

Project: Ghana Emergency Medicine Collaborative

Document Title: Cardiovascular Emergencies

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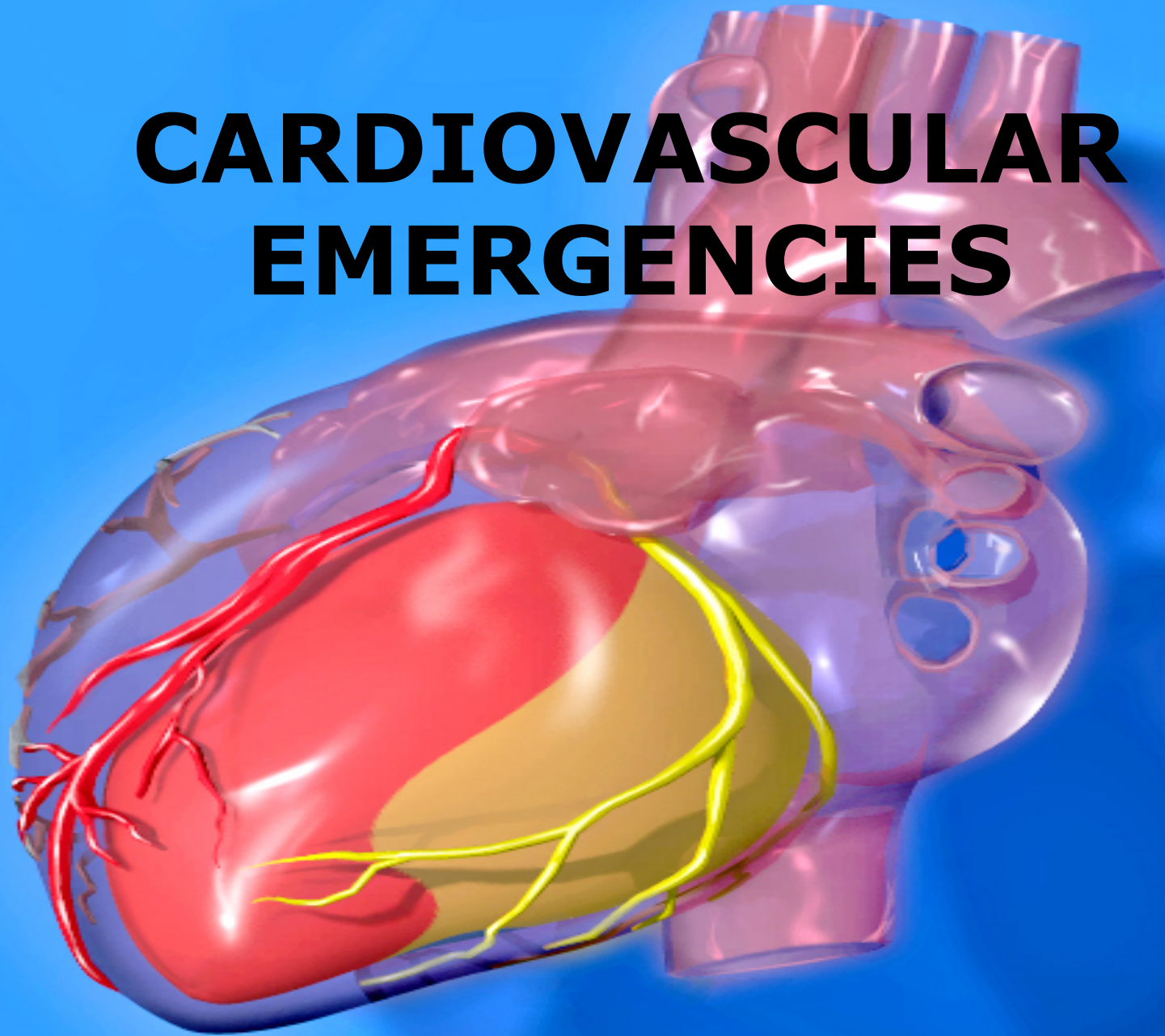


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CARDIOVASCULAR EMERGENCIES



Primary Assessment

- Across the room assessment
 - A- airway
 - B- breathing
 - C- circulation

Vital Signs

- Blood pressure
 - Hyper, hypo or normotensive
- Heart rate
 - Tachycardic/bradycardic, regular/irregular
- Respiration rate
 - Tachypnic/bradypnic, regular/irregular
- Temp
- Pulse ox

Secondary Assessment

- Subjective

- Health history

- Objective

- Your own assessment

Health History

Pain

OPQRST mnemonic

Location of pain

History of similar pain?

