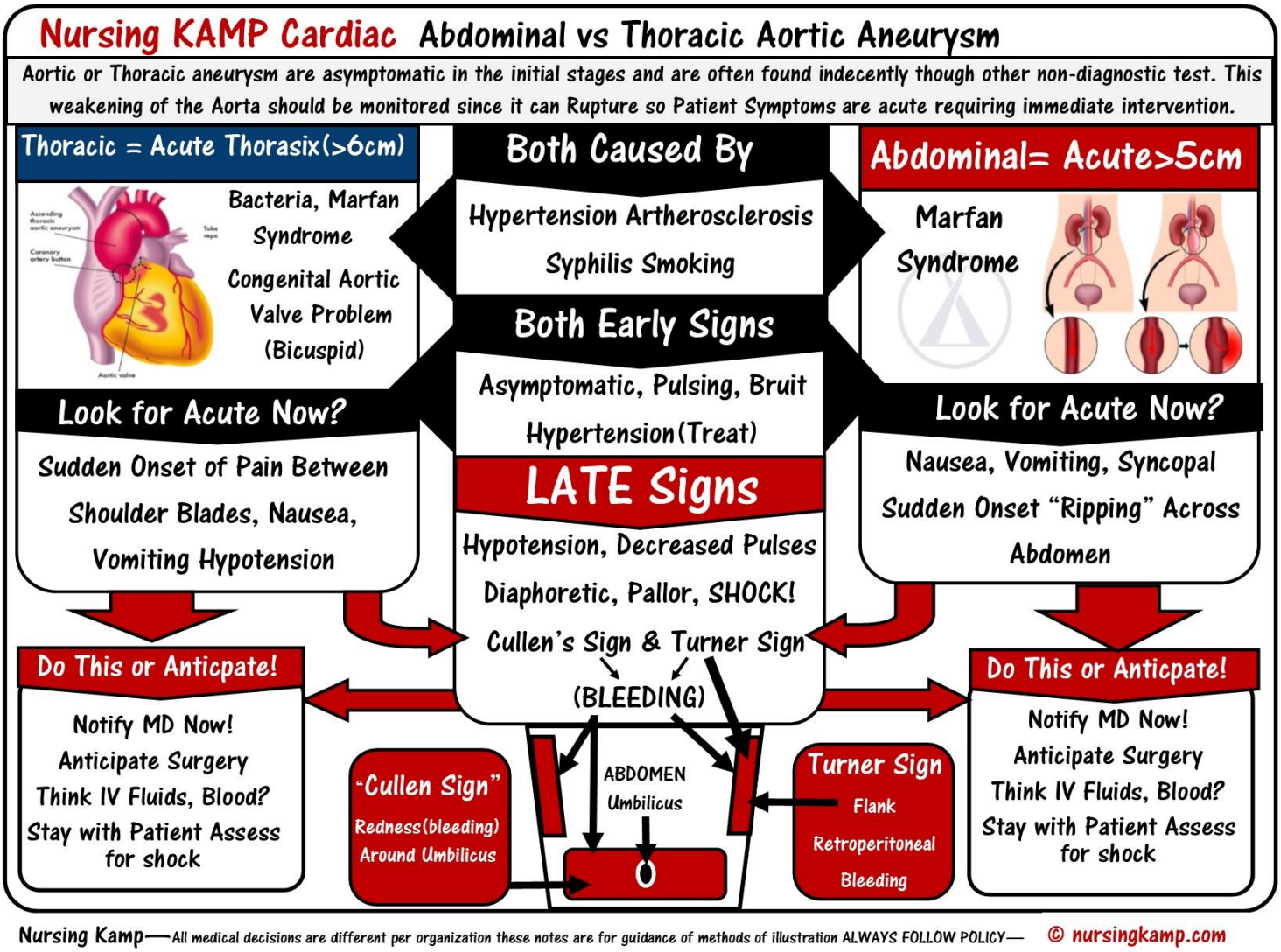
Prior to surgery, interventions are implanted to prevent any complications with a presenting aneurysm

Preventative measure - B-HANDS-100

- Beta Blockers- Usually preventive
- H-Hydralazine- Acute Anti-Hypertensive
- A-Apresoline – Vasodilates decreasing overall tension in the vascular bed
- N- Nipride-(Nightpride) keep away from sunlight - Vasodilates decreasing overall tension in vascular bed
- D-Don't Palpate any aneurysm - risk for rupture
- S-Systolic- 100-120 maintain below

Post-op AAA Repair is Monitoring the CHAIR

- C- Circulation-Assess signs of circulation (low BP, High HR, Low MAP, Pulses, Bleeding
- H- Hemorrhage
- A- Arterial Occlusion- Absent pulses are always acute!
- I- Infection- TIMING is everything with this, > 72 hours
- R-Renal Failure – Prerenal is a late sign, Elevated BUN/Cr



Congestive HEART FAILURE (CHF) Is Caused by Several Conditions

Heart failure results when the heart is unable to pump blood effectively, resulting in a decreased ejection fraction (EF). This can be described as either RIGHT-Rest (chronic) or Left (lungs) sided.

RULE 34: CHF is a chronic condition that should have exacerbations. Exacerbations are life threatening and require immediate action. Patients who are not having exacerbations are often managed in an ongoing fashion to prevent complications with diuretics and other medications

Causes of Heart Failure are

- HTN, Valve Disease or previous Myocardial infarctions

The ejection fraction is a measurement of the blood that is ejected out of the heart, which is determined with a bedside echo or TEE. Adequate EF should be greater than 60% for perfusion of the organs. If it is less than 60% fluid will result and present as either right or left sided symptoms.

Right Sided Heart Failure = Right (Rest of the body)

Right sided is more chronic, since it causes the heart's deoxygenated blood to back up into the venous system, which results in peripheral edema and venous congestion of the organs, liver, and spleen. This makes the Patient Feel "Full" and "Full of Fluid".

Symptoms of Right Sided CHF = **WET BEACH SAND! Wet: Wet Congestion Fluid!**

- B-Bilateral(congestion) – the problem is the right side of the heart isn't pumping effectively, resulting in the blood pooling or backing up before the heart- BILATERAL is key that this is most likely right sided heart failure (ipsilateral is ACUTE immediate action, could be occlusion, tamponade)
- E-Edema (congestion)
- A –Ascites (congestion)- As the venous system begins to congest, the fluid begins to third space resulting in ascites and hepatomegaly
- C-Congestion Symptoms
- H-Hepatomegaly(congestion)
- S-Shunting Symptoms
- A-Anorexia (Shunting/Congestion)
- N-Nausea (Shunting/Congestion)
- D-Distended Neck Veins (congestion) is CHARACTERISTIC of Right sided Heart Failure

RULE 35: Distended Neck Veins- First Decide if it is ACUTE or Chronic- Since questions presenting with distended neck veins are not always Right Sided Failure, first look at the question and the data in the question. If there is other information it could also be Cardiac Tamponade or Trauma

RULE 36: CVP- ACUTE Central Venous Pressure is the same as Distended Neck Veins, though it is a more accurate assessment of Right Sided Fluid Status. Normal CVP is 1-8. Though generally I like to think 4-8 since < 4 is generally LOW fluid status, and > 8 is too much fluid, if there is a CVP number in the question it is acute and asking about fluid.

