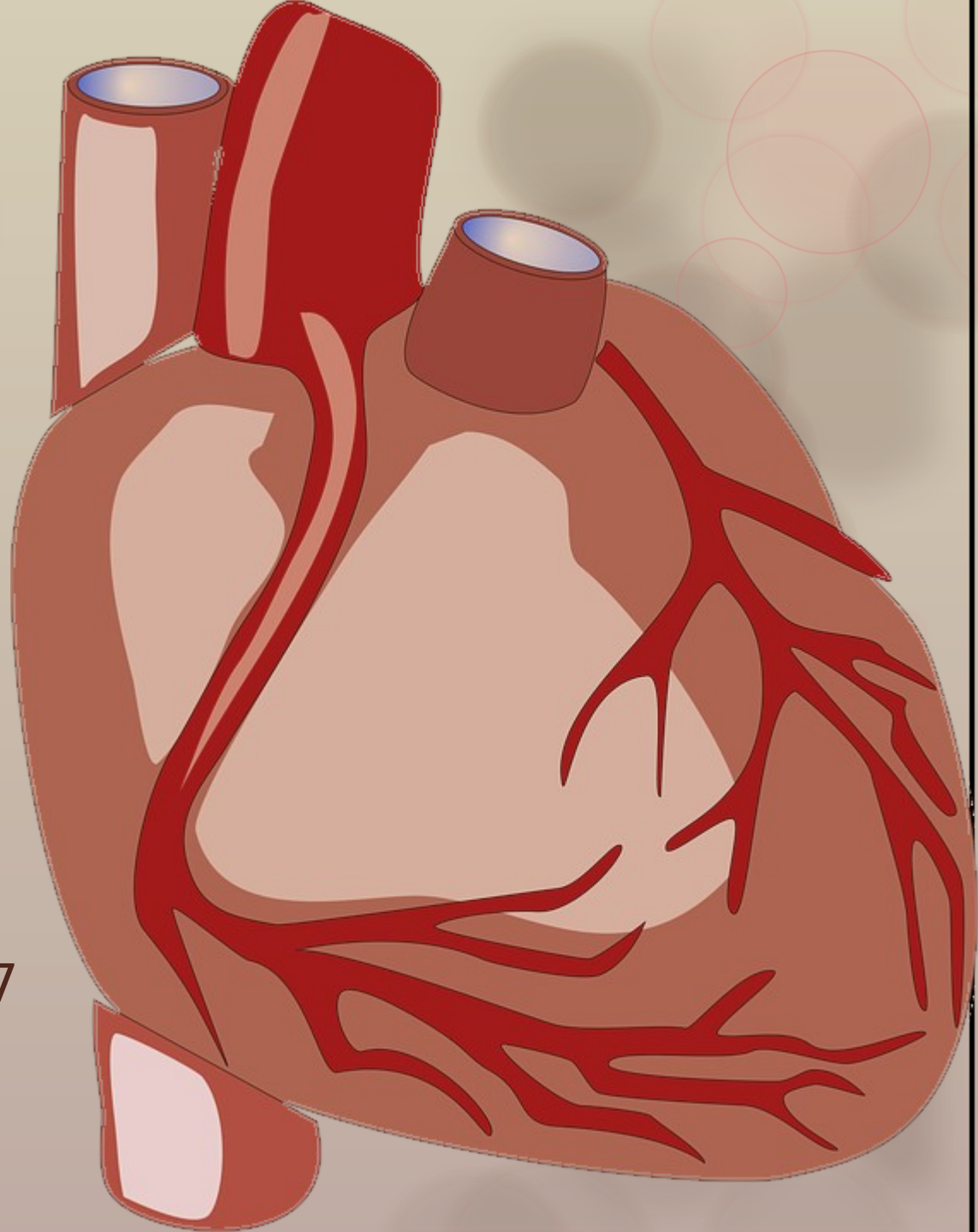


Care of the Cardia c Patient

Jami Jones RN, MSN
Instructional Module 7

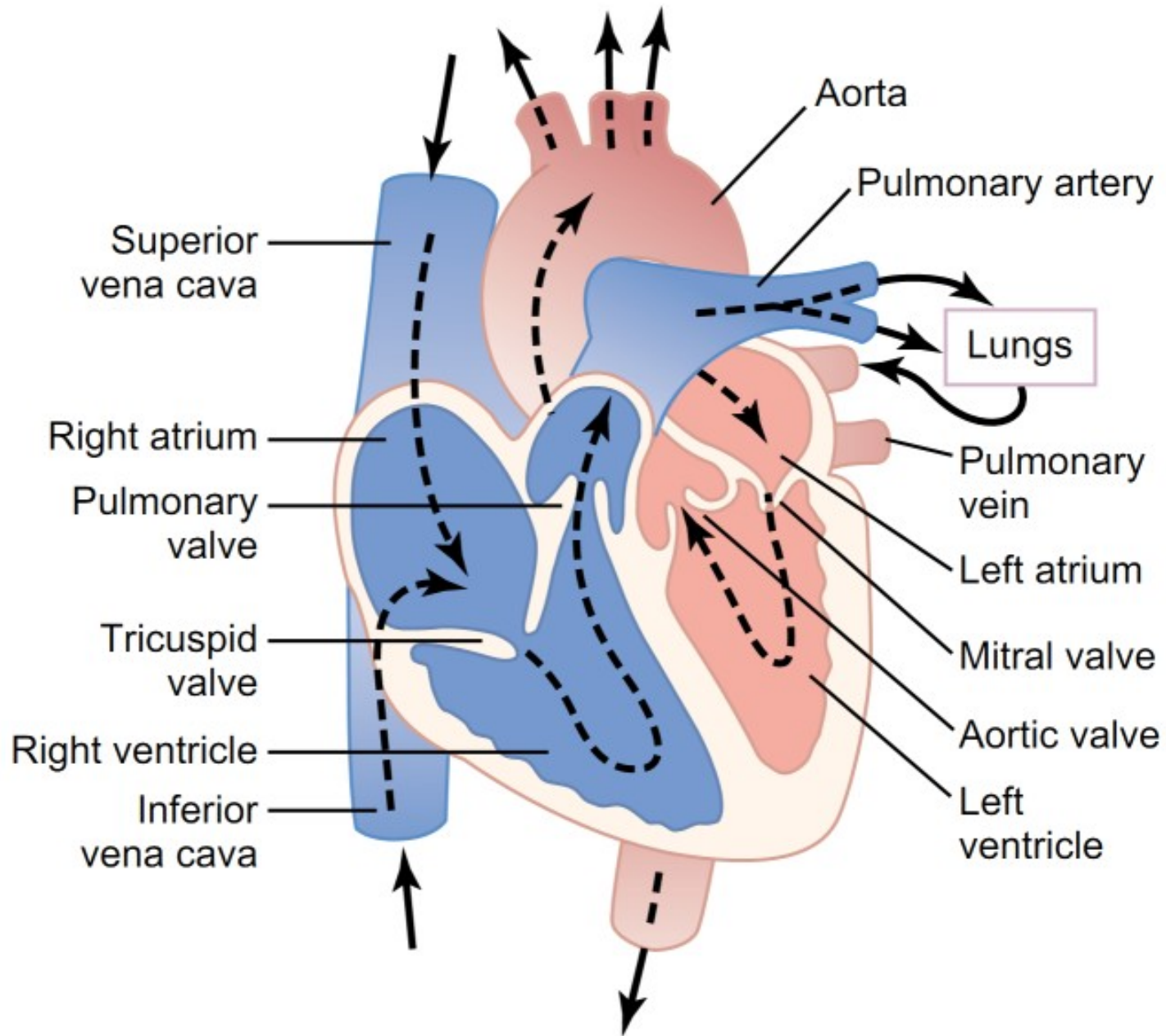


Learning Outcomes

- Integrate knowledge of cardiac anatomy and how it relates to perfusion.
- Recognize signs and symptoms of cardiac problems along with nursing interventions.
- Participate in discharge and rehabilitation therapy plans to prevent re-hospitalization.
- Recognize abnormal cardiac rhythms and intervene when necessary.