Other symptoms?

Shortness of breath, chest pressure, palpitations, dizziness, syncope, nausea, vomiting, abdominal pain, edema

Co morbidities

Smoking hx, obese, hypertension, diabetes, CHF, hx of aortic aneurysm or dissection, irregular heart rhythms, drug use, high cholesterol

Family health history

Medications

OPQRST

- O- Onset
 - What was the pt doing during the onset of symptoms?
- P- Provoking factors
 - What makes the pain worse, also what makes it better?
- Q- Quality
 - What is the quality of the pain? How does the pt describe it? (dull, sharp, pressure, burning, crushing, tearing, constant, intermittent, etc.)
- R- Radiation
 - Does the pain radiate anywhere? (jaw, arm, back, etc.)
- S- Severity
 - How bad is the pain? 1-10 scale, FACES scale for children
- T- Time
 - How long have you had the pain? Constant vs. intermittent, had similar pain in the past?

Cardio Assessment

- Inspect
- Palpate
- Percuss
- Auscultate

Inspect

- General appearance
- Skin color
- Skin turgor
- Capillary refill
- Pulsations
- Bleeding
- Diaphoretic/dry

Palpate

● Pulses

- Thready, bounding, equal bilaterally?
 - Radial
 - Brachial
 - Femoral
 - Popliteal
 - Dorsalis pedis
 - Posterior tibial

Palpable radial pulse = BP of at least 80 mmHg systolic

Palpable femoral pulse = BP of at least 60 mmHg systolic



Percussion

- Can percuss for cardiac borders if needed-
 - Begin at axillary line and percuss along 5th intercostal space toward sternum.
 - Resonance to dullness at L border of heart, cannot usually hear R border d/t sternum.

Auscultation

- Rate
 - Tachycardic, bradycardic
- Rhythm
 - Regular, irregular
- Heart sounds



Heart sounds

- Normal S1, S2

- Lub dub

- Murmur

- Whooshing

- Friction Rub

- S3

- S4

Murmurs

● Innocent/harmless

- Common in infants/children
- Happens d/t increase in blood flow through heart: pregnancy, fever, hyperthyroidism, children

● Abnormal

- Congenital structural heart defects
 - Septal defects, cardiac shunts, valve abnormalities (stenosis, regurgitation)
- Infectious processes
 - Rheumatic fever, endocarditis
- Older Age
 - Valve calcification causing more turbulent blood flow

● Mitral Valve Prolapse

- Mitral valve does not close properly causing blood to flow back into atrium

<http://depts.washington.edu/phsdx/audio/mr.mp3>

S3 or Ventricular Gallop

- After S2
- Failing left ventricle, increased blood volume in ventricles
- Dilated CHF
- Ken-tuck-y

<http://depts.washington.edu/physdx/audio/s31.mp3>

S4 or Atrial Gallop

- Before S1
- Blood being forced into hypertrophic left ventricle
- Failing left ventricle, restrictive cardiomyopathy.
- Tenn-ess-ee

<http://depts.washington.edu/physdx/audio/s41.mp3>

● Pericardial Friction Rub

- Infectious: bacterial, viral, TB, fungal
- Non-infectious:
Rheumatoid Arthritis,
Systemic Lupus
Erythematosus, other
inflammatory diseases

<http://depts.washington.edu/physdx/audio/rub.mp3>

Diagnostic Procedures



ECG

- 12 lead Electrocardiogram
- Measures detailed electrical activity of the heart
- Identifies Normal Sinus Rhythm (NSR), Cardiac Arrhythmias, Myocardial Infarctions (MI)