LEFT SIDED Heart Failure = Left Lungs ACUTE!

This is the acute side, since it involves oxygenated blood that is backing up into the lungs. This results in crackles and problems with pumping oxygenated blood to the vital organs

Symptoms of Left Sided Heart Failure:

34 Dyspneic Lung CLOUD!

- 3-S3– Left Lateral 5MCL
- 4-S4 Left Lateral 5MCL
- D-Dyspneic
- C –Crackles-Not Clearing
- L-Lung– Lung Crackles
- O-Orthopnea Sleep Lying Down
- U-Urine-Decreased Perfusion first sign MAP is decreasing
- D–Decreased
- Elevated PAWP (Wedge Pressure) > 12

RULE 37: PAWP- ACUTE Pulmonary Artery Wedge Pressure (or PAWP) is an accurate assessment of LEFT Sided Fluid Status since it is achieved through a SWANN catheter. The normal wedge pressure is PAWP 8-12 - LOW fluid status= <8, and > 12 is too much fluid, so if there is a PAWP number in the questions it is important to think this is an acute question asking about fluid and left sided fluid

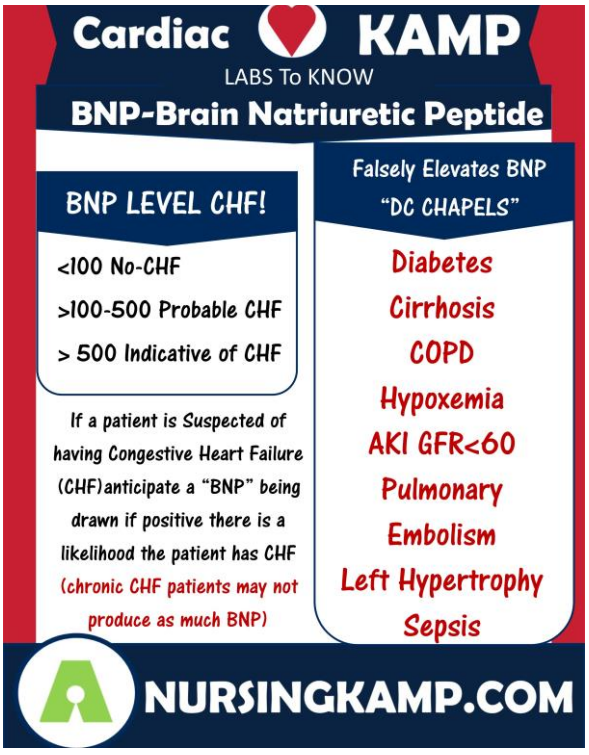
Left = Lungs and this is the ACUTE intervention Side
Treatment involves recognizing that this an acute complication and the heart is not pumping effectively and it is building up on the LUNG side.

- High Fowlers position- Increases the patient's ability to oxygenate. Patients with severe CHF generally will want to be sitting High Fowlers Dangling and never put supine
- Assess—Always Think Oxygen- Patients are often put on oxygen and sometime HIGH FLOW oxygen to increase pressure at the alveola level
- Vital Signs – assessment of oxygen saturations
- Standing Orders- Are there standing orders?
- Oxygen? Sometimes Positive Pressure machines help oxygenate the patient
- Anticipate an EKG, Telemetry, BNP and Notify MD

Meds to question are Beta Blockers with Heart failure patient and patients with Ejection Fraction in the 40s may be put on Digoxinfor atrial kick.

RULE 38: NEW s3 S4 Heart sounds and New Murmurs coupled with history of CHF or other Right or Left Sided CHF Symptoms is always ACUTE and should be assessed and notify MD

BNP -Brain Natripueritic Peptide(BNP)- Is an amino acid that is secreted by the ventricle. This is in response to the brain getting involved once the heart is failing to pump, as in heart failure. When the heart is in failure and exceeding its ability to pump, the brain recognizes that there is a decrease of cardiac output and perfusion to the brain. BNP is excreted, and this allows contractility. (This can be viewed as a last effort of the body.)



RULE 39: BNP -Brain Natripueritic Peptide- is the Main Lab to Evaluate to whether a patient has Heart failure. > 100 is generally indicative of heart failure, and >900 is severe heart failure.

From the American Heart Association – Reference to Classifications of Heart Failure

Doctors usually classify patients' heart failure according to the severity of their symptoms. The table below describes the most commonly used classification system, the New York Heart Association (NYHA) Functional Classification[1]. It places patients in one of four categories based on how much they are limited during physical activity.

Class	Patient Symptoms
I	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea (shortness of breath).
II	Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea (shortness of breath).
III	Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, or dyspnea.
IV	Unable to carry on any physical activity without discomfort. Symptoms of heart failure at rest. If any physical activity is undertaken, discomfort increases.

Class	Objective Assessment
A	No objective evidence of cardiovascular disease. No symptoms and no limitation in ordinary physical activity.
B	Objective evidence of minimal cardiovascular disease. Mild symptoms and slight limitation during ordinary activity. Comfortable at rest.
C	Objective evidence of moderately severe cardiovascular disease. Marked limitation in activity due to symptoms, even during less-than-ordinary activity. Comfortable only at rest.
D	Objective evidence of severe cardiovascular disease. Severe limitations. Experiences symptoms even while at rest.

http://www.heart.org/HEARTORG/Conditions/HeartFailure/AboutHeartFailure/Classes-of-Heart-Failure_UCM_306328_Article.jsp#

ACUTE Medications given in exacerbations of CHF

- Nesiritide-Natrecor (BNP Derivative Medication increases contractility)
- Milirinone-primacor (works on contractility while vasodilating decreasing afterload)
- Dobutamine-Dobutrex – (beta 1 Agonist medication increases contractility)

