System Happenings

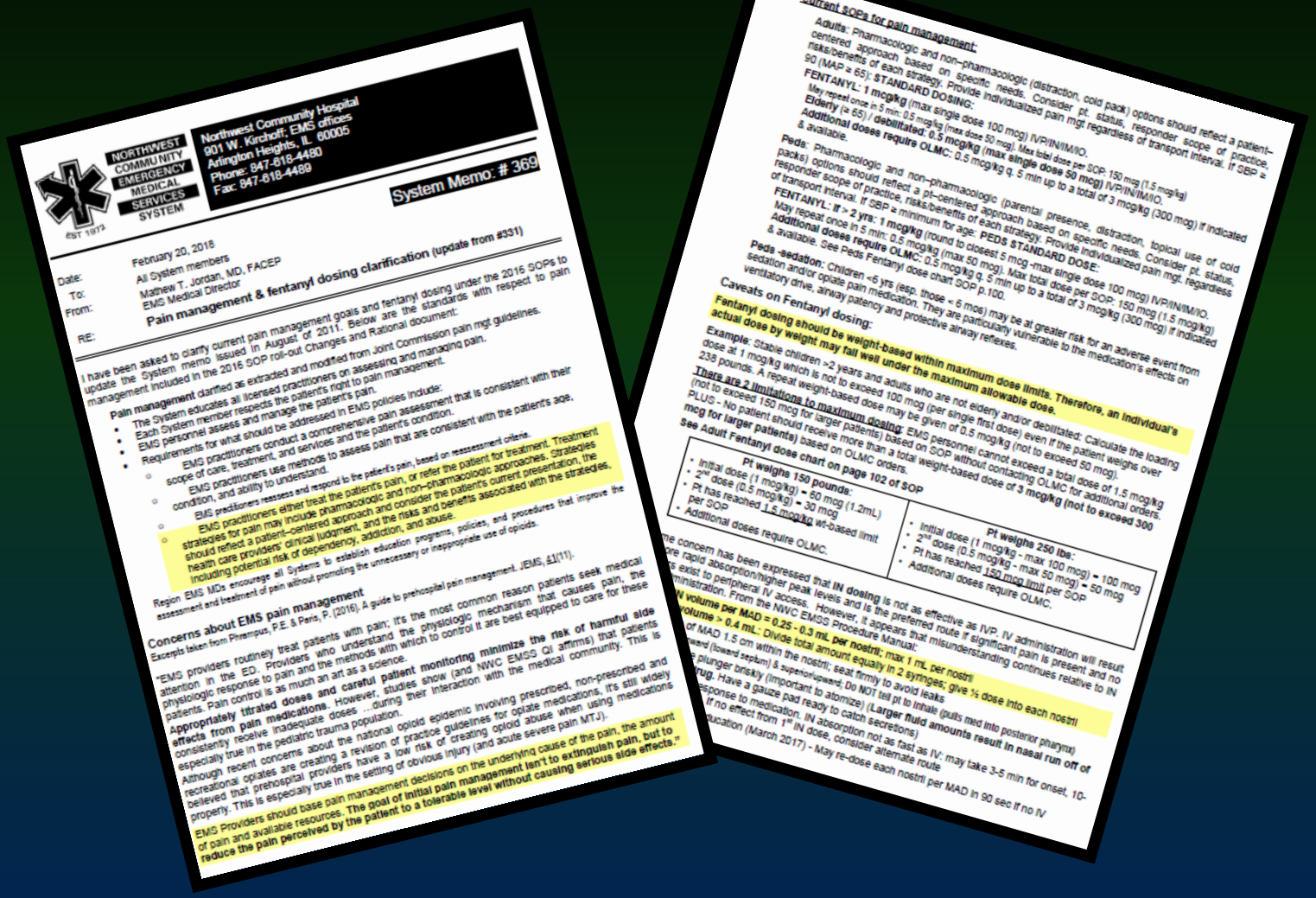
- Each month CE would like to bring system updates
  - Updates and ideas that one as a system member should be aware of…
- Committee Updates
- New product information
- www.nwcemss.org

NORTHWEST COMMUNITY EMERGENCY MEDICAL SERVICES SYSTEM
EST 1972

System Updates

- Students are just about ready to come to the field the first of March
- Video laryngoscopy continues in full swing; education is rolling out to the field agency by agency with more than half of the system now using (VL) King Vision
- PBPI: reviewing pain control (see handout)
- R and D: TXA; trauma equipment; inline all in one neb kit trial

System Memo #369



NORTHWEST COMMUNITY EMERGENCY MEDICAL SERVICES SYSTEM
EST 1973

Northwest Community Hospital
901 W. Kirchoff; EMS offices
Arlington Heights, IL 60005
Phone: 847-618-4480
Fax: 847-618-4489

System Memo: # 369

Date: February 20, 2018
To: All System members
From: Mathew T. Jordan, MD, FACEP
EMS Medical Director
RE: **Pain management & fentanyl dosing clarification (update from #331)**

I have been asked to clarify current pain management goals and fentanyl dosing under the 2016 SOPs to update the System memo issued in August of 2011. Below are the standards with respect to pain management included in the 2016 SOP roll-out Changes and Rational document:

Pain management clarified as extracted and modified from Joint Commission pain mgt guidelines.

- The System educates all licensed practitioners on assessing and managing pain.
- Each System member respects the patient's right to pain management.
- EMS personnel assess and manage the patient's pain.
- Requirements for what should be addressed in EMS policies include:
  - EMS practitioners conduct a comprehensive pain assessment that is consistent with their scope of care, treatment, and services and the patient's condition.
  - EMS practitioners use methods to assess pain that are consistent with the patient's age, condition, and ability to understand.
  - EMS practitioners reassess and respond to the patient's pain, based on reassessment criteria.
  - EMS practitioners either treat the patient's pain, or refer the patient for treatment. Treatment strategies for pain may include pharmacologic and non–pharmacologic approaches. Strategies should reflect a patient–centered approach and consider the patient's current presentation, the health care providers' clinical judgment, and the risks and benefits associated with the strategies, including potential risk of dependency, addiction, and abuse.

Region EMS MDs encourage all Systems to establish education programs, policies, and procedures that improve the assessment and treatment of pain without promoting the unnecessary or inappropriate use of opioids.

Concerns about EMS pain management

Excerpts taken from Pinampus, P.E. & Paris, P. (2016). A guide to prehospital pain management. *JEMS, 41*(11).

"EMS providers routinely treat patients with pain; it's the most common reason patients seek medical attention in the ED. Providers who understand the physiologic mechanism that causes pain, the physiologic response to pain and the methods with which to control it are best equipped to care for these patients. Pain control is as much an art as a science.

Appropriately titrated doses and careful patient monitoring minimize the risk of harmful side effects from pain medications. However, studies show (and NWC EMSS QI affirms) that patients consistently receive inadequate doses ...during their interaction with the medical community. This is especially true in the pediatric trauma population.

Although recent concerns about the national opioid epidemic involving prescribed, non-prescribed and recreational opiates are creating a revision of practice guidelines for opiate medications, it's still widely believed that prehospital providers have a low risk of creating opioid abuse when using medications properly. This is especially true in the setting of obvious injury (and acute severe pain MTJ).

EMS Providers should base pain management decisions on the underlying cause of the pain, the amount of pain and available resources. **The goal of initial pain management isn't to extinguish pain, but to reduce the pain perceived by the patient to a tolerable level without causing serious side effects."**

Current SOPs for pain management:

Adults: Pharmacologic and non–pharmacologic (distraction, cold pack) options should reflect a patient–centered approach based on specific needs. Consider pt. status, responder scope of practice, risks/benefits of each strategy. Provide individualized pain mgt regardless of transport interval. If SBP ≥ 90 (MAP ≥ 65): **STANDARD DOSING:**

FENTANYL: 1 mcg/kg (max single dose 100 mcg) IVP/IN/IM/IO.
May repeat once in 5 min: 0.5 mcg/kg (max dose 50 mcg). Max total dose per SOP: 150 mcg (1.5 mcg/kg)
Elderly (≥ 65) / **debilitated: 0.5 mcg/kg (max single dose 50 mcg)** IVP/IN/IM/IO.
Additional doses require OLMC: 0.5 mcg/kg q. 5 min up to a total of 3 mcg/kg (300 mcg) if indicated & available.

Peds: Pharmacologic and non–pharmacologic (parental presence, distraction, topical use of cold packs) options should reflect a pt–centered approach based on specific needs. Consider pt. status, responder scope of practice, risks/benefits of each strategy. Provide individualized pain mgt. regardless of transport interval. If SBP ≥ minimum for age: **PEDS STANDARD DOSE:**

FENTANYL: If > 2 yrs: 1 mcg/kg (round to closest 5 mcg -max single dose 100 mcg) IVP/IN/IM/IO.
May repeat once in 5 min: 0.5 mcg/kg (max 50 mcg). Max total dose per SOP: 150 mcg (1.5 mcg/kg)
Additional doses require OLMC: 0.5 mcg/kg q. 5 min up to a total of 3 mcg/kg (300 mcg) if indicated & available. See Peds Fentanyl dose chart SOP p.100.

Peds -sedation: Children <6 yrs (esp. those < 6 mos) may be at greater risk for an adverse event from sedation and/or opiate pain medication. They are particularly vulnerable to the medication's effects on ventilatory drive, airway patency and protective airway reflexes.

Caveats on Fentanyl dosing:

Fentanyl dosing should be weight-based within maximum dose limits. Therefore, an individual's actual dose by weight may fall well under the maximum allowable dose.

Example: Stable children >2 years and adults who are not elderly and/or debilitated: Calculate the loading dose at 1 mcg/kg which is not to exceed 100 mcg (per single first dose) even if the patient weighs over 238 pounds. A repeat weight-based dose may be given of 0.5 mcg/kg (not to exceed 50 mcg).

There are 2 limitations to maximum dosing: EMS personnel cannot exceed a total dose of 1.5 mcg/kg (not to exceed 150 mcg for larger patients) based on SOP without contacting OLMC for additional orders. PLUS - No patient should receive more than a total weight-based dose of **3 mcg/kg (not to exceed 300 mcg for larger patients)** based on OLMC orders.

See Adult Fentanyl dose chart on page 102 of SOP

Pt weighs 150 pounds:	**Pt weighs 250 lbs:**
• Initial dose (1 mcg/kg) = 60 mcg (1.2mL) • 2nd dose (0.5 mcg/kg) = 30 mcg • Pt has reached 1.5 mcg/kg wt-based limit per SOP • Additional doses require OLMC.	• Initial dose (1 mcg/kg - max 100 mcg) = 100 mcg • 2nd dose (0.5 mcg/kg - max 50 mcg) = 50 mcg • Pt has reached 150 mcg limit per SOP • Additional doses require OLMC.

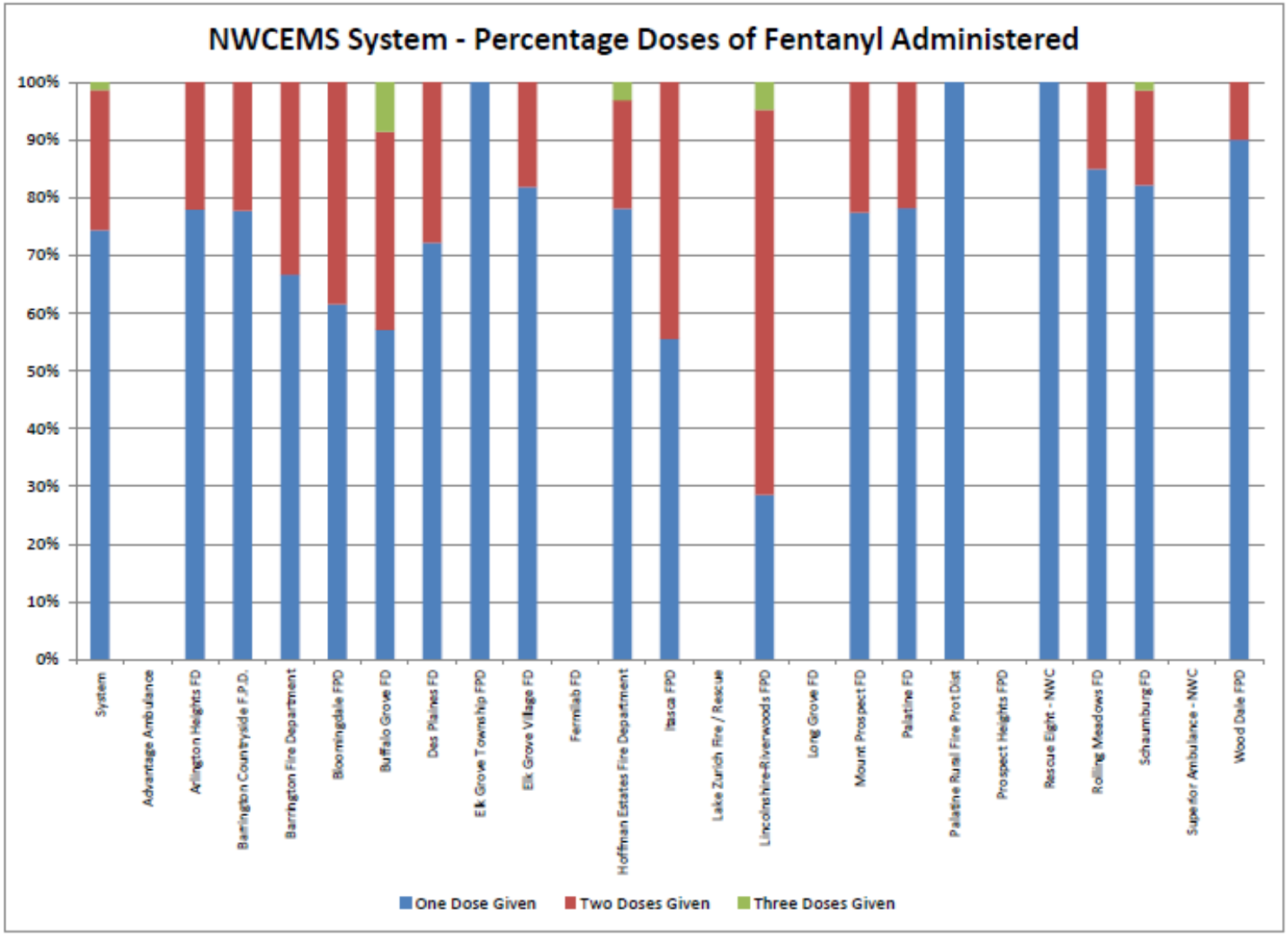
The concern has been expressed that **IN dosing** is not as effective as IVP. IV administration will result in more rapid absorption/higher peak levels and is the preferred route if significant pain is present and no IO exist to peripheral IV access. However, it appears that misunderstanding continues relative to IN administration. From the NWC EMSS Procedure Manual:

IN volume per MAD = 0.25 - 0.5 mL per nostril; max 1 mL per nostril
IN volume > 0.4 mL: Divide total amount equally in 2 syringes; give ½ dose into each nostril or MAD 1.5 cm within the nostril; seat firmly to avoid leaks
ward (loward septum) & superior-upward; Do NOT tell pt to inhale (pulls med into posterior pharynx)
plunger briskly (important to atomize) (**Larger fluid amounts result in nasal run off of rug.** Have a gauze pad ready to catch secretions)
sponse to medication. IN absorption not as fast as IV: may take 3-5 min for onset. 10-
If no effect from 1st IN dose, consider alternate route
dication (March 2017) - May re-dose each nostril per MAD in 90 sec if no IV

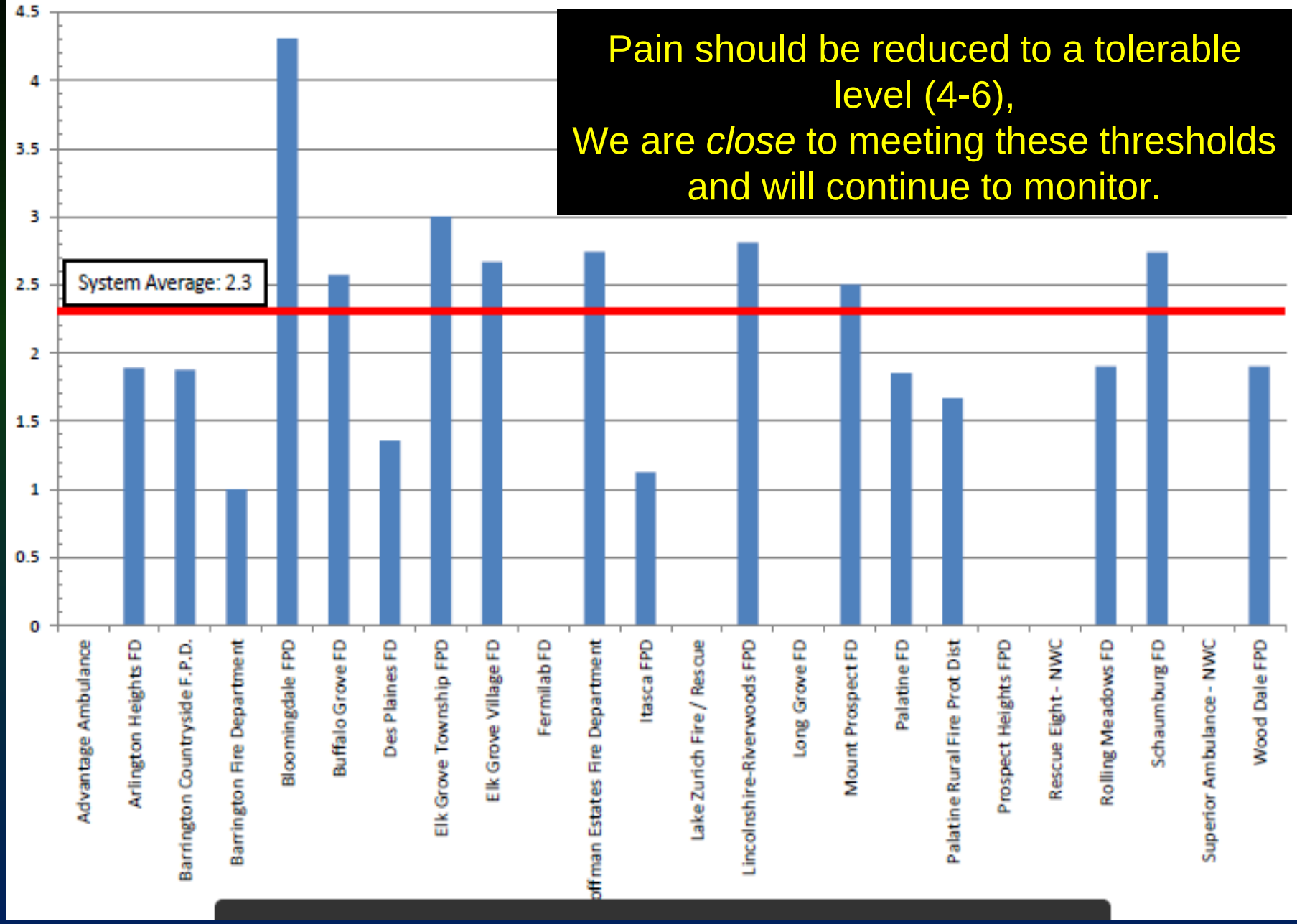
Last Page of Handout

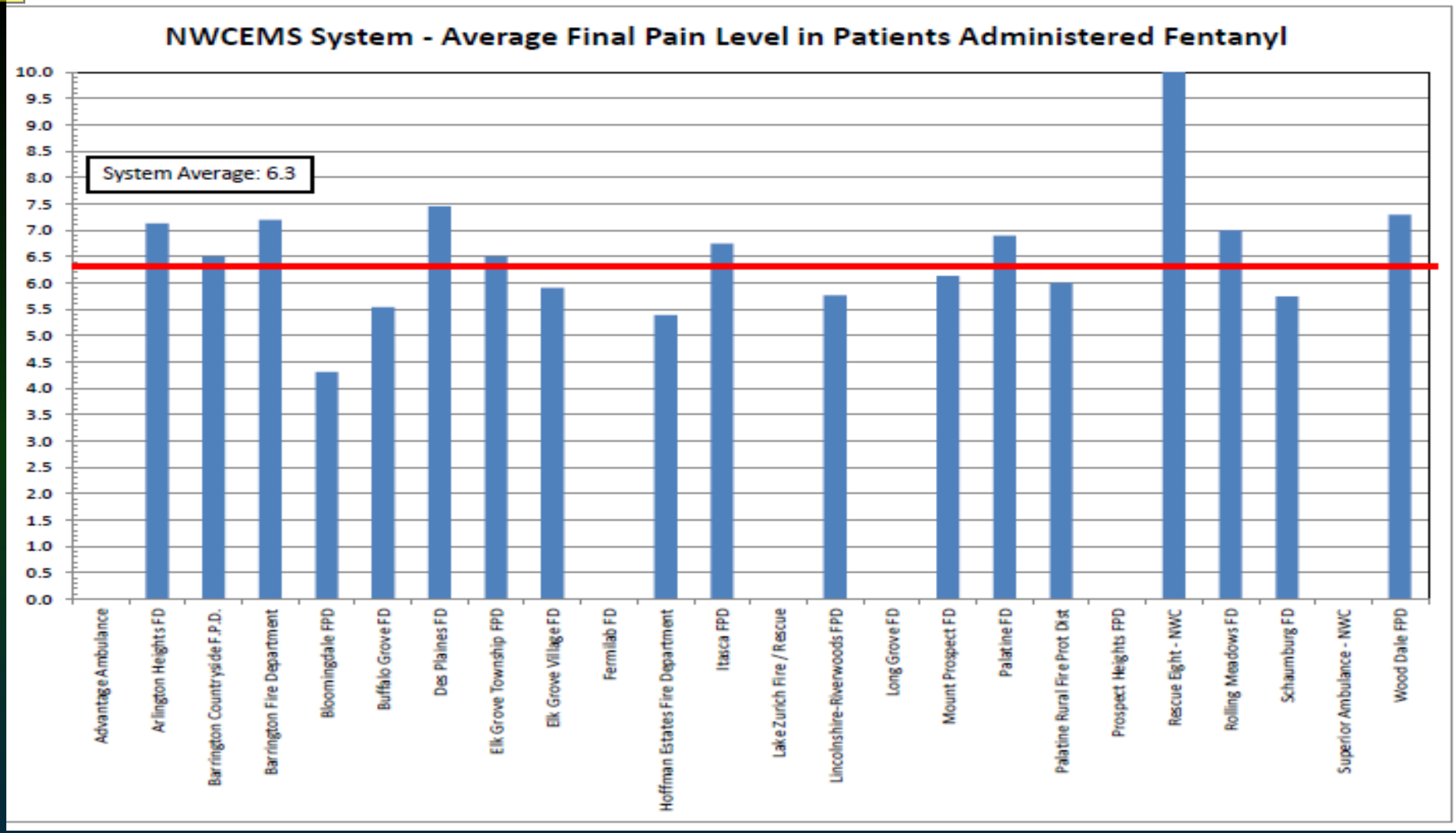
75% of patients receive only one dose of medications

PBPI Pearls:
Pain Management



NWCEMS System - Average Pain Change in Patients Administered Fentanyl





Reducing pain has shown more effective IV over IN.
If a line can be started, pain relief is more likely to be reported.

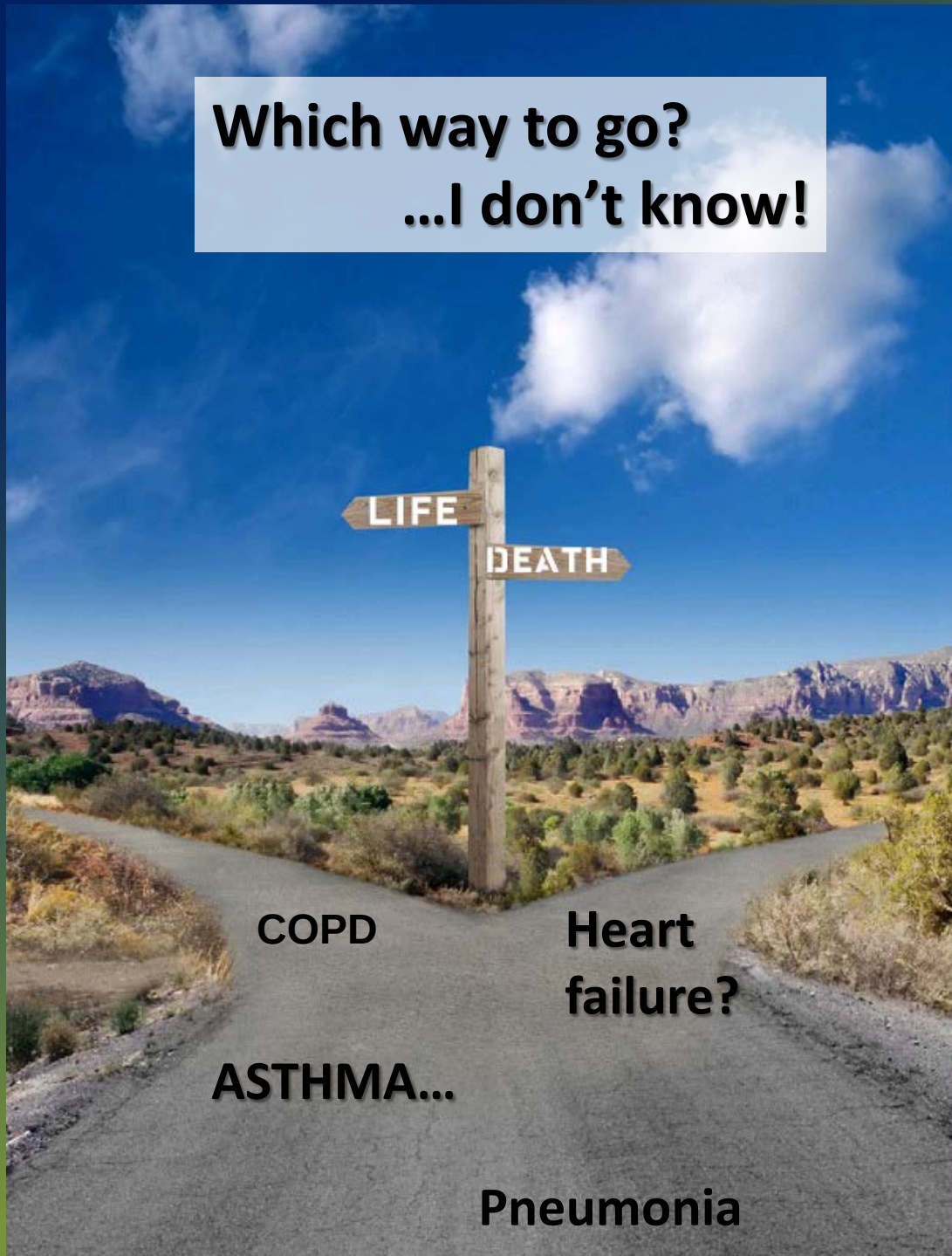
HF vs. Asthma: Which way to go?

Susan Wood, BSN, RN, Paramedic

March 2018 CE

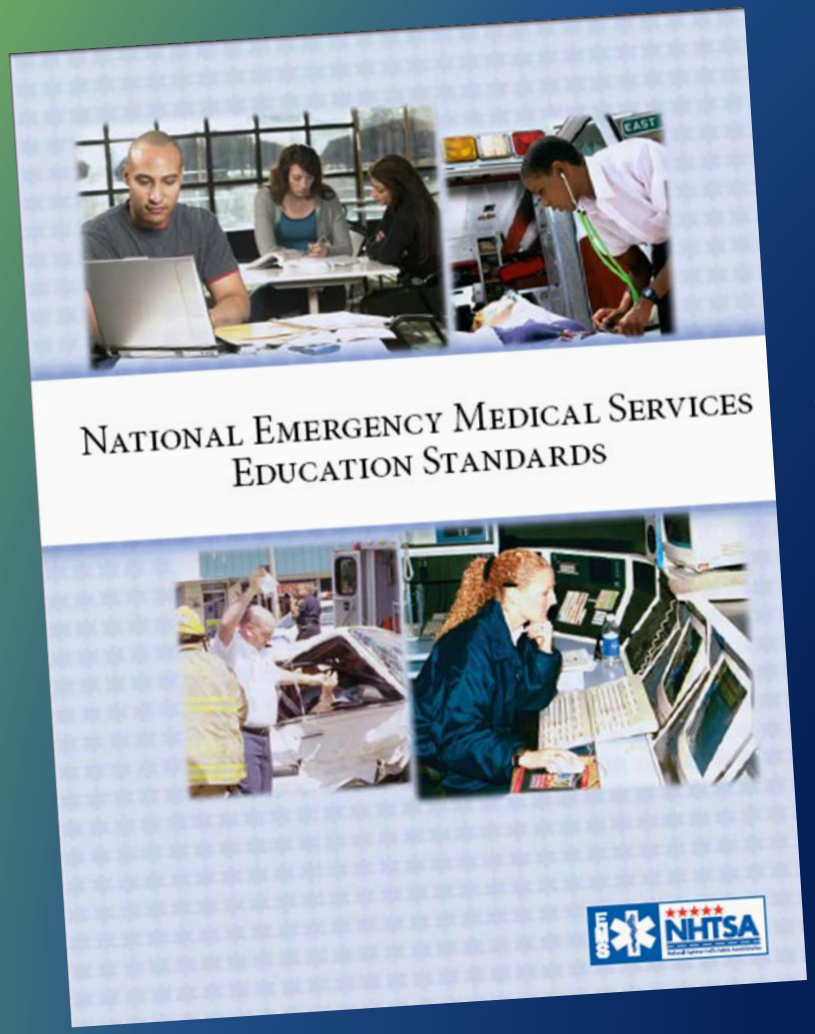
NWC EMSS

Called for respiratory distress…




I have
heart
failure
HELP!