Reasons to obtain ECG

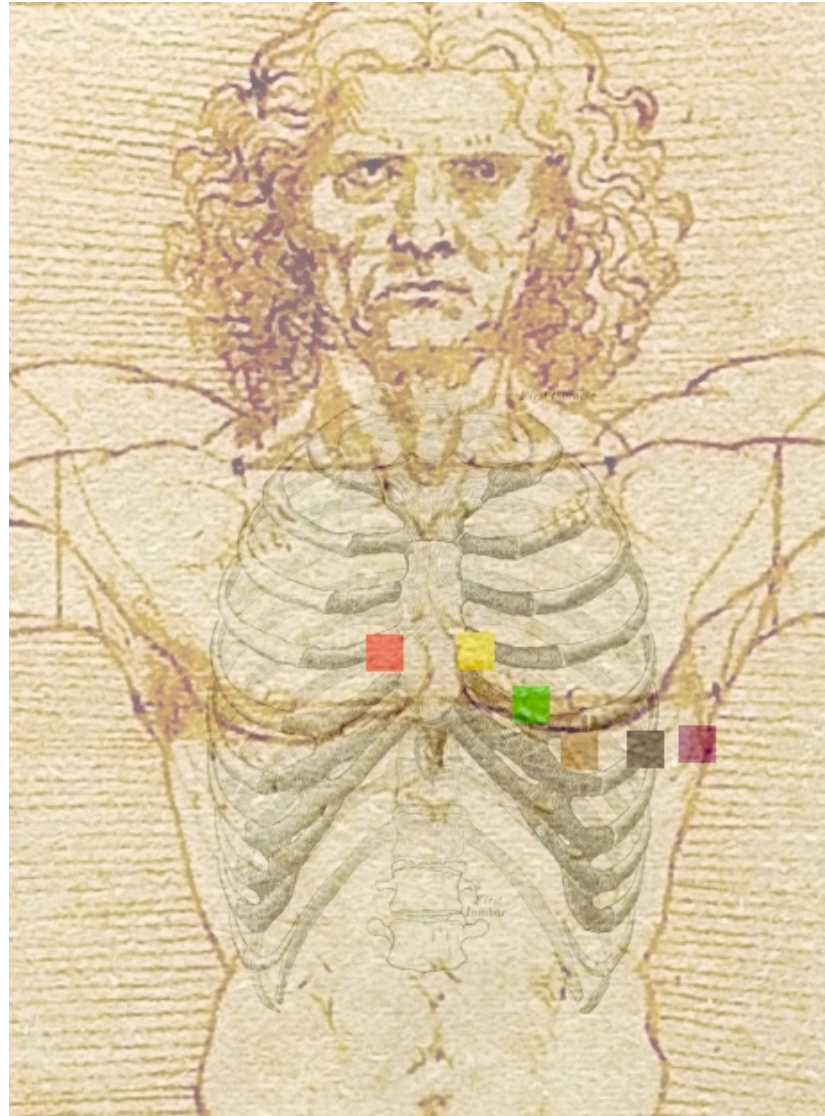
- Chest pain/pressure
- Shortness of breath/difficulty breathing
- Palpitations or pounding of heart
- Tachycardia/bradycardia
- Syncope