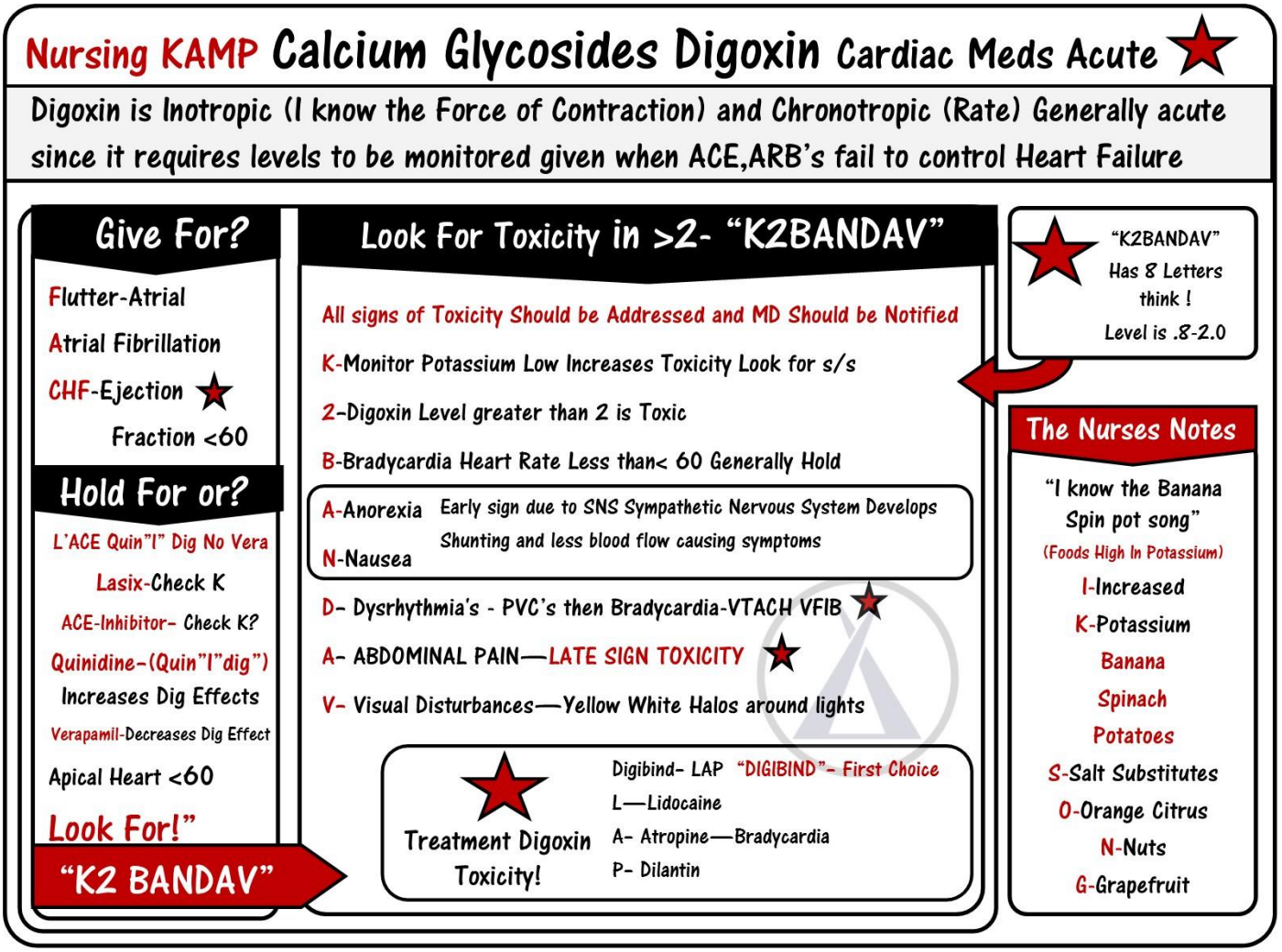
When patients no longer have an adequate ejection fraction, usually in the 40s Digoxin can be prescribed since it is a Calcium Glyceride that provides atrial kick or PUMP Inotropic. This requires additional blood work to check

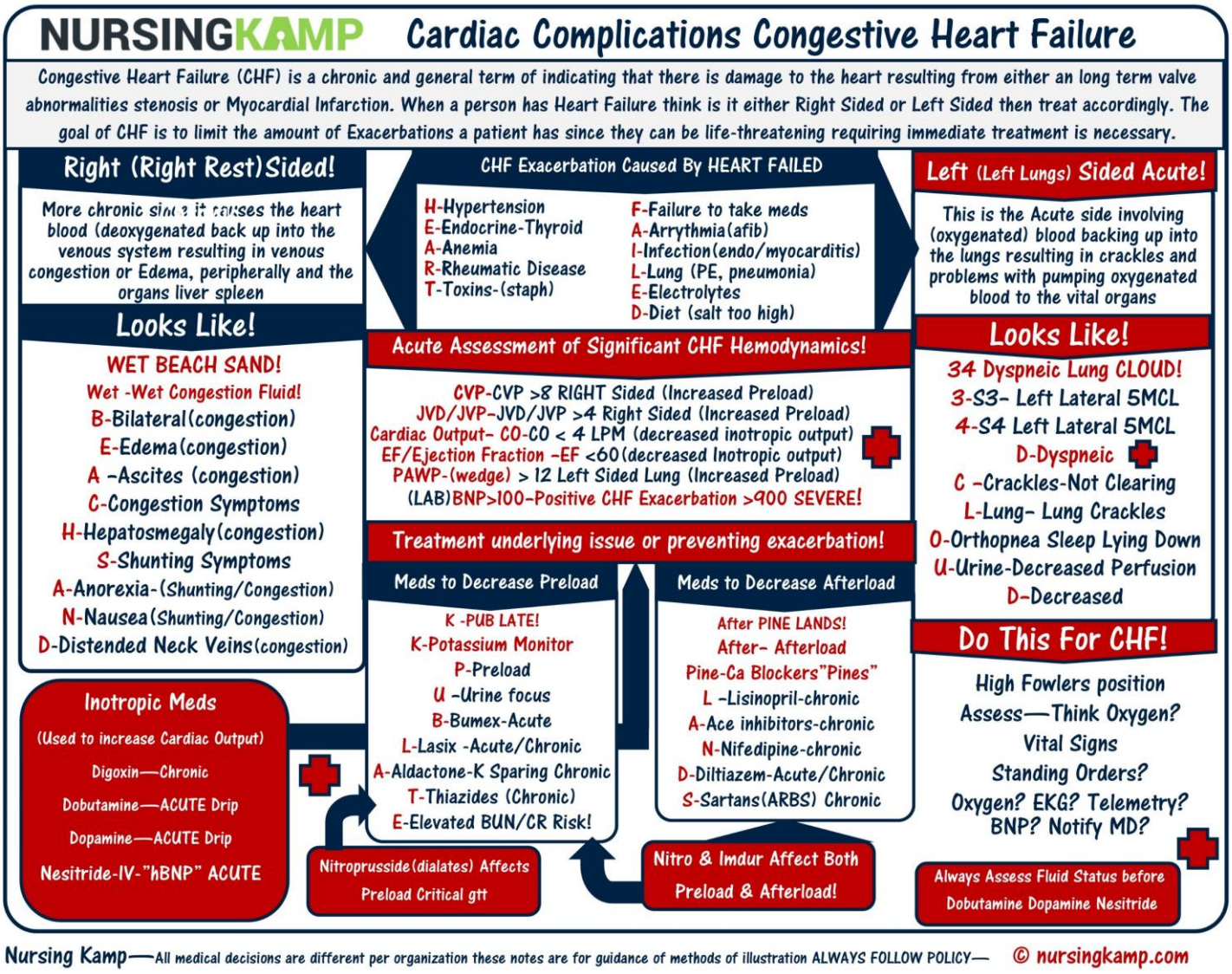
drug levels. Heart rates below 60 and greater than 120 should be held and investigated with this med