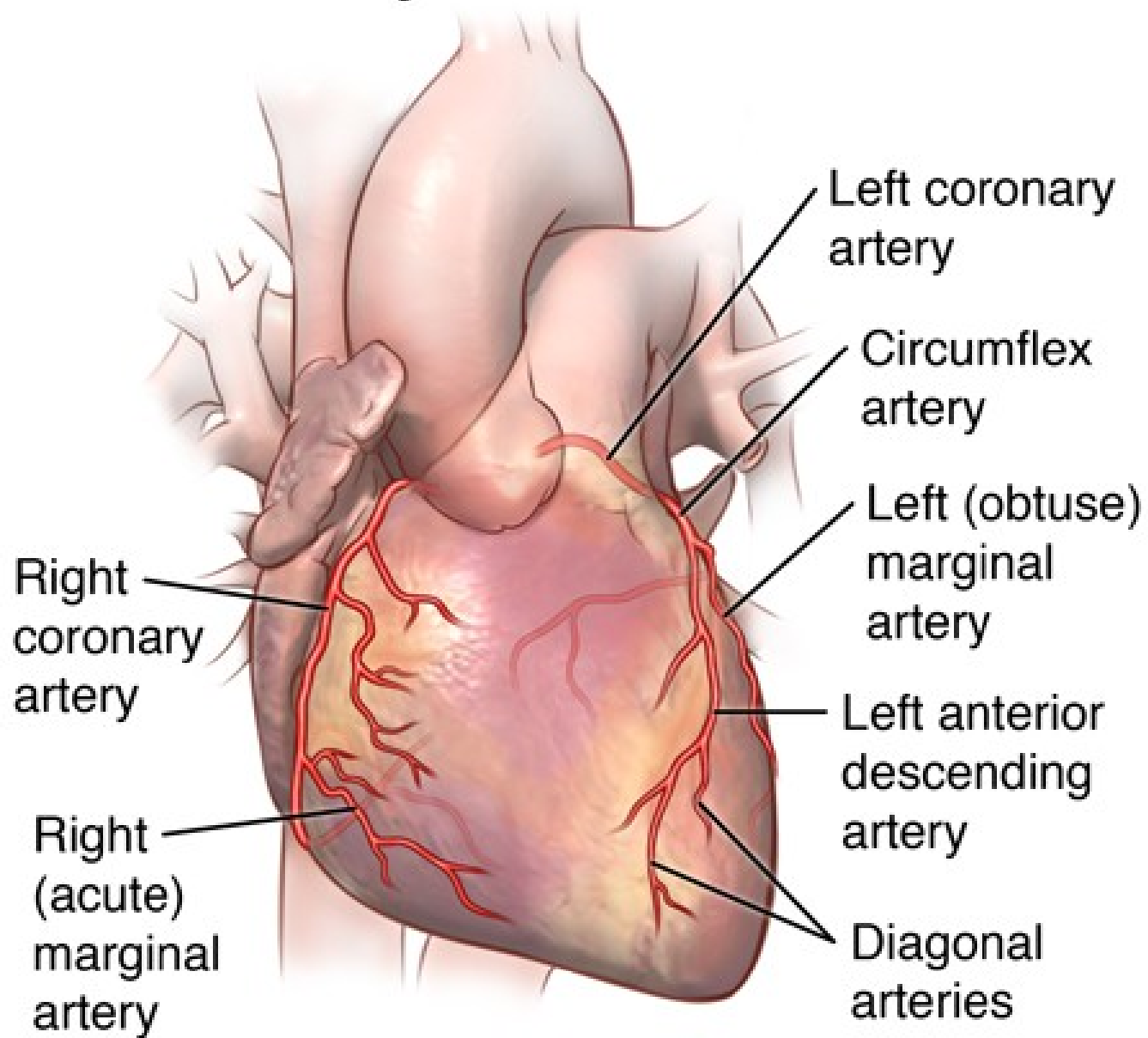


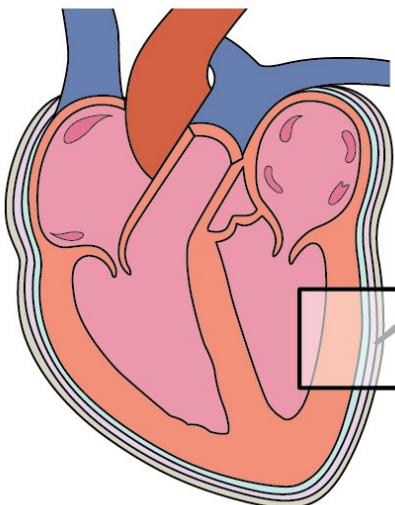
HEAD AND UPPER EXTREMITY



TRUNK AND LOWER EXTREMITY

Coronary arteries of the heart





Endocardium

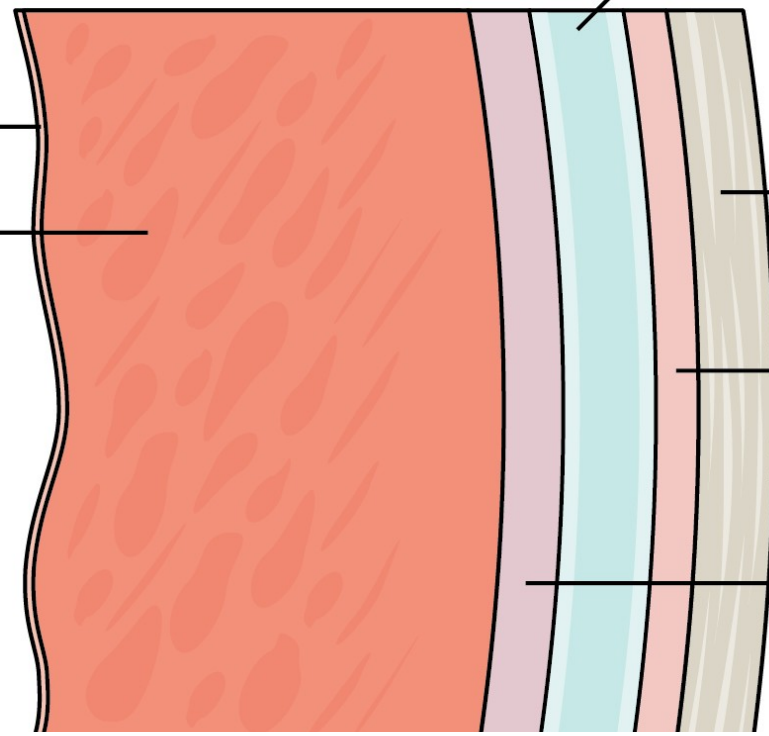
Myocardium

Pericardial cavity

Fibrous pericardium

Parietal layer of serous pericardium

Epicardium (viceral layer of serous pericardium)



What does the heart do?



- Here is a review of basic A&P

<https://www.youtube.com/watch?v=X9ZZ6tcxArl>

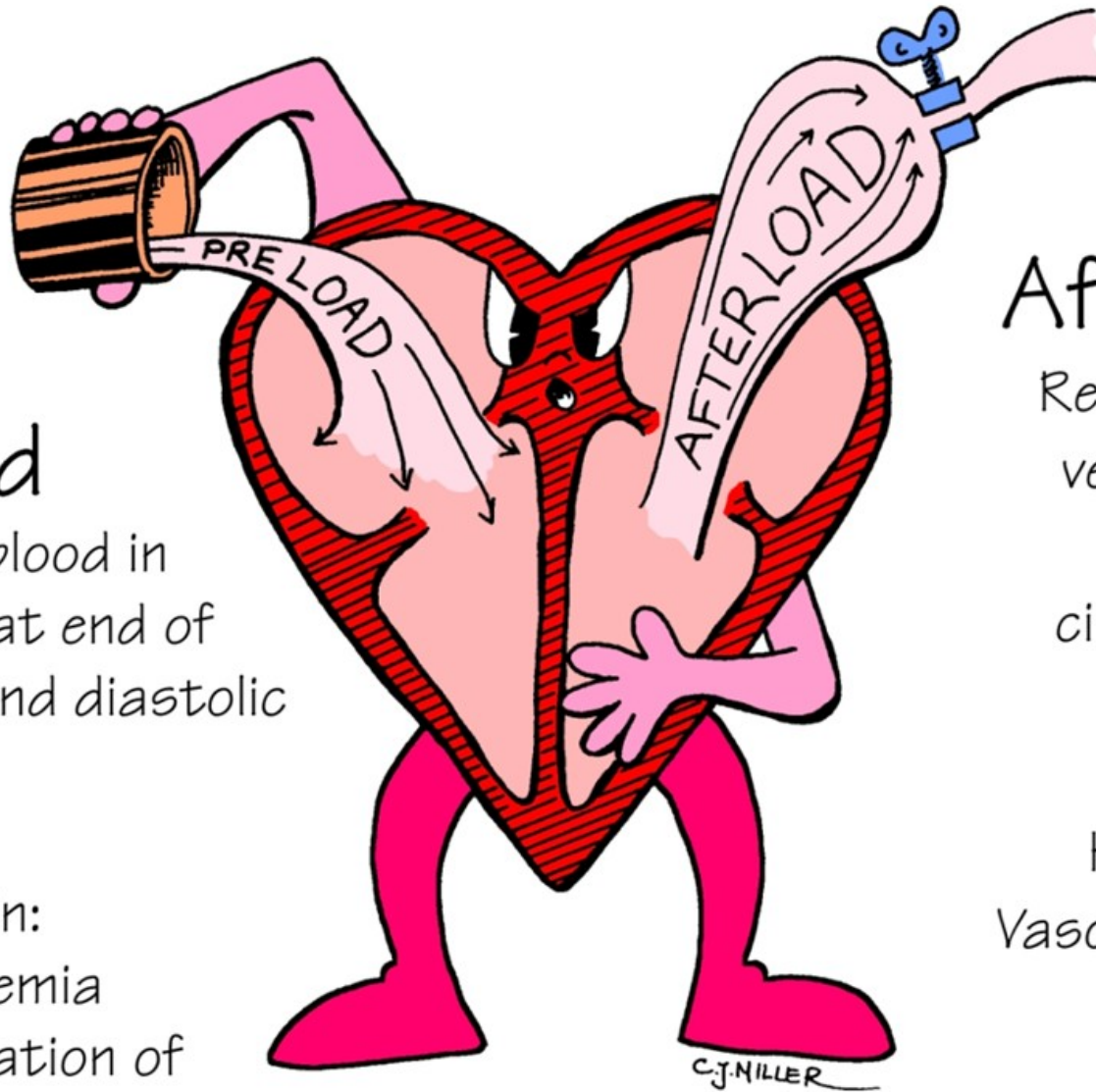
PRELOAD AND AFTERLOAD

Preload

Volume of blood in ventricles at end of diastole (end diastolic pressure)