Lead Placement

V1- 4th
intercostal
space, right of
sternum

V2- 4th
intercostal
space, left of
sternum

V3- 5th
intercostal
space between
V2&V4

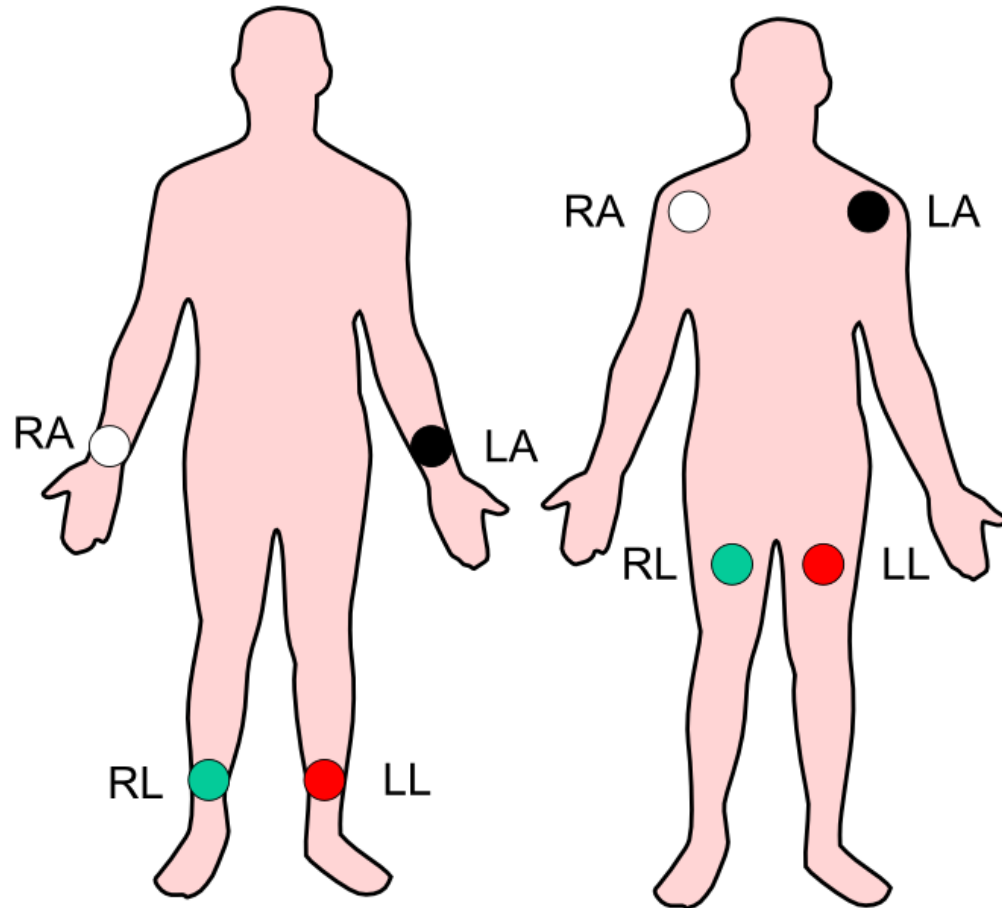


V4- 5th
intercostal
space, L mid-
clavicular
line.

V5- 5th
intercostal
space, L
anterior
axillary line

V6- 5th
intercostal
space, L mid-
axillary line

Limb Lead Placement



RA = Right Arm
LA = Left Arm
RL = Right Leg
LL = Left Leg

Labs – Cardiac Markers

● Troponin

- Released into blood stream within 6hrs after damage to heart
- Can stay in blood stream 1-2 weeks after
- Normal $<0.4\text{ng/ml}$

● CK

- Creatinine kinase shows damage to cardiac and skeletal muscles
- Total CK normal 38-120mg/ml