K2BANDAV for risk of toxicity and symptoms Normal Level 0.8-2.0

- K for monitoring potassium low potassium (check if the patients on Lasix, bumex)
- 2 for the level that it's greater than (Check if patient is in Kidney failure, or aldactone)
- B for bradycardia, so monitor apical pulse, and hold Less than 60 (may treat with Atropine)
- A-Anorexia is an early sign (so assess)
- N- Nausea is an early sign (never ignore digoxin in questions with nausea or anorexia)
- D-Dysrhythmias
- A-Abdominal Pain is a late sign: Acute NOW
- V- Visual disturbances – halos around light -Acute Hold

Digibind is the antidote for Digoxin and the level is .8-2.0. > 2 is Toxic and should be held if GI distress. It is given after meals
Toxicity dysrhythmias may also be treated with Phenytoin or Lidocaine
Verapamil increases risk of toxicity
Monitor older adults who are taking digoxin for manifestations of toxicity since they get toxic more quickly





RULE 40: Patients on Digoxin may be on Lasix or Spironolactone, and since both effect Potassium in some way, they are often tested on. Patients on digoxin can become toxic if the Potassium level is low

RULE 41: Muscle weakness, Cramps, Nausea, Loss of appetite while on digoxin should never be ignored. Assess Digoxin Level or Potassium Level

Lidocaine: Antidysrhythmic given in acute conditions for ventricular fibrillation and ventricular tachycardia. Sometimes in low doses it is given for PVCs. Only given IV and the nurse shoul monitor for drowsiness, cns depression and potential for seizures, Levels should be drawn with this medication. 1.5- 6 mcg/ml

INFLAMMATIONS AND INFECTIONS

Though not the most likely in cardiac or tested in the NCLEX, it is an area in which the nurse must have a general idea of the causes and symptoms the patient may present with.

Basically : Endocarditis= (EndoStartsOutside) IV Drug use or Staph and shows up as spots on hand and feet

Myocarditis- Middle Tissue Problem Virus or Bacteria CHF Symptoms s3, s4 Heart sound

Pericarditis- Peripheral Procedure related results in Tamponade Tripod Position Rubbing Heart Sound

Cardiac Tamponade – Complication of Pericarditis – Triple Ds Distant Heart Sounds, (muffled) Decreased Blood Pressure, and Distended Neck Veins

Three layers of tissue of the heart- Endocardium (Enter inside), Myocardium (middle), Pericardium (outside)

Endocarditis **=Endocardium** (Inside)

Endocardium = the Inside layer of the heart is the Endocardium. If you think the blood enters inside the problem, "E"nters (endocardium) the problem, that Starts (strep, staph) outside like IV Drug Use.

Endocarditis usually starts with Strep or Staph and the patient may generally be healthy, so pt history is important to assess for underlying causes.

Heart failure and arterial embolization from fragments of infection breaking loose and becoming lodged into vascular, this shows up as spots on the hands and feet, petechia with new onset murmur and increased WBC>10

A positive blood culture is a prime diagnostic test, though ECHOs can help define acute valve or structure issues. The treatment for endocarditis is drug therapy.

Myocarditis **= Myocardium (middle)**

Infection of the Myocardium can be acute or chronic, ultimately resulting in hypertrophy (big Hearts) or ECG changes

Caused by Viral (most common) or Bacteria

- Think CHF Symptoms/Treatment since the Muscle is Affected
- Echocardiogram– Evaluate LV Function since we want the EF greater than 60
- CHF– Monitor CHF symptoms
- Biopsy– Evaluate myocarditis if positive (antibiotics)
- Meds– CHF and Inotropic Decrease Preload treat Symptoms of CHF and decreased Cardiac Output
- Bed Rest– During Acute phase
- Treat Underlying Cause of Myocarditis

Pericarditis = **Pericardium** (peripheral outside)

Pericarditis is generally "P"rocedure related, CABG, Pericardiocentis or Viral. The patient is usually sitting forward and reports pain; there will be a friction rub heart sound and elevated WBC.

Infection of the pericardium can be acute or chronic. Most common is **PAID**

- Pericarditis ("P"rocedure related, CABG, Pericardiocentis or Viral)
- Aneurysm

- Infections (Bacterial Fungal)
    - Drugs- (chapp) Coumadin, Heparin, Procainamide, Phenytoin

Treatment for Pericarditis is PADSM

- P-Pericardiocentesis– To Drain Fluid- Keep additional set in the room Also
- A-Antibiotics– Treat Underlying infection
- D-Drain– (Pericardial) Monitor drains for kinks and clots for possible cardiac tamponade
- S-Steroids are given for inflammation
- M-Monitor ECG ST Changes and Angina
- N-NSAID's are given for Inflammation

This complication puts the patient at risk for cardiac tamponade, or excessive fluid within the pericardial cavity, restricting diastolic ventricular filling and cardiac output.

Penicillin is the antibiotic of choice for treatment.

Emphasize tertiary prevention, explaining that recurrences of carditis may occur with re-infection and antibiotic prophylaxis may be necessary for the rest of their life.

Cardiac Tamponade is the result of excessive fluid on the outside of the heart, resulting in ineffective pumping or cardiac output.

Caused by Blunt force trauma, Percardiocentesis, CABG

Becks Triad= 3 Ds = Three characteristic things that would indicate it may be tamponade

- Distant Heart Sounds (muffled flip bell of stethoscope)
- Decreased Blood Pressure (widened pulse pressure)

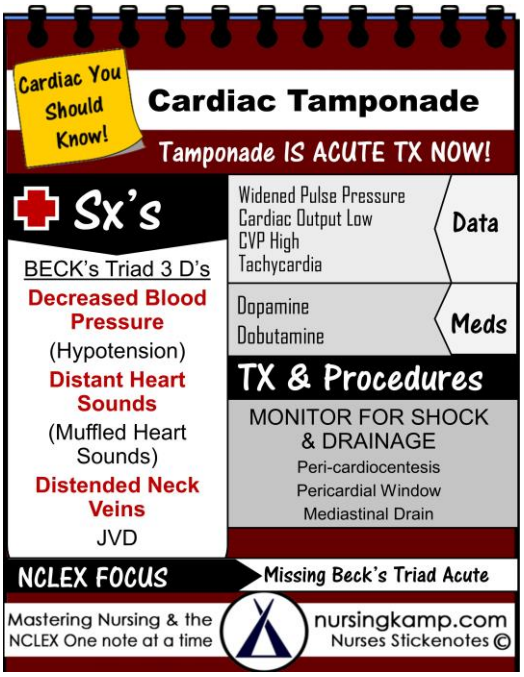
Distended Neck Veins (JVD)