Upon completion, participants will do the following without critical error:



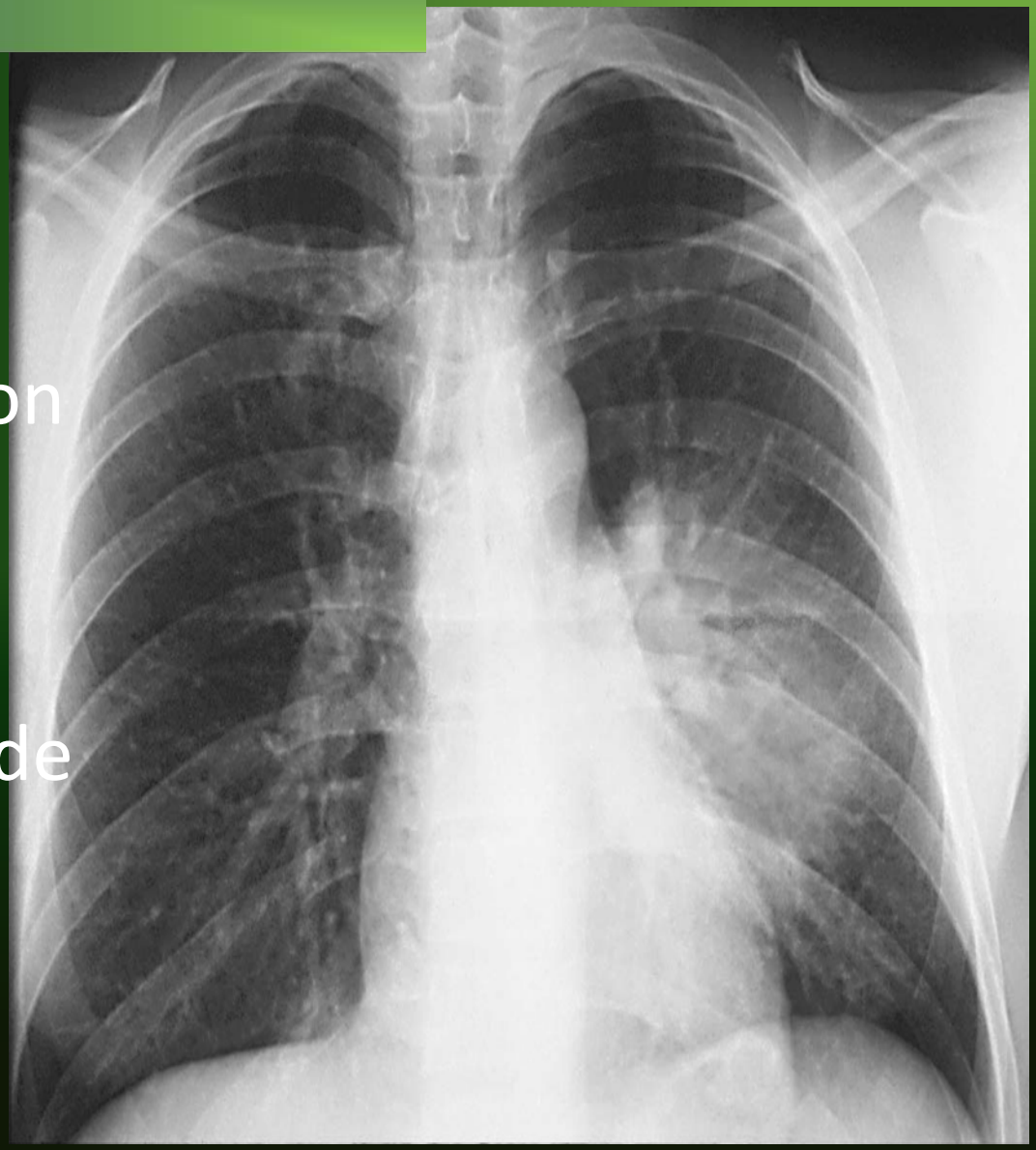
Integrate assessment findings in pts who present w/ respiratory distress to form an accurate field impression.

Develop a list of differential diagnoses using higher order thinking and critical reasoning.

- Compare and contrast pts who present w/ dyspnea, weakness, & AMS.
- Weigh the indications & contraindications of possible interventions and sequence evidence-based care.

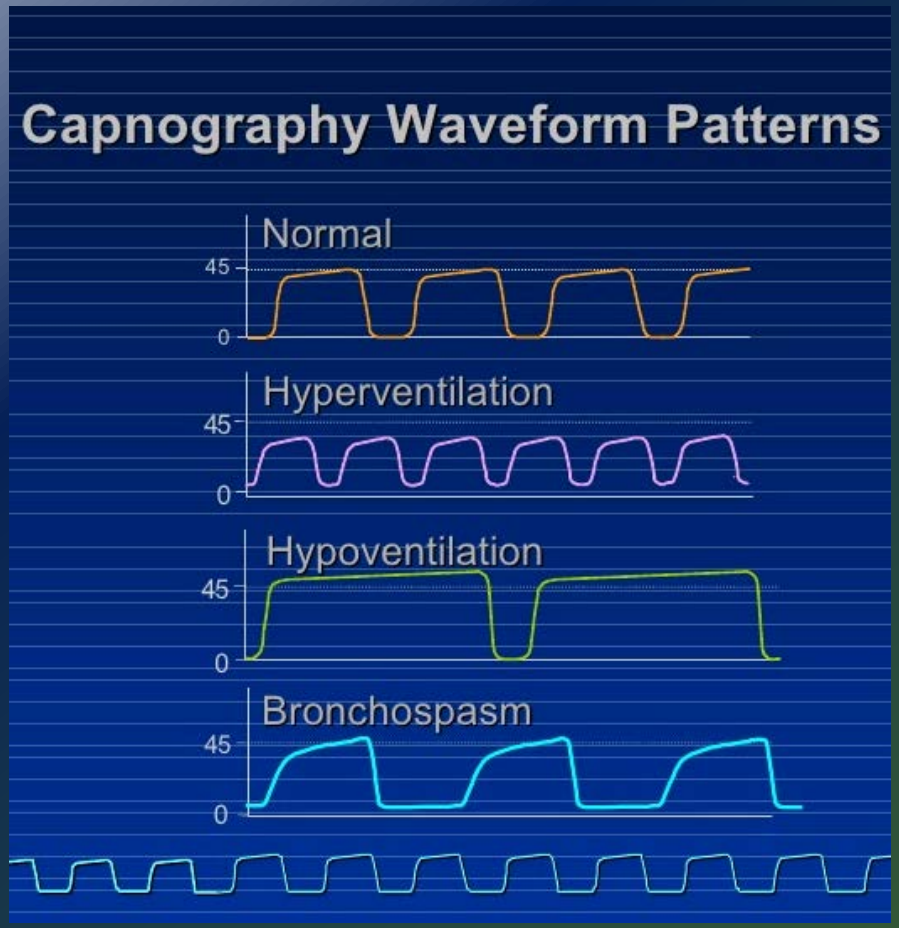
Shortness of Breath

1. Pneumonia
2. CHF
3. COPD exacerbation
4. Pneumothorax
5. PE
6. Cardiac tamponade
7. Anaphylaxis
8. Asthma



Stats from the system

7% of calls for "breathing problem"



Top Primary impression last quarter of 2017:

Dyspnea / Other Respiratory Unspecified

Acute respiratory distress syndrome

No abnormal findings upon Exam

Asthma with exacerbation

Pneumonia

COPD with exacerbation

Anxiety disorder

Heart failure

Weakness

Resp Distress: Bottom Line

All respiratory problems can be categorized as impacting

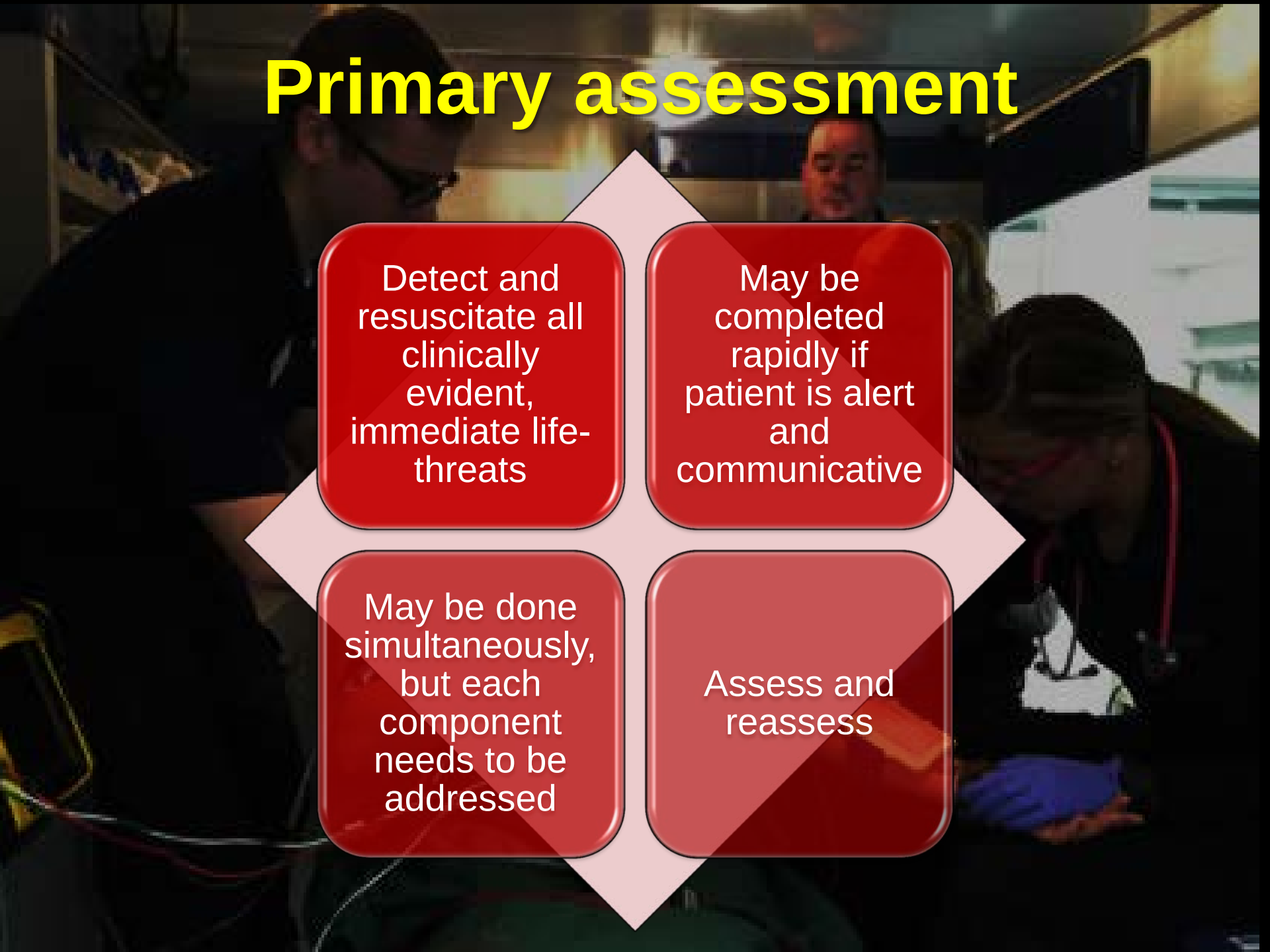
- Oxygenation
- Ventilation
- Diffusion
- Perfusion

Once identified, treatment is directed at cause(s) of the problem

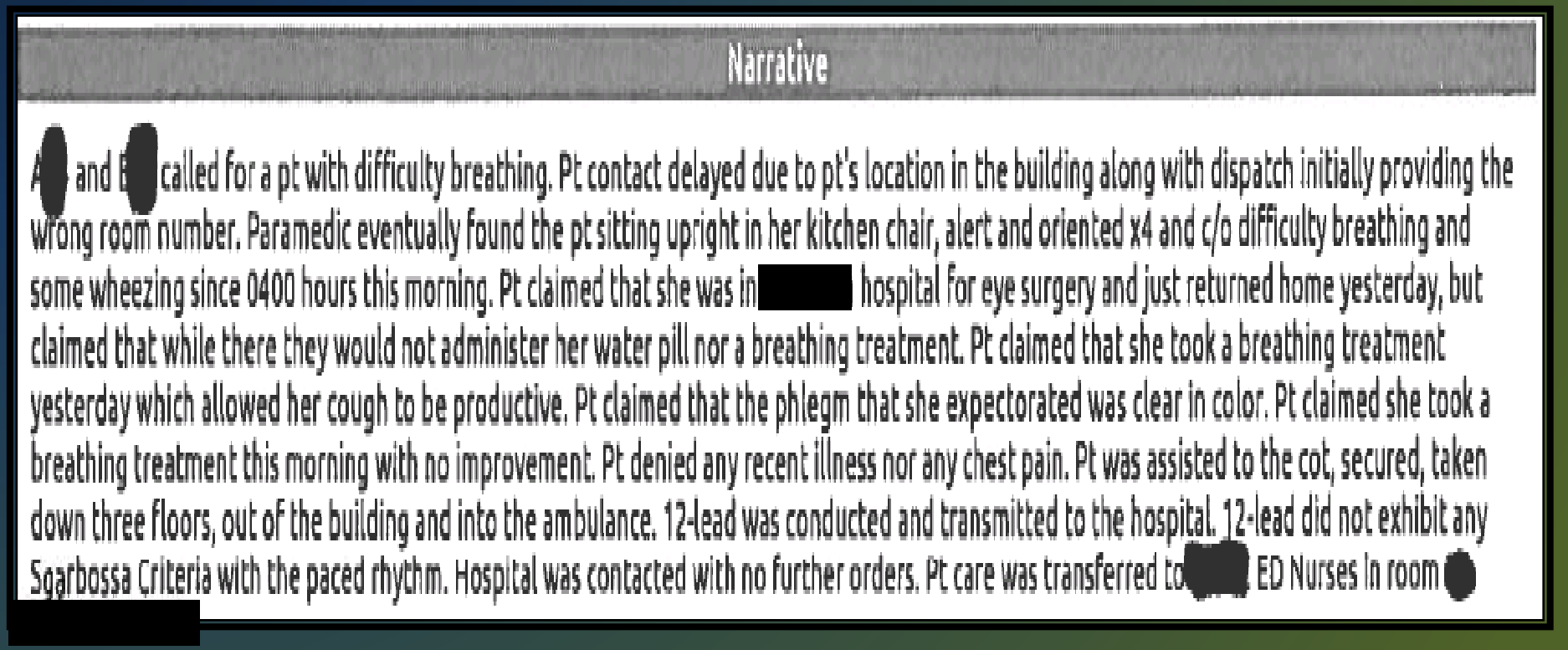
Usual Sequence of Events

- Primary assessment
- Resuscitative interventions as found
- Transport decision
- Secondary assessment
- Definitive interventions

Primary assessment



Case #1
91 F called for breathing problem



Narrative

A[redacted] and B[redacted] called for a pt with difficulty breathing. Pt contact delayed due to pt's location in the building along with dispatch initially providing the wrong room number. Paramedic eventually found the pt sitting upright in her kitchen chair, alert and oriented x4 and c/o difficulty breathing and some wheezing since 0400 hours this morning. Pt claimed that she was in [redacted] hospital for eye surgery and just returned home yesterday, but claimed that while there they would not administer her water pill nor a breathing treatment. Pt claimed that she took a breathing treatment yesterday which allowed her cough to be productive. Pt claimed that the phlegm that she expectorated was clear in color. Pt claimed she took a breathing treatment this morning with no improvement. Pt denied any recent illness nor any chest pain. Pt was assisted to the cot, secured, taken down three floors, out of the building and into the ambulance. 12-lead was conducted and transmitted to the hospital. 12-lead did not exhibit any Sgarbossa Criteria with the paced rhythm. Hospital was contacted with no further orders. Pt care was transferred to [redacted] ED Nurses in room [redacted]

[redacted]

This is the history as it is uncovered; what is next to complete?

Detailed Findings

Location	Description	Details
Eye		
Bilateral:	Reactive	
Left:	Reactive	
Right:	Reactive	
Chest/Lungs	Breath Sounds-Equal Wheezing-Expiratory - Left Wheezing-Expiratory - Right Sounds Present At Bases Sounds Present At Apexes	

Normal Findings

Skin ; Mental Status ; Neurological ; Eye ( ) ;

Vitals

Position	AVPU	BP	MAP	Method	Pulse	Strength	Rhythm	Resps	Effort	SpO2	
Sitting / Fowlers	Alert	170/80	110	Cuff - Auscultated	76	Strong	Regular	20	Normal	96	Room Air
Sitting / Fowlers	Alert	182/92	122	Cuff - Automated	69	Strong	Regular	31	Normal	93	Room Air

What question can help determine the path for appropriate care?

What was the Wave Form on ETCO2?: [redacted]

Past Medical History

Patient Medications

Medication	Dosage	Route	Current Medication Comments
Levothyroxine Sodium			
Atenolol			
Folbee			
Bumetanide			
pantoprazole			
Warfarin Sodium			
Simvastatin			
Albuterol / Ipratropium			

Medication Allergies

Medication Allergies	Medication Allergy Comments
Lisinopril	
Sulfa Medications	
Ciprofloxacin	

Medical History: CV - Cardiac Pacemaker , CV - Heart Failure, Hypothyroidism, Neuro - Stroke / CVA (Infarction/Clot), GI - GERD/Reflux

Medical History Obtained From: Patient, Family

Pregnancy: No

Advance Dir

ED Assessment:

"Tachypneic, coarse breath sounds throughout, normal chest excursion, no respiratory distress, mild B lower ext. edema"

CXR

..mild interstitial edema w/cardiomegaly

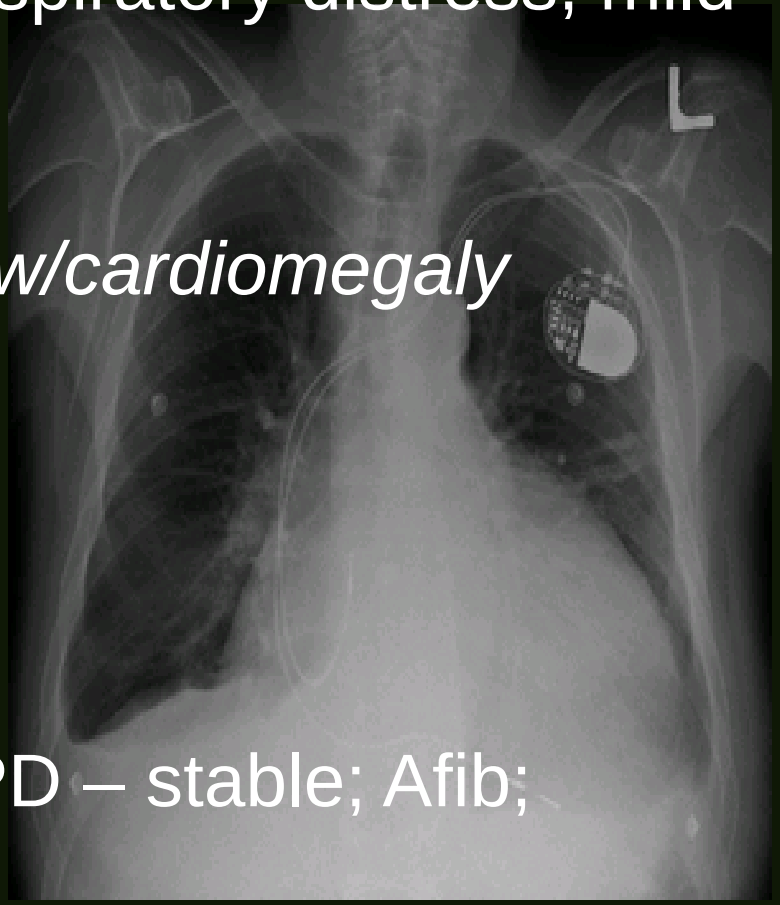
BNP – 1148 (NL < 450)

Treated

IV diuretics – lost 8 lbs!

Final diagnosis

Acute diastolic HF; COPD – stable; Afib; Hypothyroid



…D/C back home 2 days later

First priorities

Primary assessment

Immediate evaluation of:

A Airway

B Breathing/Oxygenation

C Circulation/cardiac status

D Disability & neuro status

E Environment/Expose

A: ***She is able to give good history***

B: ***Mild distress noted; effort normal***

C: ***Regular rate & rhythm***

D: ***GCS 15; Pupils reactive***

E: ***No injuries noted***

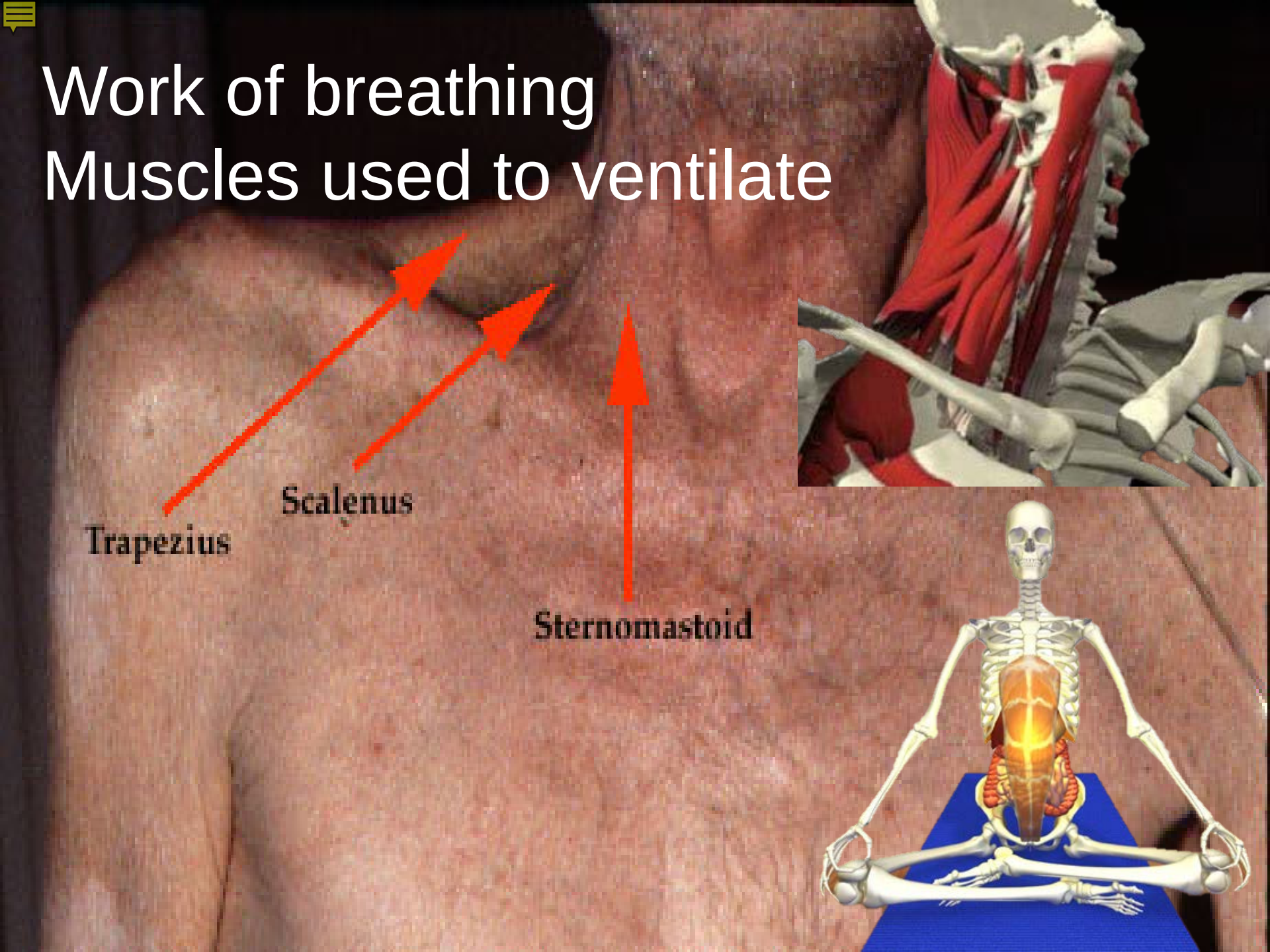
Airway impaired?

Positioning of pt?

How is the breathing?

How many words can be spoken in one sentence?

Work of breathing
Muscles used to ventilate

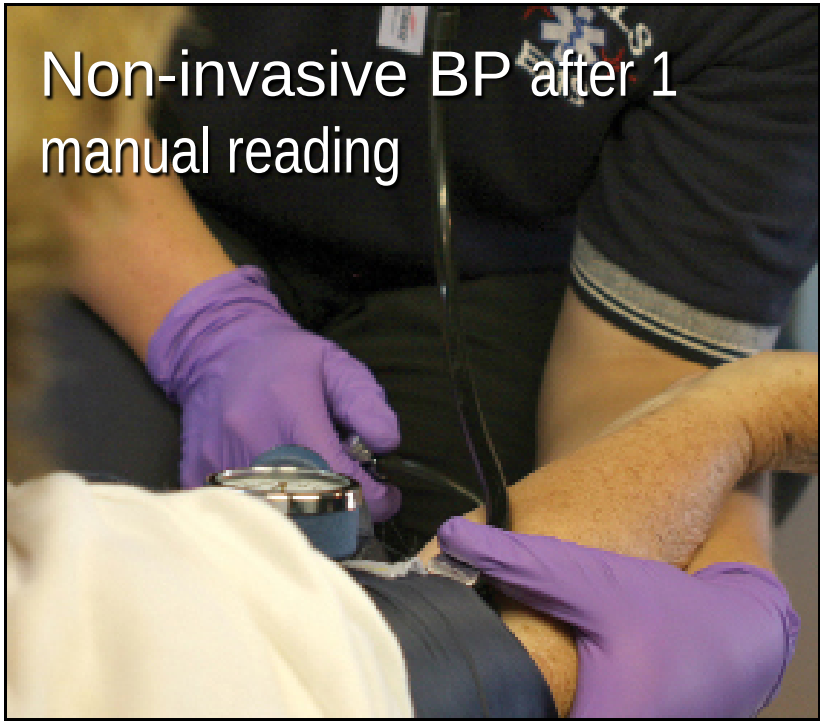


Monitoring is essential

Capnography

ECG rhythm + 12 lead

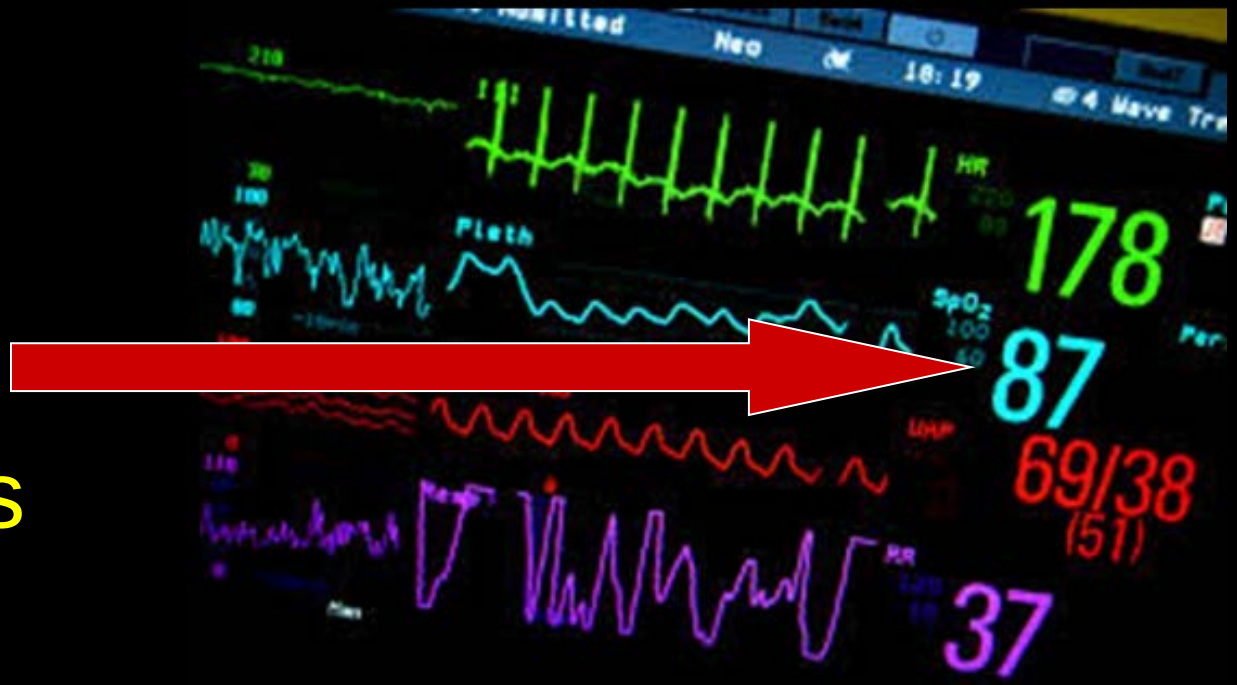
Non-invasive BP after 1 manual reading



Pulse oximetry range guidelines

OK:	94%-100%
Mild-mod hypoxemia:	90%-93%
Severe hypoxia:	< 90%

Severely low SpO_2 (< 90%) predictor of poor outcomes



Use the

right tool the right way!