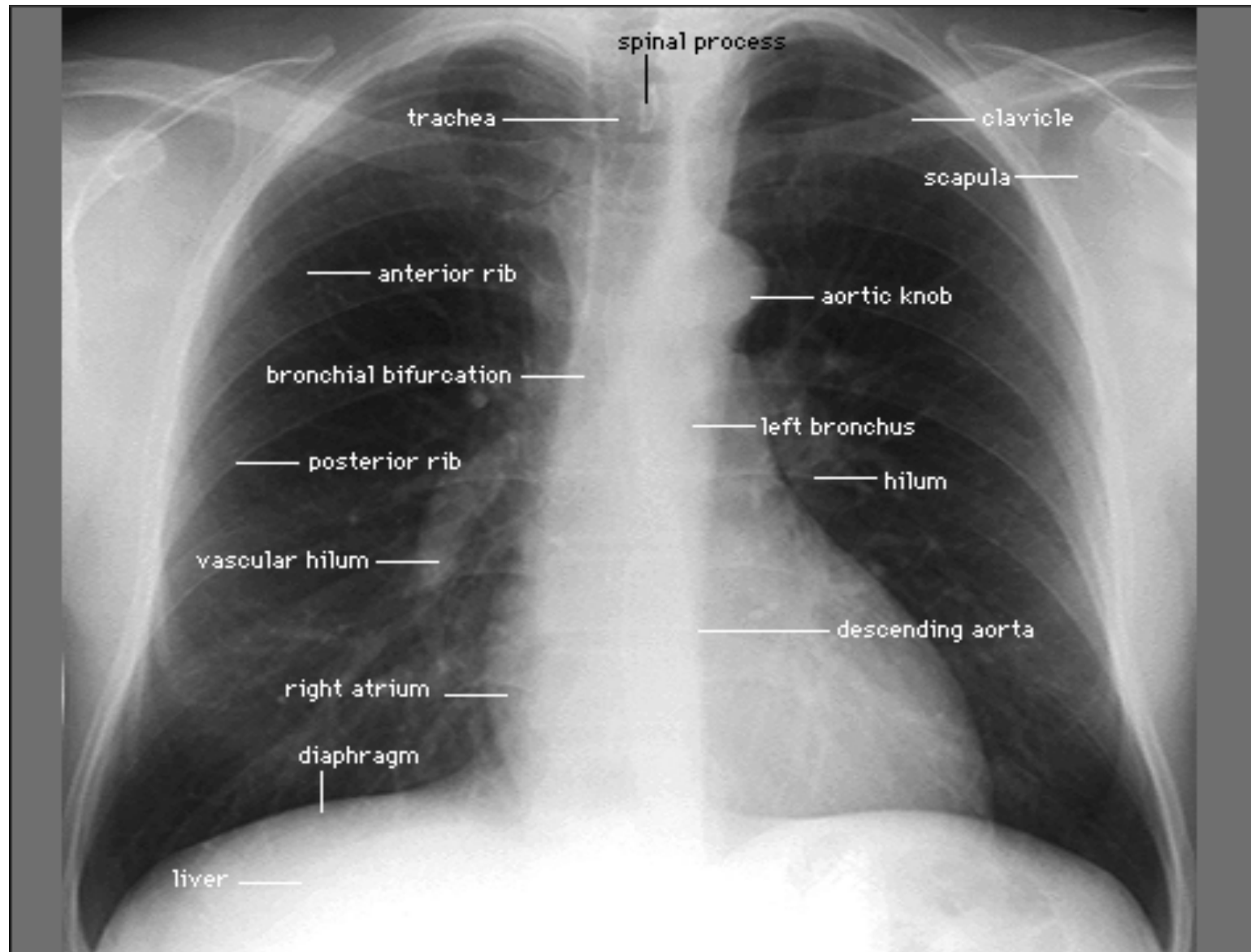
● CK-MB

- More cardiac specific
- Seen in blood 3-4hrs after onset of chest pain
- Peaks 18-24hrs and is out of blood stream approx 72hrs after
- Normal 0-3mg/ml