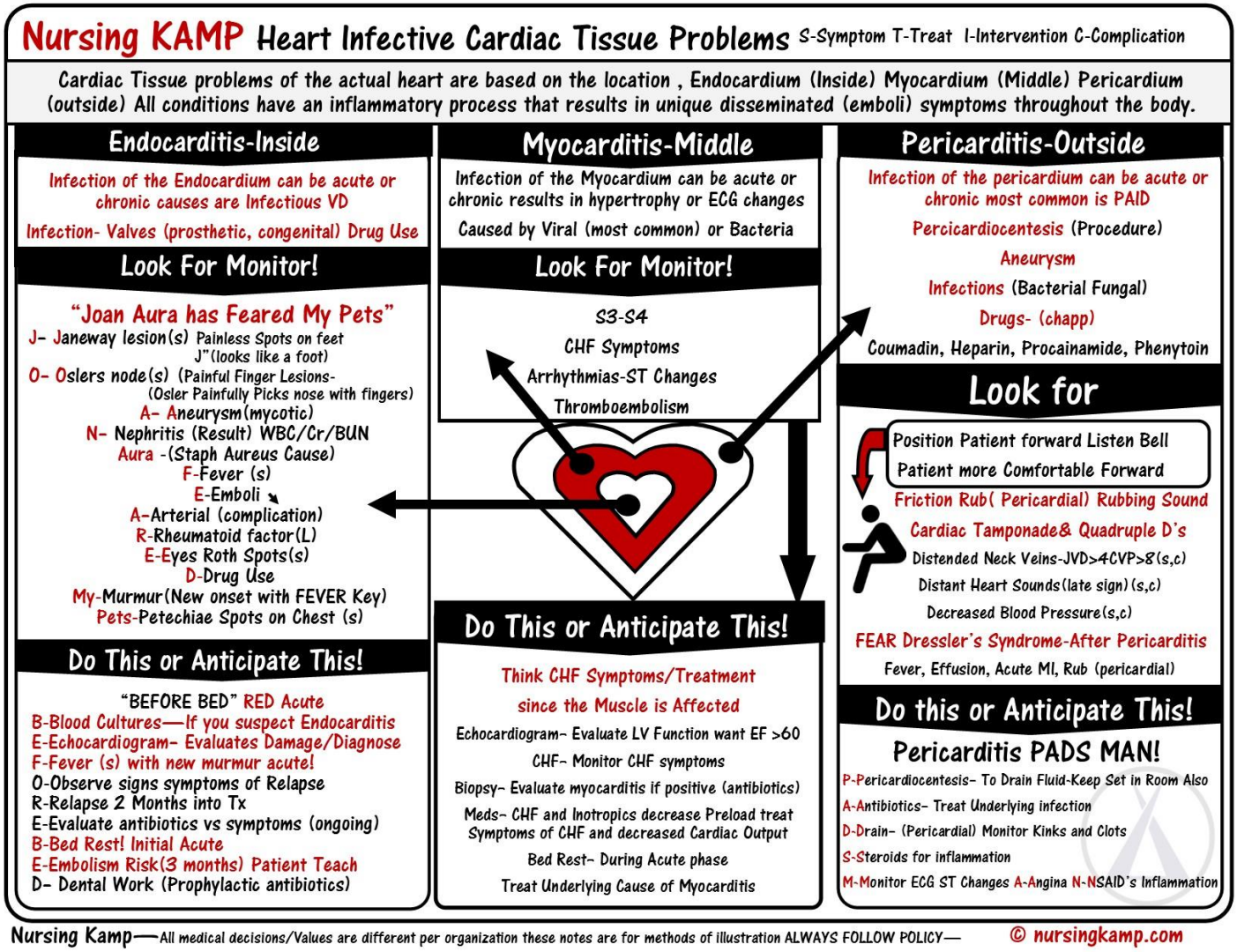
Treated with:

- Pericardiocentesis
- Perciardial window
- Drain

Drain should be monitored for Kink and Clots for recurring cardiac tamponade

RULE 42: Patients with pericarditis have a rubbing sound (like leather) on heart sounds positioned usually in the tripod. They may have hemoptysis and are at risk for cardiac tamponade





CARDIOMYOPATHY

Cardiomyopathy is a subacute or chronic disease of cardiac muscle that is classified into four categories on the basis of abnormalities in structure and function:

Dilated cardiomyopathy- D - "Floppy Heart" Basically this is like a balloon that has be blown up to many times its size; eventually it loses its elasticity

Hypertrophic Cardiomyopathy- BIG Trophy Hearts- Basically the Muscle wall is too big, allowing for less blood to be filled, and may displace the apical location of the heartbeat. Due to size this is a characteristic sign during assessment.

Restrictive cardiomyopathy, and right ventricular cardiomyopathy.

The care of patients with dilated or restrictive cardiomyopathy is the **same as for heart failure.**

Heart transplantation is the treatment of choice for end-stage heart disease as a result of coronary artery disease, valvular disease, severe cardiomyopathy, or congenital health disease.

The surgeon transplants a heart from a donor with a comparable body weight and ABO compatibility into a recipient less than 6 hours after procurement.

The postoperative care of the heart transplant recipient is similar to that for conventional cardiac surgery; however, the nurse must be especially observant to identify occult bleeding into the pericardial sac with the potential for tamponade.

Post op – Organ Rejection is Heart Failure. Symptoms: cardiac tamponade, bleeding and cardiogenic Shock.

To suppress natural defense mechanisms and prevent transplant rejection, patients require immunosuppressants for the rest of their lives.

Observe for symptoms of heart transplant rejection orthostatic

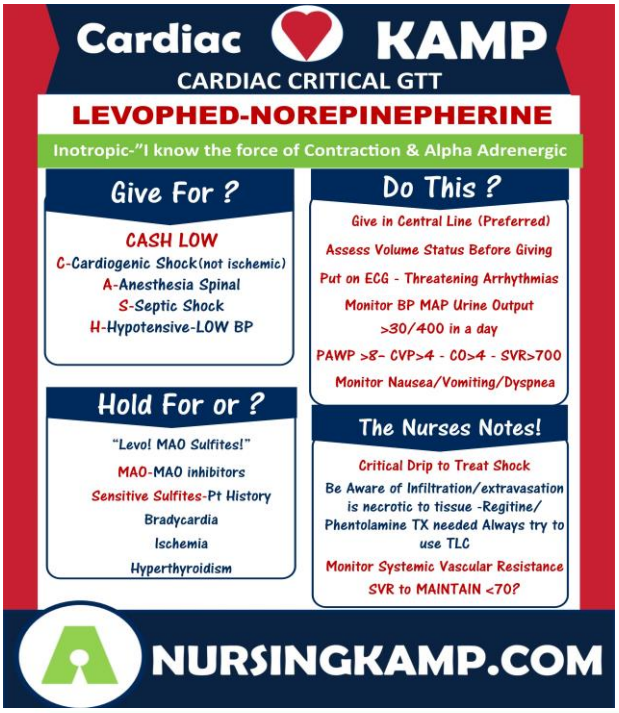
Monitor patients on beta-blockers for hypotension and bradycardia and take the pulse of patients taking digoxin

Hemodynamics and the NCLEX- The following sheet covers all the Hemodynamics a nurse should be familiar with in the NCLEX.

Generally, if there are hemodynamics in the questions, it is a question about perfusion or fluid volume status and the relationship of whether it requires ongoing monitoring or medication administration.