Increased in:

Hypervolemia
Regurgitation of cardiac valves



Afterload

Resistance left ventricle must overcome to circulate blood

Increased in:
Hypertension
Vasoconstriction

↑ Afterload
↑ Cardiac workload

Let's Talk About Acute Coronary Syndrome

What is Acute Coronary Syndrome?

- A condition that occurs when blood flow is decreased or blocked in the heart:
 - Unstable angina
 - NSTEMI
 - STEMI



Our objective with ACS: Decrease O₂ Demand and Increase O₂ Supply!

O₂

- Decrease physical activity
- Apply supplemental oxygen
- Administer medication

- Decrease preload
- Decrease afterload
- Dilate coronary arteries
- Reduce contractility
- Reduce heart rate
- Prevent further thrombosis

O₂

O₂

O₂

O₂

O₂

O₂

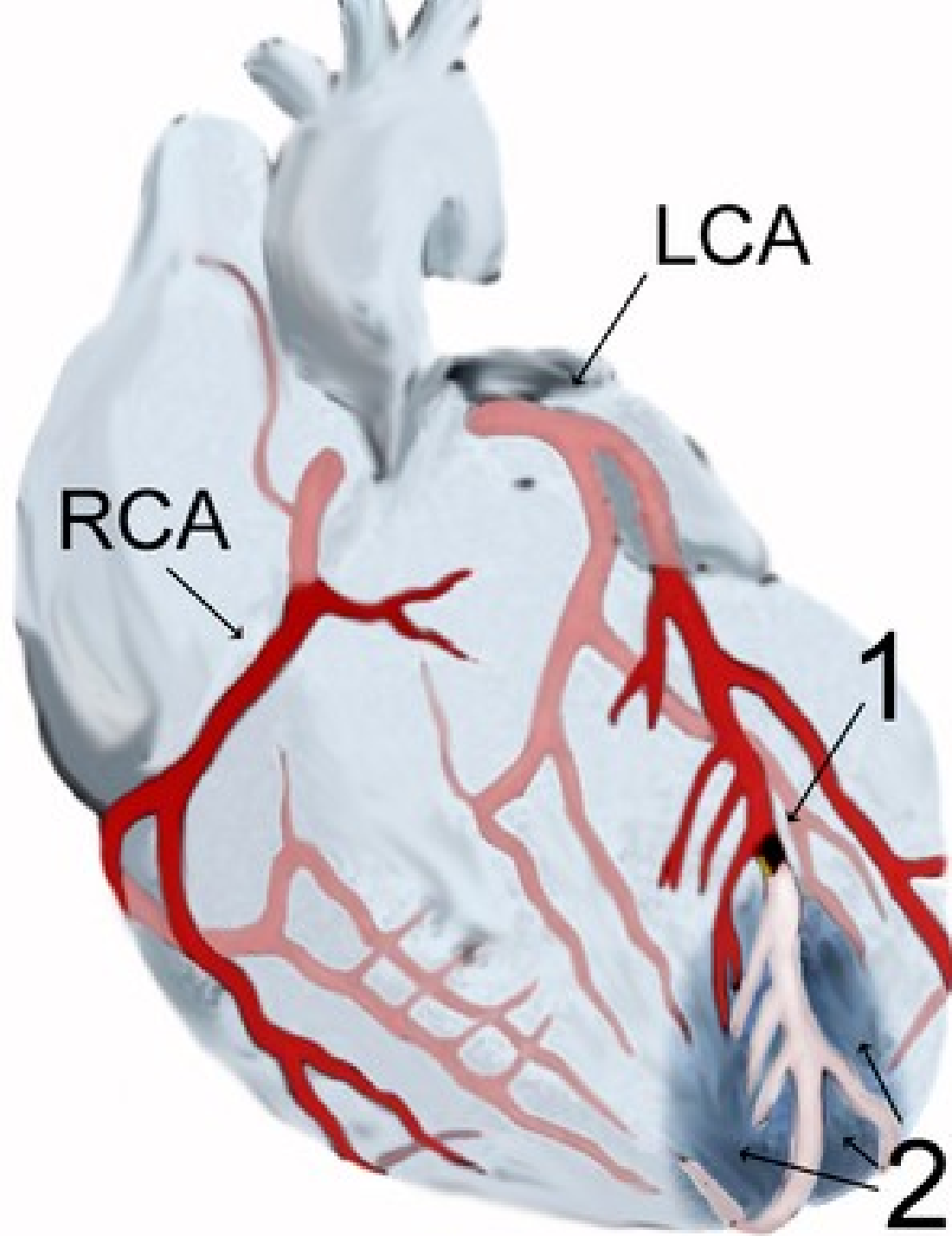
O₂

- Beta Blockers
- Anticoagulants
- Ca Channel Blockers
- Nitrates
- Opioids
- ACE/ARB

Let's Talk About Myocardial Infarction...MI

What is an MI?

- Death or necrosis of myocardial cells caused by blood flow blockage
- STEMI
- NSTEMI



Time = Muscle

- Once cells have died, they are gone
- The body replaces necrotic cells with scar tissue
- Hypoxia begins in 10 seconds
- Damage occurs after 20 minutes of O2 deprivation
- **A STEMI is an emergent situation!
Intervention w/in 90 minutes!**
- A NSTEMI is non-emergent



Signs and Symptoms of MI

○ Typical symptoms:

- Chest pain/discomfort/pressure
- Elevated blood glucose
- N/V
- Diaphoresis
- Increased HR/BP
- S3/S4 heart sounds
- Peripheral vasoconstriction
- Fever
- SOB
- Dizziness
- AMS
- Dysrhythmias
- Pulmonary edema

○ Atypical symptoms:

- Any symptom not accompanied by chest pain...



Descriptions frequently used by patients include:

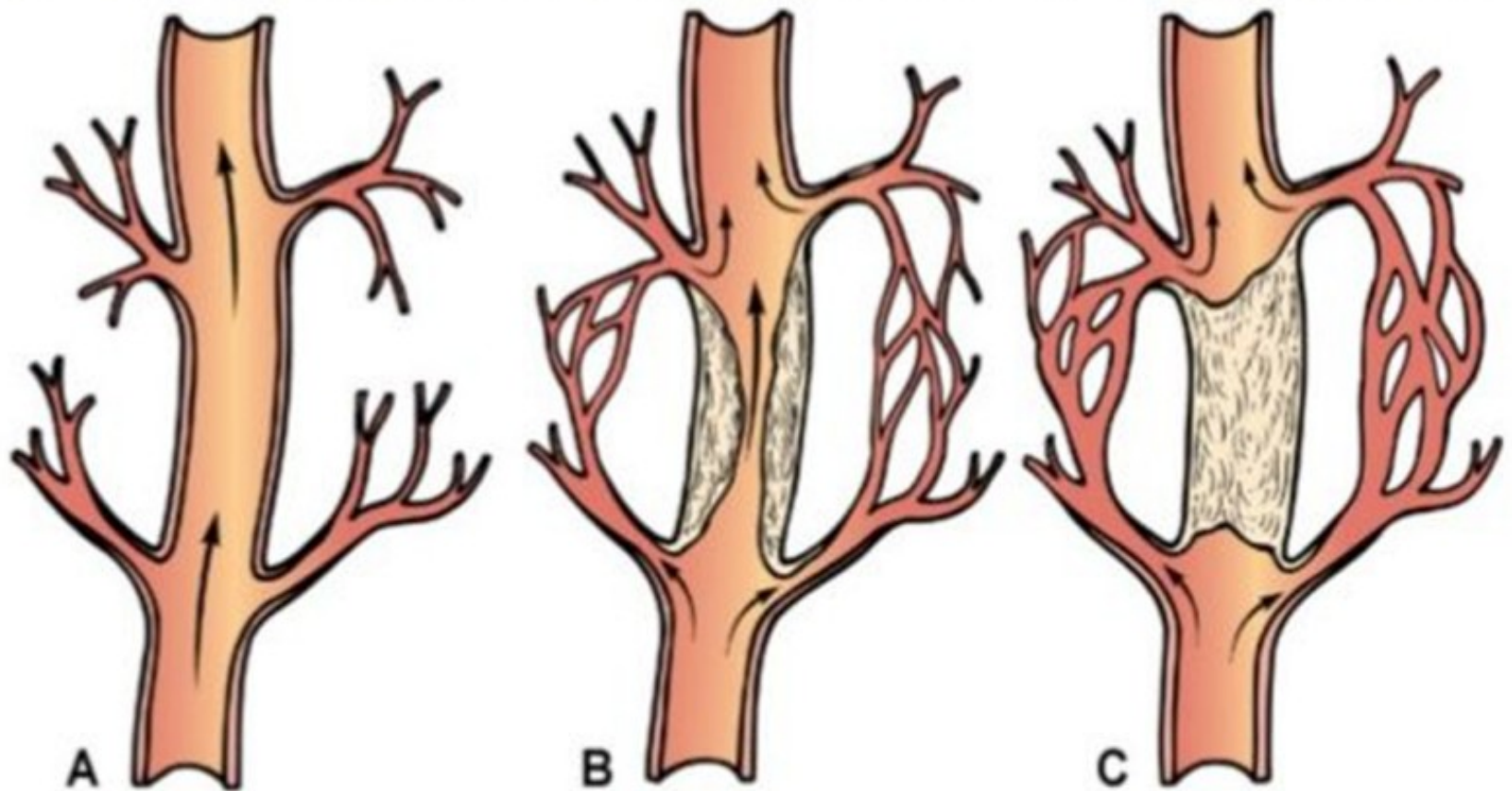
It is generally not described as:

• Squeezing • Burning/Heartburn	• Sharp
• Tightness • Band-like sensation	• Knife-like
• Pressure • Knot in the center of the chest	• Changed w/ breathing
• Ache • Toothache	• Stabbing
• Crushing • Heavy weight on chest (elephant sitting on chest)	• Like “pins and needles”

Evaluation of MI

- Diagnosis is made with elevated cardiac enzymes **PLUS:**
 - ? Typical Symptoms
 - ? ST Segment Changes
 - ? History of Cardiac Intervention
-
- EKG
- Cardiac Enzymes
- Stress Test
- Echocardiogram
- Coronary Angiogram

Occlusion/Collateral Circulation

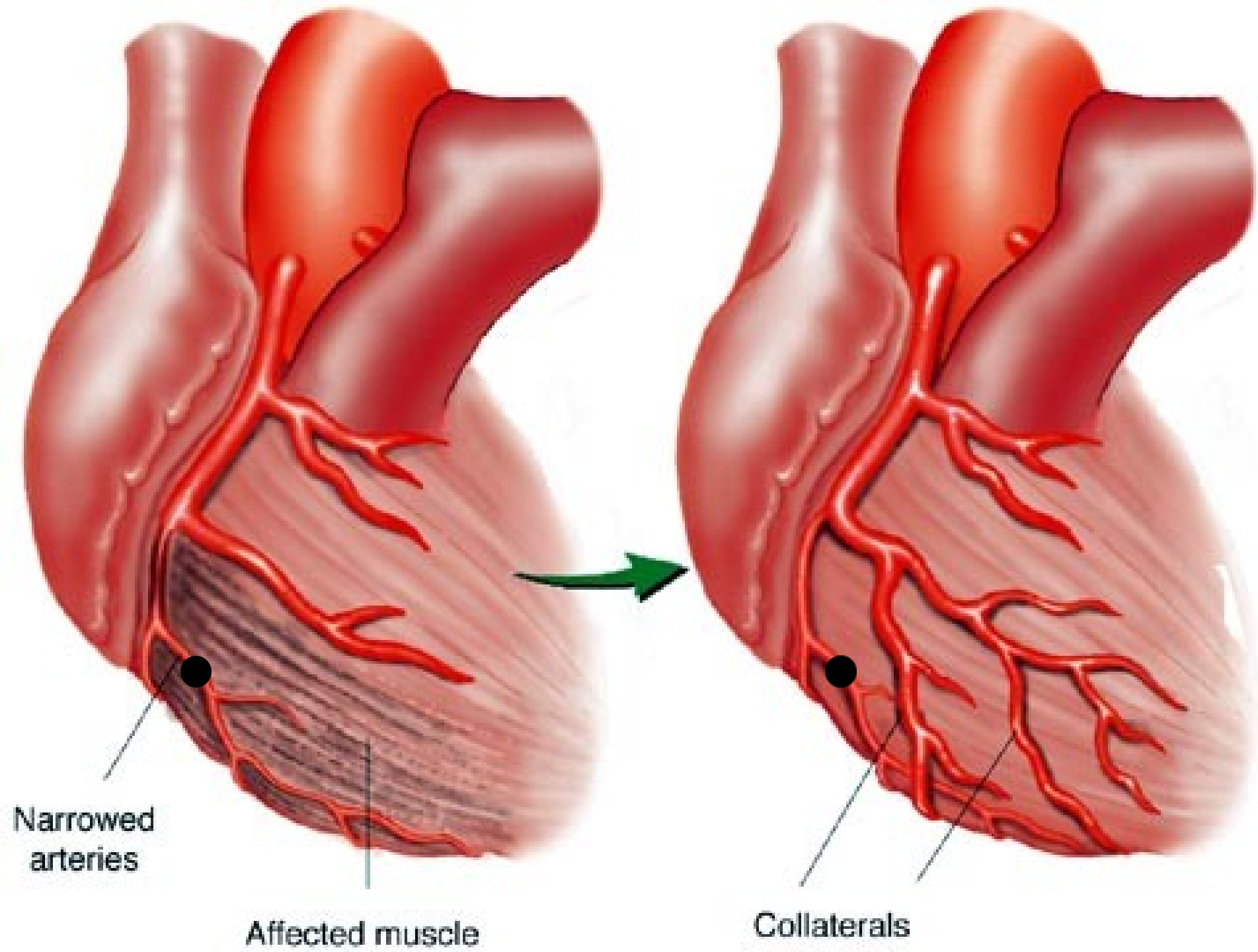


Vessel Occlusion with Collateral Circulation

A. Open, functioning coronary artery

B. Partial coronary artery closure with collateral circulation being established

C. Total coronary artery occlusion with collateral circulation bypassing the occlusion to supply the myocardium



Question...

You are the nurse working in triage in the adult ED.
According to you, which patient should be seen first?

- A) A 78-year old complaining of dizziness and chest pain radiating to their left arm
- B) A 17-year old complaining of abdominal pain who is doubled over crying
- C) A 34-year old grabbing their chest who appears diaphoretic and pale
- D) A 55-year old vomiting coffee-ground emesis who appears lethargic and pale

Let's Talk Lab Work...

- Troponin (T or I)
 - Elevates 4-6 hours after injury, peaks at 10-24 hours
 - Level = <0.03 ng/mL (I); <0.1 ng/mL (T)
 - Returns to baseline in 10-14 days
- Creatine Kinase (CK)
 - Elevates 6 hours after injury, peaks at 18 hours
 - Level = 30-170 U/L
 - Returns to normal 24-36 hours following injury
- Myoglobin (CK-MB)
 - Elevates within 2 hours, peaks at 3-15 hours
 - Level = <90
 - Returns to normal 12-24 hours after injury

Your Patient Complains of Chest Pain.....what do you do??

- Apply supplemental O2
- Get vital signs
- Get an EKG
- Ensure adequate IV access
- Draw cardiac enzymes
- Place the patient on a cardiac monitor
- Administer medication
- Get patient ready for reperfusion therapy



Medication for MI



- Nitrates (IV/SL nitroglycerin)
- Beta Blockers (metoprolol)
- Antiplatelet Agents (ASA/clopidogrel/eptifibatide)
- Anticoagulants (heparin/enoxaparin)
- Thrombolytic Therapy (alteplase)

<https://www.youtube.com/watch?v=viK121c8iZI>

Heparin-Induced Thrombocytopenia (HIT)

- Immune response to heparin
 - Body forms antibodies against heparin
 - Platelets activated = ↑platelet plugs = ↑R/O thrombosis = ↓circulating platelets
- Usually occurs 5-10 days into treatment
 - Can occur in as little as 24 hours
- Suspect HIT
 - Plt. <150 or drop of 50% or more from baseline
 - Arterial or venous thrombosis
 - Acute systemic reactions after administration
- Treatment?