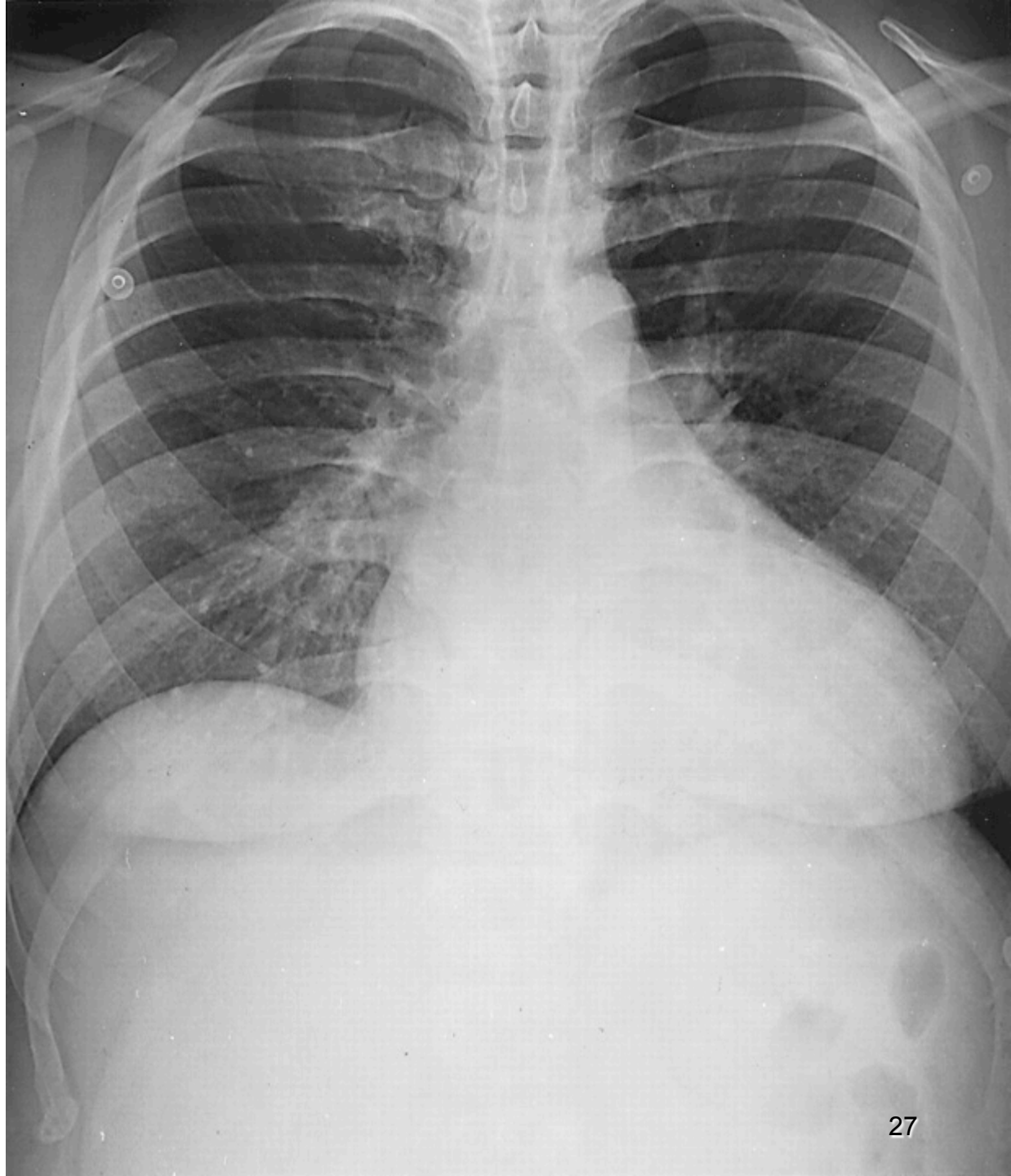
X-Ray

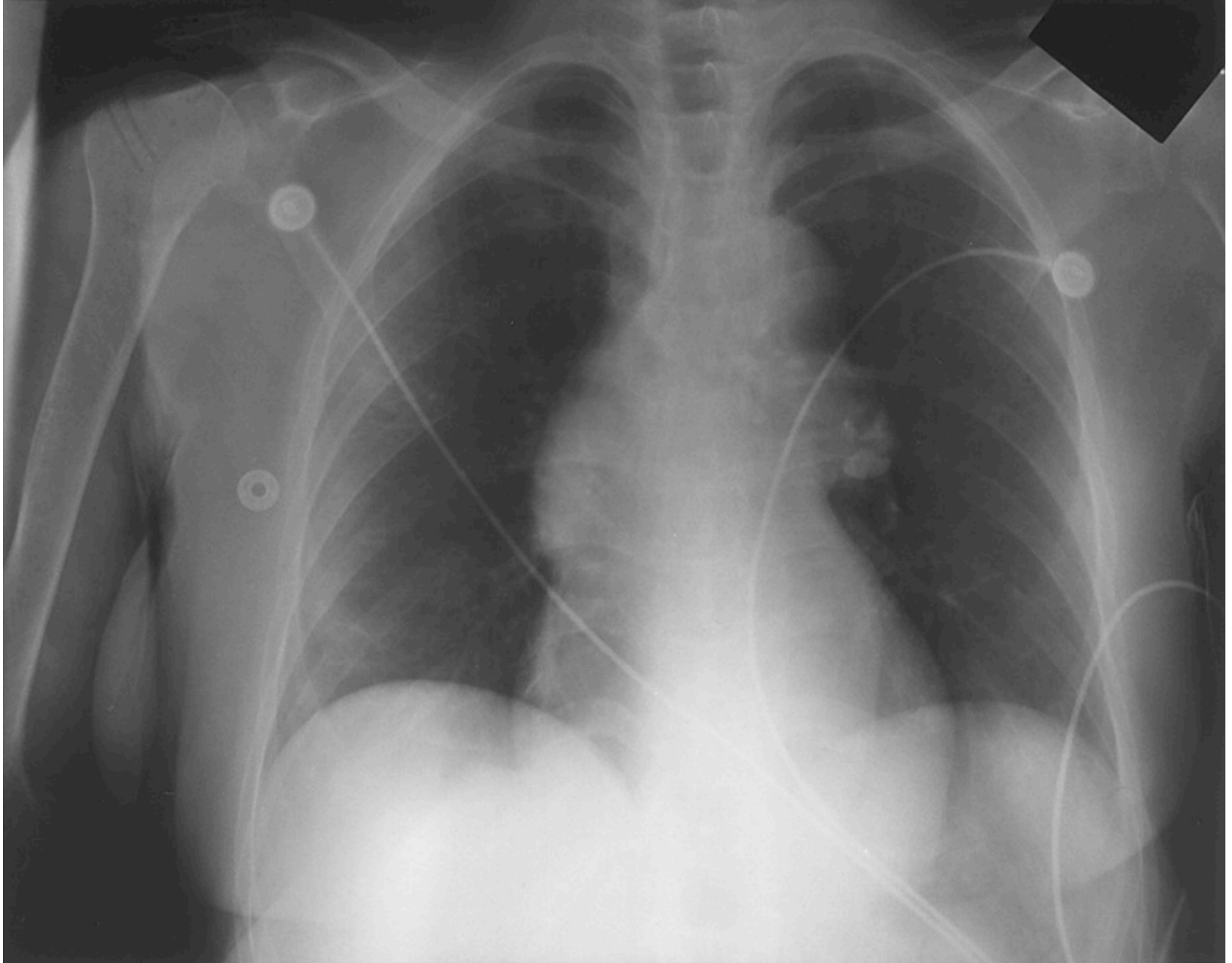
- Normal vs. Abnormal
- Abnormal cardiac findings:
 - Cardiomegaly
 - Enlarged atria/ventricles
 - Widened mediastinum
 - Trauma
 - Pulmonary effusions