Poor peripheral perfusion

If low, validate on another site

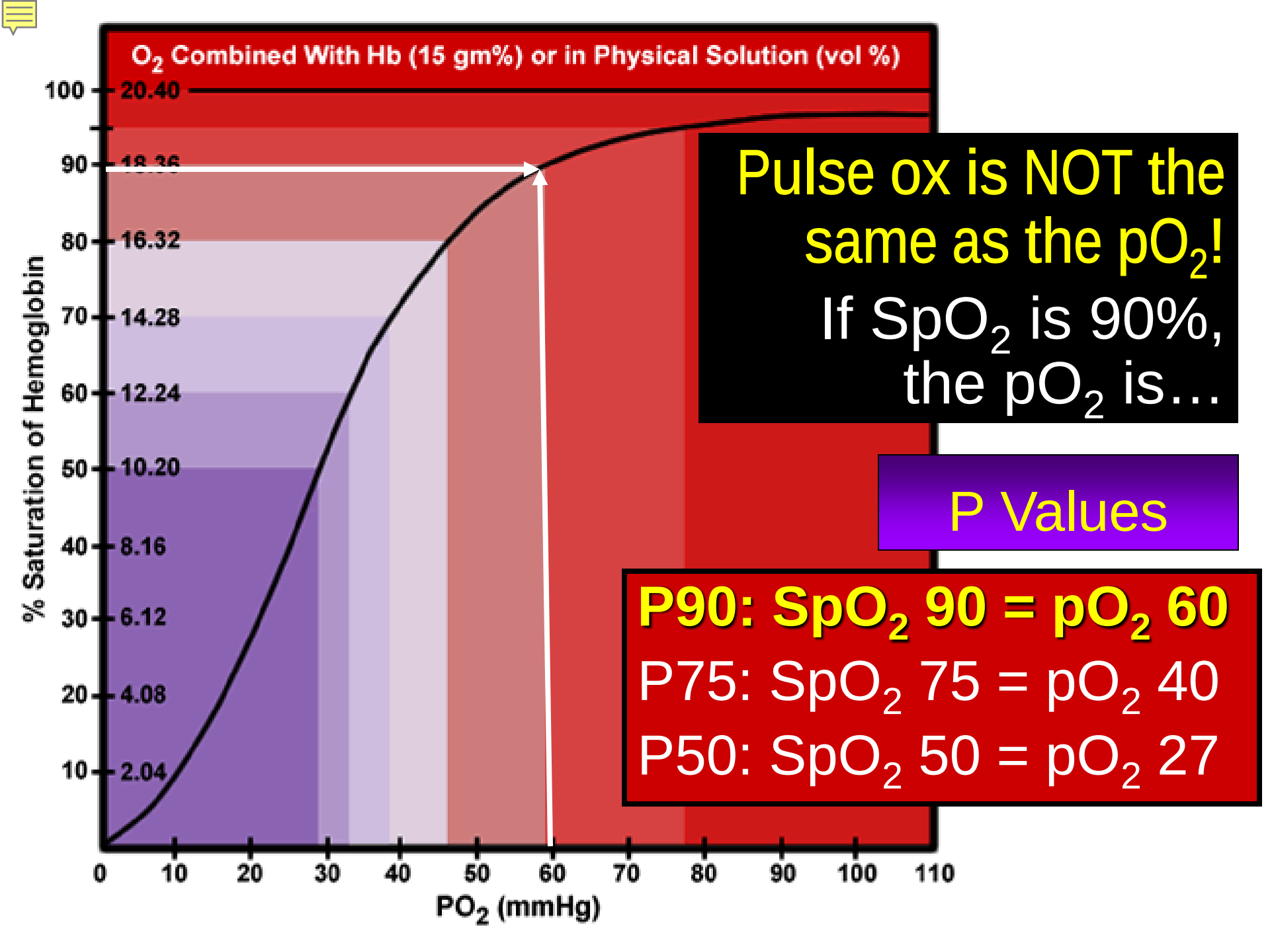
Gas exchange/ evidence of hypoxia

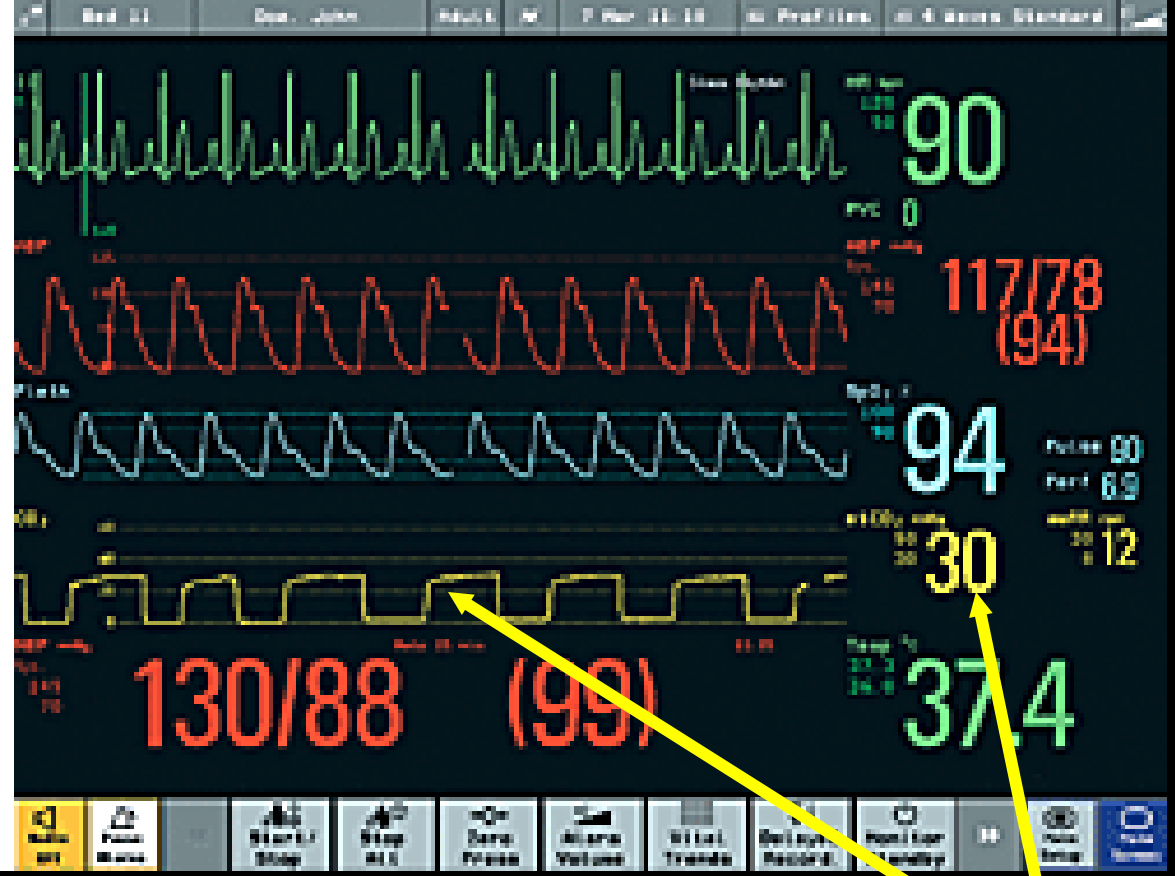
Adequacy of oxygenation

Adequacy of peripheral perfusion

Evidence of SNS stimulation/compensation

Cool, hot, pale, flushed, mottled, ashen, cyanotic, & diaphoretic skin must be explored for cause


O_2 Combined With Hb (15 gm%) or in Physical Solution (vol %)
100
20.40
90
18.36
80
16.32
70
14.28
60
12.24
50
10.20
40
8.16
30
6.12
20
4.08
10
2.04
% Saturation of Hemoglobin
0
10
20
30
40
50
60
70
80
90
100
110
PO_2 (mmHg)
Pulse ox is NOT the same as the pO_2!
If SpO_2 is 90%, the pO_2 is…
P Values
P90: SpO_2 90 = pO_2 60
P75: SpO_2 75 = pO_2 40
P50: SpO_2 50 = pO_2 27



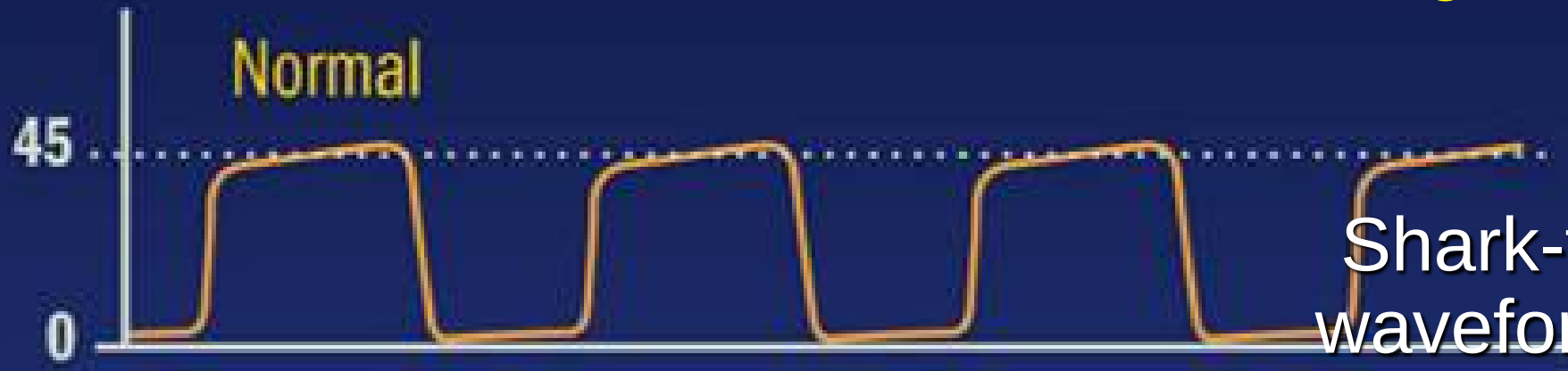
Capnography

Indicates adequacy of ventilations, perfusion, & dead space by detecting how much CO_2 is exhaled

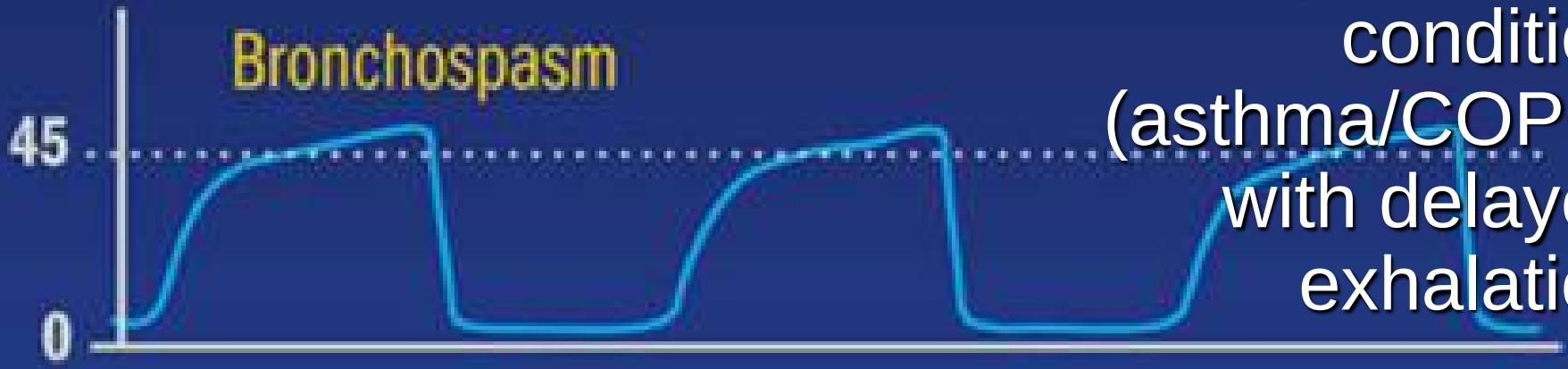
Gives a numeric value & graphic waveform

HF should have normal, squared off waveform

Waveform shape helps make a differential diagnosis



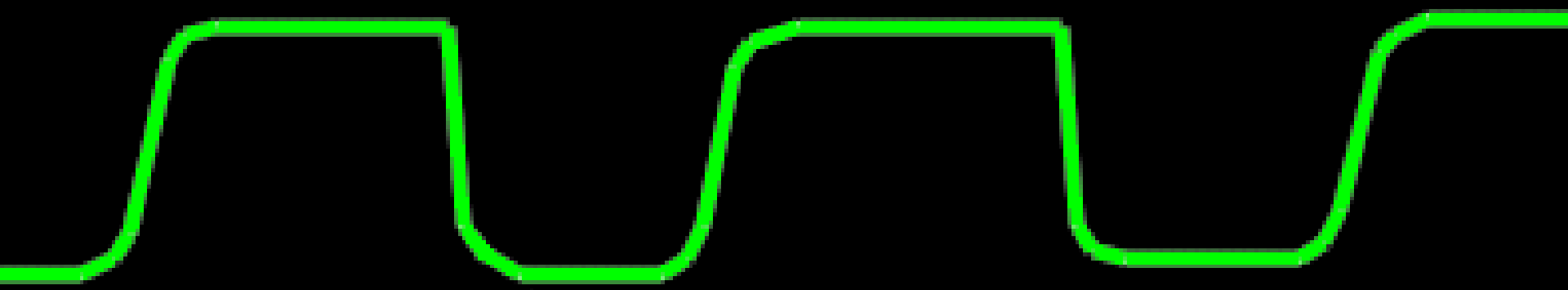
Shark-fin waveform suggests a pulmonary condition (asthma/COPD) with delayed exhalation



Capnography

- Metabolism yields cellular “waste”
- Perfusion: adequate blood flow transports O_2 and CO2 to and from cells back to alveoli
- Ventilation: CO_2 exhaled from alveoli

Interpretation requires consideration of ***all 3!***



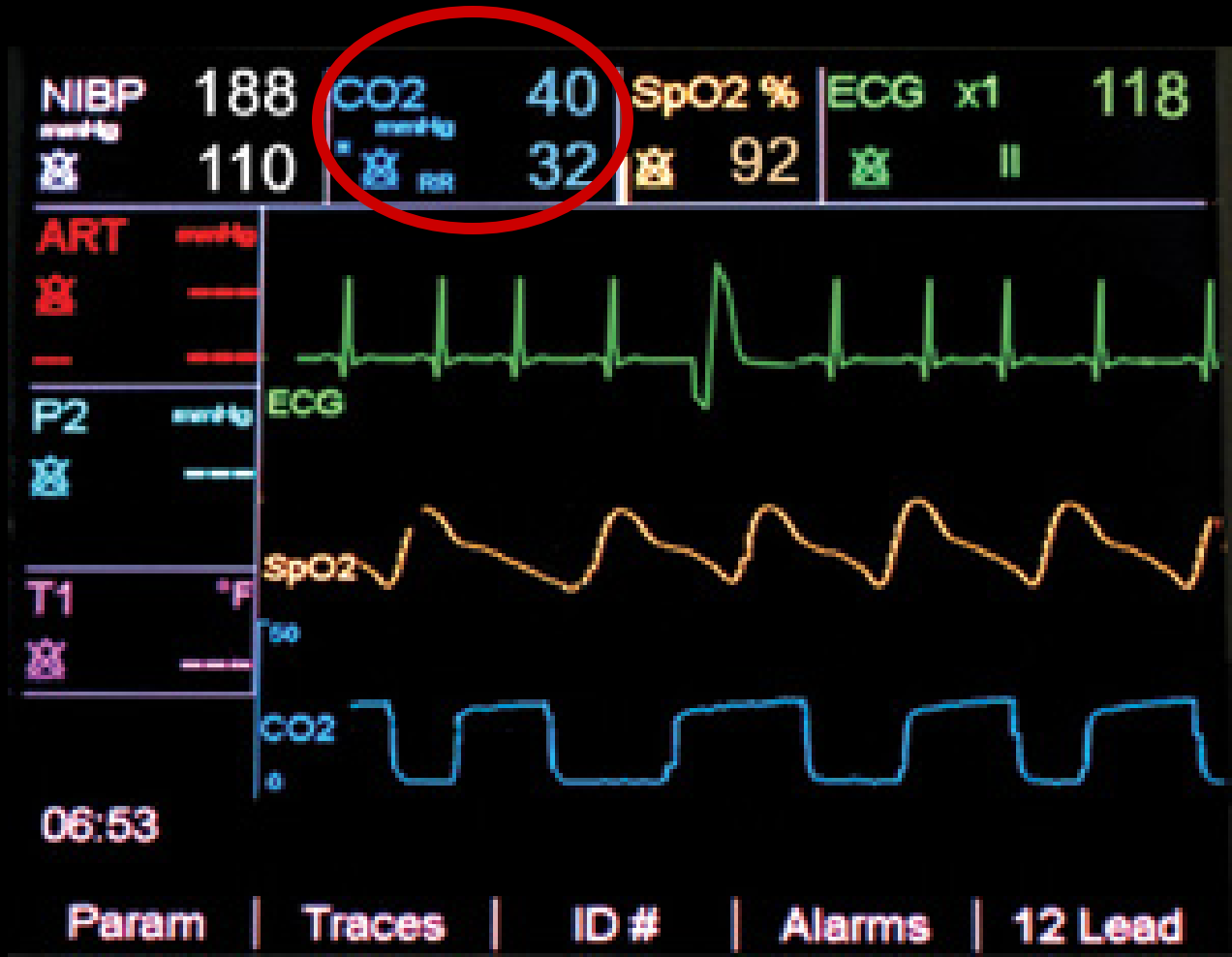
CAPNOGRAPHY

ABSENT	DECREASED	INCREASED
M E T A B O L I S M		
Malfunction sensor/monitor ✓ sensor; exhale into	Hypothermia	Hyperthermia Shivering Pain
P E R F U S I O N		
Arrest w/o CPR Exsanguination	Shock Arrest w/ CPR Pulmonary embolism ↓ Cardiac output	↑ Cardiac output Reperfusion after ROSC
V E N T I L A T I O N		
Apnea ET extubation ET obstruction Esophageal tube	**HYPER**ventilation Bronchospasm Mucus plugging	**HYPO**ventilation Resp depression COPD

Capnography findings in HF

After CPAP started, $EtCO_2$ may briefly rise d/t improved ventilations, before it falls due to tachypnea

Severely ↑ $EtCO_2$ indicates pCO_2 levels and ventilatory failure



Heart failure defined

Complex clinical syndrome of impaired cardiac function

Perfusion inadequate to meet metabolic demands

Severe symptoms - Acute decompensated HF
Severest form: pulmonary edema

#2: 76 F with SOB
Wt: 95.3 kg

Cardiac - Heart Failure / Pulmonary Edema (8 / 9) — Adult Only

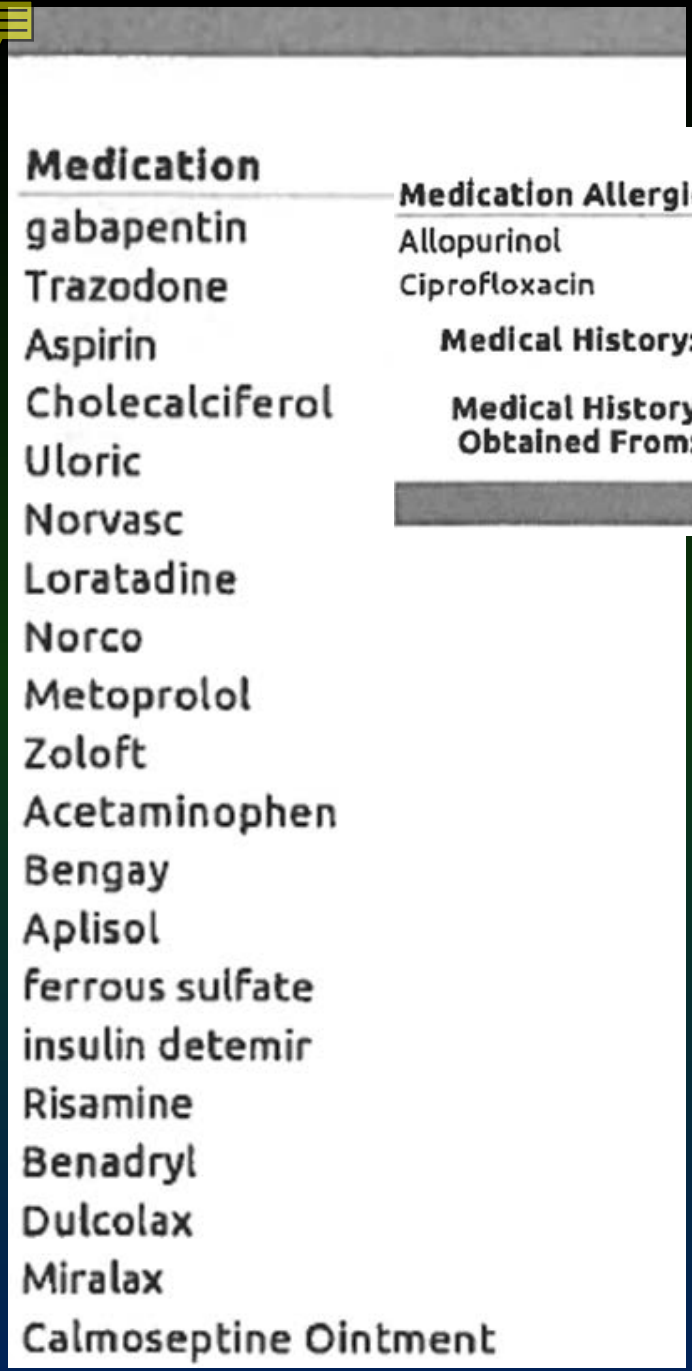
Primary Impression: Heart failure

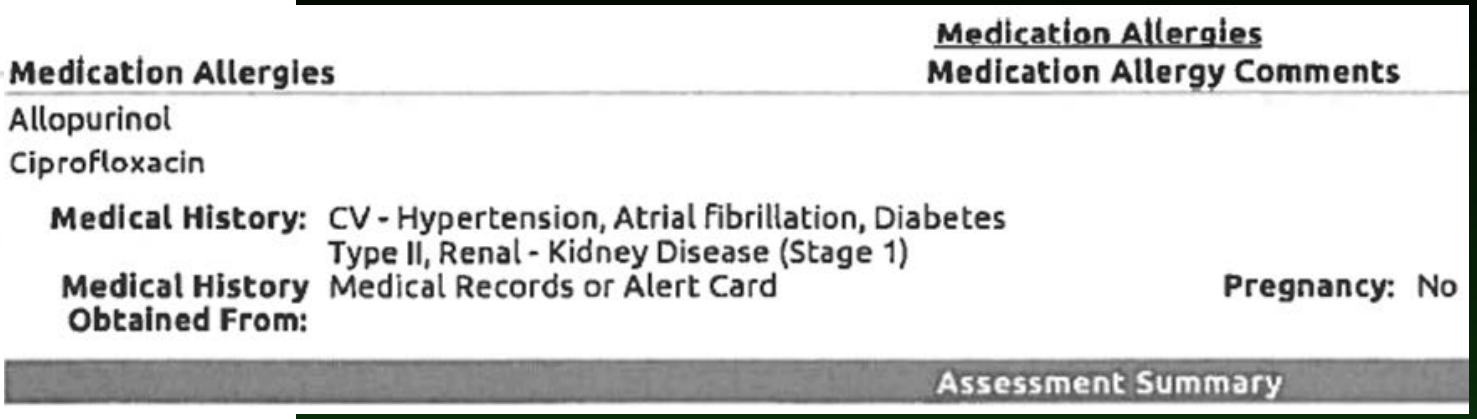
Initial Patient Acuity: Critical / Red **Final Patient Acuity:** Improved

Narrative

In summary, crew was dispatched to location for 76 year old female in respiratory distress. Upon arrival, patient was found sitting in bed unable to speak more than two words between breaths. She said she has been feeling this way for about an hour. Assessment was performed. NTG was given and patient was placed on CPAP with much relief. She denied chest pain and weakness. ASA was not given due to patient already having taken it. BP did not decrease, and second NTG was given. Patient was placed on and secured to cot in position of comfort. 12 lead was obtained and transmitted. BP again did not decrease, and third NTG was given [redacted] was contacted without further orders. Ongoing ALS care was given en route without incident. Patient said she was feeling much better and patient care was transferred to RN in [redacted]

Past Medical History





Medication List…friend or foe?

Vitals

AVPU	BP	MAP	Method	Pulse	Strength	Rhythm	Resps	Effort	SpO2	
Alert	200/110	140	Cuff - Auscultated	80	Strong, Bounding	Regular	32	Labored	90	Room Air
Alert	210/120	150	Cuff - Automated	80	Strong, Bounding	Regular	22	Assisted	97	CPAP
Alert	236/150	179	Cuff - Automated	80	Strong, Bounding	Regular	26	Assisted	97	CPAP
Alert	224/122	156	Cuff - Automated	90	Strong, Bounding	Regular	24	Assisted	98	Room Air
Alert	226/162	183	Cuff - Auscultated	77	Strong, Bounding	Regular	28	Assisted	97	Room Air

	GCS	GCS Qual	BG	BG H/L	Temp	Temp Method	ETCO2	Pain Score	Pain Type	Stroke Score	Stroke Type
...ously	15	Accurate with no influence	147		37.4	Tympanic	22				
...ously	15	Accurate with no influence					48				
...ously	15	Accurate with no influence					44				
...ously	15	Accurate with no influence					33				
...ously	15	Accurate with no influence					43				

What was the Wave Form on ETCO2?: [redacted]

B crackles; no other abnl assessment findings per documentation

Normal Findings

Mental Status ; Neurological ; Head ; Face ; Eye () ; Neck ; Shoulder (Shoulder-Left, Shoulder-Right) ;
Abdomen (Generalized, Left Lower Quadrant, Left Upper Quadrant, Periumbilical, Right Lower Quadrant, Right Upper Quadrant) ; Pelvis ;
Hip (Hip-Left, Hip-Right) ; Upper Leg (Leg-Upper-Left, Leg-Upper-Right) ; Knee (Knee-Left, Knee-Right) ;
Lower Leg (Leg-Lower-Left, Leg-Lower-Right) ; Ankle (Ankle-Left, Ankle-Right) ;
Foot (Foot-Dorsal-Left, Foot-Dorsal-Right, Foot-Plantar-Left, Foot-Plantar-Right, Toe-1st (Big)-Left, Toe-1st (Big)-Right, Toe-2nd-Left, Toe-2nd-Right, Toe-3rd-Left, Toe-3rd-Right, Toe-4th-Left, Toe-4th-Right, Toe-5th (Smallest)-Left, Toe-5th (Smallest)-Right) ;
Upper Arm (Arm-Upper-Left, Arm-Upper-Right) ; Elbow (Elbow-Left, Elbow-Right) ; Forearm (Forearm-Left, Forearm-Right) ;
Wrist (Wrist-Left, Wrist-Right) ;
Hand (Finger-2nd (Index)-Left, Finger-2nd (Index)-Right, Finger-3rd (Middle)-Left, Finger-3rd (Middle)-Right, Finger-4th (Ring)-Left, Finger-4th (Ring)-Right, Finger-5th (Smallest)-Left, Finger-5th (Smallest)-Right, Hand-Dorsal-Left, Hand-Dorsal-Right, Hand-Palm-Left, Hand-Palm-Right, Thumb-Left, Thumb-Right) ;
Back/Spine (Back-General, Cervical-Left, Cervical-Midline, Cervical-Right, Crush Injury, Lumbar-Left, Lumbar-Midline, Lumbar-Right, Sacral-Left, Sacral-Midline, Sacral-Right, Thoracic-Left, Thoracic-Midline, Thoracic-Right) ;

ED Presentation:

Tachypneic, ↓ BS both lung bases & mid lung fields; bilateral crackles & bilateral lower extremity edema

SPO2 99% on bipap

CXR showed interstitial edema

BNP 869

ED Presentation continued:

Started on NTG & diuretic drip

Had β-blocker Δ

Final dx:

acute respiratory failure, hypertensive urgency, afib, acute diastolic heart failure.

…discharge back to NH 7 days later

Prescribed & OTC
Homeopathic
Compliance
Time & amt of last dose

Medications

Cardiac

- ACEIs: “prils”
- ARBs: “sartans”
- Beta blockers: “lols”
- Ca Blockers
- Diuretics
- Vasodilators
- Anticoagulants (AF)
- Antiarrhythmics
- Digoxin

Pulmonary

- Short/long-acting beta agonists
- Anticholinergics
- Mast cell inhibitors
- Leukotriene modifiers
- Steroids
- Methylxanthines
- Erectile dysf. drugs
- Home oxygen

Time and amount of last dose

Meds – ACE Inhibitors (ACEI)

Generic name ends in “pril”

Blocks creation of angiotensin II:

Vasodilates pt, ↓ BP, prevents remodeling and ↓ the heart’s workload

Benza*pril* / Lotensin

Captopril / Capoten

Enalapril / Vasotec

Fosinopril / monopril

Lisinopril / Prinivil / Zestril

Moesipril / Univasc

Perindopril / Aceon

Quinapril / Accupril

Ramipril / Altace

Trandolapril / Mavik

Beta 1 blockers

Acebutolol (Sectral)
Atenolol (Tenormin)
Betaxolol (Kerlone)
Bisoprolol (Zebeta)
Carvedilol (Coreg)
Labetalol
Metoprolol/Lopressor/Toprol
Nadolol (Corgard)
Pembutolol
Pindolol
Propranolol (Inderal)
Timolol (Blocadren)
Sotalol (Betapace)

- Ca channel blockers
- Diuretics
- Vasodilators
- Statins (atorva*statin*) for high cholesterol
- Zetia (etc.)

Anticoagulants

apixaban (Eliquis)
aspirin, argatroban
bivalirudin (Angiomax)
clopidogrel (Plavix)
dabiagatran (Pradaxa)
eptifibatide (Integrilin)
lepirudin (Refludan)
presugrel (Effient)
rivaroxaban (Xarelto)
ticagrelor (Brilinta)
ticlodipine (Ticlid)
warfarin (Coumadin, Jantoven)

Sub-q route:

dalteparin (Fragmin)
enoxaparin (Lovenox)
fondaparinux (Arixtra)
tinzaparin (Innohep)

Heparin (IV & sub-q)

Looking for Clues in History

Cancer, COPD, Heart disease	• Smoking history
Coronary artery disease	• Family hx, HTN, high cholesterol
Pulmonary embolism	• Recent immobilization, trauma or surgery; travel, prior family hx of clotting; pregnancy, oral contraceptive use, calf pain, leg swelling

The two major risk factors for developing heart failure, specifically for the elderly:

1. Hypertension
2. Artery disease

EMERGENCY MEDICINE REPORTS

Practical, Evidence-Based Reviews in Emergency Care

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AUTHORS

Leslie Anne Juarbe Rivera, MD, MPH, Emergency Medicine Surgical Critical Care Fellowship, R Adams Cowley Shock Trauma Center, University of Maryland, Baltimore.

Jay Menaker, MD, Associate Professor of Surgery and Emergency Medicine, University of Maryland School of Medicine; Medical Director, Lung Rescue Unit; Medical Director, Critical Care Resuscitation

Systolic and Diastolic Heart Failure

Introduction

Acute decompensated heart failure is a serious condition that presents in the emergency department and the intensive care unit. It is associated with mortality rates of 4% to 11% during hospitalization and 20% to 36% during the first year after discharge.[1,2] The causes of heart failure are multifactorial, making it, at times, difficult to diagnose and treat. However, with modern technological advancements, clinicians are becoming more efficient at identifying and treating this disease.

Past medical history

Ask about cigarette and tobacco use

Report in pack years

- # of packs smoked/day
- # of yrs they've smoked
- Multiply together

Problems when pack years surpass 20

…PMH

SOB, cough, dyspnea?

Asthma/COPD?

Other pulmonary conditions?

CVD: CAD, HTN, ACS, stroke

HF, dysrhythmias

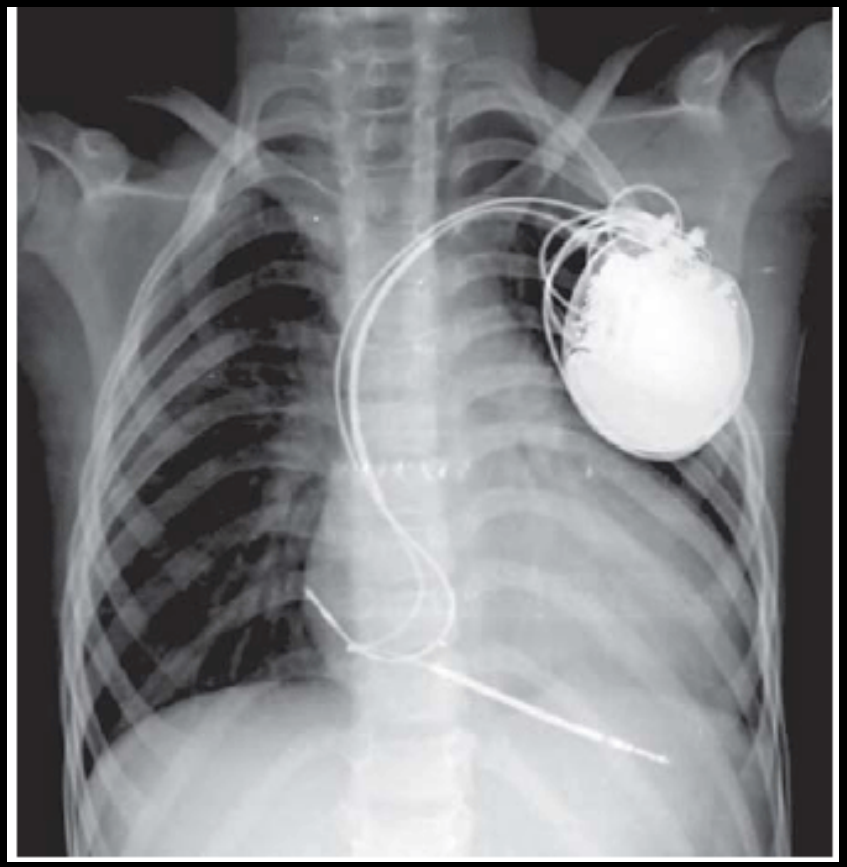
Valve disease

Diabetes

Drug abuse

Chronic renal failure

Gastric surgery



Review of Systems
look for evidence if SOB…

Chest pain or pressure suggests pulm embolism, MI, pericarditis GI cause

Dependent edema, PND, orthopnea, JVD, bilateral dependent wheezes or crackles. suggests HF

Fever, chills, cough, green/yellow/ rusty sputum, isolated bronchial breath snds, crackles suggest pneumonia

How to listen?