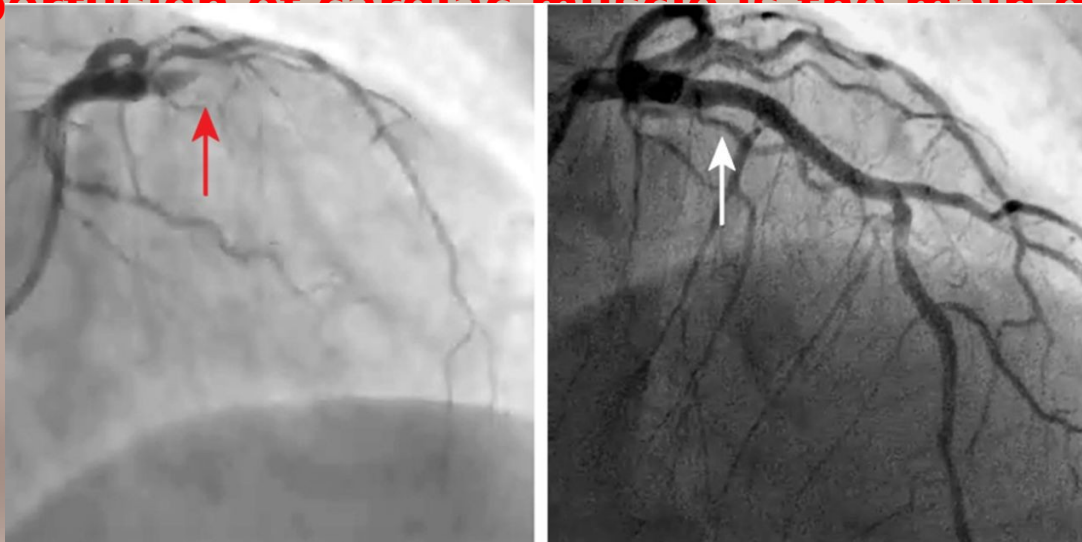
Continued Treatment of MI

- Percutaneous Coronary Intervention (PCI)
- Cardiac Bypass

https://www.youtube.com/watch?time_continue=87&v=p5gHvSbBNXI (Thrombectomy aspiration catheter w/ stent)

<https://www.youtube.com/watch?v=0PRPeuJ0g0A> (CABG)

****Reperfusion of cardiac muscle is the main goal!****



Cardiogenic Shock



- Inadequate tissue perfusion due to cardiac dysfunction
O₂ to Cardiac Muscle = Cardiac Function = Perfusion to Body
- Most common cause: ?
- What else could cause cardiogenic shock?
- Treatment:
 - Reperfusion of cardiac muscle!
 - Find the cause and treat it!
 - ASA before PCI, clopidogrel after PCI
 - Symptom management
- **Life-threatening/high mortality rate ~50-75%**



Symptom Management in Cardiogenic Shock

- Dysrhythmias:
 - Antidysrhythmics
 - amiodarone
- Hypotension:
 - Positive inotropic and vasopressor agents
 - norepinephrine
 - dopamine
 - Avoid Beta Blockers
 - Cautious fluid administration
 - May try a 250 mL fluid challenge
- Fluid overload:
 - Diuretics
 - Vasodilators



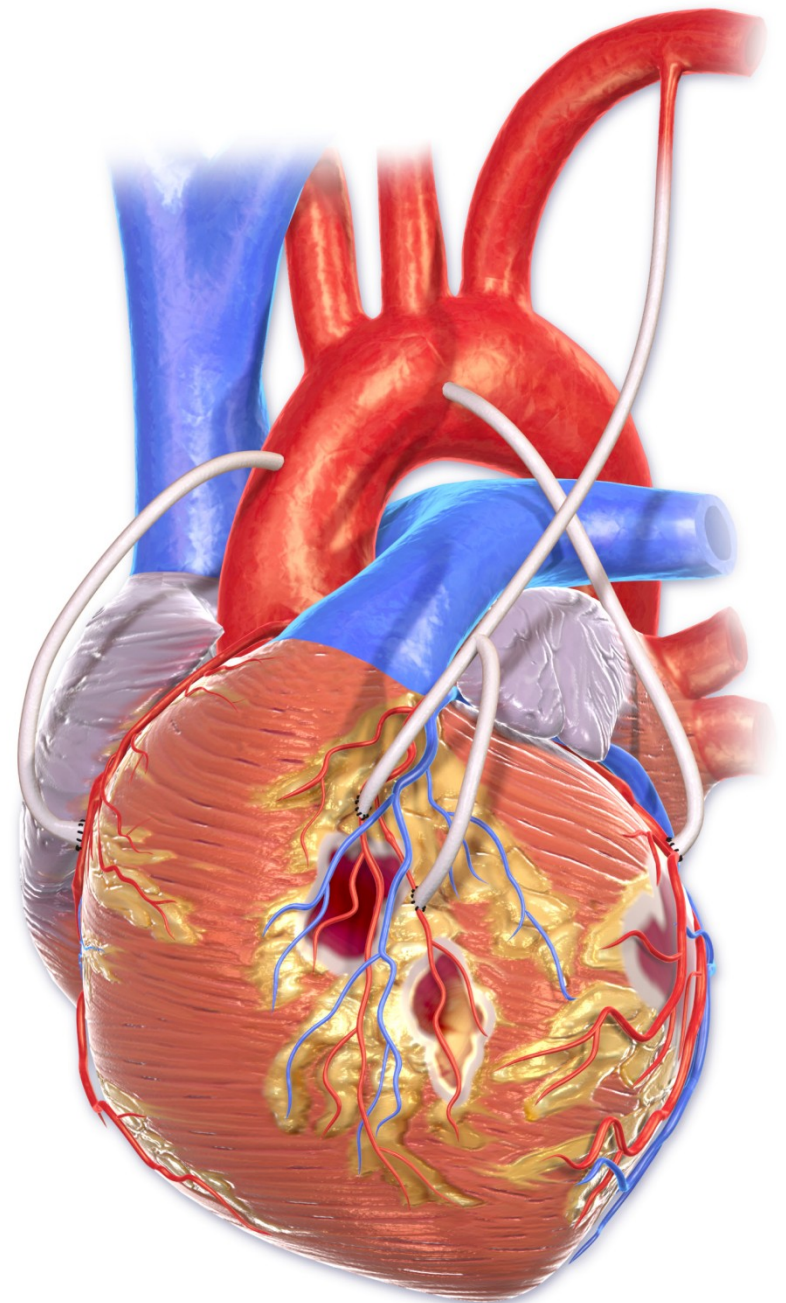
Recovery After an MI

- Several weeks
 - Scar tissue replaces damaged heart muscle
- Life style changes are necessary
 - New medications
 - Diet modification
 - Activity modification
 - Tobacco cessation
- Cardiac rehab is a good resource for these patients.

What if a blockage
cannot be fixed
with PCI?

Cardiac Bypass

- The surgeon “bypasses” a blockage that cannot be opened with PCI.



Coronary Artery Bypass Graft (CABG)
Quadruple Bypass

Nasogastric tube to decompress stomach.

Endotracheal tube for providing ventilatory assistance, suctioning, and use of end-tidal CO₂ monitor.

Swan-Ganz catheter for monitoring central venous pressure, pulmonary artery and pulmonary artery wedge pressures, temperature, SVO₂. Can be used for determining cardiac output, for venous and pulmonary artery blood sampling, and for medication administration. Venous lines can be used for fluid administration.

ECG electrodes for monitoring heart rate and rhythm.

SpO₂ monitor for measuring arterial oxygen saturation.

Assess peripheral pulses: radial, posterior tibial, dorsalis pedis.

Neurological assessment:

- Level of responsiveness
- Hand grasp
- Pupils
- Pain
- Movement

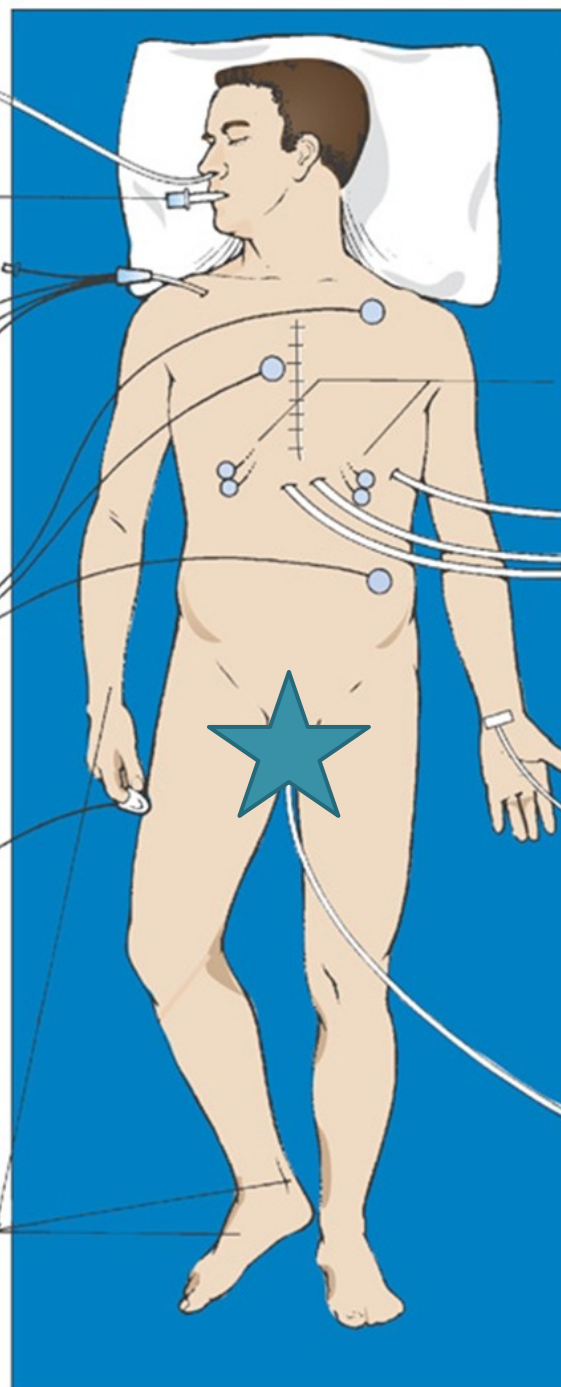
Assess skin color and temperature, color of lips, and color and capillary refill of nail beds.