Normal Chest X-ray



CARDIOMYOPATHY





Other diagnostic procedures

● Stress Test

- Exercise or Dobutamine/ Adenosine
- ECG, BP, O2 sat measured during exertion, monitored for changes.

● CT (Computed Tomography) Scan

- Dissection, AAA, PE, Trauma

● Echocardiogram

- Ultrasound of heart that visualizes heart movement and blood flow.
- Measures Ejection Fraction: amount of blood pumped from ventricle (usually left). Normal 55%-70%
- Stress Echo: echo after exercise exertion

Cardiovascular Nursing Diagnoses & Collaborative Problems

- Activity Intolerance *related to* compromised oxygen transport system *secondary to* cardiomyopathies, dysrhythmias, myocardial infarction, congenital heart disease, congestive heart failure, angina, valvular disease.
- Ineffective tissue perfusion *related to* decreased cardiac output *secondary to* dysrhythmia, cardiomyopathy with decreased EF, cardiac damage.
- Anxiety *related to* unfamiliar environment, diagnostic tests, loss of control.
- Risk for Ineffective Respiratory Function related to excessive secretions secondary to cardiac disease-CHF (PC)

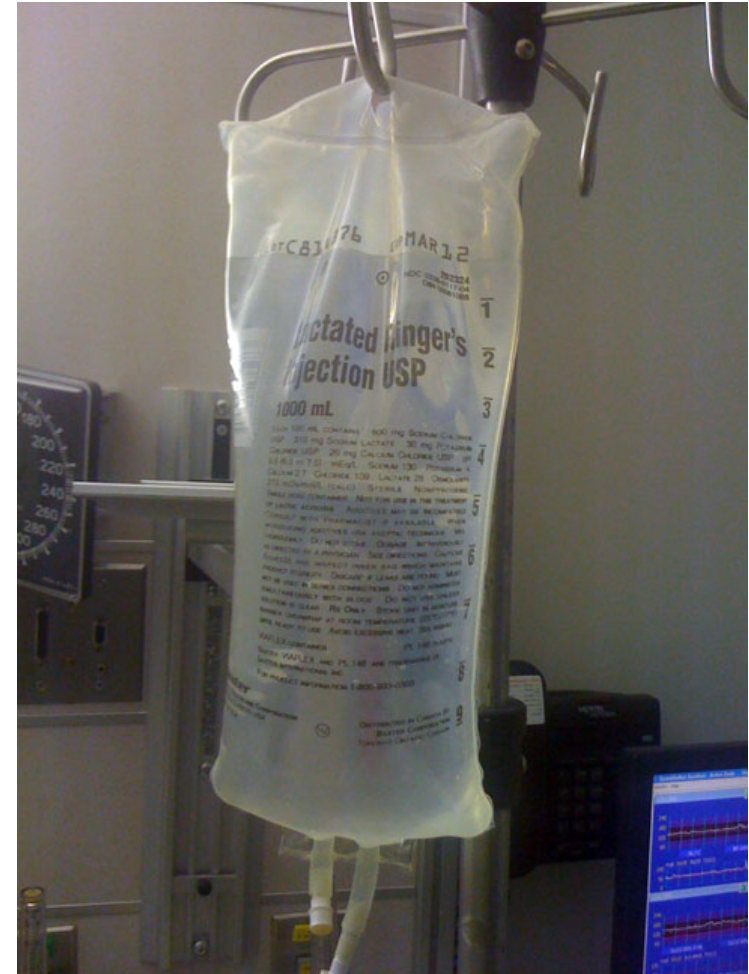
Priorities of Cardiovascular Care

- A-airway B-breathing C-circulation
- Restore proper/adequate cardiac function/blood flow.
 - Correct/control arrhythmias
 - Maintain perfusion, BP and HR
 - Time = Muscle
- Symptom management
- Ongoing monitoring
- Patient education