Sit pt up (if able)

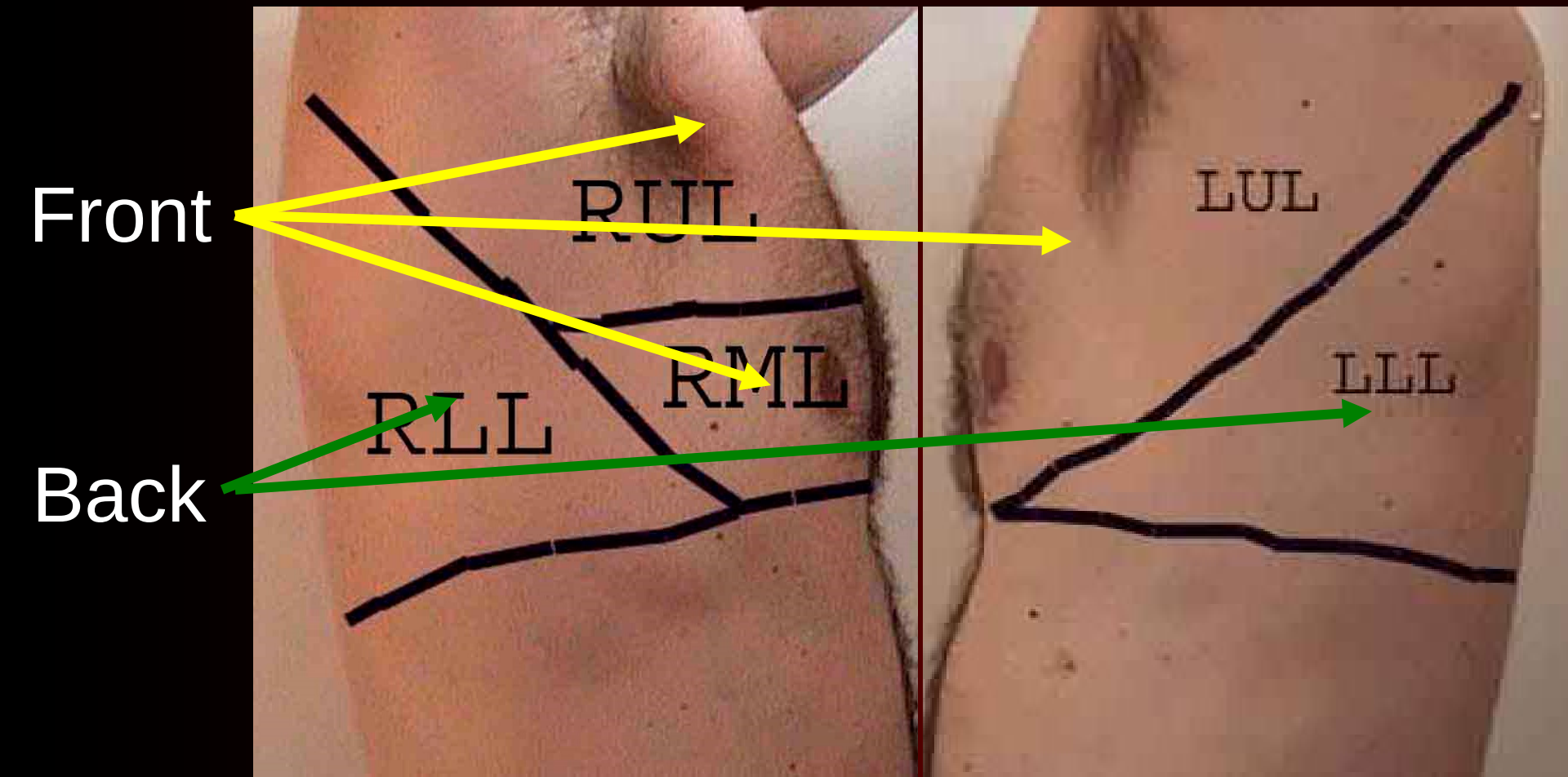
Turn supine patient to assess back

Ask pt to breathe normally through open mouth

Stethoscope on skin – not over clothes

Technique:
Where should you listen?

All lobes, front and back



All that wheezes is not asthma Consider other causes

A: Asthma
S: Stasis: Pulmonary embolism
T: Toxins/inhaled irritants
H: Heart: HF; “cardiac asthma”
M: Mechanical obstruction, FB, cancer
A: Allergy/aspiration
TIC: Trauma, infection, chronic (COPD)

Decision tool if patient is wheezing

PMH

Cardiac	Pulmonary
□ CVD: HTN; ACS; HF □ Stroke or TIA □ Dysrhythmias □ Periph vascular dx □ Valve disease □ Diabetes; renal dx □ Drug abuse □ No Hx resp problem □ + cardiac risk factors	□ Asthma/COPD □ Pulmonary embolus risk factors □ Pneumothorax □ Pleural effusion □ TB, lung cancer □ Smoking; inhalation exposure

Decision tool: Adult wheezing

Clinical presentation

Cardiac	Pulmonary
□ Pain: non-pleuritic □ Cough: frothy □ Dyspnea on exertion □ Orthopnea; PND □ Freq. nocturia	□ Pain: may be pleuritic □ Cough: mucous, yellow, green □ Chills, fever, night sweats

Upright, (tripod?) position
Accessory muscle use; retractions
Breathing w/ pursed lips – own PEEP
Right heart failure?

Decision tool: Dyspnea

Vital signs

Cardiac	Pulmonary
Hyper/hypodynamic state Pulse deficits if fast HR or ectopics Weak pulse w/ hypotension	BP WNL unless very hypoxic / dehydrated

Tachypnea w/ ↑ WOB

↓SpO_2; evidence of hypoxia

↑$EtCO_2$; evidence of hypercarbia

Pulsus paradoxus if air trapping/real trouble

Tx with CPAP & NTG

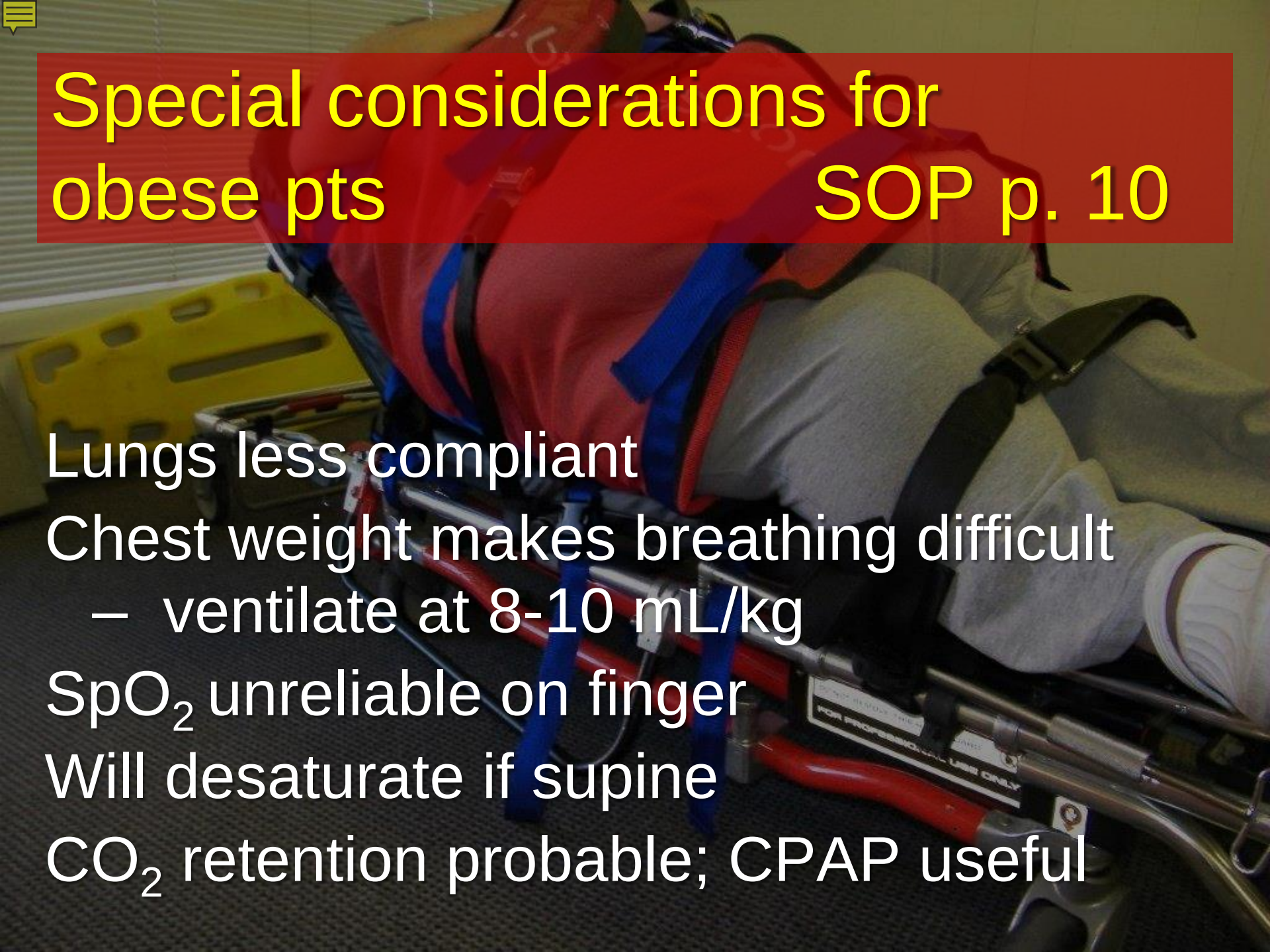
- Is this the correct treatment for this patient?

  Yes

- Could anything more be done?

  More NTG

Special considerations for obese pts SOP p. 10



- Lungs less compliant
- Chest weight makes breathing difficult
  - ventilate at 8-10 mL/kg
- SpO_2 unreliable on finger
- Will desaturate if supine
- CO_2 retention probable; CPAP useful

#3 84 M with SOB

Narrative

Found pt sitting and AOx4. Pt c/o shortness of breath that began yesterday but worsened today. Pt was just prescribed home O2 for his pulmonary fibrosis but noticed low oxygen saturation with O2 therapy along with shortness of breath. Pt was pale. Bilateral crackles at bases. ALS care given per protocol. Pt denied fever, chest pain, N/V, dizziness, and headache. Pt admitted relief from CPAP and nitro therapy. Secondary assessment was unremarkable. [redacted]vas contacted and pt transported without incident to ER nursing staff, room [redacted]

Past Medical History

Patient Medications

Medication	Dosage	Route	Current Medication Comments
Aspirin			
Metoprolol			
atorvastatin			
Amlodipine Besylate			
pantoprazole			

Medication Allergies

Medication Allergies	Medication Allergy Comments
No Known Drug Allergy	

Medical History: Cardiac AICD

Other Past Medical History: pulmonary fibrosis
quadruple bypass about 20 years ago

Medical History Obtained From: Patient, Family

Advance Directives:

Detailed Findings

Location	Description	Details
Skin	Pale	
Mental Status	Normal Baseline for Patient Oriented-Event Oriented-Person Oriented-Place Oriented-Time	
Neurological	Normal Baseline for Patient Normal Speech Normal Gross Motor Normal Cerebellar Function Gait-Normal	
Eye Bilateral:	Reactive PERRL	
Chest/Lungs	Breath Sounds-Equal Sounds Present At Bases Crackles-Right Crackles-Left	
Ankle Ankle-Left: Ankle-Right:	Normal Motor Function-Normal Sensation-Normal Pulse-Normal Normal Motor Function-Normal Sensation-Normal Pulse-Normal	

Normal

Head; Face; Eye (Bilateral); Neck; Abdomen (Generalized); L
Ankle (Ankle-Left, Ankle-Right);

Vitals

AVPU	BP	MAP	Method	Pulse	Strength	Rhythm	Resps	Effort	SpO2	
Alert	140/72	95	Cuff - Auscultated	96	Strong	Regular	24	Labored	64	Low FiO2 (1-6 LPM)
Alert	144/72	96	Cuff - Auscultated	98	Strong	Regular	24	Labored	90	High FiO2 (10-25 LPM)
Alert	113/59	77	Cuff - Automated	96	Strong	Regular	28	Normal	88	High FiO2 (10-25 LPM)

	GCS	GCS Qual	BG BG H/L	Temp Temp Method	ETCO2	Pain Score	Pain Type	Stroke Score	Stroke Type
ous ously	15	Accurate with no influence				0	Numeric (0-10)	Normal	Cincinnati
ous ously	15	Accurate with no influence			28	0	Numeric (0-10)		
ous ously	15	Accurate with no influence			26	0	Numeric (0-10)		

What was the Wave Form on ETCO2?:

ED Presentation:

Bibasilar crackles, ↑ RR, no accessory muscle use; temp 101.2. Had started on antibiotics 2 days prior.

BNP – 211 (not an indication for HF)

CXR – increasing infiltrate disease of right lung compared to previous

Admitted with acute respiratory insufficiency, hypoxia, pneumonia right upper and left lower lobes. Antibiotics continued and received IV steroids which were then changed to oral administration.

+ for rhinovirus. d/c home 9 days later

80F Trouble breathing & CP

Provider Impression

Protocols Used

[redacted]

Protocol Age Category

Adult Only

Initial Patient Acuity: Critical / Red **Final Patient Acuity:** Improved

Narrative

Called to scene for the patient having trouble breathing. Upon arrival found a/ox3 patient sitting in wheel chair complaining of trouble breathing for the last hour while laying down. ALS care initiated and vitals assessed. Lung sounds revealed bi lateral crackles and her room O2 was 94% and dropping. [redacted] protocol followed with marked improvement shown after CPAP admin [redacted] contacted with no questions or orders given. Patient reassessed throughout transport and care transferred to ED without incident. [redacted]

Past Medical History

Patient Medications

Medication	Dosage	Route	Current Medication Comments
Aspartate			
atorvastatin			
Metaproterenol Sulfate			
Novolin N			

[redacted] #4

Medication Allergies

Medication Allergies	Medication Allergy Comments
No Known Drug Allergy	

Medical History: CV - Cardiac Pacemaker , CV - Ventricular Tachycardia, CV - Heart Failure, Atrial fibrillation

Advance Directives:

Detailed Findings

Location	*Description*	*Details*
Eye		
Bilateral:	Reactive	
Left:	Reactive	
Right:	Reactive	
Chest/Lungs	Crackles-Left Crackles-Right	

Normal Findings

Skin; Mental Status; Neurological; Head; Face; Eye (); Neck; Shoulder (Shoulder-Left, Shoulder-Right); Heart; Abdomen (Generalized, Left Lower Quadrant, Left Upper Quadrant, Periumbilical, Right Lower Quadrant, Right Upper Quadrant); Pelvis; Hip (Hip-Left, Hip-Right); Upper Leg (Leg-Upper-Left, Leg-Upper-Right); Knee (Knee-Left, Knee-Right); Lower Leg (Leg-Lower-Left, Leg-Lower-Right); Ankle (Ankle-Left, Ankle-Right); Foot (Foot-Dorsal-Left, Foot-Dorsal-Right, Foot-Plantar-Left, Foot-Plantar-Right, Toe-1st (Big)-Left, Toe-1st (Big)-Right, Toe-2nd-Left, Toe-2nd-Right, Toe-3rd-Left, Toe-3rd-Right, Toe-4th-Left, Toe-4th-Right, Toe-5th (Smallest)-Left, Toe-5th (Smallest)-Right); Upper Arm (Arm-Upper-Left, Arm-Upper-Right); Elbow (Elbow-Left, Elbow-Right); Forearm (Forearm-Left, Forearm-Right); Wrist (Wrist-Left, Wrist-Right); Hand (Finger-2nd (Index)-Left, Finger-2nd (Index)-Right, Finger-3rd (Middle)-Left, Finger-3rd (Middle)-Right, Finger-4th (Ring)-Left, Finger-4th (Ring)-Right, Finger-5th (Smallest)-Left, Finger-5th (Smallest)-Right, Hand-Dorsal-Left, Hand-Dorsal-Right, Hand-Palm-Left, Hand-Palm-Right, Thumb-Left, Thumb-Right); Back/Spine (Back-General, Cervical-Left, Cervical-Midline, Cervical-Right, Crush Injury, Lumbar-Left, Lumbar-Midline, Lumbar-Right, Sacral-Left, Sacral-Midline, Sacral-Right, Thoracic-Left, Thoracic-Midline, Thoracic-Right);

What tx should be done?

Vitals

Position	AVPU	BP	MAP	Method	Pulse	Strength	Rhythm	Resps	Effort	SpO2	
Sitting / Fowlers	Alert	160/80	107	Cuff - Auscultated	90	Strong	Regular	28	Normal	94	Room Air
Sitting / Fowlers	Alert	140/70	93	Cuff - Auscultated	90	Strong	Regular	28	Normal	100	Room Air
Sitting / Fowlers	Painful	140/80	100	Cuff - Automated	80	Strong	Regular	18	Normal	100	Room Air

al	GCS Eye	GCS	GCS Qual	BG BG H/L	Temp Temp Method	ETCO2	Pain Score	Pain Type	Stroke Score	Stroke Type
nted	4 - Opens spontaneously	15	Accurate with no influence			28	0	Numeric (0-10)		
nted	4 - Opens spontaneously	15	Accurate with no influence							
nted	4 - Opens spontaneously	15	Accurate with no influence			35				

What was the Wave Form on ETCO2?: [redacted]

ED Presentation:

Tachypneic, expiratory wheezing w/ rales
Weaned off bipap to NC
tx w/ diuretics, nebs, expectorant & antibiotics

CXR

no active infiltrate

BNP

1187

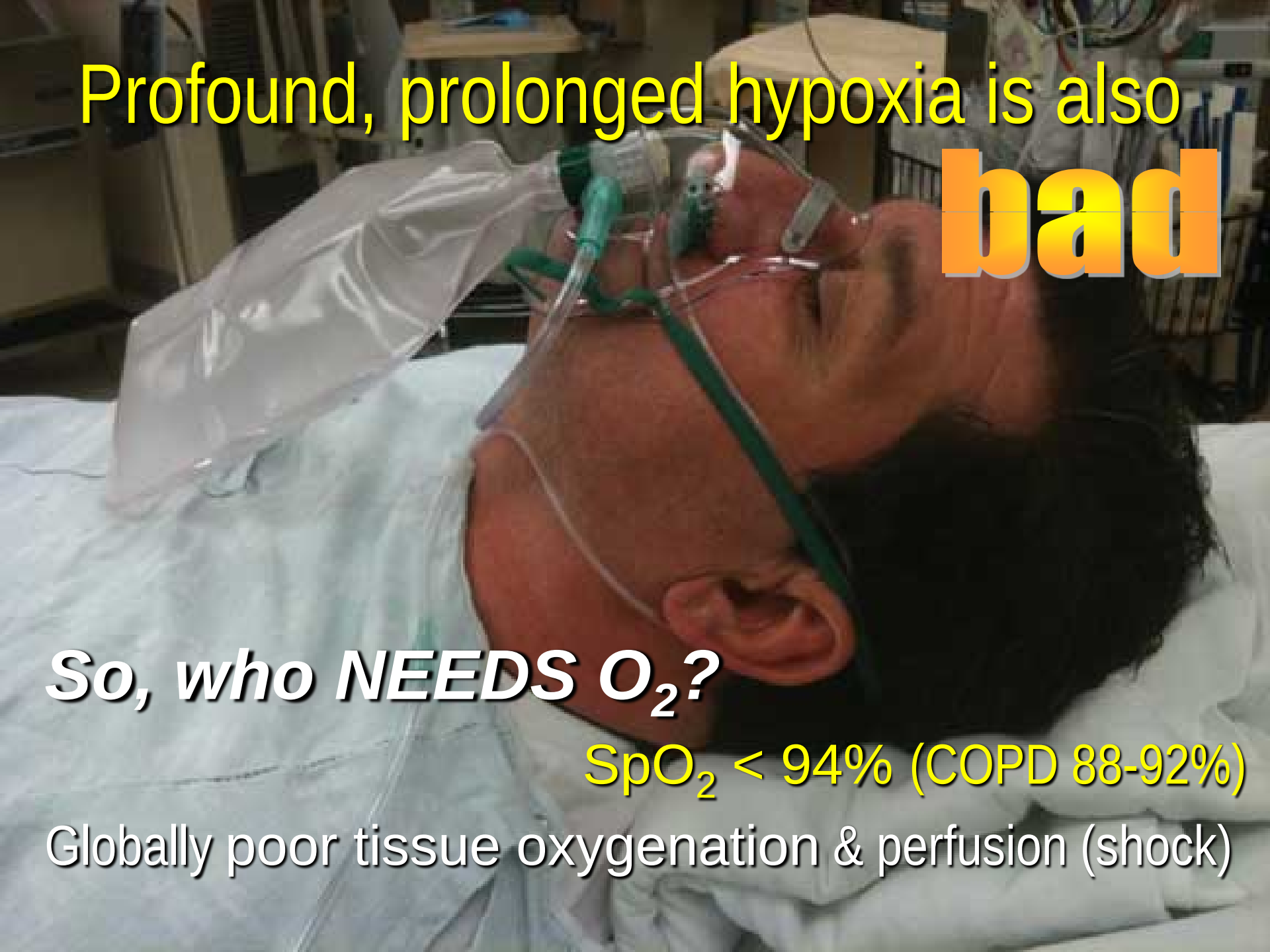
Final dx:

Acute systolic / diastolic HF, bronchitis 2° to influenza, COPD exacerbation

…back to nsg home 6 days later

What is she doing?

Why does this help?


Profound, prolonged hypoxia is also
bad
So, who NEEDS O_2?
SpO_2 < 94% (COPD 88-92%)
Globally poor tissue oxygenation & perfusion (shock)

Some can be harmed by ***hyper***oxia

- Uncomplicated Acute MI
- Post-cardiac arrest
- Acute exacerbations of COPD
- Stroke
- Newborn resuscitation

Give O_2 to these pts only if evidence of hypoxia and titrate to dose that relieves hypoxemia without causing hyperoxia (SpO_2 94%)

Iscor, S. et al. (2011) Supplementary oxygen for nonhypoxemic patients: O(2) much of a good thing? Crit Care, 15(3), 305

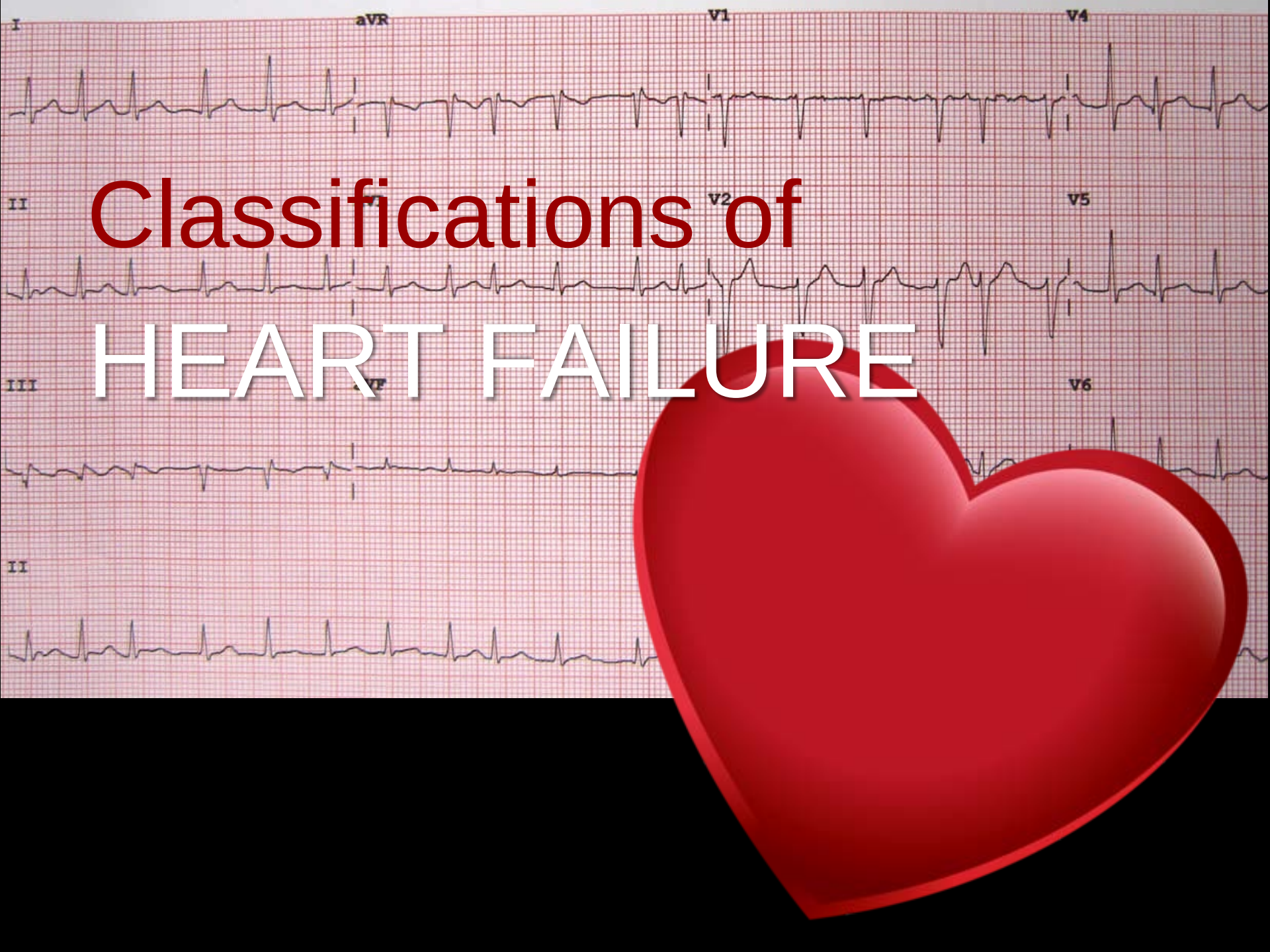
Consider cause: rate, rhythm, volume, or pump problem; treat based on etiology