Epicardial pacing electrodes to temporarily pace the heart.

Mediastinal and pleural chest tubes attached to suction; drainage and wound healing are monitored.

Radial arterial line; used for monitoring arterial blood pressure and for blood sampling.

Indwelling catheter to closed drainage system for accurate measurement of urine output; a temperature probe may be part of the indwelling catheter.



Chest Tubes

- Always present after bypass to drain excess blood
 - Frank blood immediately post-op
 - Serosanguinous >1 hours post-op
 - Drainage should not be >100 mL/hr
-
- What do we assess?
 - What do we monitor for?



In-Line Connector
with needleless
access sampling port

**New Larger Easy-
to-Grab Handle**
and **Flexi-Hangers**
allow the drain to be
hung bedside from a
single point

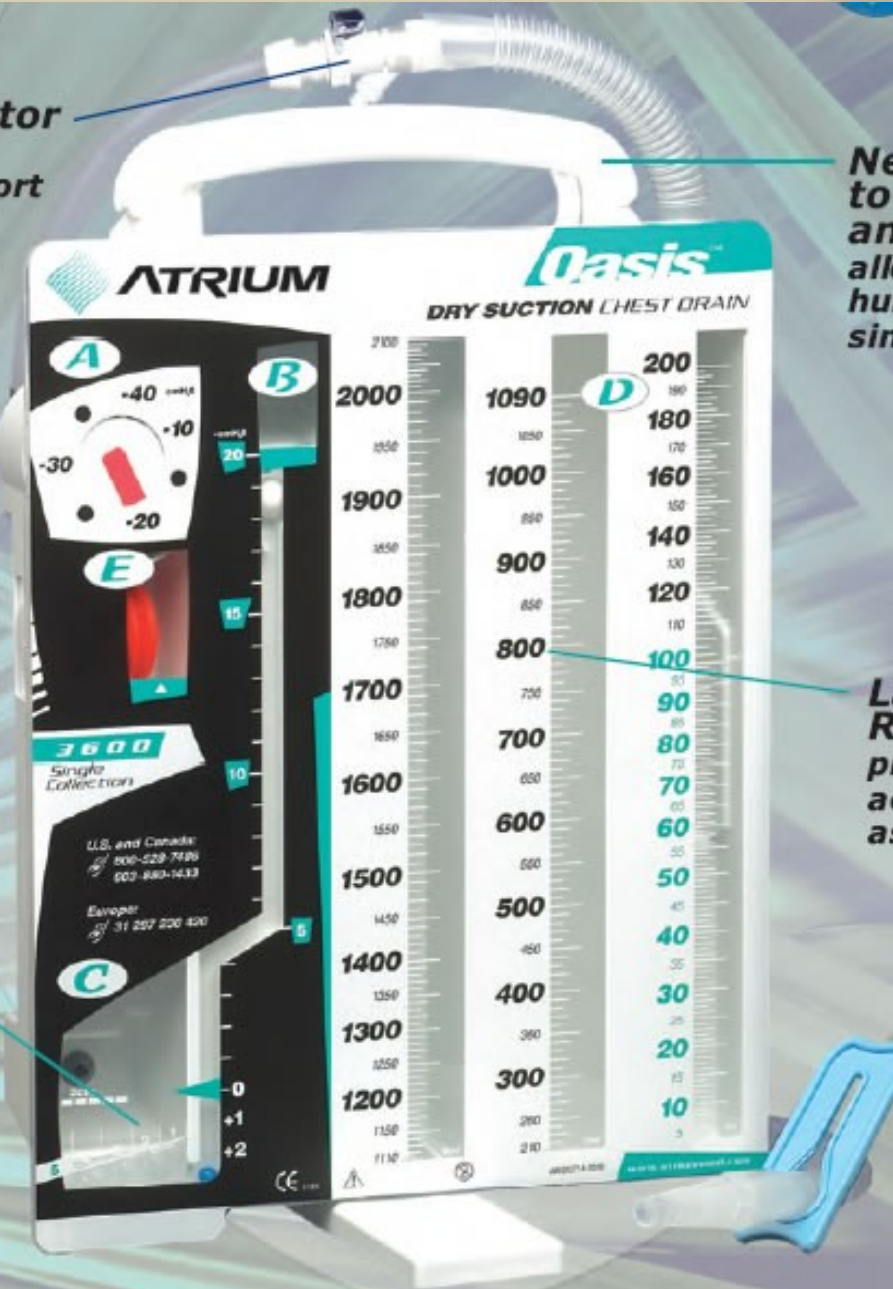
**Convenient
Fingertip
Suction
Adjustment**

**Innovative Knock-
Over Nozzles**
allow fluid levels to be
recovered in the event
of an accidental knock-
over

**Pre-Packaged
Water**
offers the ultimate in
fast, convenient setup

**Large, Easy-to-
Read Graphics**
provide fast,
accurate drainage
assessment

**New Graduated Air
Leak Monitor**
for assessing patient
air leak trends

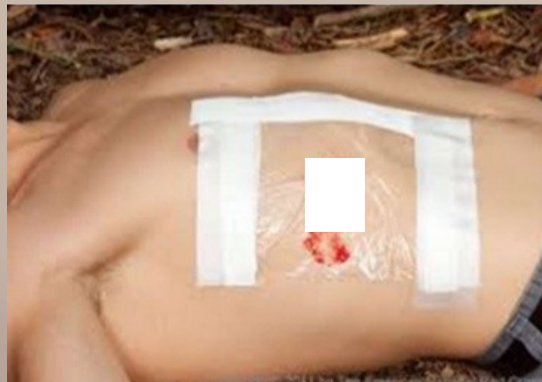


What do we do....

- If chest tube disconnects from setup or setup breaks?



- If chest tube is pulled out?

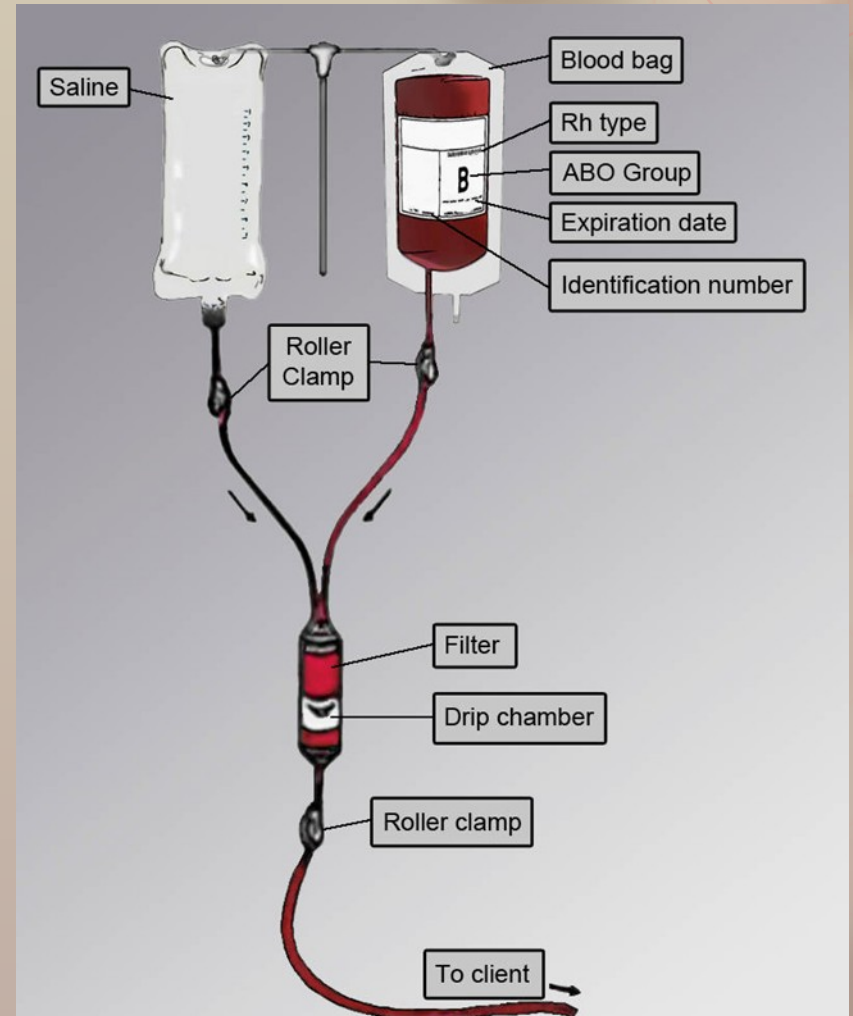


Blood Transfusions

- Blood often needed after major surgery
- Considered a “transplant” and should be monitored closely
- Types of transfusions:
 - Red Blood Cells (RBC's)
 - White Blood Cells (WBC's)
 - Cryoprecipitate
 - Fresh Frozen Plasma (FFP)
 - Platelets
 - Albumin