Interventions

- ECG
- IV Fluids
- Apply oxygen
- Control bleeding
- Cardiac catheterization
 - Cardiac stents
- Defibrillation
- Cardioversion
- Pacing
- Pericardiocentesis
- Thoracotomy ?

Medications



Anti-hypertensives

Labetalol

Apresoline

HCTZ-hydrochlorothiazide

Metoprolol

Verapamil

Nitroglycerin IV drips or sublingual

Furosemide

Anti-arrhythmics

- Adenosine
- Amiodarone
- Lidocaine
- Verapamil and Labetalol

Vasopressors

- Dopamine
- Dobutamine
- Epinephrine

Evaluation & Ongoing Monitoring

- Re-evaluation of pt symptoms
- Continuous cardiac monitor/repeat ECG
- Repeat labs-troponin, ck
 - Repeat 4 and 8hrs after
 - Troponin elevates 3-12hrs after damage
 - CK-MB elevates 4-12hrs after

Documentation

- Vital signs
- Cardiac Rhythm
- Airway/Airway adjuncts
- Pain score!
- Interventions
- Pt tolerance of interventions
- Pt condition

Documentation Example:

12:03 Pt arrives clutching chest, tachypnic and diaphoretic. Reports midsternal chest pain radiating to L shoulder/arm starting 30min ago, pain is 9/10 on 10 point scale. +Nausea and SOB. VS: BP-170/89 HR-102 RR-24 Temp-37.0 Pulse Ox 97% on RA

12:05 12 Lead ECG performed, presented to Dr. for interpretation.

12:08 18g IV placed to R Forearm, labs drawn and sent for Trop, CK, PT/PTT, Basic and CBC. IV flushes well with no s/s infiltration, pt tolerated procedure well.

12:13 VS: BP-168/90 HR-99 RR-22

Pt provided Nitro 0.4mg SL for pain score 9/10

12:18 Patient sitting up in bed, cardiac monitor and O2 2L NC in place. Awake, alert, and appears uncomfortable, slightly diaphoretic and holding chest at times. Breaths equal, non labored. Pt does report that his pain is a little better after Nitro, now a 5/10 on 10 point scale. NSR on monitor, will continue to monitor. VS: BP- 145/78 HR-90 RR-20

Patient Education

- Healthy diet and exercise
- Know your risk factors
- Know your body
 - Chest pain, difficulty breathing, pain/ numbness/tingling down L arm, jaw pain, palpitations or racing heart, dizziness, nausea/vomiting, fatigue, sweating.

Age Related Considerations



Pediatric

- Increased volume of circulating blood
- Increased HR, decreased BP, increased RR
- Cardiac output maintained by increasing HR. CO falls quickly with bradycardia or HR >200bpm.
- Higher CO than adults.
- Hypotension LATE sign of shock..
- Sympathetic nervous system poorly developed
- Become dehydrated more easily
- Congenital Heart Defects

Normal Vital Signs

AGE	HEART RATE	RESPIRATORY RATE	SYSTOLIC BLOOD PRESSURE
NEWBORN	90-170	40-60	52-92
1 MO.	110-180	30-50	60-104
6 MO.	110-180	25-35	65-125
1 YEAR	80-160	20-30	70-118
2 YEARS	80-130	20-30	73-117
4 YEARS	80-120	20-30	65-117
6 YEARS	75-115	18-24	76-116
8 YEARS	70-110	18-22	76-119
10 YEARS	70-110	16-20	82-122
12 YEARS	60-110	16-20	84-128
14 YEARS	60-105	16-20	85-136

Geriatric

- Calcification/atherosclerosis
- Thickening of heart wall → hypertension
- Slight increases in PR interval on ECG
- Decreased sensitivity to baroreceptors regulating BP
- ✂ Takes longer for heart to increase and decrease in rate
- ✂ S/S MI may differ
 - Confusion, fatigue, nausea/vomiting, short of breath-without chest pain!