Differential for SOB

Heart failure
AMI
COPD
Pneumonia

Pulmonary emboli
Pneumothorax
Anaphylaxis
Aspiration

Classifications of HEART FAILURE

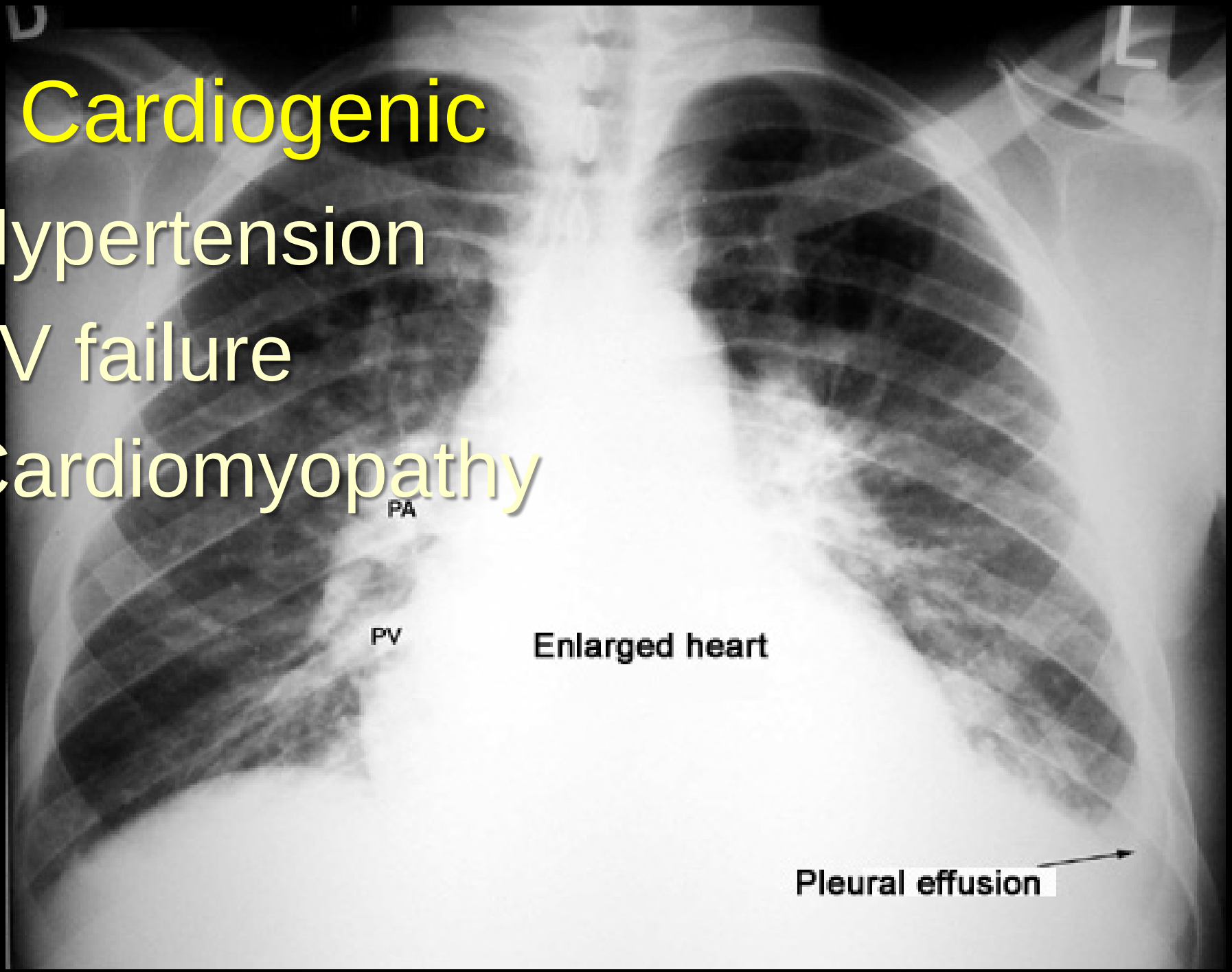


Cardiogenic

Hypertension

LV failure

Cardiomyopathy



Non-Cardiogenic

Aspiration of gastric contents

Drugs or narcotics

Exposure to toxic chemicals

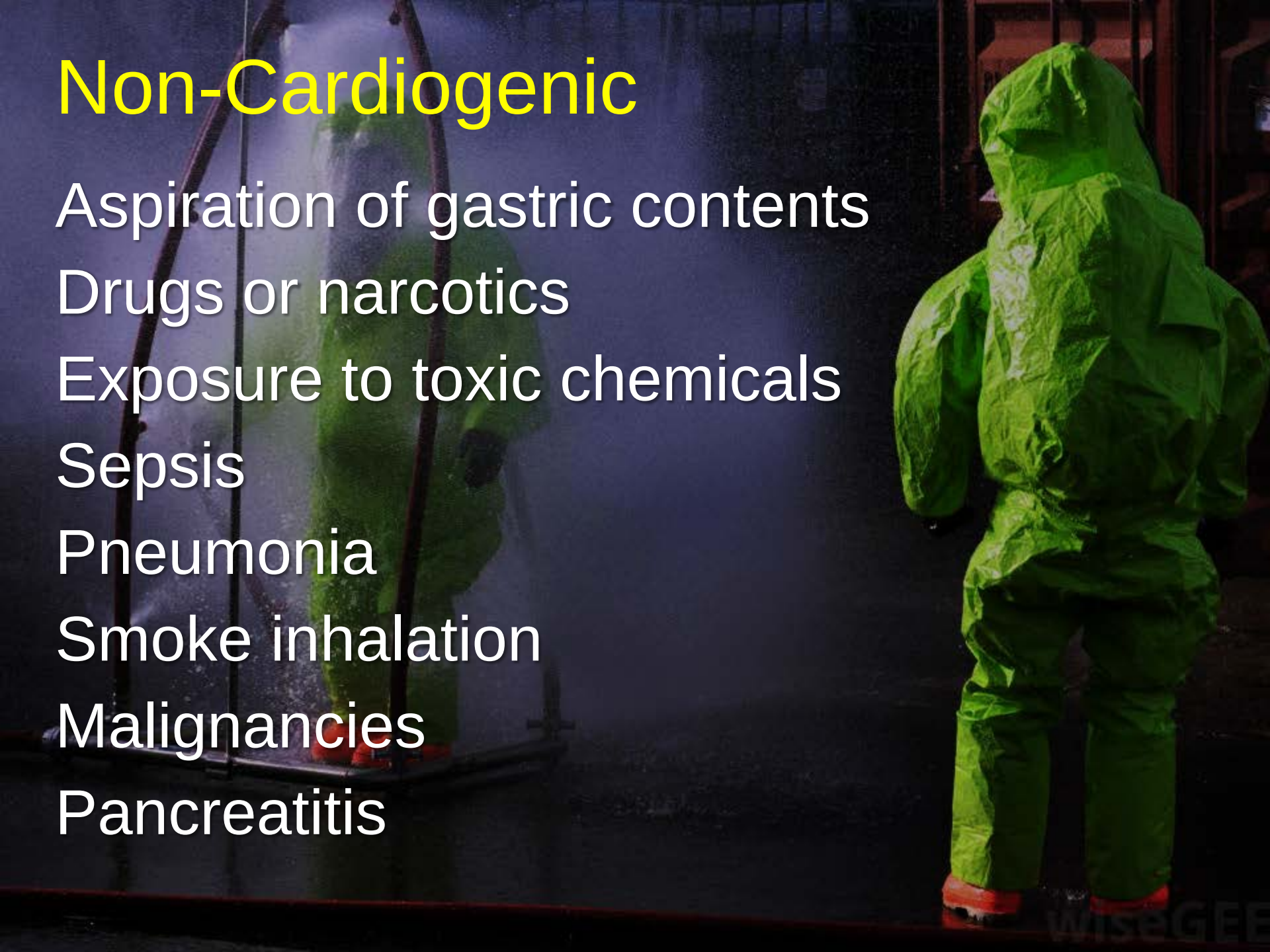
Sepsis

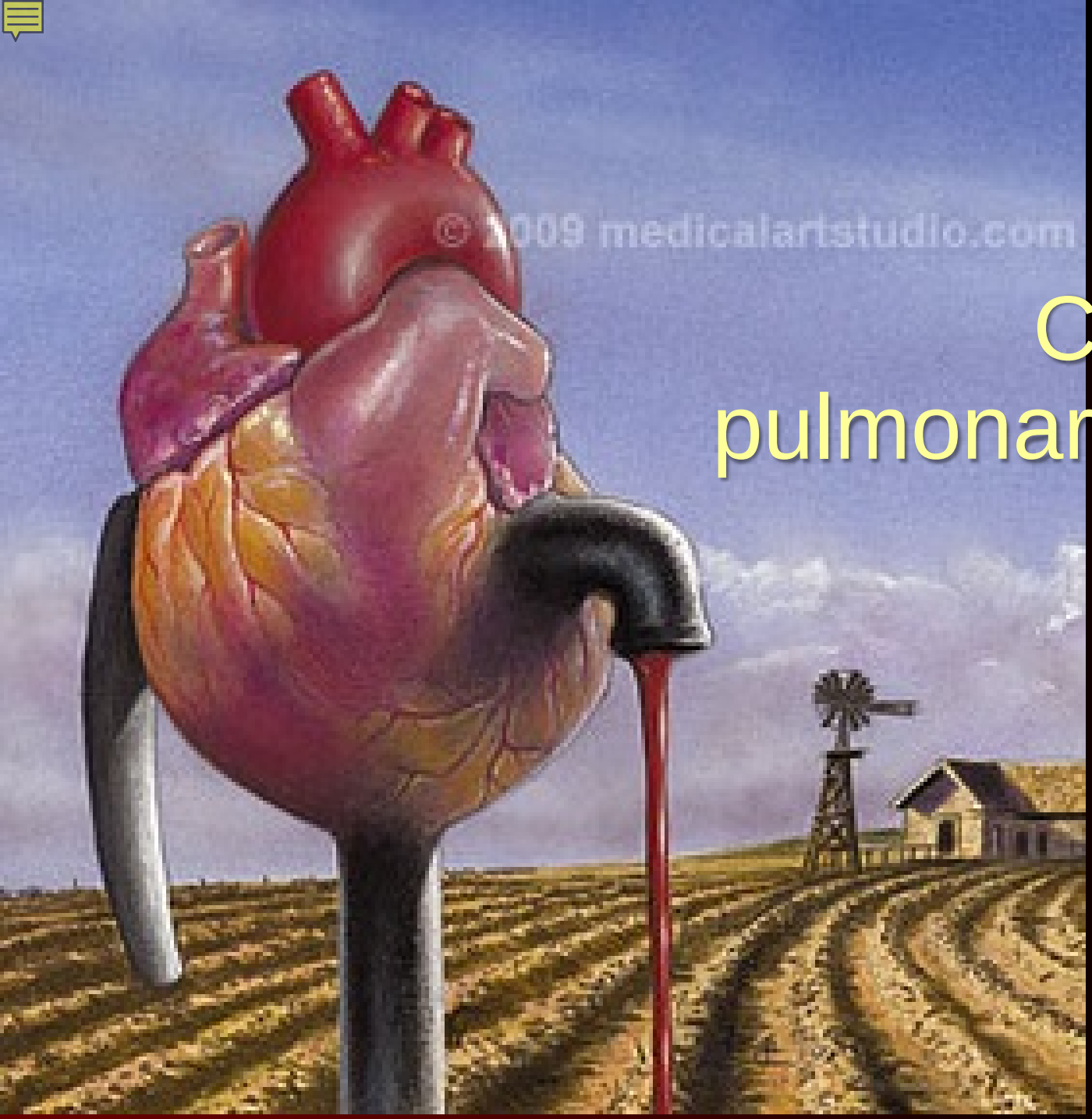
Pneumonia

Smoke inhalation

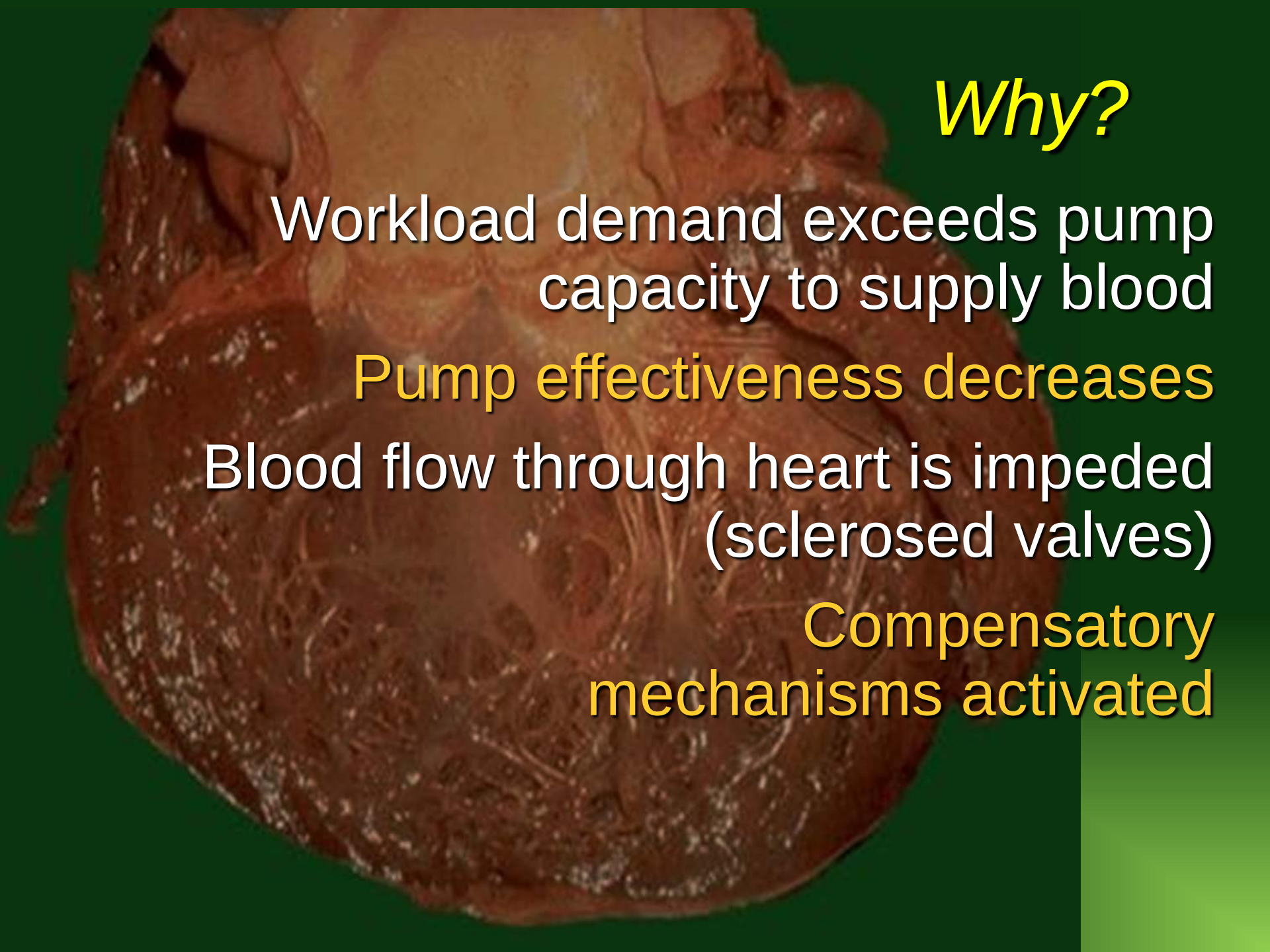
Malignancies

Pancreatitis





Causes of pulmonary edema



Why?

Workload demand exceeds pump capacity to supply blood

Pump effectiveness decreases

Blood flow through heart is impeded (sclerosed valves)

Compensatory mechanisms activated

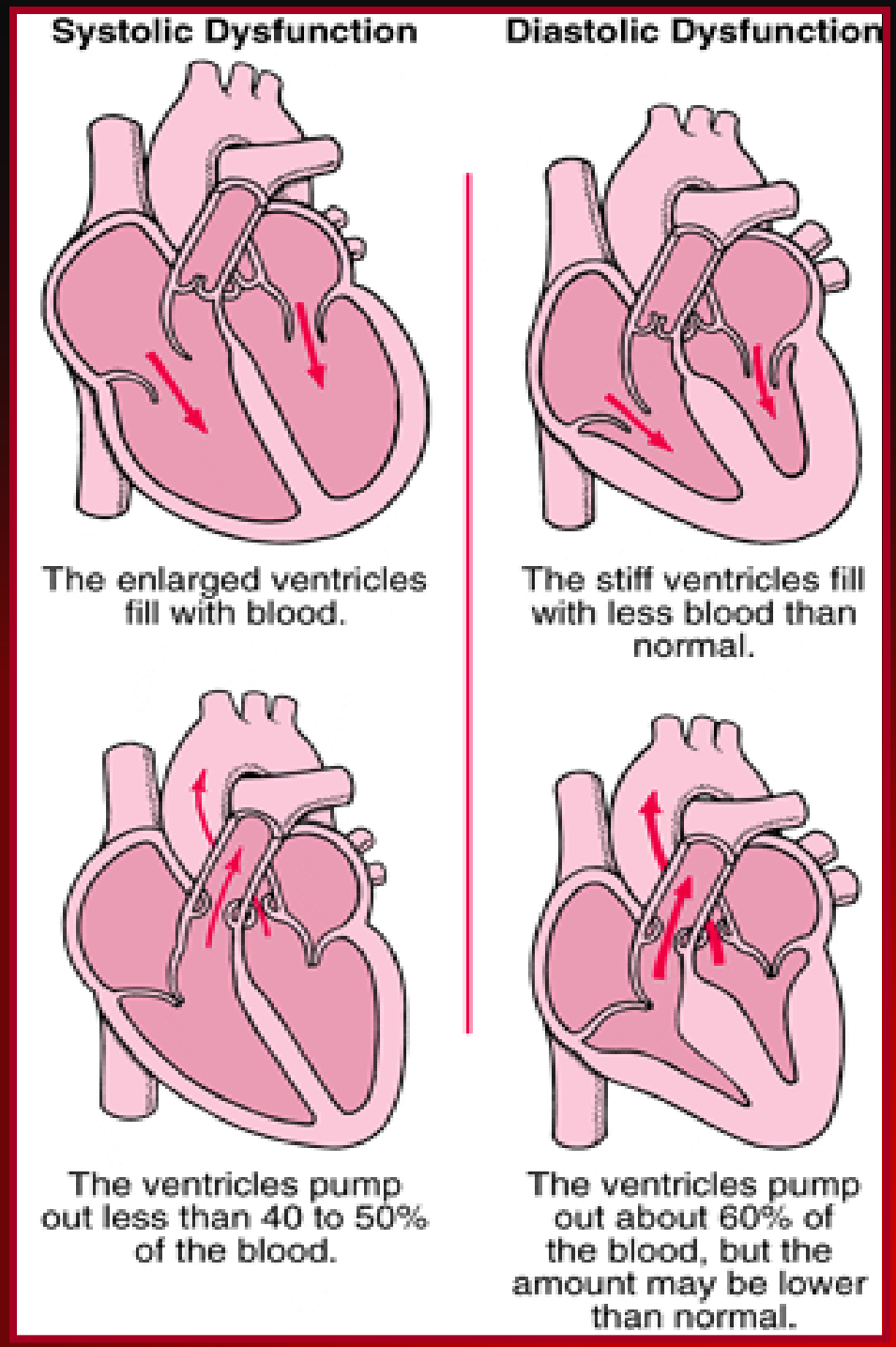

Overstretching + hypertrophy =
myocardial dilation, ↓ contractility,
↓ SV & ↓ ejection fraction

Systolic =

Impaired cardiac contractility (EF < 40%)

Diastolic =

Impaired cardiac relaxation prevents proper ventricular filling (EF normal)



Classification of HF cont.

LV failure: Often acute ➔ pulmonary congestion

RV failure: Gradual ↑ in severity; failure of LV, RV or both; peripheral congestion: JVD, dependent edema, hepatomegaly

Backwards failure: SV insufficient, ↑ filling pressures & congestion in venous beds that empty into that chamber

Forward failure: ↓ CO & **perfusion deficits** in tissues that receive blood from that chamber

Compensatory mechanisms to LV forward failure

- ↓SV sensed by baroreceptors in aortic arch, carotid sinus, and kidneys
- Osmoreceptors in brain

Let the games begin…

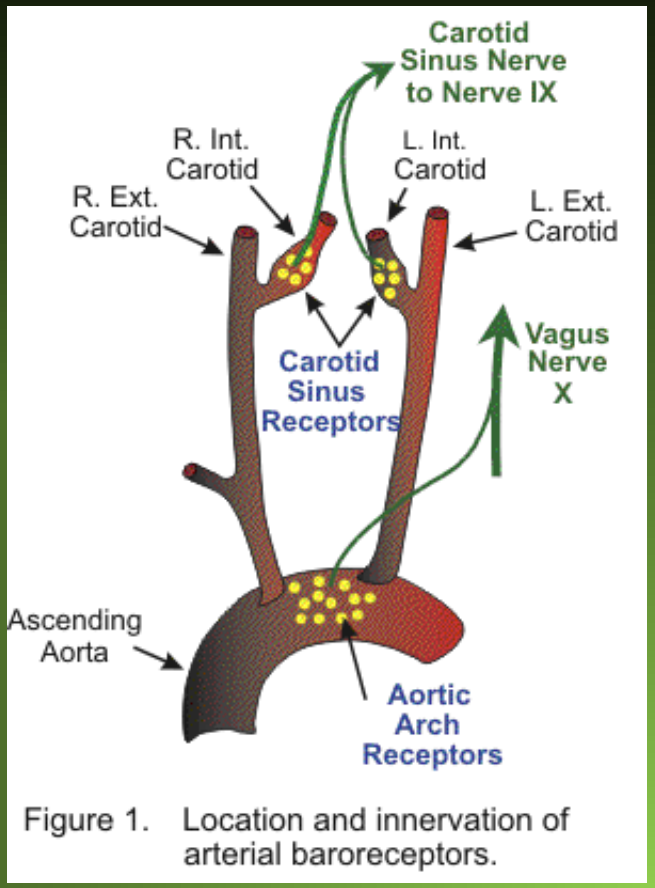
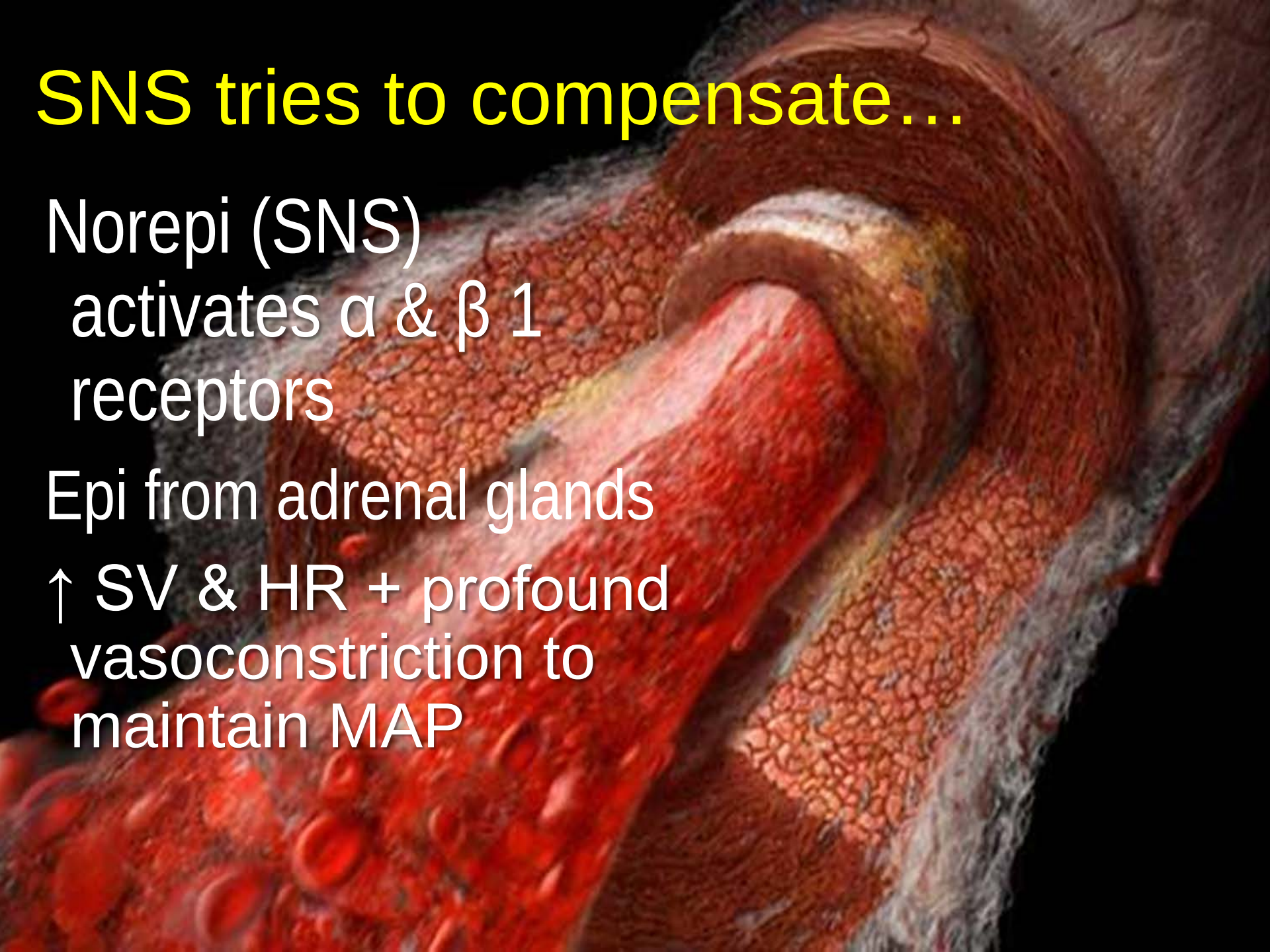


Figure 1. Location and innervation of arterial baroreceptors.

SNS tries to compensate…

- Norepi (SNS)
  - activates α & β 1 receptors
- Epi from adrenal glands
- ↑ SV & HR + profound vasoconstriction to maintain MAP



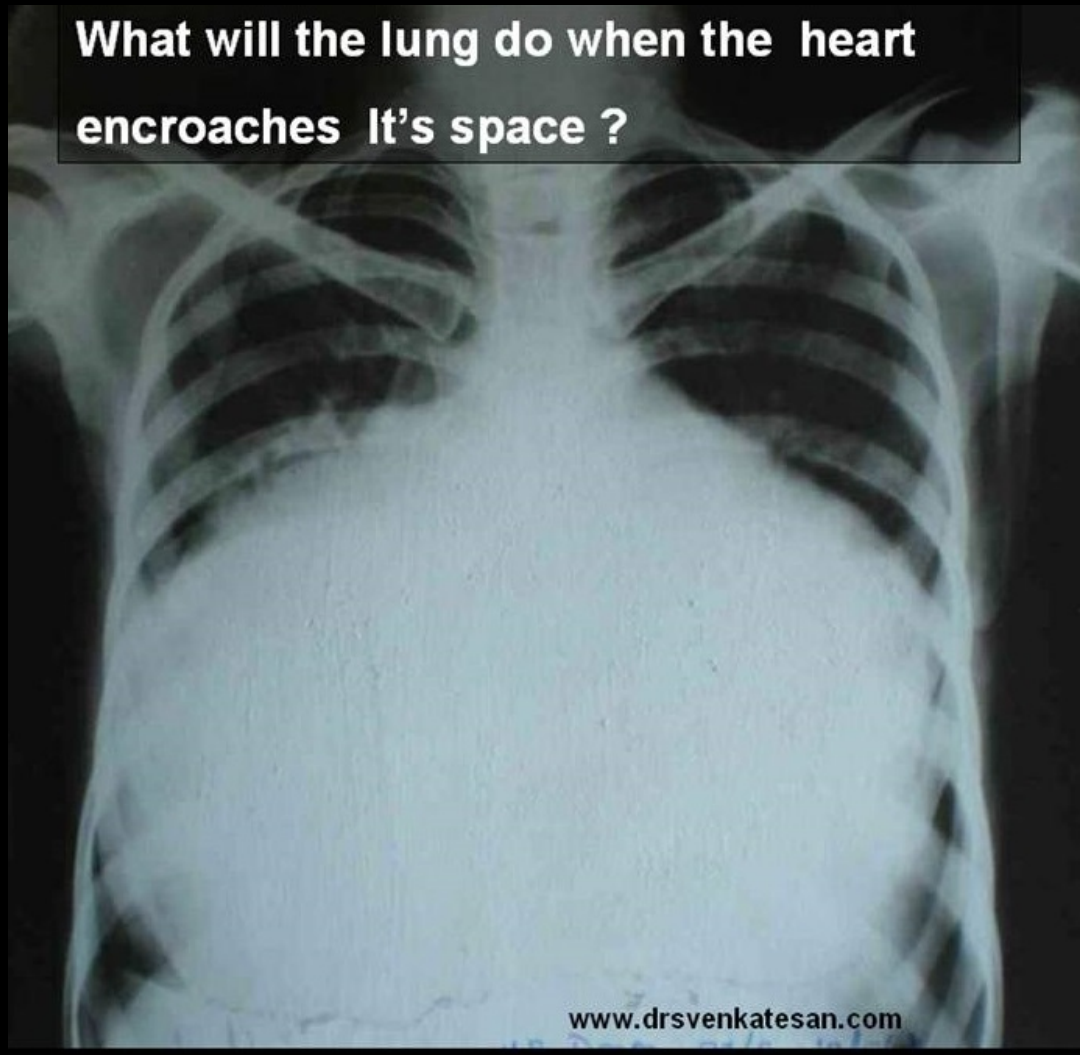
Vasoconstriction ↑ afterload pressures – heart works harder

↑ work = enlarged heart

Simultaneously becomes stiffer & more rigid, ↓ in elasticity

Can’t fill

Can’t pump



Acute: Rapid deterioration, fast onset

Chronic: Progressive; slow structural changes (CHF)

Chronic decompensated: exertion, too much Na, fluid imbalances, noncompliance with meds, sudden ↑ in metabolic demand (fever, anemia), acute MI

HF Assessment findings

↑ HR and RR w/ ↑ WOB

BP normal or ↑

SpO_2 < 94% on RA

Restlessness/anxiety/confusion

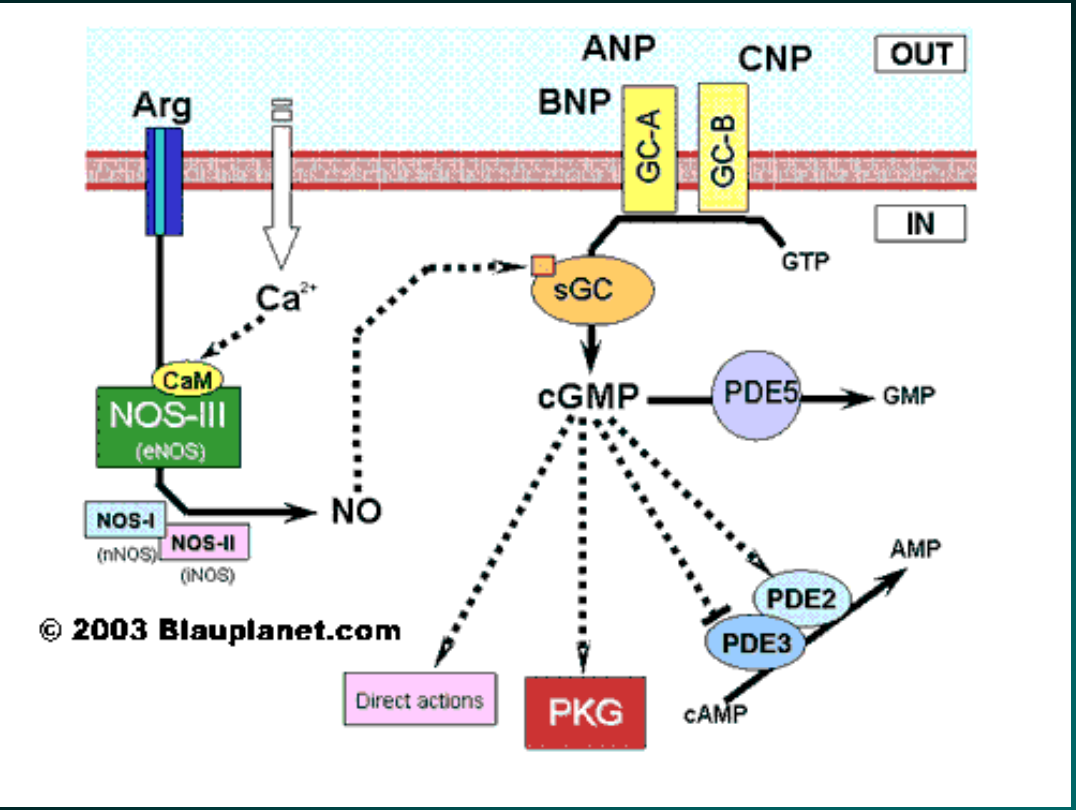
Tripod position

Skin-cool, pale, ashen, cyanotic

BNP

Released from damaged atria & ventricles

Modulates excessive neuroendocrine stimulation – *vasodilates* patient



End result – Water pressure problem in lungs

Pressure in vessels > pressure in tissues → fluid leaks to interstitial spaces

Lymph system removes 10-20 mL fluid/hr in healthy lung

Under stress, can remove more with ↑ flow

In HF, fluid accumulates faster than removed = interstitial edema

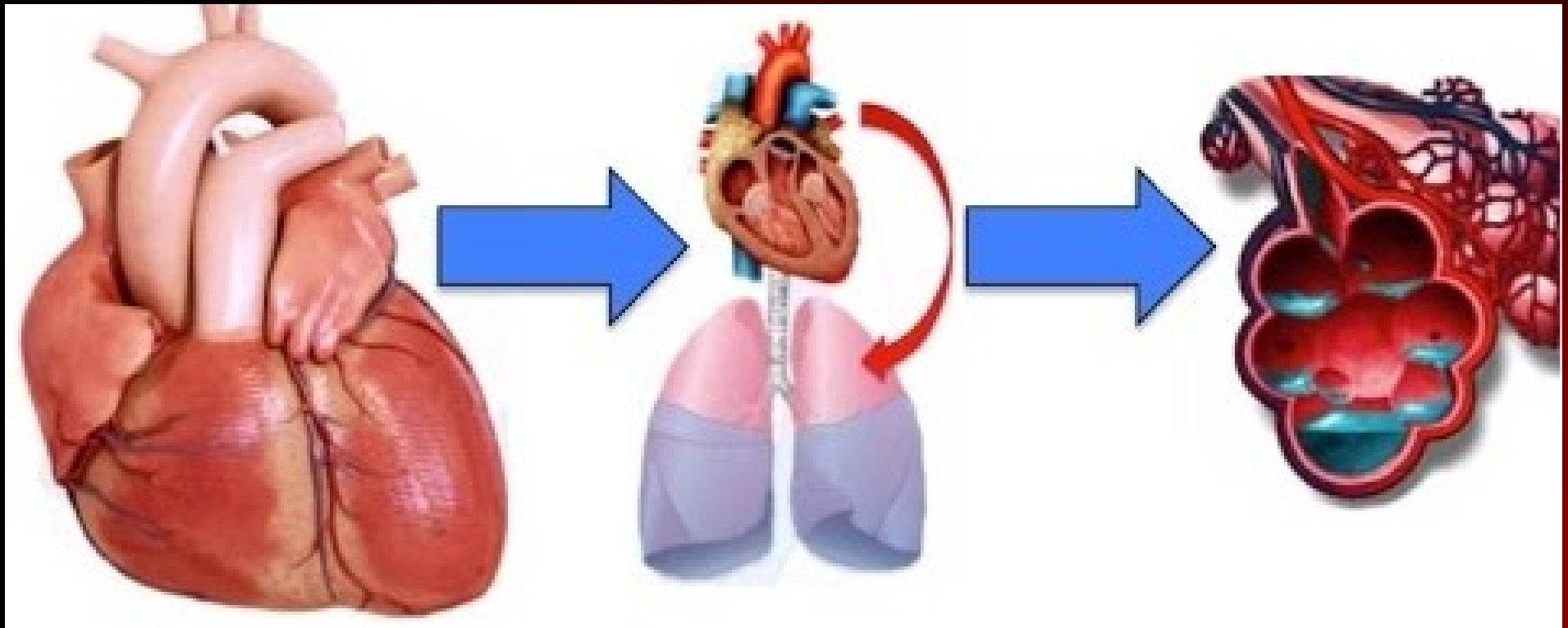

LEAKY PIPES

Basic problems…

Excess pressure in pulmonary vessels →

Excess fluid in lung tissues; alveolar flooding, loss of surfactant, atelectasis →

Impaired ventilations & gas exchange



Heart failure Assessment

Differentiate HF from other conditions by:

- History
- Meds
- S&S

History

Onset	Provocation	Quality
Prior intubation	Recurrence	Severity
Chest pain	Trauma	Fever
Hemoptysis	Cough & sputum	Time course
Affecting sleep	PND	Tobacco & drugs

…History

- SOB, cough, dyspnea?
- Asthma/COPD?
- Other pulmonary conditions?
- CVD: HTN, stroke
- Myocardial disease
  - MI, HF, dysrhythmias
- Valve disease
- Diabetes
- Renal failure
- Drug abuse

Predisposing factors

HTN, smoking, diabetes
Alcohol, drug abuse
Valvular disease
Vascular dx
Thyroid dysfunction
Chest irradiation
Fluid overload
Sleep apnea
Bacterial infection

So, you're sure it's HF…

Heart Failure		COPD / Asthma
▪ PMH of and/or meds for: CVD, CAD, MI, HF, HTN, cardiomyopathy, high cholesterol, ICD, bivent. pacing, DM, renal failure, smoking, alcoholism ▪ Meds: See list on HF SOP page ▪ Paroxysmal nocturnal dyspnea ▪ Orthopnea ▪ Dyspnea on exertion (DOE) ▪ Cough: (non-productive or productive; frothy, clear, white, pink)	▪ Weight gain (tight shoes, belt, watch, rings?) ▪ Fatigue ▪ Crackles (initially end-insp) or wheezes ▪ 12-L abnormal (acute MI, AF, LVH, ischemia, BBB, "age-undetermined infarction) ▪ S3 (3rd heart sound, after lub-dub, best heard at apex) ▪ JVD, pedal edema (RHF)	▪ PMH of and/or meds for: asthma, COPD, chronic bronchitis, emphysema, smoking ▪ Rx: Bronchodilators, anticholinergics, steroids ▪ Cough: productive yellow/ green ▪ S/S respiratory tract infection: fever, chills, rhinorrhea, sore throat ▪ Exposure to known allergen ▪ Capnograph: "sharkfin" waveform ▪ Wheezes (initially expiratory)

CPAP vs. Intubation

CPAP

Non-invasive

Easily D/C'd

Easily adjusted

No sedation

Comfortable

Intubation

Invasive

Usually don't extubate in field

Potential for infection

Traumatic

Benefits of C-PAP

Increased alveolar pressures
stop further fluid movement into alveoli

How does C-PAP work?