Right sided measurements are chronic in that they are generally not life threatening, unless it is episodic like elevated JVP in cardiac tamponade.

Left sided measurements are acute and should be evaluated, assessed, or interventions implemented in acute conditions.



NURSINGKAMP Cardiomyopathy Dilated VS Hypertrophic

Cardiomyopathy is a modeling change of the Hearts Muscle Tissue. There are two conditions Dilated Cardiomyopathy (big floppy heart resulting in weak contractions- or Hypertrophic (big trophy hearts resulting in poor cardiac output) Both Result in CHF like symptoms and develop over time first symptoms being SOB and fatigue- Each condition should be further evaluated for the underlying cause

Dilated Cardiomyopathy

Damaged muscle fibers resulting in thinning and dilation reducing contractility and cardiac output. Can lead to Mitral and Tricuspid regurgitation-New Murmur

DO THIS-"Clean LAD"

C- Coumadin
L - Lasix
E- Enalapril
A- Ace Inhibitors
N- Nitro
L-Lorsartan—Amiodarone
D- Digoxin

Good to Know!

Also Called Congestive Cardiomyopathy
Most common in 30-40's
No Salt
No Alcohol
No Pregnancy (age related)

LOOK FOR!

May have syncopal episodes, Narrowed Pulse Pressure
Jugular Vein Distention, Hepatosmegaly, Edema
Right Sided CHF Symptoms S3, S4 Gallop
Elevated BNP
Dig Toxicity, PE, Weight >2lb in 1 Day
Pulmonary Congestions "Frothy Sputum"

Hypertrophic Cardiomyopathy

Thickening of the Intraventricular Septum or Ventricle
Further classified as obstructive (blocking the Aortic Valve) or non obstructive

DO THIS

"Calcium WAD"
Ca- Blockers (verapamil)
Warfarin
Amiodarone (slowderone)
Disopyramide

DON'T DO THIS

No LANDDD
Lasix
ACE-Inhibitors
Nitrates
Digoxin
Dopamine-Dobutamine

LOOK FOR!

May have syncopal episodes, orthopnea and DOE—Harsh Systolic Murmur after S1 at apex with a lateral displacement of the Apex, Prominent S4,frequent s3- Pulsus bisferiens
Patients can have Angina, Pulmonary Congestions Crackles and sudden death.

NURSINGKAMP The Cardiac Medication Overview

These are the Cardiac Medications You should know! They are ordered in Priority from A – E "A" are the most acute medications then retrospectively B, C etc. Though all meds have adverse side effects some require more assessment and direct monitoring than others– "A" medications are all ACUTE and should be monitored closely or are used in acute situations.

A — Acute Medications

"A Hand Sewn Lad"- Adenosine-Heparin-Atropine-Nitro-Dopamine-Streptokinase-Epinepherine-Warfarin-Neophenerine-Levophed-Amiodarone-Dobutamine– ALL ACUTE– CARDIAC MEDICATIONS

B — Beta Blockers

"Belly Laugh Out Loud" LOL(suffix)-Metoprolol-Labetolol-Atenelol-Propanolol -Carvedelol

Monitor 4 B's of Beta Blockers– Bradycardia, Blood Glucose, Bronchoconstriction, Blood Pressure

C — Calcium Channel Blockers

"DV –AV Pines" Diltiazem Verapamil AV(DV affects rate)"Pines" Amlodipine–Nifedipine

Two types DV is rate related Pines are Blood Pressure related.

Check or ? if on either → Beta Blocker / Calcium Glycoside

C — Calcium Glycoside (Digoxin)

"Digoxin/Lanoxin Monitor "K2BANDAV" K (Potassium low) 0.8-2.0 >2 Level Dig Toxic Acute!

Bradycardia-Anorexia-Nausea Dysrhythmias- Abdominal Pain- Visual Disturbance

D — Diuretics Ace Inhibitors Arb's

Lasix/Bumex - Potassium Wasting Diuretic– Spironolactone-Potassium Sparing Diuretics

ACE inhibitors Lisinopril, Captopril "Ace King High in April!" A-Angiodema C-Cough

E-Electrolyte K High -ARB's "Ortho Sartan" Ortho-Orthostatic Risk –Sartan-suffix

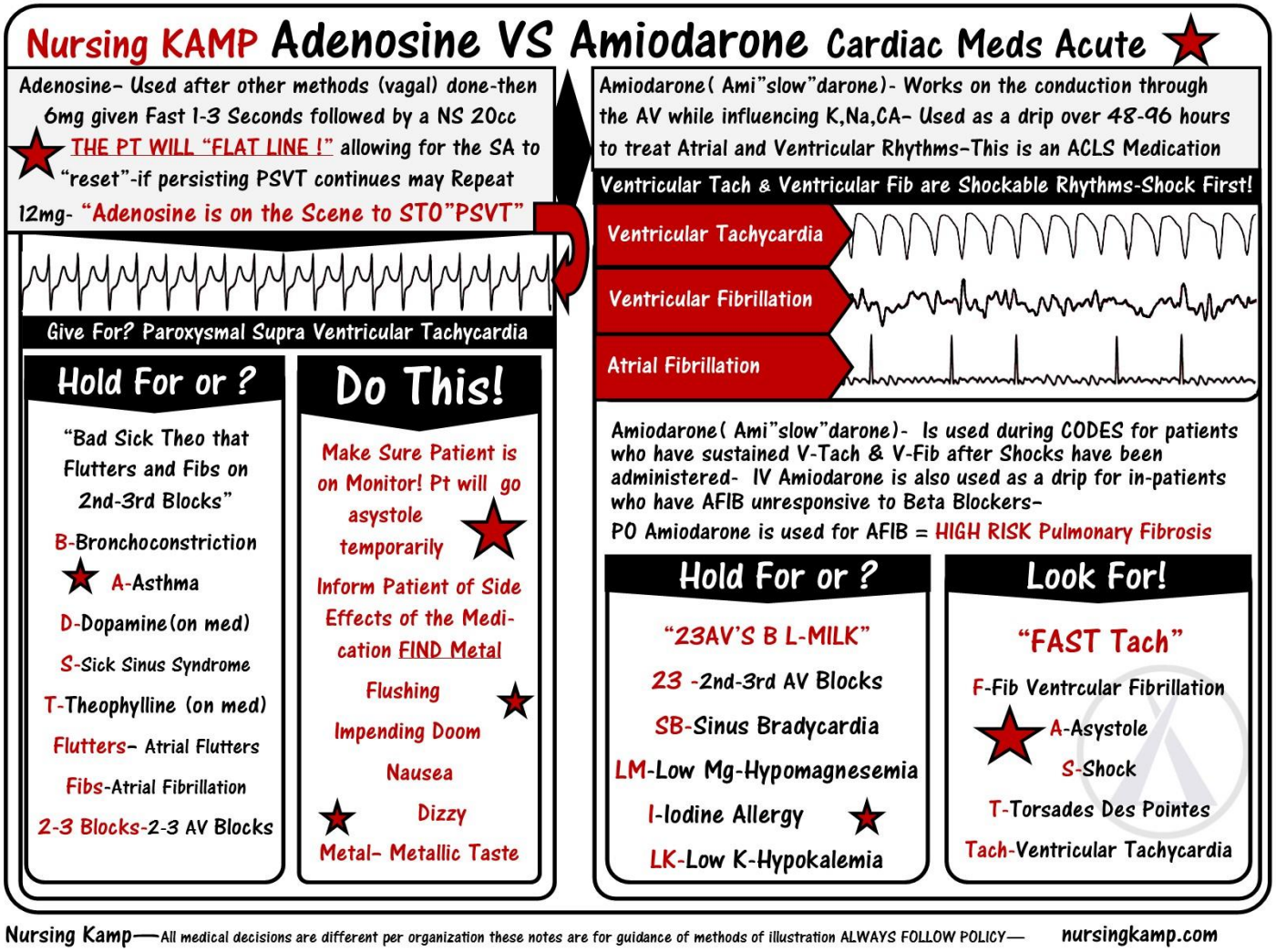
Ace's & Arbs are in the "D" section since they work outside the heart reducing fluid through the RAS System