RBC Transfusion

- Maintain Hgb at or above 7
- One unit = 300-500 mL.
- Start w/in 30 minutes
- Infuse within 4 hours
- Two nurse verification
- Consent is necessary
- Special blood tubing
- Normal Saline
- Transfusion reactions



Transfusion Reaction

- Vital signs within 30 minutes before starting
- Remain with the patient for the first 15 minutes
- Post-transfusion vital signs
- Reaction suspected = **STOP** transfusion
- Infuse normal saline TKO
- Physician determines whether to stop or treat and continue
- Blood work and urine sample
- Blood, tubing and lab work are sent to blood bank

Blood Transfusion Reaction

***Any change seen
in your patient
can be an
indication of a
reaction!!**



Allergic

MILD
Facial Flushing
Hives/ Rash
SEVERE
Increased Anxiety
Wheezing
Decreased BP



Febrile

Headache
Tachycardia
Tachypnea
Fever/Chills
Anxiety

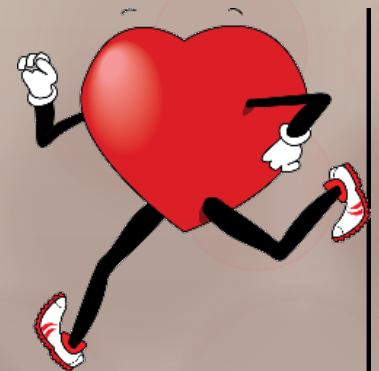


Hemolytic

Decreased BP
Increased RR
Hemoglobinuria
Chest Pain
Apprehension
Low Back Pain
Fever
Tachycardia
Chills

Cardiac Rehabilitation

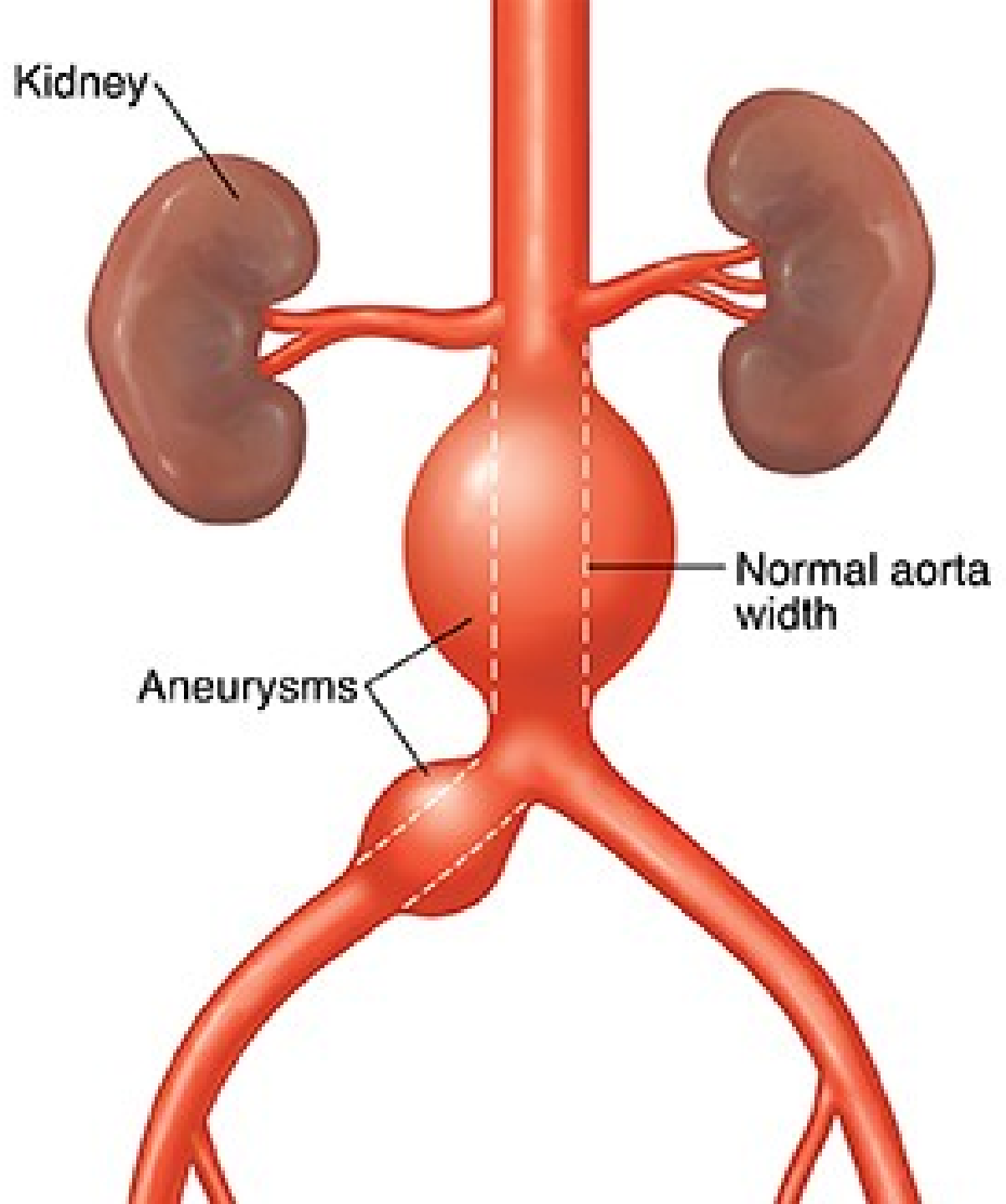
- Restoration of a person to an optimal state of function:
 - Physiologic = weight reduction, smoking cessation, physical exercise, healthy eating, rest & comfort
 - Psychologic = dealing with fear, anger, depression
 - Mental = management of stress, relaxation techniques
 - Spiritual = support to deal with guilt or feeling of hopelessness
 - Economic = dealing with loss of income or restrictions on work
 - Vocational = assistance with new skills



Let's Talk About Aneurysms

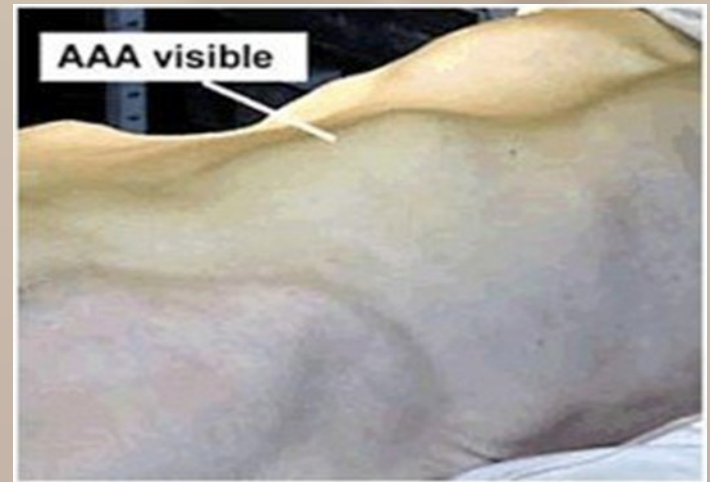
What is an aneurysm?