Positive pressure “splints” lower airways at end of expiration & keeps alveoli open

Prevents atelectasis

↓ Inspiratory work

Less energy used to open alveoli with next breath

↓ respiratory muscle fatigue

↓ WOB – gets thru crisis w/o

Why is that helpful?

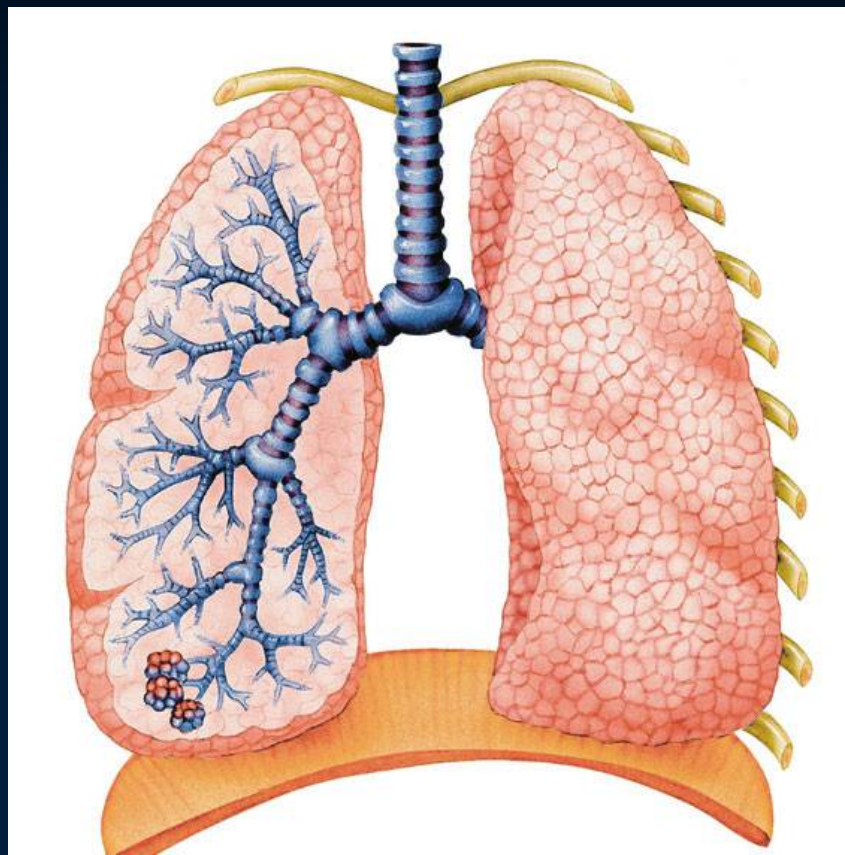
1 cm CPAP ↑ PP of alveolar air by ~1%

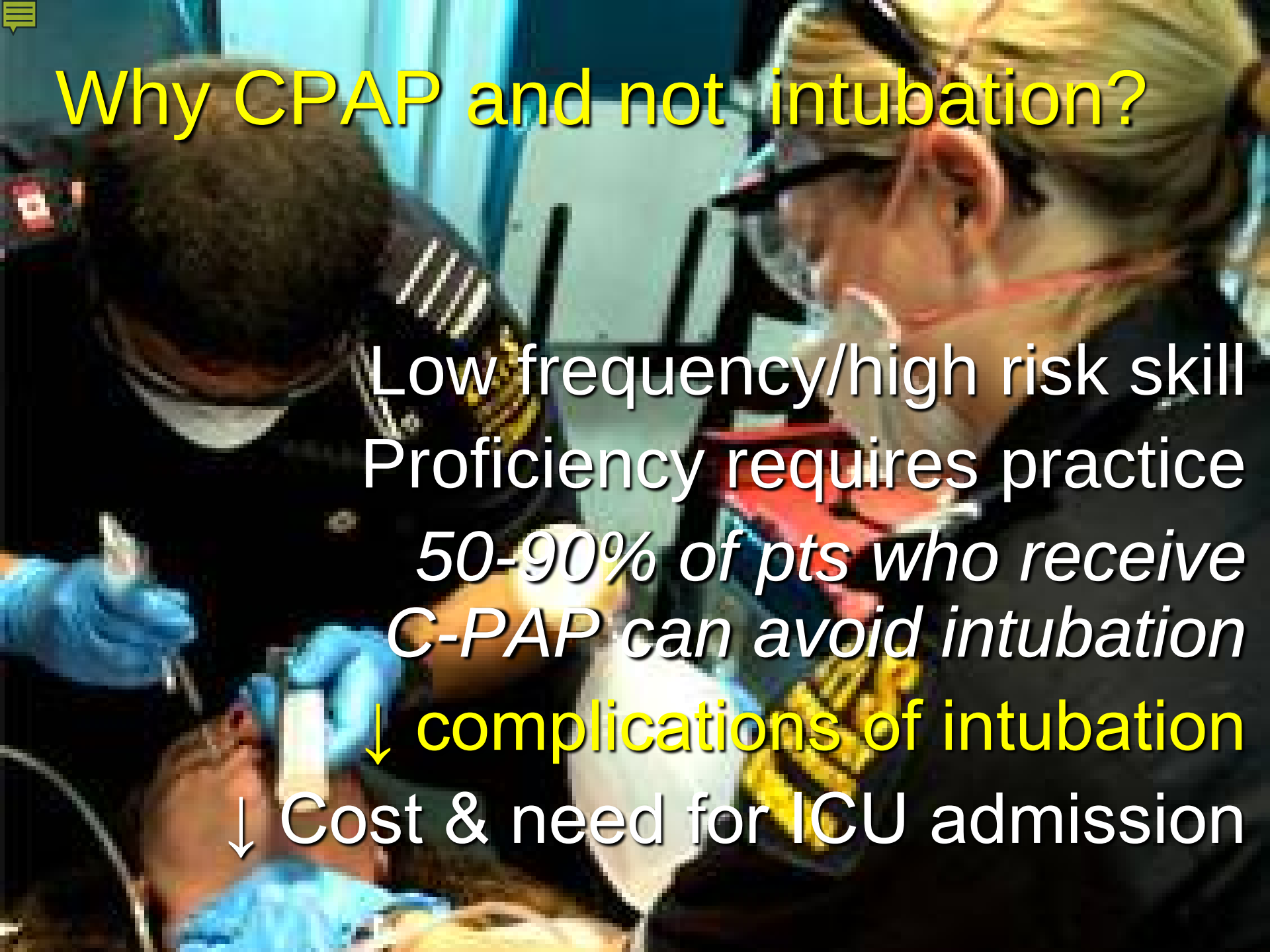
↑ alveolar pressures = better distribution of gases + reverses microatelectasis

Prolongs O_2 diffusion time by 50%

↑ in driving pressure facilitates diffusion

Improves gas exchange





Why CPAP and not intubation?

Low frequency/high risk skill

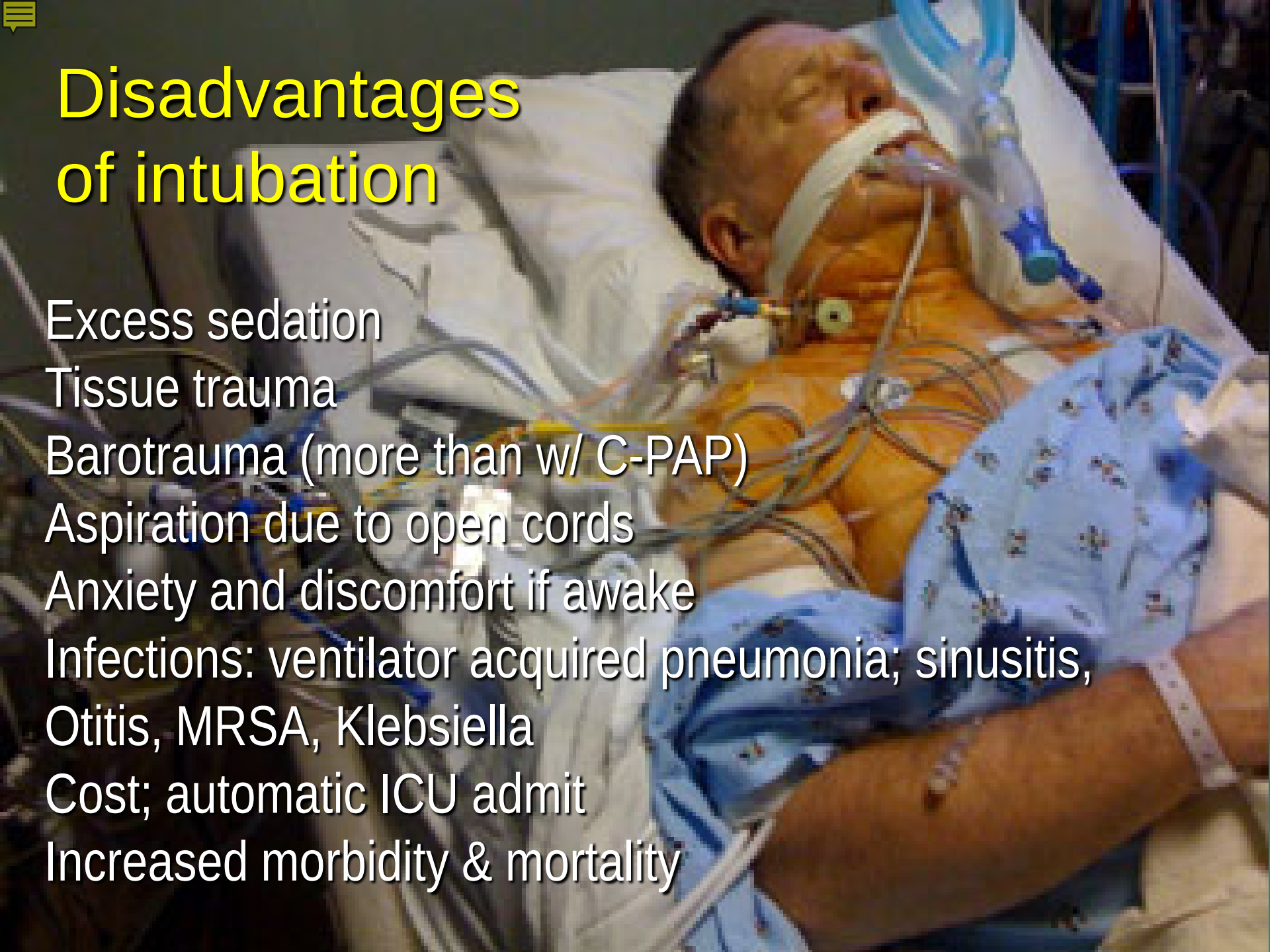
Proficiency requires practice

50-90% of pts who receive C-PAP can avoid intubation

↓ complications of intubation

↓ Cost & need for ICU admission

Disadvantages of intubation



Excess sedation
Tissue trauma
Barotrauma (more than w/ C-PAP)
Aspiration due to open cords
Anxiety and discomfort if awake
Infections: ventilator acquired pneumonia; sinusitis, Otitis, MRSA, Klebsiella
Cost; automatic ICU admit
Increased morbidity & mortality

Assess for CPAP indications

Alert, can consent, understand & cooperate

Intact airway, can clear secretions, good ventilatory effort

Significant respiratory distress – needs support but not ETI

↑ WOB; verbal impairment

Accessory muscle use; retractions; paradoxical breathing

C-PAP on-going monitoring

Patient tolerance, comfort, mental status

RR / depth; subjective feeling of distress

Lung sounds, SpO_2, capnography

BP, pulse, ECG

While prepping CPAP, give…

ASPIRIN 324 mg PO unless contraindicated

AMI cause of acute HF

HF pts at ↑ risk for thromboembolic events

AF promotes stasis & ↑ risk of thrombus formation

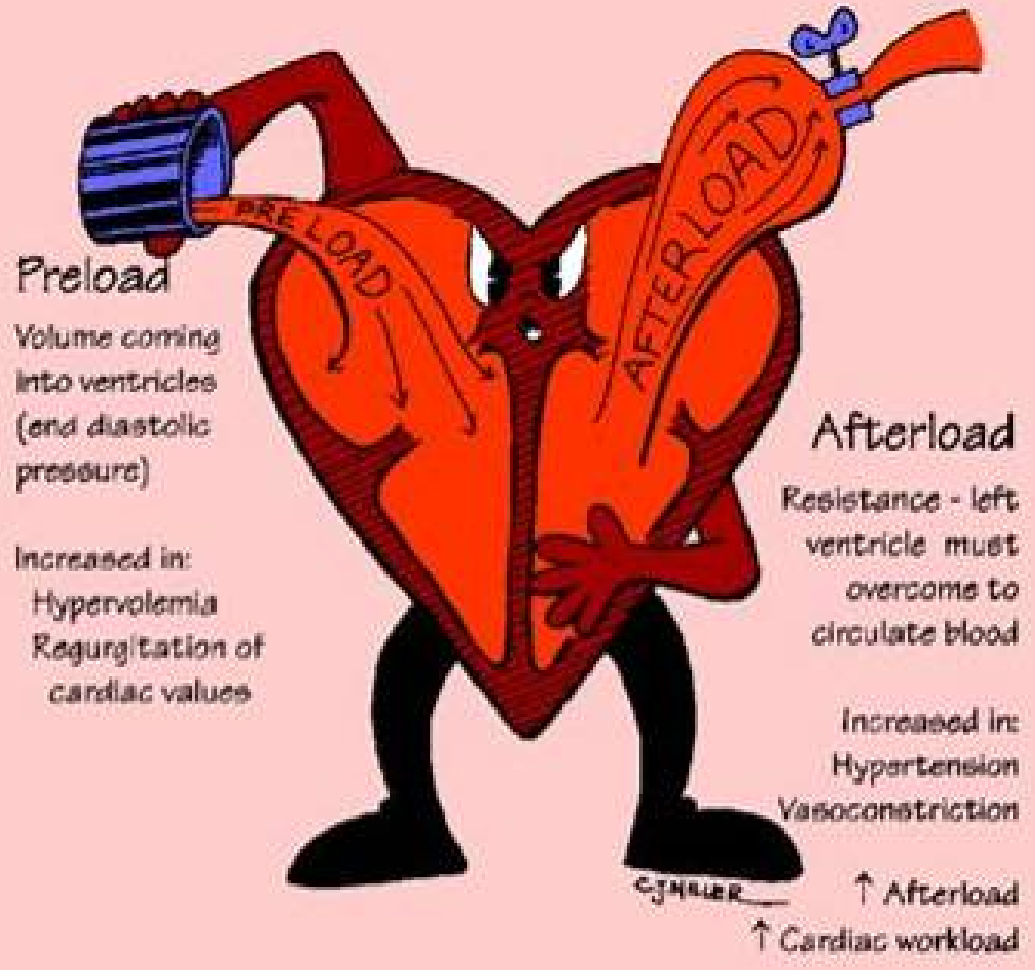
May give small sip of water to swallow ASA prior to NTG


Why is NTG so important for HF?
TNT
HANDLE WITH CARE
TNT
TNT
HANDLE WITH CARE

Dilate veins = ↓ RV preload (↓ **lung water**)
Dilate CA = ↓ ischemia; ↑ pump function
Dilate arteries = ↓ LV afterload

Net benefit:
↓ workload &
↑ CO

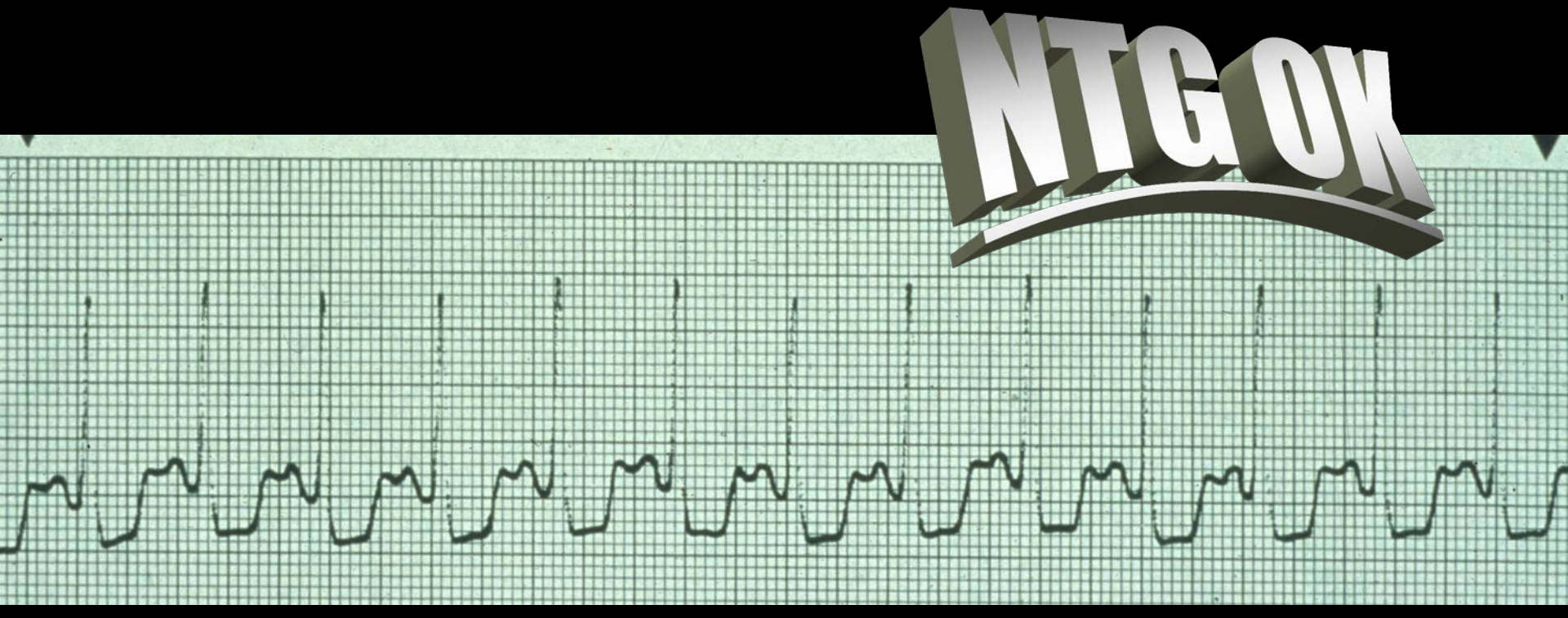
Give even if no chest pain



Can EMS give NTG if HR >100 in HF?

Different from ACS

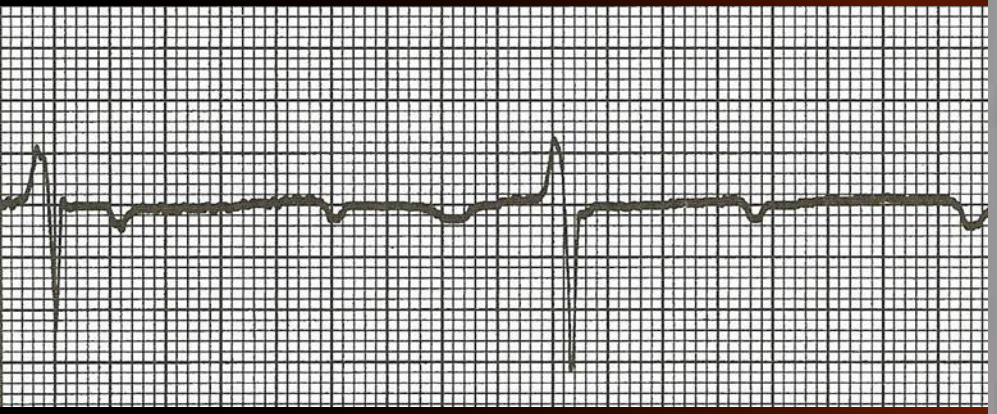
Benefits of NTG outweigh risk if patient in HF is tachycardic

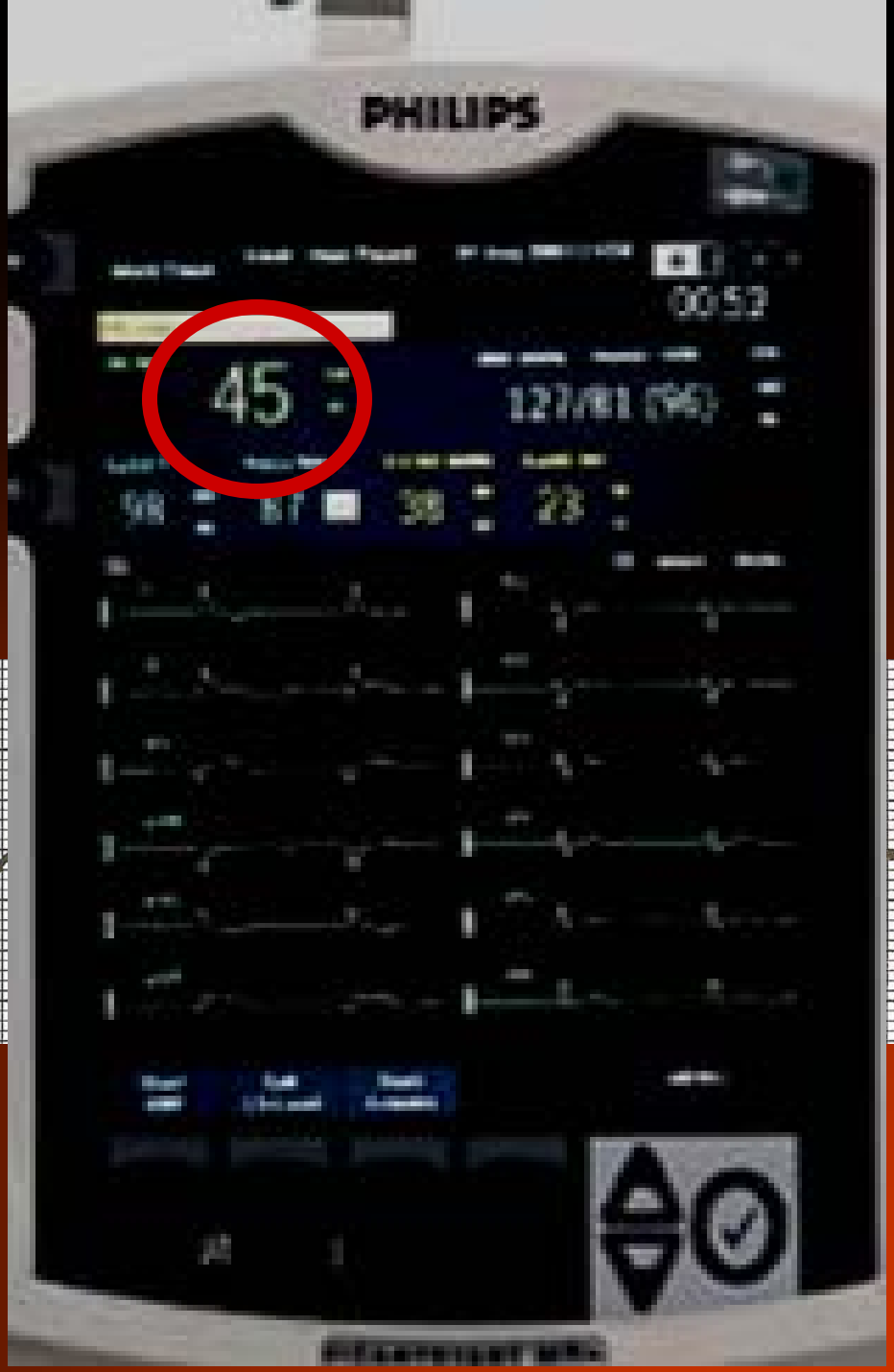


If severe anxiety:
midazolam in
2 mg increments
every 30-60 sec
IVP (0.2 mg/kg IN)
up to 10 mg
IVP/IN/IM
May repeat to
20 mg if
SBP > 90

Monitor ECG

Severe bradycardia is bad!





12-Lead ECG if:

Discomfort (nose to navel, shoulder, arm, back)

SOB/HF

Palpitations; dysrhythmia

Diaphoresis; dizziness/syncope

Weak/tired/fatigued

GI complaint

Pts w/ hypoxia & distress, can have unrecognized ischemia

Outcome goals:

Pt rating of dyspnea is improved

SpO_2 94%

$EtCO_2$ 35-45

RR 12-20

Resp effort normal & unlabored

Lung sounds clear or improving

No therapy complications

BREAK

TIME

#5 67 M SOB

Provider Impression

Protocols Used
Initial Medical Care (8 / 9)

Protocol Age Category
Adult Only

Primary Impression: [redacted]

Initial Patient Acuity: Emergent / Yellow

Final Patient Acuity: Improved

Narrative

[redacted] companies dispatched to listed location for the person having trouble breathing. [redacted] responded fro[redacted] Upon arrival crew received report from [redacted] including vitals. Patient is a 67 year old male who is alert and oriented x3 of 3 sitting in a chair with pursed lip breathing and a barrel chested appearance. Patient told crew that he got home from the hospital on Sunday after suffering an inferior wall STEMI o[redacted] He stated he had one stent implanted. He told crew that he has been short of breath every day but today it is the worst it has been and he cant seem to catch his breath. Patient also has a history of COPD. Crew initiated capnography monitoring as well as cardiac monitoring. Lungs assessed as clear with diminished sounds in the right lower lobe. Patient placed on oxygen at 4 LPM nasal canula. Crew assisted the patient to the stair chair and brought outside to the cot and then to the ambulance. Crew obtained and transmitted a 12 Lead EKG showing sinus rhythm. Patient denies any other complaints including chest pain, dizziness, nausea, or numbness. Crew contacte[redacted]ia cell with no orders. Patient continuously monitored for remainder of transport with no change in condition. Upon arrival crew gave a full oral report to receiving RN in ER room 12. Patient transferred from cot to be by crew without incident. Patient care transferred, end of report[redacted]

[redacted]

Past Medical History

Medication Allergies

Medication Allergies
Pt Denies Rx Allergies

Medication Allergy Comments

Medical History: COPD, CV Myocardial Infarction (STEMI)

Medical History Obtained From: Patient

Advance Directives:

Location	Description	Detailed Findings Details
Skin	Cold Dry	
Chest/Lungs	Breath Sounds-Decreased Right Breath Sounds-Normal-Left	

Mental Status ; Neurological ;

Capnography:

Shark fin

12 L: no acute changes; R atrial abnl

Vitals

Position	AVPU	BP	MAP	Method	Pulse	Strength	Rhythm	Resps	Effort	SpO2	
Sitting / Fowlers	Alert	150/108	122	Cuff - Auscultated	96			24	Labored	91	Room Air
Sitting / Fowlers	Alert	144/102	116	Cuff - Automated	92			22	Normal	96	Low FiO2 (1-6 LPM)
Sitting / Fowlers	Alert	140/98	112	Cuff - Automated	90			22		97	

How would you treat this patient?