E — Everything Else Electrolytes

CAMP– (all electrolytes that effect Cardiac ECG)

C-Calcium A-Arrhythmias M-Magnesium P-Potassium

Statins– lovastatin, rosuvastatin - Not So Stat Cholesterol Meds



Cardiac ABCDE is a concept around evaluating the acuity of medications. It starts with A, the acute medications. Since all these medications are acute, meaning they require an acute patient condition and additional monitoring, priority assessment and nursing action is warranted.

A = All of these acute medications should be given specific attention if they are seen in the NCLEX or test questions and answers . Since they are generally acute situations requiring further assessment or immediate intervention, the medication is acute and the patient may be at risk.

A-MEDICATIONS "A Hand Sewn Lad"-

Adenosine-Heparin-Atropine-Nitro-Dopamine-Streptokinase-Epinepherine-Warfarin-Neophenerine-Levophed-Amiodarone-Dobutamine– ALL ACUTE– CARDIAC MEDICATIONS

A-Adenosine- Used to STOP PSVT. Given 6-12mg IVP fast and quickly IV flush: you must put a patient on the monitor since the adenosine will "flatline" the patient temporarily, resetting the heart rate. Adenosine is on the scene to StoP-SVT (paroxysmal supra ventricular tachycardia)

H-Heparin- Get a baseline PTT and they are therapeutic once the PTT is 1.5 -2x's the normal PTT. The antidote is protamine sulfate

A- **Atropine** -This is an anticholinergic that speeds up the heart rate and is used for symptomatic bradycardia. Side effects include dry mouth, blurred vision, urinary retention, constipation

N- Nitro- Part of the HONAMB MI Protocol, a medication that vasodilates the arteries. Watch for hypotension and follow Nitro protocol every 5 min x 3

D- Dopamine Beta agonist at low doses <10, meaning it contracts the heart at less than 10 mcg/kg/min and greater than 10 mcg/kg/min. It is alpha agonist meaning it "squeezes" or constricts the vessels away from the heart. Used in critical conditions shock. This medication can eviscerate the tissues requiring any infiltration of this medication to be stopped and regitine and MD notified.

S- Streptokinase-Acute clot buster used in acute situations. Puts the patient at risk for bleeding complications. Monitor coagulation labs and previous history

E-Epinephrine- Part of ACLS (advanced cardiac life support) Algorithm given in codes for pulseless patients

W-Warfarin-Coumadin – Used for atrial fibrillation or patients with valves requiring ongoing coagulation- Monitoring the PT INR for therapeutic ranges. Vitamin K is the antidote administered IM for an INR greater than >4. Patients should eat no leafy green vegetables

N-"Neo" Neophenerine- Vasopressor strictly ALPHA used in shock when only squeeze is needed.

L-Levophed- Levophed Vasopressor Used in shock- Important to make sure patient has adequate fluid level prior to administration-. This medication can eviscerate the tissues, requiring any infiltration of this medication to be stopped and regitine and MD notified.

A-Amiodarone- Used in ACLS in with patients with Atrial Fibrillation started as an IV bolus then maintenance drip. Can be taken PO, though highest risk is Pulmonary Fibrosis. (New onset wheezes are acute) **Incompatible with heparin**

D- Dobutamine- Strictly BETA. used during cardiogenic shock when cardiac output drops, to enhance contractility. Also used in stress tests when the patient can't run on the treadmill. This medication can eviscerate the tissues requiring any infiltration of this medication to be stopped and regitine and md notified.

NURSINGKAMP Blood Pressure- Inotropic-Chronotropic Cardiac Meds

Affecting Heart Rate

All of These Medications have an affect on the rate either the Beta cells ,SA/AV Node or the Electrolytes on the cellular level

"Triple A -B C Double D"

Atropine (+) IV
Symptomatic Bradycardia-SLOW

Adenosine (-) IV
On the Scene to STO"PSVT" For Super Fast

Amiodarone (-) gtt IV/gtt
Ami"slow"darone - Fast Atrial-Ventricle

B-Beta-blocker (-) IV/gtt/PO
Slow Down Overall Conduction of Beta Cells

Calcium Channel Blocker(-)IV/gtt
"DV"-AV Diltiazem & Verapamil Fast Atrial

D- Digoxin (-) IV/PO
Slows Conduction and Increases Contraction

Dopamine (+) gtt
Increases Conduction of Beta Cells A

Some meds are termed either Positive (faster) or Negative S(slower) Chronotropic (Relating to RATE in THE SA or AV)

Affecting Contraction

All of these medications help with Contraction of the Heart Muscle therefore increasing the Cardiac Output called "Positive Inotropic"

(I Know the Force)

Calcium Gluconate (+) IV
D- Digoxin (+) IV/PO
Dopamine (+)
Dobutamine (+) gtt
Epinephrine (+) IV/gtt
Norepinephrine (Levophed)+gtt

Negative Inotropic
Decreases Contraction
Beta Blocker(-) IV/gtt/PO
Diltiazem & Verapamil(-)IV/gtt/PO
Quinidine(-)IV/PO

Dromotropic
Medication that Changes the rhythm
Diltiazem, Verapamil, Amiodarone, Sotolol

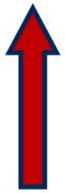
Affecting BP

These ACUTE Medications will affect Blood Pressure

Vasodilates the Blood Vessels
Decreasing Blood Pressure

Bumex-Lasix IV/GttPO
Nitroglycerin IV,gtt,PO
Nitroprusside IV,gtt
Morphine IV/gtt

Vasoconstricts Blood Vessels
Increasing Blood Pressure



NEOphenylephrine
Epinephrine IV,gtt
Dopamine <10mcg IV,gtt
Norepinephrine -gtt

Chronic PO Meds Affecting Blood Pressure

Ace Inhibitors (Pril's)
Angiotensin 2 Inhibitors (Sartans)
Beta Blockers (lol)
Calcium Channel Blockers (pines)

Clinical Nursing KAMP's Cardiac Assessment ©2019

Peripheral Pulses

Rate: Number per Minute—60-90
Rhythm: Regular or Irregular
Symmetry: Even Uneven

Amplitude:

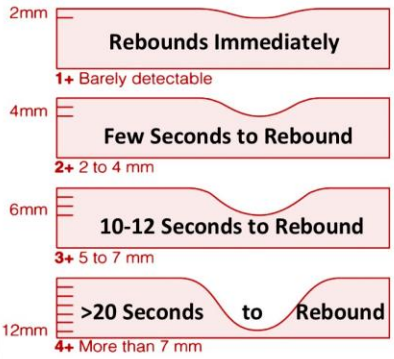
4 = Bounding (fluid, thyroid, CRD, CHF)
3 = Increased (MOST PT WISH)
2 = Normal (Stable)
1 = Weak (Dehydration, Occlusion)
0 = Absent or No palpable (Acute)

If unable to assess pulse Doppler (US) Doppler use is a potential acute condition.