- When an artery wall weakens causing it to widen abnormally or “balloon out”



Signs & Symptoms of a AAA

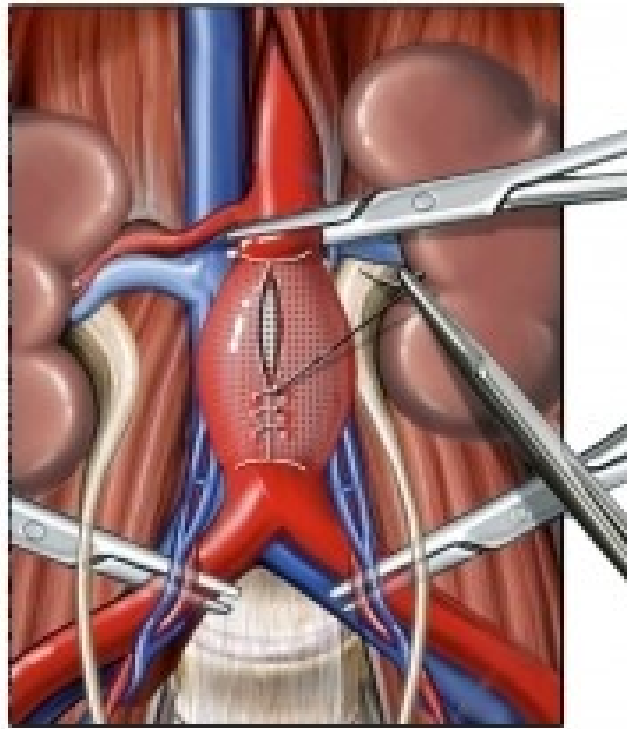
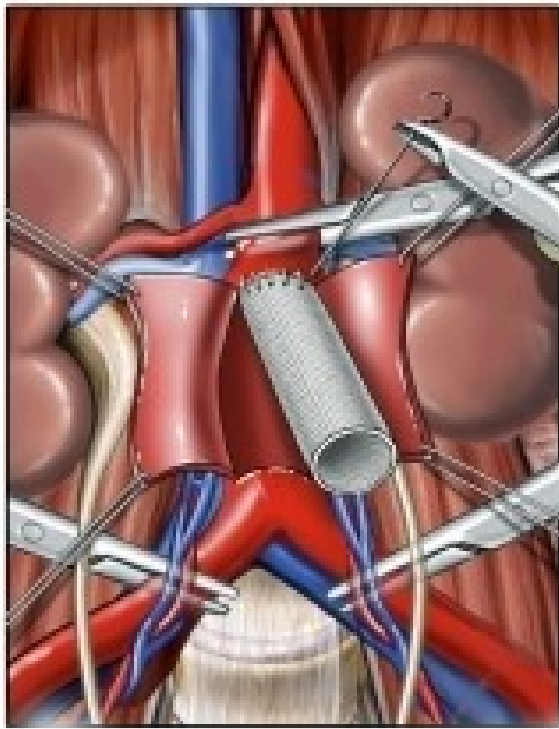
- Nonruptured:
 - Abdominal, back or flank pain
 - Pulsating abdomen
 - Pain or discoloration in the feet
- Ruptured:
 - Severe pain
 - Hypotension
 - Pulsatile abdominal mass
 - **MEDICAL EMERGENCY!!**



- What are your priorities for these patients?

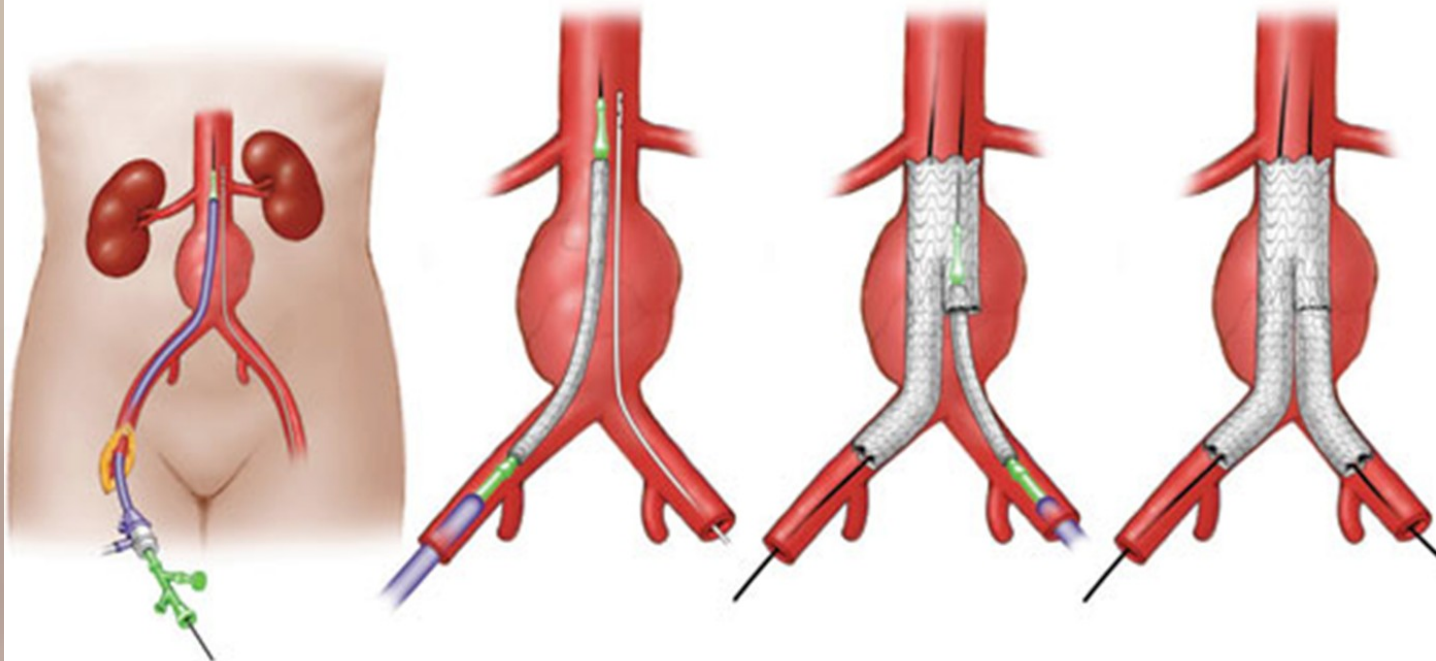
Management of a AAA

- Open Repair
- Endovascular Aneurysm Repair (EVAR)
 - Replace diseased part of aorta
- Complications post-op:
 - MI
 - Bleeding
 - Renal Failure
 - Bowel/Ureteral injury
 - GI complications
 - Leg ischemia
 - Graft infection (mortality of 90% with this)



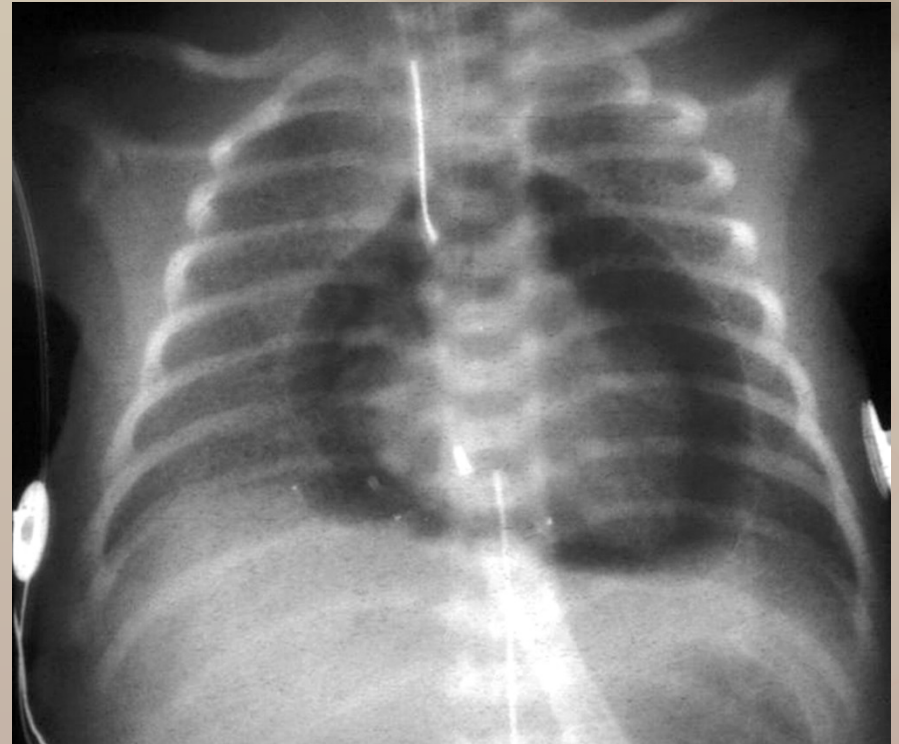
- Open Repair

- Endovascular Repair



Cardiac Tamponade

- A pericardial effusion extends the sac beyond it's limits
- The heart is unable to function properly
- What would we expect to see in a patient with cardiac tamponade?



Treatment for Cardiac Tamponade

- If having hemodynamic changes = Pericardiocentesis:
 - Percutaneous
 - Surgical
- If no hemodynamic changes:
 - Conservative management with continuous hemodynamic assessment