ED Assessment:

History included recent admit for asthma

↑ RR and diffuse wheezes

CT chest – bilateral PEs (all lobes)

Treatment:

Had catheter directed lysis (tpa) due to to significant dyspnea, clot burden and RV strain

Final dx:

PEs, SOB, acute respiratory failure with hypoxia, acute asthma exacerbation

…d/c home 3 days later

Can patients have more than one diagnosis at a time?

Differential for SOB

Heart failure
AMI
COPD
Pneumonia

Pulmonary emboli
Pneumothorax
Anaphylaxis
Aspiration

56 M in respiratory distress

Narrative

[redacted] were dispatched for the asthma pt at home. Crews arrived on scene of the multi-story apartment building and after gaining entry met the pt standing in a tripod position in the doorway of his unit. Pt was speaking in short word clusters and said he "was glad we were here." Pt appeared anxious and was notably diaphoretic. Pt's significant other was home and stated that he woke from sleeping with an asthma attack. They attempted to treat him with a home albuterol nebulizer without relief prior to calling EMS. She also stated that the pt has had a productive cough for about three days. Pt placed on C-Pap and a duoneb treatment started. Vitals obtained, lung sounds assessed, capnography monitored. Fever noted. ABMC contacted with report. Pt reported improvement and was able to speak in full sentences during transport. Pt care transferred to ED staff in rm 9 upon arrival. [redacted]

Past Medical History

Patient Medications

Medication	Dosage	Route	Current Medication Comments
Dicyclomine			
valsartan			
Bumetanide			
montelukast			
Hydrochlorothiazide			

Medication Allergies

Medication Allergies	Medication Allergy Comments
Pt Denies Rx Allergies	

Medical History: CV - Hypertension, Resp - Asthma (Moderate), Bronchitis

Other Past Medical History: pre-diabetic

Medical History Obtained From: Patient

Advance Directives:

#6

Detailed Findings

Location	Description	Details
Skin	Diaphoretic Warm	
Mental Status	Oriented-Event Oriented-Person Oriented-Place Oriented-Time	
Neurological	Normal Speech Gait-Normal	
Chest/Lungs	Breath Sounds-Decreased Left Pain with Inspiration/expiration-Left Crackles-Left Wheezing-Inspiratory - Right	

Capnography: square 35; 42

Normal Findings

Face ;

Not Done

Vitals

Time	PT/	Position	AVPU	BP	MAP	Method	Pulse	Strength	Rhythm	Resps	Effort	SpO2	
10:47:18	No	Sitting / Fowlers	Alert	146/102	117	Cuff - Auscultated	110	Strong	Regular	30	Labored	96	CPAP
10:53:18	No	Sitting / Fowlers	Alert	157/135	142	Cuff - Automated	90	Strong	Regular	23	Normal	95	CPAP
11:00:18	No	Sitting / Fowlers	Alert	129/67	88	Cuff - Automated	101	Strong	Regular	19	Normal	96	CPAP

ED Presentation

Tachypneic w/ ↓ BS; insp./exp. wheezes in all lung fields

SPO2 97% on bipap

“sick” for 3 d w/ productive cough; chest & back pain

Allergic to cats (and has them)

Treated w/ IV steroids

Final dx:

RSV w/ acute resp. insufficiency & asthma exacerbation

…d/c home 5 days later

Asthma pathophysiology

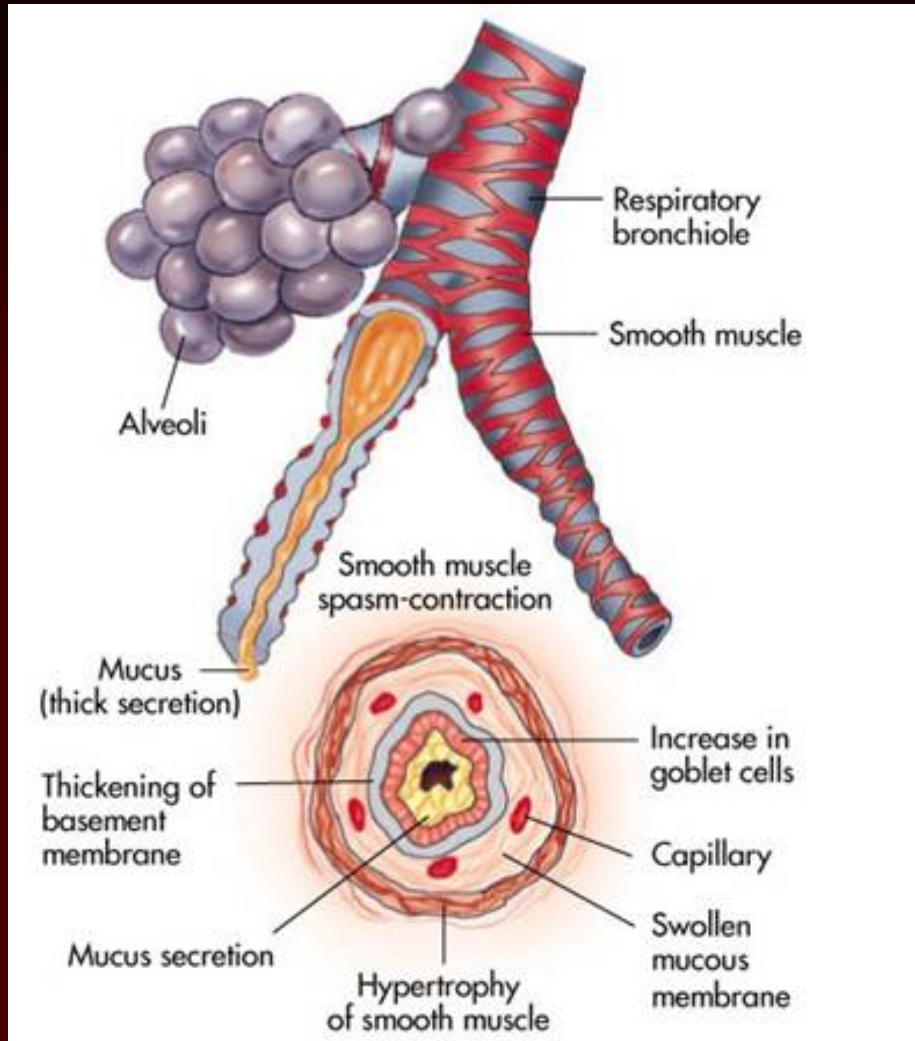
7-10 fold ↑ in WOB

Airflow obstruction caused by:

Spasm: Smooth muscle contraction

Secretions: Mucus plugging

Swelling: Inflammatory changes in bronchial walls

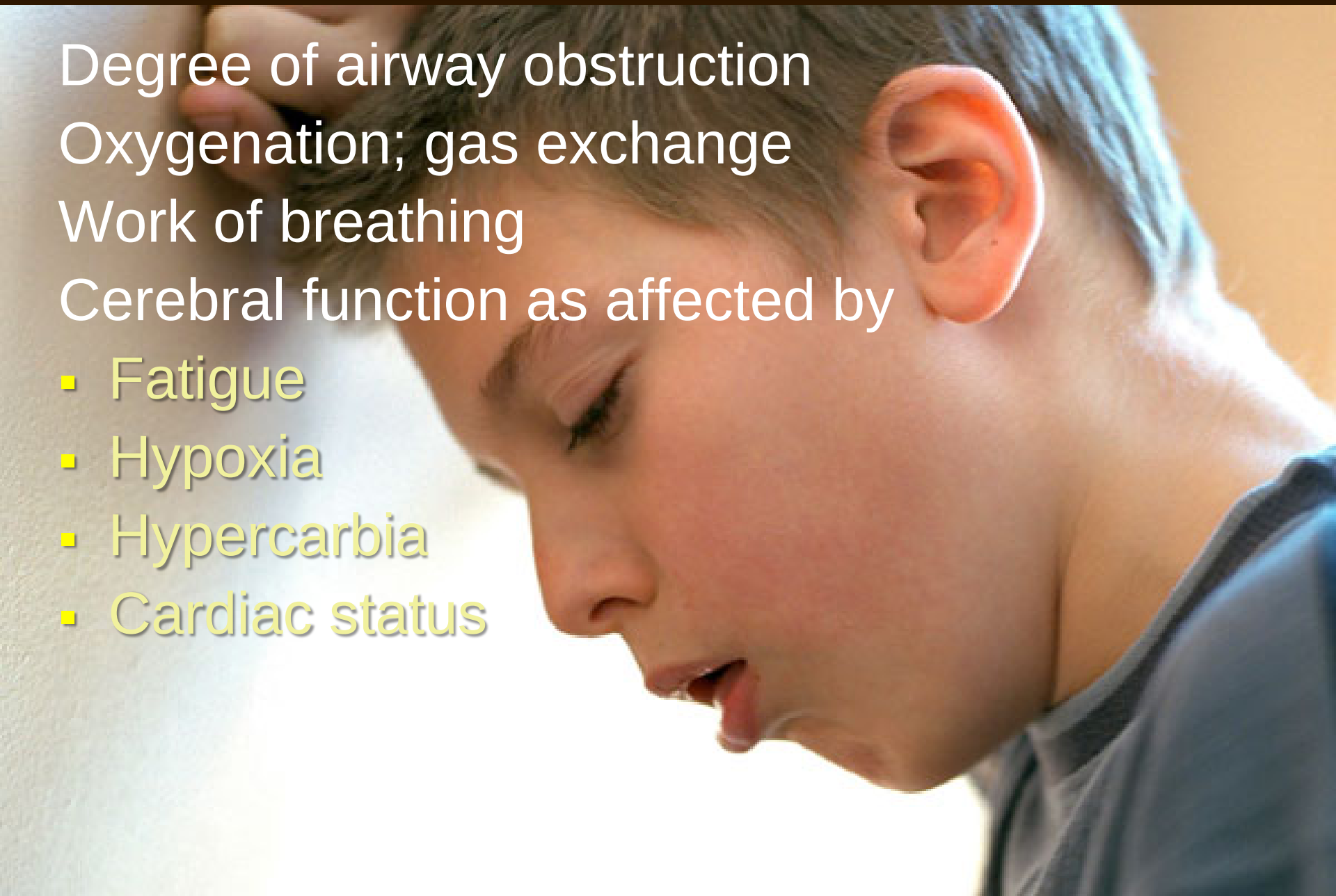


Patient assessment

Asthma attacks are classified as mild, moderate, severe or respiratory arrest imminent

Goal: Identify high-risk patients and get them into the emergency healthcare system ASAP

Assess…



Degree of airway obstruction

Oxygenation; gas exchange

Work of breathing

Cerebral function as affected by

- Fatigue
- Hypoxia
- Hypercarbia
- Cardiac status

Asthma red flags

RR > 40 and $EtCO_2$ > 40

Tachypnea should drop $EtCO_2$

Increased WOB
w/ normal CO_2
is a bad sign

Asthma: Assessment findings

Hx asthma

Position: sitting up / leaning forward

May be fatigued

Lungs: clear → wheezes → diminished → absent

SpO_2 WNL early in attack; does not often drop unless severe attack

Capnography: sharkfin

Speech: fragmented

Retractions – worse w/ ↑ severity

Provider Impression

Protocols Used	Protocol Age Category
Resp - Asthma / COPD / Reactive Airway (8 / 9)	General

Primary Impression: [redacted]

Initial Patient Acuity: Emergent / Yellow

Final Patient Acuity: Improved

Narrative

[redacted] were dispatched for the pt at work with difficulty breathing. Crews arrived on scene and were directed to the pt in an office area of the shipping warehouse facility. Pt was seated in a rolling chair with her legs propped up on another chair. Pt was speaking in word clusters in a low voice. Pt stated it was an asthma attack and she is asthmatic. Vitals obtained, nebulizer treatment started. Pt moved to stretcher and to ambulance. Pt placed on monitor. Pt able to answer questions in full sentences now. [redacted] contacted with report. Pt monitored for changes while enroute. Care transferred to ED staff in rm 9 upon arrival. - [redacted]

Past Medical History

Patient Medications

Medication	Dosage	Route	Current Medication Comments
Unable to Complete			

Medication Allergies

Medication Allergies	Medication Allergy Comments
Ibuprofen	

Medical History: Resp - Asthma (Severe), Hyperlipidema / High Cholesterol , CV - Hypertension

Medical History Obtained From: Patient

Pregnancy: Possible/Unconfirmed **Advance Directives:**

7 43 F w/ SOB

Vitals

Time	PTA	Crew	Position	AVPU	BP	MAP	Method	Pulse	Strength	Rhythm	Resps	Effort	SpO2	
22:59:00	No	[redacted]	Sitting / Fowlers	Alert	170/86	114	Cuff - Auscultated	80	Strong	Regular	20	Labored	98	Room Air
23:05:00	No		Semi-Fowlers	Alert	178/98	125	Cuff - Automated	72	Strong	Regular	16	Labored	98	Low FiO2 (1-6 LPM)
23:12:00	No		Semi-Fowlers	Alert	/			78	Strong	Regular	14	Labored	97	Low FiO2 (1-6 LPM)

Time	PTA	GCS Motor	GCS Verbal	GCS Eye	GCS	GCS Qual	BG	BG H/L	Temp	Temp Method	ETCO2	Pain Score	Pain Type	Stroke Score	Stroke Type
22:59:00	No	6 - Obeys commands	5 - Oriented	4 - Opens spontaneously	15	Accurate with no influence					42				
23:05:00	No	6 - Obeys commands	5 - Oriented	4 - Opens spontaneously	15	Accurate with no influence					36				
23:12:00	No	6 - Obeys commands	5 - Oriented	4 - Opens spontaneously	15	Accurate with no influence					40				

What was the Wave Form on ETCO2?: Shark fin √

Detailed Findings

Location	Description	Details
Skin	Warm Diaphoretic	
Mental Status	Oriented-Event Oriented-Person Oriented-Place Oriented-Time	
Neurological	Normal Speech Normal Gross Motor	
Eye Bilateral:	Reactive PERRL	
Chest/Lungs	Breath Sounds-Decreased Left Breath Sounds-Decreased Right	

Face ; Eye (Bilateral) ;

Interventions

Medications

Time	Crew	Medication	Route	Dosage	Response	PTA	Medication Comments
[redacted]	[redacted]	Albuterol	Nebulizer	2.5 mg	Unchanged	No	
		Ipratropium	Nebulizer	0.5 mg	Unchanged	No	
		Oxygen	Nebulizer	6 LPM	Improved	No	

EKG

Vitals

gns Taken	Cardiac Rhythm / Electrocardiography (ECG)	ECG Type	Method of ECG Interpretation
	Sinus Rhythm	4 Lead	Human Interp
	Sinus Rhythm	4 Lead	Human Interp

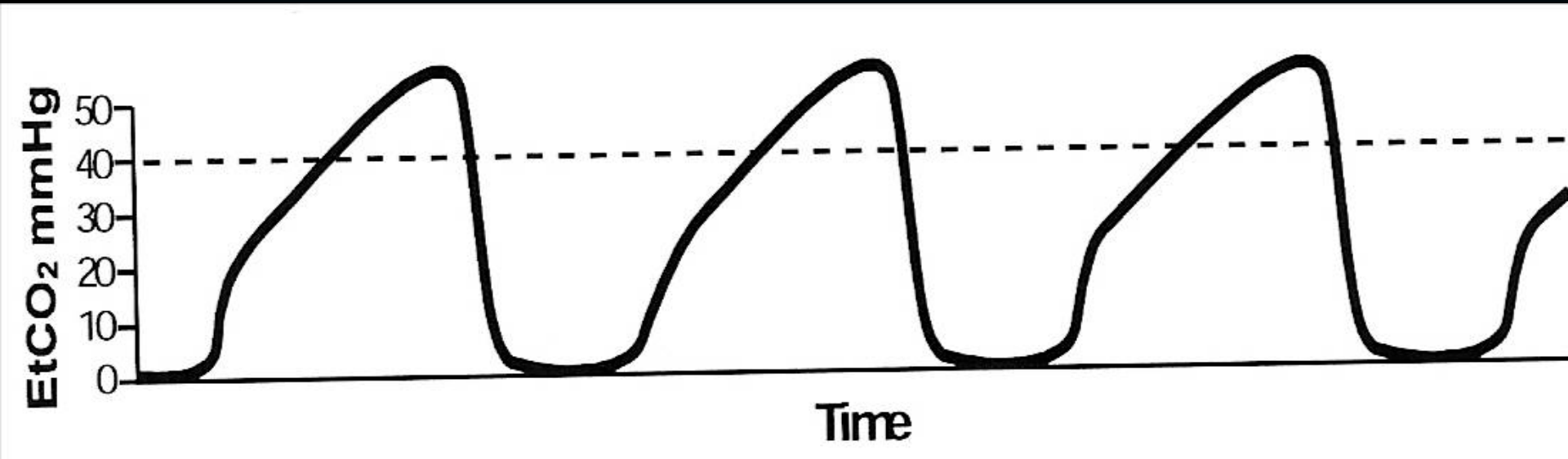
ED Presentation

Faint respiratory wheezes remain w cough, congestion & CP from cough & takes ibuprofen

SPO2 100% RA

Additional duo neb given to pt in ED and d/c home

Look for loss of rectangular waveform

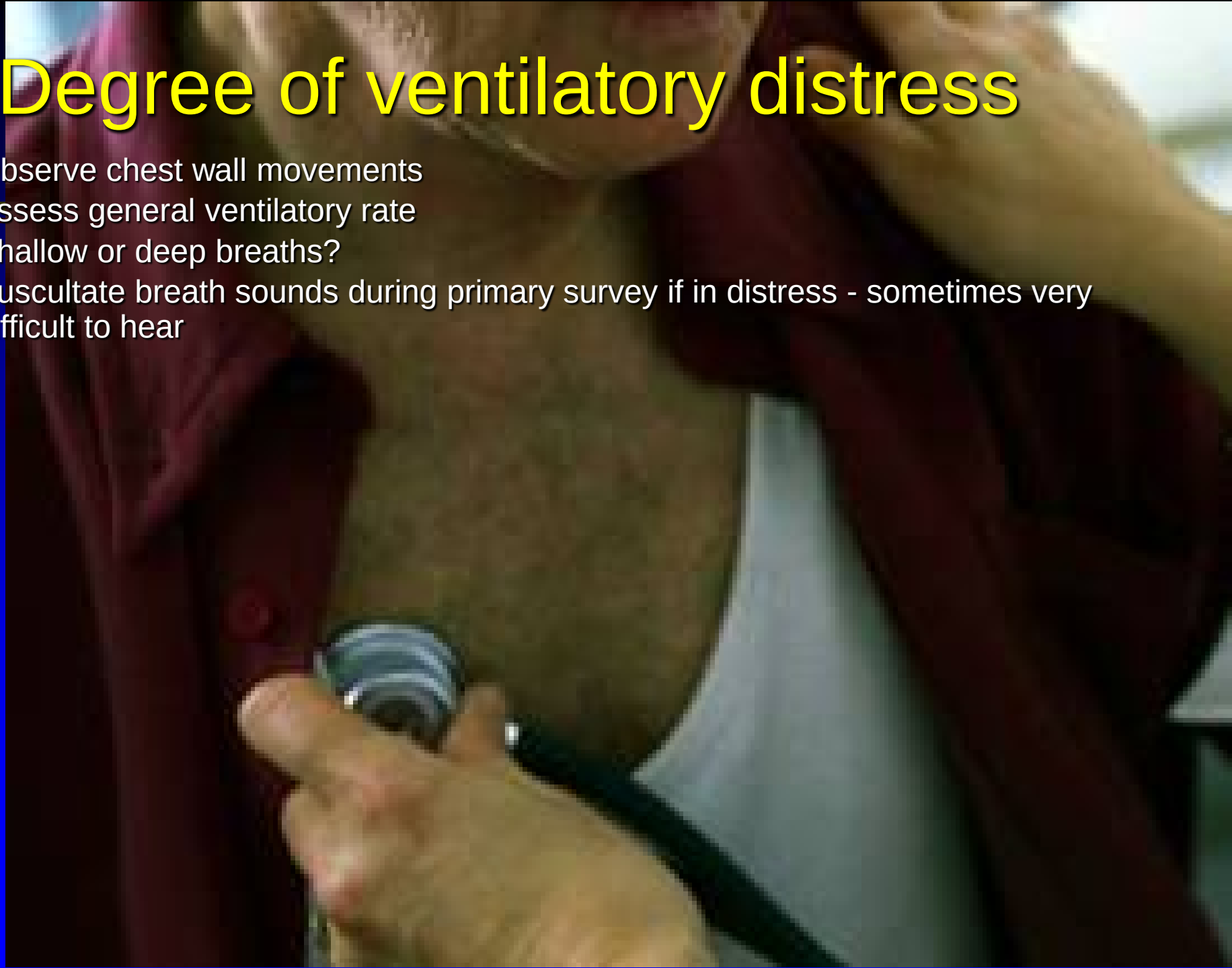


- Shark fin pattern helps determine difference between asthma & HF
- Indicates incomplete or obstructed exhalation
- In need of bronchodilators


Speech: Full sentences or word clusters?
Cough?
Cerebral function
Fatigue

Degree of ventilatory distress

- Observe chest wall movements
- Assess general ventilatory rate
- Shallow or deep breaths?
- Auscultate breath sounds during primary survey if in distress - sometimes very difficult to hear



Breath sound assessment

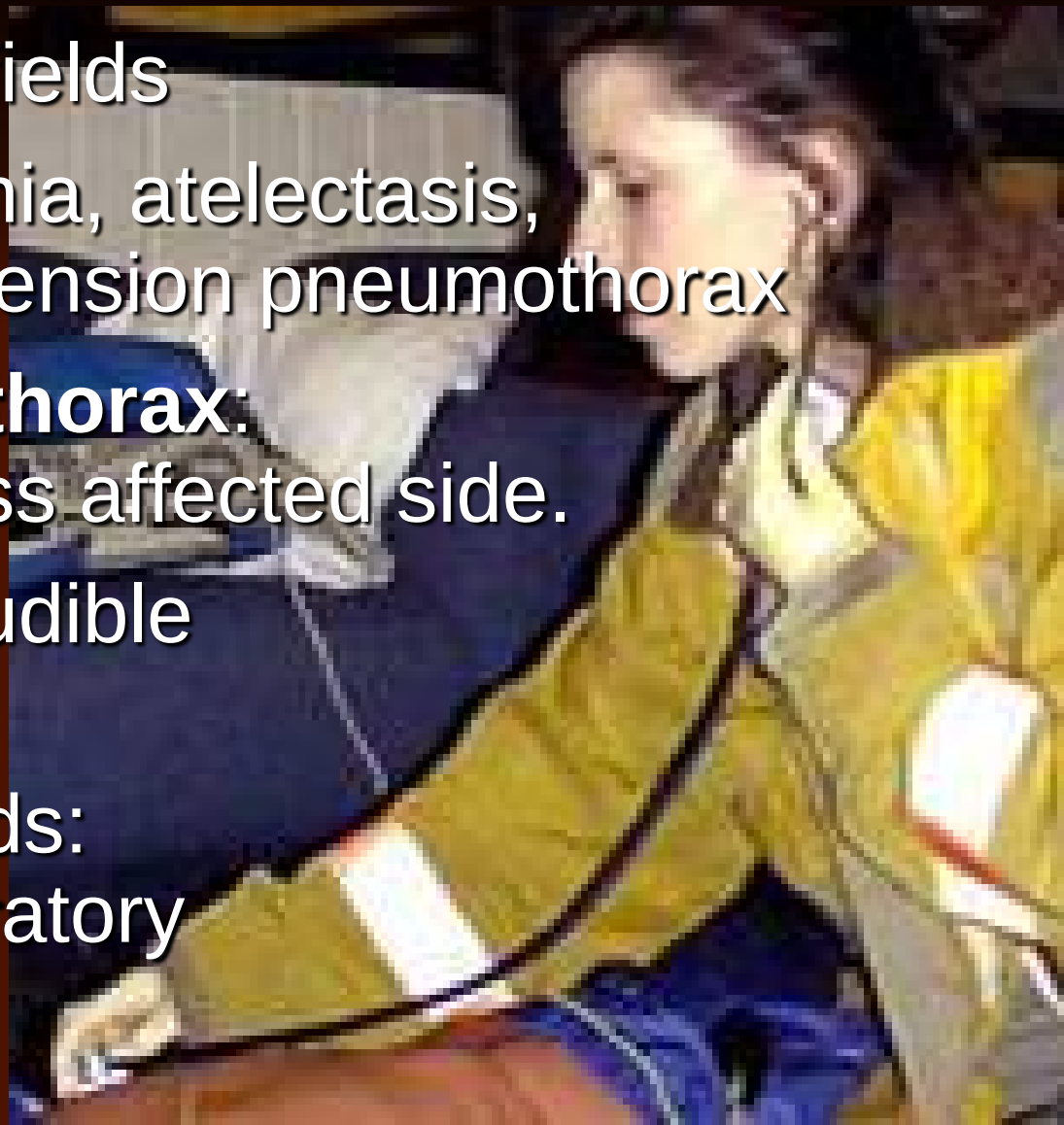
Listen over all lung fields

Assess for pneumonia, atelectasis, pneumothorax or tension pneumothorax

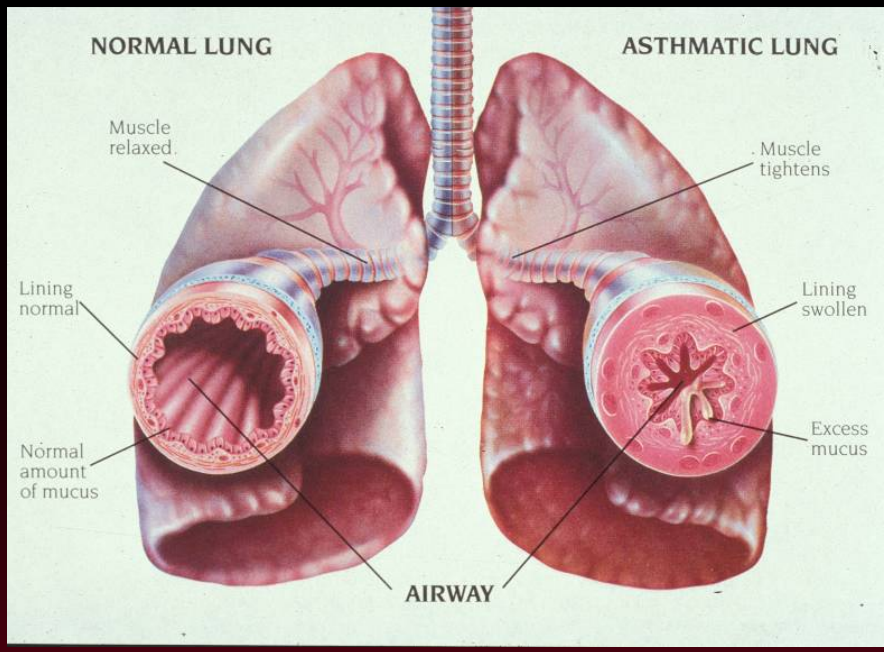
If tension pneumothorax:
Needle decompress affected side.