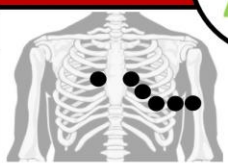
Capillary Refill: <3 Seconds Normal

Skin

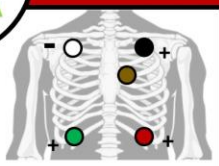
Observe edema foot, ankles, legs
Bilateral(chronic) Unilateral (acute)



Skin: Cool, Clammy, Diaphoretic, Warm all may be acute signs, ASSESS!



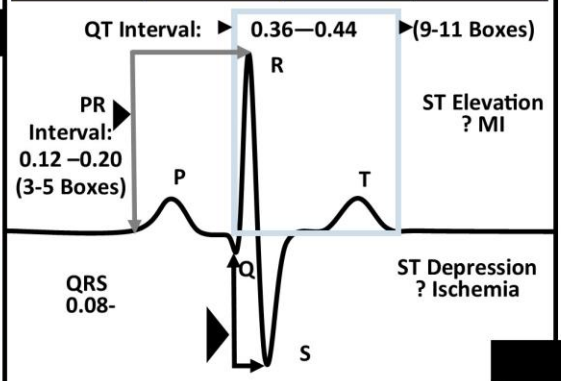
12 Lead EKG Placements
V1- 4th Intercostal
V2- 4th Intercostal
V3– Between v2 & v4
V4– 5th Intercostal mid clavicle
V5– level with v4 anterior axillary line
V6– Level v5 Left Mid-axillary line



ECG Telemetry Lead
Monitor Lead II, V1
Monitor ST Elevation
ST Depression

12 Lead Heart Locations

I—Lateral	AVR	V1-Septal	V4-Anterior
II-Inferior	AVL-Lateral	V2-Septal	V5– Lateral
III-Inferior	AVF-Inferior	V3 Anterior	V6-Lateral



BASIC ECG ASSESSMENT—Are they in LEAD II
Rate: Is it fast or slow 60-100 <60 brady >100 Tachy
Rhythm: Is it regular or irregular
P Waves: Is there a P wave before every QRS (Blocks,Afib)
PR Interval: Is the PR Interval Normal(?Blocks. (electrolytes)
QRS: Is the QRS Normal or Wide(? vtach,Fib, Torsades,BBB)
Extra: Are there any extra Complexes (PVC's)

Vitals & Hemodynamics

Blood Pressure
Systolic <90 Acute Hold Meds generally
- **Systolic:** 90-130
- **Diastolic:** 60-90

Mean Arterial Pressure (MAP): 60
(Diastolic x 2 + Systolic Divided by 3)

Heart Rate(HR): >60-100 bpm
Cardiac Output: 4-8 lpm
Cardiac Index: 2.5-4 l/min2
Stroke Volume(SV): 60-120 ml/b
Pulse Pressure(systolic-diastolic): 30-40

Right Sided Measurements
Central Venous Pressure (CVP): 0-8
Jugular Venous Distension(JVD):<4

Left Sided Measurements
Ejection Fraction (EF): >60
Pulmonary Artery Wedge Pressure (PAWP): 8-12

Orthostatic Vital Signs:
Used to Assess dehydration
Assist Patient to lye supine for 10 minutes. Do baseline vitals.
Raise to sitting then to standing take vitals Take Vitals
20/20/10 Changes
Heart Changes 20 BPM
Systolic Changes 20
Diastolic Change 10

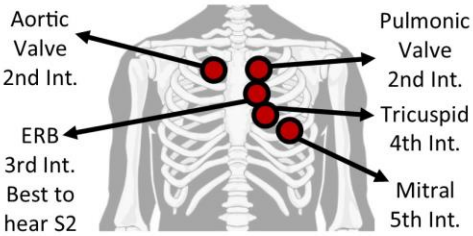
Cardiac Labs

Total Cholesterol <200
<3 C Reactive Protein
Triglycerides <200
Troponin T<0.04
LDL (BAD) <150
Troponin I<0.01
CK-MB <50
HDL (GOOD) <50
CK-Total <150
BNP (CHF) <150
(Cardiac Enzymes)

Acute MEDS
Adenosine 6mg IVP 12mg,(SVT)
Amiodarone 300 mg IVP(VT VF, SVT)
Atropine 0.5mg q3-5 min (brady)
Epinephrine 1mg q3-5 min(Cardiac Arrest)

Heart Sounds & Murmur Classification

S1: Mitral & Tricuspid Valves(BS MiT) Heard Before systolic Mitral and Tricuspid
S2: Aortic & Pulmonic Valves (BaD P) Heard Before Diastolic Aortic and Pulmonic
S3: Extra Heart Sounds (Listen Left Side, Bell, Mitral Area) Thyroid?Anemic?Pregnant? Athletic?, CHF?
S4: Extra Heart Sounds (Listen Left Side, Bell, Mitral Area) HTN?Aortic Pulmonic Stenosis? CHF?



Abnormal Heart Sounds:
Muffled Heart Sounds(distant): Cardiac Tamponade?
Pericardial Friction Rub(rubbing): Pericarditis's?
Clicks: Mechanical Valves?

Murmur Classification

Grade 1: Barely Hear Valsalva Clearer
Grade 2: Hear with the Stethoscope
Grade 3: Moderate Loud
Grade 4: Loud Hear & Thrill Vibration
Grade 5: Very Loud Hear & Thrill with Stethoscope slight off
Grade 6: Very Loud Hear & Thrill without Stethoscope

(Coumadin)
PT 10-13 Seconds
Ptt 25-35 Seconds
(Heparin)
(Heparin 0.3-0.7)
INR
1-2-Normal
2-3– Therapeutic
3-4 Valves
>4 Hold

Coagulation

Other Cardiac Lab Values

Fibrinogen	150-450
D-Dimer	<20
Amiodarone (med)	0.5-2.0 mg/L
Digoxin (med)	0.8-2.0
Nitroprusside (med)	<10 mg/dl
Propranolol (med)	50-100
ESR (sed rate)	< 20