Wheezes may be audible w/o a stethoscope

Note timing of sounds: inspiratory or expiratory



Wheezes



Assess timing, pitch

Severity **does not correlate well with degree of airway obstruction**

Absence of wheezing may indicate critical airway obstruction, whereas increased wheezing may indicate a positive response to bronchodilator therapy

If an older patient is wheezing & has NO Hx of asthma/COPD or allergic reactions…

- Assess capnography!
- Strongly consider a cardiac cause and treat per HF/pulmonary edema SOP first

Albuterol/HHN

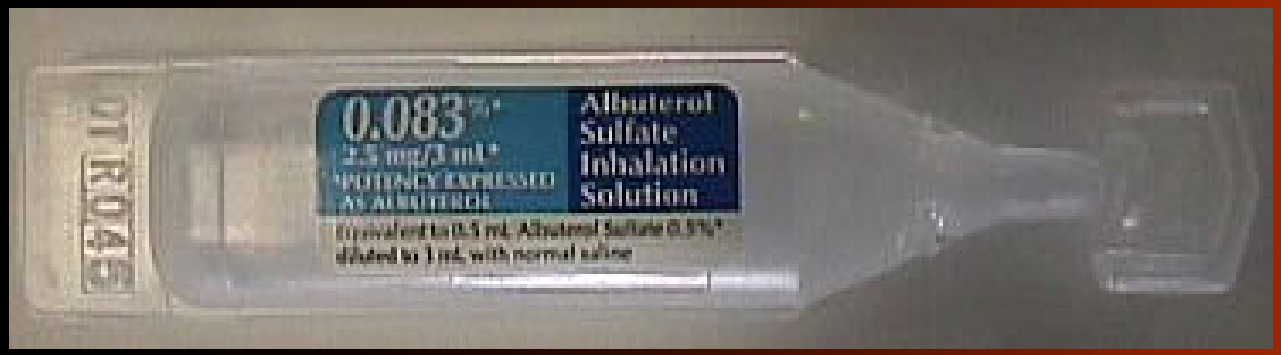
2.5 mg w/ O_2 at 6 L/min

Begin transport as soon as neb is started

Don’t wait for a response

Continue enroute

May repeat Albuterol & ipatropium



Ipratropium bromide (Atrovent)

Dose: HHN: 0.5 mg in 2.5 mL NS

Takes up to 1 hr to achieve full effects

Severe distress

Severe SOB

Orthopnea

Accessory muscle use

Speaks in syllables

Tachypnea

Breath sounds diminished or absent

SpO_2 ≤94%

Exhausted

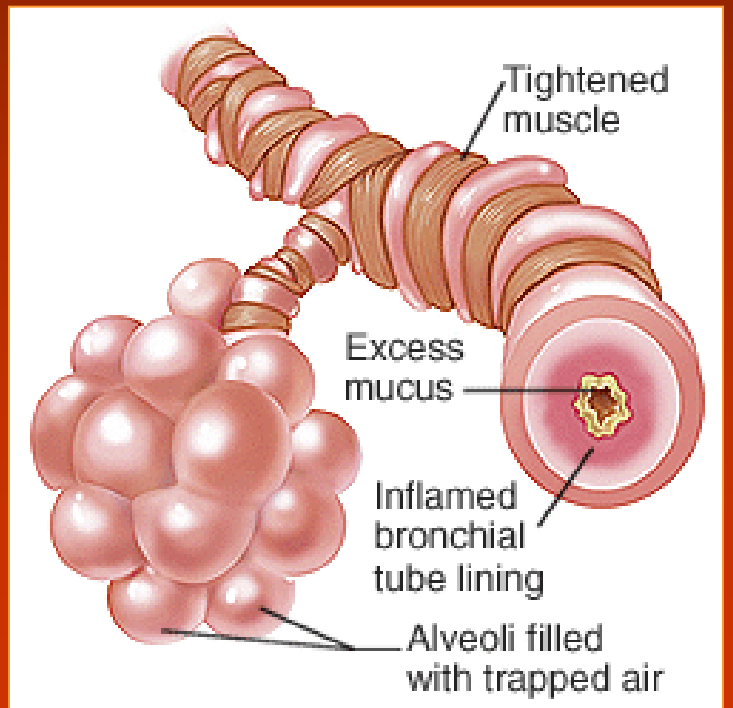
HR & BP dropping

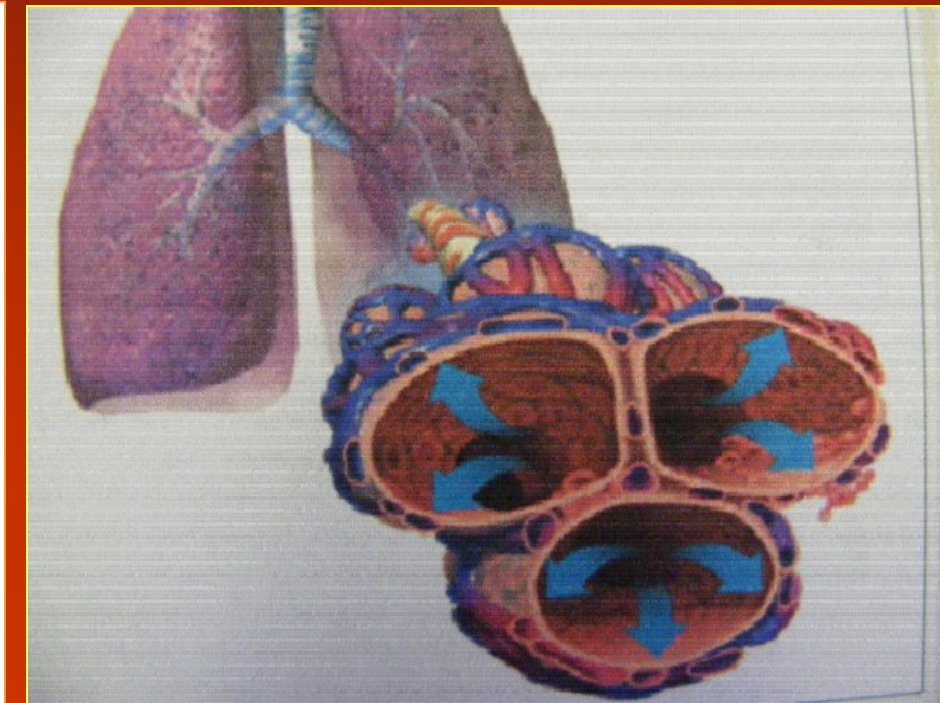
Severe distress

Terminal bronchioles collapse (spasm) during exhalation leading to air trapping in the alveoli

Pt. breathes through pursed lips (replicates PEEP)

Will keep lower airways open so the pt can exhale





Epinephrine effects

	Alpha	βeta
Heart (B1)	None	↑ rate, force, automaticity, conduction
Lungs (B2)	Constricts	Dilates
Vessels	Constricts	Dilates

Epinephrine 1mg/1mL IM

Indications: Deteriorating ventilations and/or severe asthma attack

Action: Relaxes bronchial smooth muscle, constricts bronchial arterioles
Reduces congestion

Onset 5-10 min

Individualized risk/benefit analysis required

Why IM instead of IV?

Asthma pts need their bronchioles dilated.

They *DO NOT* need their vessels constricted!

Easy to remember:

IV epi affects the **v**essels

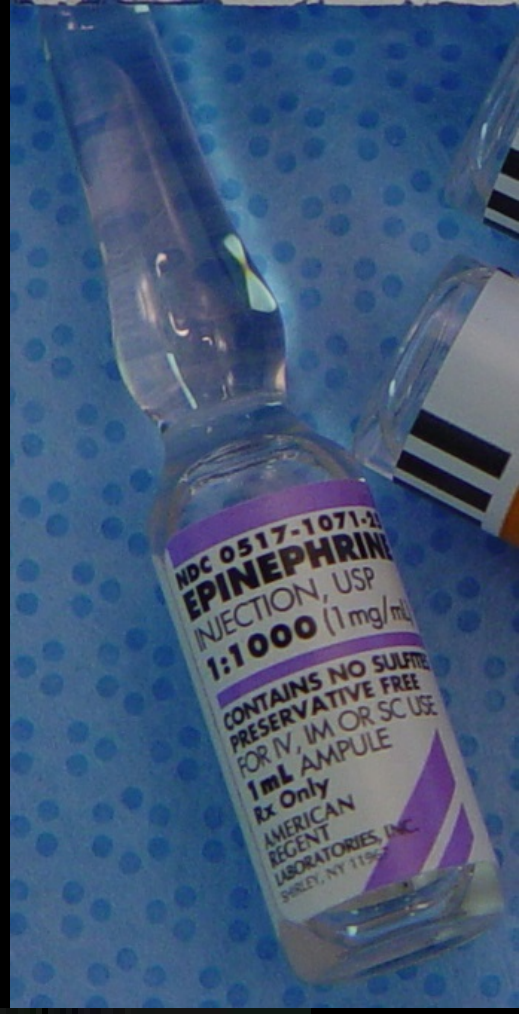
IV epi only given to hypotensive or pulseless patients

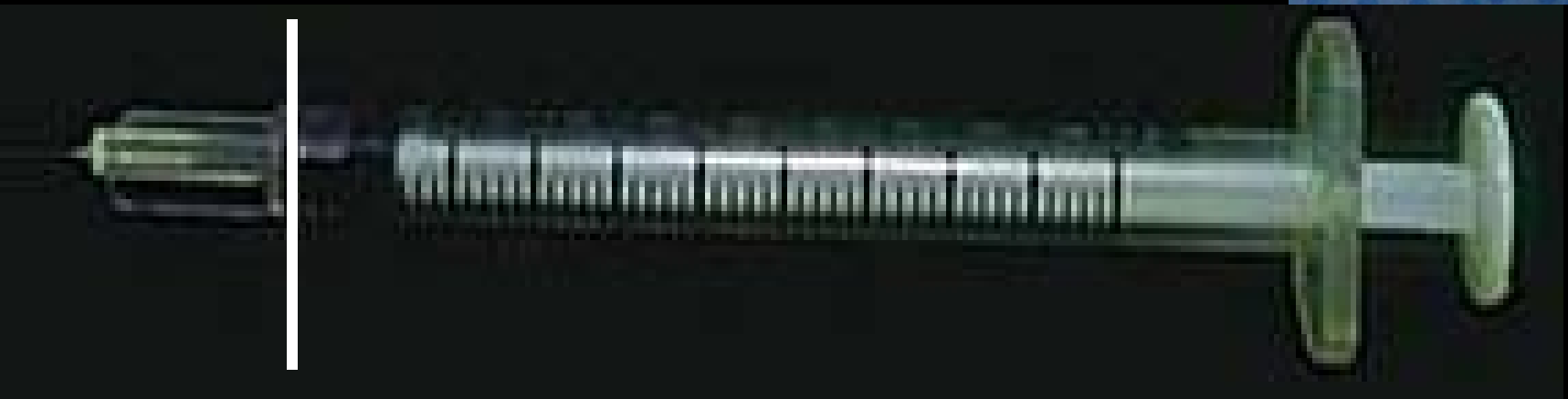
Epi -dose

Epi 1mg/1mL 0.3 mg (0.3 mL) IM

- Begin transport as soon as Epi is given
- Don’t wait for a response
- Repeat X 1 in 10 min if minimal response

Peds: 0.01 mg/kg up to 0.3 mg





Epinephrine side effects

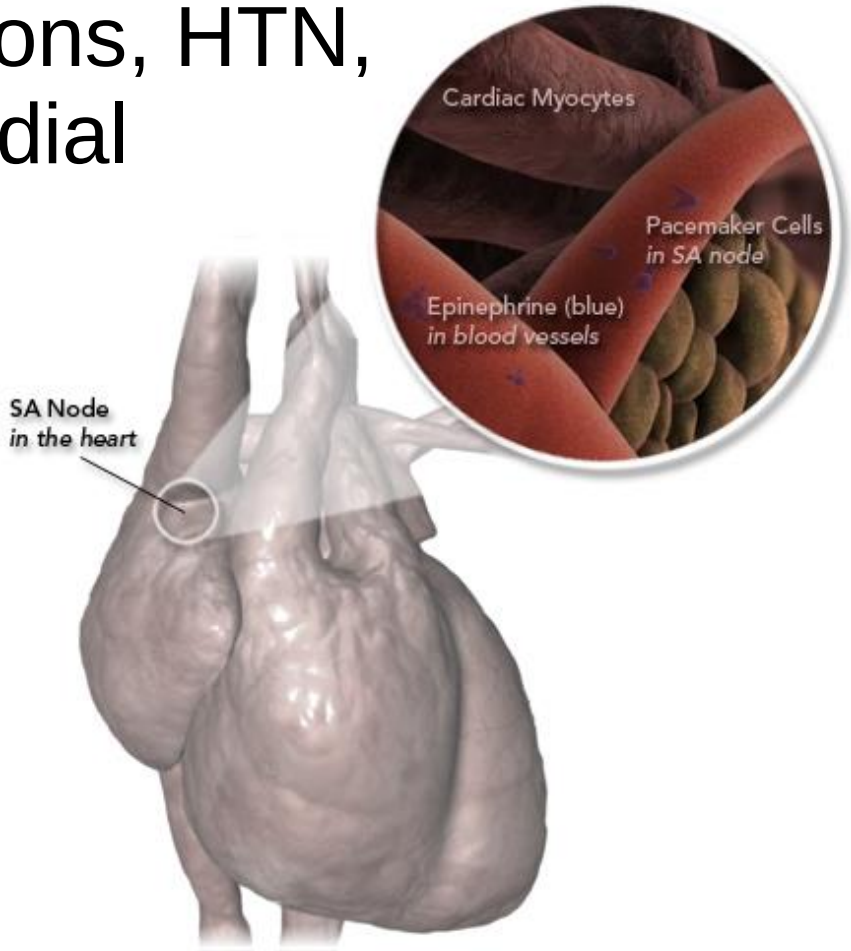
CNS: HA, dizziness, tremors, restlessness, anxiety

CV: Tachycardia, palpitations, HTN, vasoconstriction, ↑myocardial O_2 consumption

Do not give to pts in HF!

Can worsen myocardial ischemia & HTN

GI: N / V



Albuterol & ipratropium

Continue neb enroute

May repeat both

Magnesium sulfate

Actions

- Acts like a Ca blocker: relaxes bronchial & vascular smooth muscle
- May interfere with inflammatory response
- Potentiates ß agonists

Indications: Severe asthma attack refractory to epinephrine

Magnesium dose

2 Gm (4 mL) mixed w/ **16 mL NS** in a 20 mL syringe **slow IVP/IO** over 5 minutes

No more than 1 Gm/minute to avoid respiratory depression

On-going assessment

- Mental status
- Degree of dyspnea; speech
- Use of accessory muscles; WOB
- RR, effort; orthopnea
- Presence/intensity of breath sounds
- Degree of wheezing
- Peak flows; SpO_2, capnography, ECG

#8 78 M with SOB

Provider Impression

Protocols Used [redacted]

Protocol Age Category

Adult Only

Primary Impression [redacted]

Initial Patient Acuity: Critical / Red **Final Patient Acuity:** Improved

Narrative

[redacted] DISPATCHED FOR SHORTNESS OF BREATH. UPON ARRIVAL FOUND PT LAYING IN BED. PT WAS ABOUT TO HAVE DIALYSIS AND STAFF NOTED THAT HE DEVELOPED SHORTNESS OF BREATH 20 MINS PTA. PT LABORED BREATHING WITH ACCESSORY MUSCLES BEING USED UNABLE TO COMMUNICATE ON 4L/M VIA NASAL CANNULA. VITALS TAKEN. PT PLACED ON CPAP. PT UNABLE TO FOLLOW INSTRUCTIONS FOR RECEIVING ASPIRIN OR NITROGLYCERINE. VITALS REASSESSED BLOOD PRESSURE DROPPED AND GCS DETERIORATED WITH PT BEING LESS ALERT SO CPAP WAS STOPPED AND PT WAS ASSISTED WITH VENTILATIONS VIA BVM. IO ESTABLISHED. PT GIVEN LEVOPHED 8MCG/MIN. HOSPITAL CONTACTED WITH NO FURTHER ORDERS GIVEN. WHILE IN ROUTE PT CONDITION IMPROVED. BLOOD PRESSURE ELEVATED AND PT BECAME MORE ALERT. AT [redacted] CARE GIVEN TO STAFF. EOR. [redacted]

Past Medical History

Patient Medications

Medication	Dosage	Route	Current Medication Comments
Coumadin			

Medication Allergies

Medication Allergies	Medication Allergy Comments
No Known Drug Allergy	

Medical History: Renal - End Stage Renal Disease, CV - Heart Failure, COPD

Other Past Medical History: DVT

Medical History Obtained From: Health Care Personnel, Medical Records or Alert Card

Advance Directives:

Detailed Findings

Location	Description	Details
Skin	Cold Clammy Diaphoretic	
Mental Status	Confused	
Chest/Lungs	Accessory Muscles Used with Breathing Crackles-Right Crackles-Left Wheezing-Expiratory - Right Wheezing-Expiratory - Left	

What is happening with this pt?

Normal Findings

Not Done

Vitals

Time	PTA Crew	Position	AVPU	BP	MAP	Method	Pulse	Strength	Rhythm	Resps	Effort	SpO2	
16:05:00	No [redacted]	Semi-Fowlers	Alert	112/68	83	Cuff - Automated	70	Strong	Regular	36	Labored	79	Low FiO2 (1-6 LPM)
16:10:00	No	Semi-Fowlers	Alert	92/58	69	Cuff - Automated	75	Weak	Regular	28	Assisted	95	CPAP
16:14:00	No	Semi-Fowlers	Alert	52/28	36	Cuff - Automated	97	Strong	Regular	28	Assisted	96	CPAP
16:17:00	No	Semi-Fowlers	Alert	141/111	121	Cuff - Automated	78	Strong	Regular	16	Assisted	98	High FiO2 (10-25 LPM)

Time	PTA	GCS Motor	GCS Verbal	GCS Eye	GCS	GCS Qual	BG	BG H/L	Temp	Temp Method	Pain ETCO2	Pain Score	Pain Type	Stroke Score	Stroke Type
16:05:00	No	6 - Obeys commands	2 - Incomprehensible sounds	3 - Opens to verbal	11	Accurate with no influence	121								
16:10:00	No	5 - Localizes pain	2 - Incomprehensible sounds	3 - Opens to verbal	10	Accurate with no influence					25				
16:14:00	No	5 - Localizes pain	1 - No verbal/vocal sounds	3 - Opens to verbal	9	Accurate with no influence					35				
16:17:00	No	5 - Localizes pain	4 - Confused	3 - Opens to verbal	12	Accurate with no influence					43				

Interventions

Medications

Time	Crew	Medication	Route	Dosage	Response	PTA	Medication Comments
[redacted]	[redacted]	Normal saline	IO	10 mL	Unchanged	No	
		Norepinephrine Injection [Levophed]	IO	8 Micrograms per Minute (mcg/min)	Improved	No	

Procedures

	Name	Location	Size of Equipment	Attempts	Response	Success	Procedure Comments
ny	Assisted Ventilation - CPAP			1	Worse	No	
	Assist Ventilation - BVM			1	Improved	Yes	
ny	IO - Intraosseous Access			1		Yes	

ED Presentation

Tachypneic w/ ↓ BS at bases w/ course crackles

SPO2 100% RA; BP 214/89

Admitted to ICU for urgent dialysis & aggressive diuresis

CXR- HF; possible LLL infiltrate; CT no PE

Lactate level: 1.34

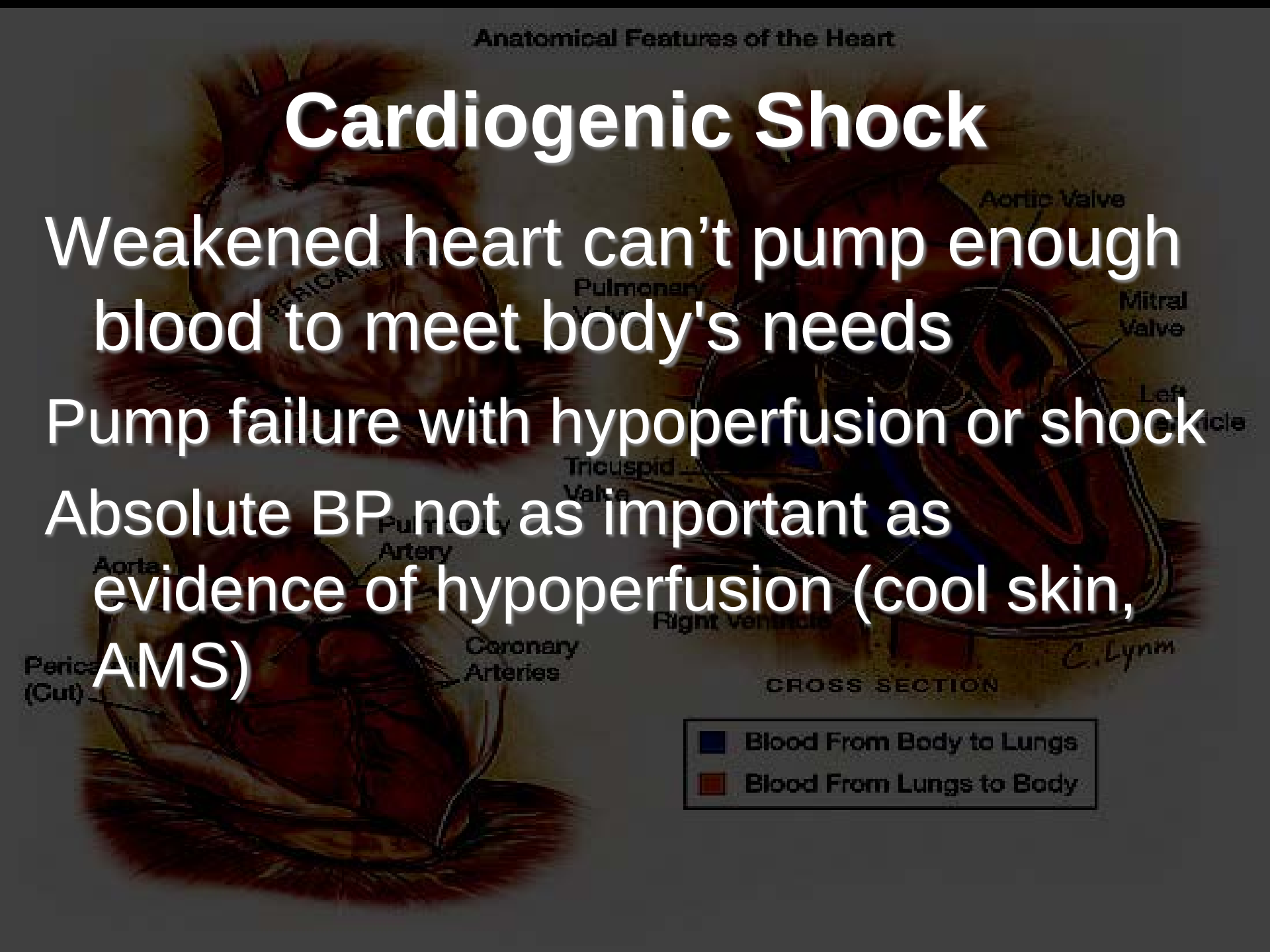
B LE pitting edema

Echo 30-40% EF

ESRD; no intubation required

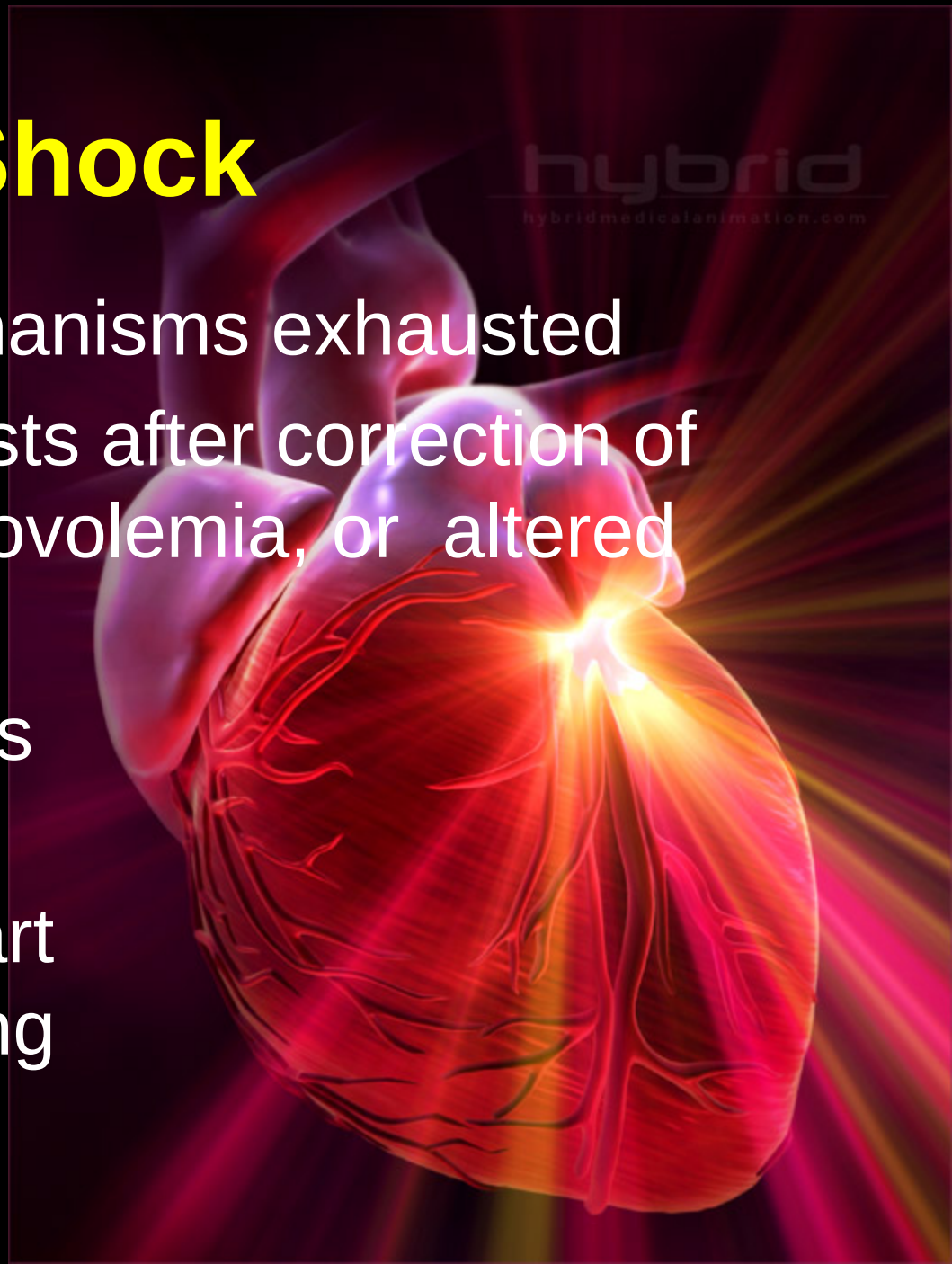
Cardiogenic Shock

- Weakened heart can’t pump enough blood to meet body's needs
- Pump failure with hypoperfusion or shock
- Absolute BP not as important as evidence of hypoperfusion (cool skin, AMS)



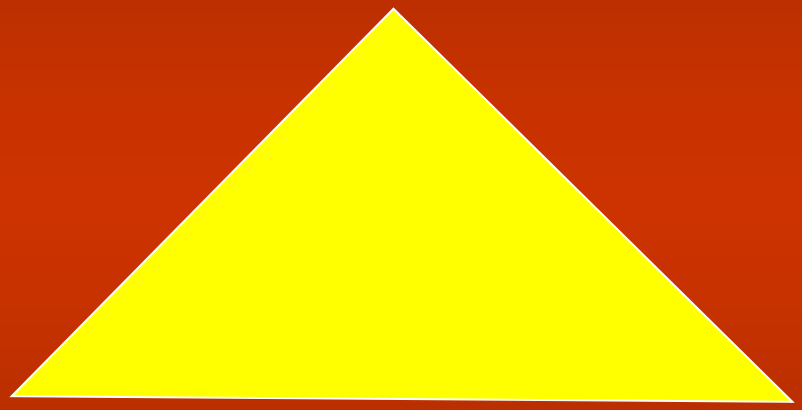
Cardiogenic Shock

- Compensatory mechanisms exhausted
- Hypoperfusion persists after correction of dysrhythmias, hypovolemia, or altered vascular tone
- Hypotension worsens coronary perfusion
- Stunned/starved heart cells stop squeezing



Triad of cardiogenic shock

Pump failure



Hypotension

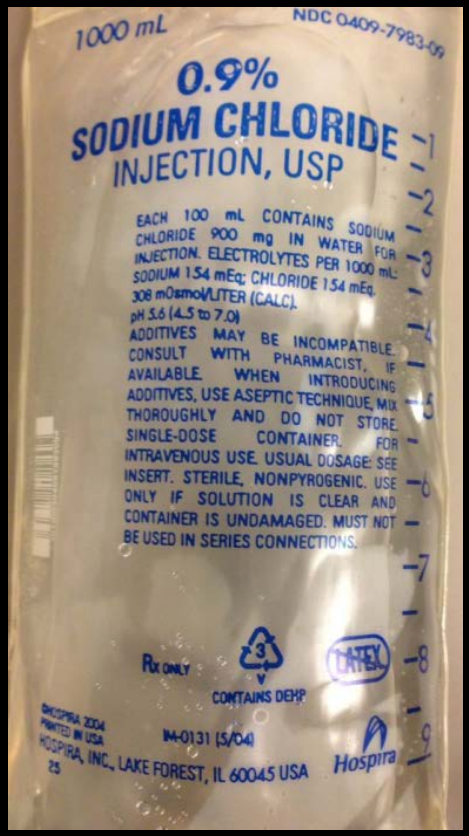
Pulmonary edema

Mix drip: 4 mg (4 mL) in 1000 mL NS or D5W

Concentration: 4 mcg/mL (dilute on purpose)

Initial dose: 8 mcg/min (2 mL/min)

Adjust upwards in 2 mcg/min (0.5 mL/min) increments to max of 20 mcg/min to reach SBP 90 (MAP ≥ 65)

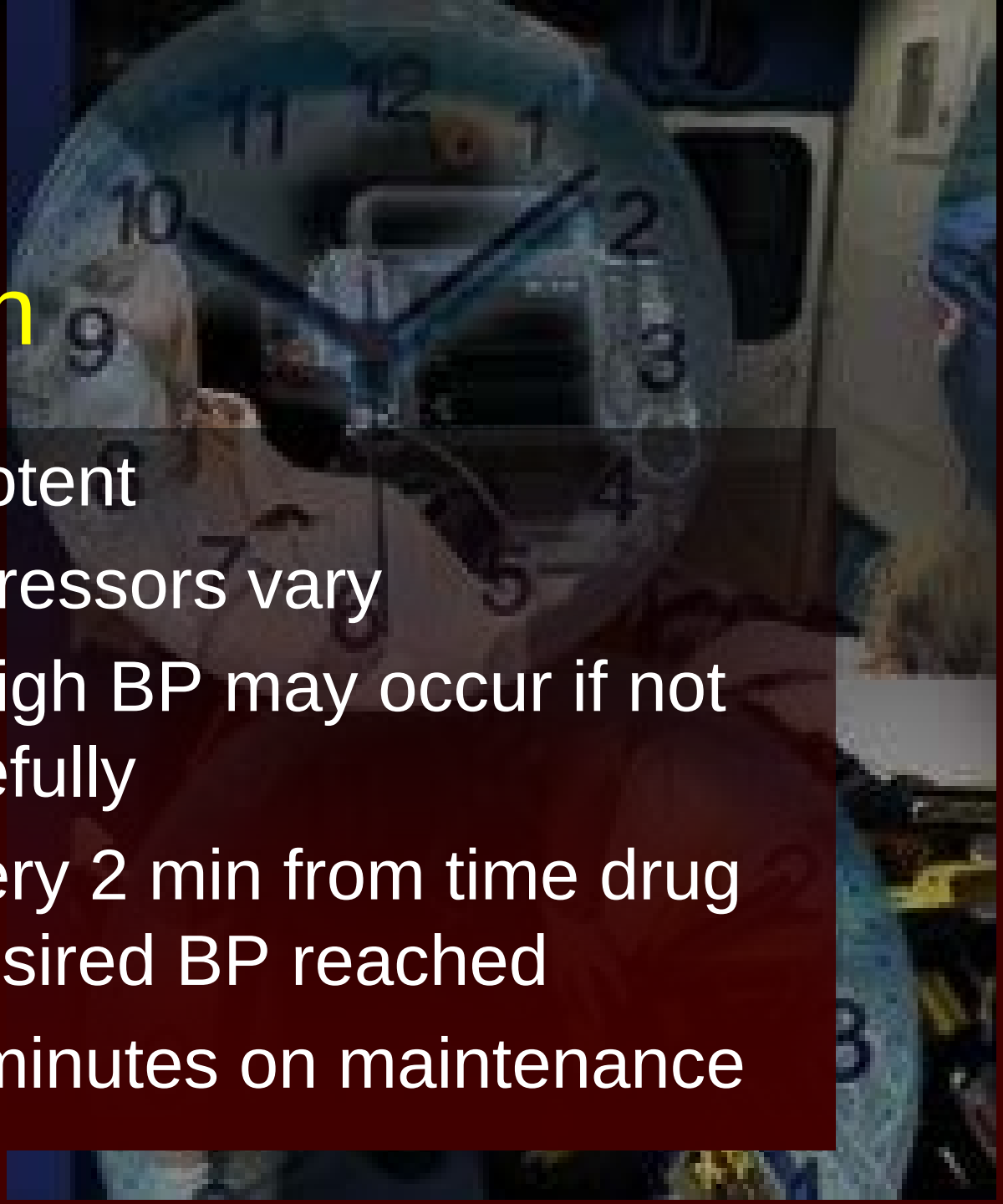


Maintenance dose

Maintenance after target BP reached:

2 mcg/min (0.5 mL/min) to (30 mcggts)
4 mcg/min (1mL/min) (60 mcggts)

Avoid hypertension



- Levophed is potent
- Response to pressors vary
- Dangerously high BP may occur if not monitored carefully
- Retake BP every 2 min from time drug started until desired BP reached
- Then every 5 minutes on maintenance

Questions?