Pulmonary Edema vs Pneumonia

1° Heart Block

N.S.R.

Wenckebach

2° Heart Block

Complete Heart Block
Acute Pulmonary Edema

Clinical signs: shock, hypotension, congestive heart failure, acute pulmonary edema

Most likely problem?
- Volume problem
- Pump problem
- Rate problem

First-line Actions
- Oxygen
- Nitroglycerine SL
- Furosemide 0.5 to 1mg/kg
- Morphine IV 2 to 10 mg

Administer
- Fluid
- Bradycardia? See algorithm
- Tachycardia? See algorithm
- Blood pressure

Let’s Review:
- Cardiac Output
  - 5000-6000 ml/min.
  - HR or SV = CO
- Sympathetic effects:
  - HR and SV
- Parasympathetic:
  - Slows HR
  - Little effect on SV

Review:
- SV = pressure in ventricle
  - Frank Starling effect
- Peripheral vascular constriction increases venous return
  - = Increased RV output.
- Vasodilation of arteries decreases PVR and diastolic pressure
  - = Increased CO.

Vital Signs
- Normal B/P is 120/70 mmHg
  - Increases with age
  - General:
    - Systolic – 100 + age up to 140
    - At age 50: usually 140 mmHg
    - Increases 1 mmHg/yr after 50.
CHF Causes

Abnormal Cardiac Function

- Dispatched as:
  - Man down
  - Chest pain
  - Heart attack
  - SOB
  - Fainted
  - Dizzy

  - Passed out
  - Choking
  - Stroke
  - DFO
  - DRT

Initial Assessment:

- Brief History
  - Onset
  - Provoking factors
  - Quality
  - Radiation
  - Severity
  - Time
  - BP changes

Meds
- Cardiac rhythm
- Abnormal breathing
- Edema
- Rales
- Changes in skin color and moisture

Right and Left Heart Failure

- Right Heart Failure
  - Causes
    - COPD
    - Left heart failure
  - Progression
    - Right ventricle cannot eject all of the blood
    - Fluid/pressure backs up
    - Right atrium
    - Venous system
    - Pedal edema, JVD

- Left Heart Failure
  - Causes
    - High afterload
  - Progression
    - Left ventricle cannot eject all of the blood
    - Fluid/pressure backs up
    - Left atrium
    - Lung tissue
    - Alveoli
    - Pulmonary edema

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Acute Left Ventricular Failure

- Acute LVF from heart disease:
  - #1 cause of heart failure.
  - Assume the worst, hope for best
  - Pt. with CAD w/ hx of MI(new or old)
  - May develop LVF.
  - Frequently LVF is only manifestation of AMI.

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LVF
- Common causes
  - Systemic HTN
  - Afterload
  - Coronary artery disease
  - Arteriosclerosis/atherosclerosis
  - Ischemia
  - Local/temporary occlusion

LVF
- Common Causes
  - Infarction
    - Permanent, necrosis
    - Significant Sized Infarct
      - Decrease effective wall motion
      - Decreased stroke volume
  - Cardiomyopathy
    - Diseased heart muscle tissue
      - ETOH
      - Enlargement

LVF
- Causes
  - Volume overload
    - Bag of Potato Chips
  - Severe anemia
  - Hypoxemia

LVF and Pulmonary Edema
- Incidence of CHF doubles per decade of life
  - > 3 million in US; > 400,000 new diagnoses/yr
  - 5 yr mortality rate /p dx;
    - 60% in men
    - 43% in women

Basically this happens
- Forward or backward ventricular flow.
  - Forward – (LVF) – reduced flow into aorta and systemic circulation
  - Backward – elevated systemic venous pressure

NY Heart Association’s classification of CHF
- Class I
  - Not limited by symptoms
- Class II
  - Fatigue, dyspnea, other sx with ordinary physical activity
- Class III
  - Marked limitation with normal activity
- Class IV
  - Symptoms at rest or with any activity
CHF
- Acute CHF
  - Rapid
- Chronic CHF
  - Slow
  - Midnight shoppers

Pulmonary edema also results from:
- CVA
- Pulmonary embolism
- Infection - Sepsis
- Allergy
- Inhalation of fumes
- Narcotic abuse
  - Especially Inhaled (Heroin)
  - Altitude sickness.

Acute Findings
- History
  - Recent change in sleep patterns
  - More frequent trips to the bathroom
  - Need to sleep on more pillows at night
  - Recent move to the recliner at nights
  - New episodes of PND
    - Paroxysmal Nocturnal Dyspnea
    - Sudden awakening with acute shortness of breath
    - Relieved after standing or sitting upright for a period of time (Midnight Walmart shoppers)

Acute Findings
- History
  - Is more nitroglycerin needed to stop the episodes of chest pain?
  - Have nitroglycerin or oxygen doses increased incrementally in the last few days?

Acute Findings – Critical Patient
- General impression/initial assessment
  - Labored respirations
  - Audible sounds
  - Tripod position
  - Frothy sputum
  - Retraction of chest muscles

Acute Findings – Critical Patient
- General impression/initial assessment
  - Lung sounds
    - Wheezing, crackles
    - Middle-to-upper lung fields
  - Diaphoresis, change in skin color
  - Severe anxiety or restlessness
  - Tachycardia or bradycardia
  - Severe hypertension may be present
Pulmonary Edema – S/S

- Tachypnea
- Orthopnea
- Paroxysmal Nocturnal Dyspnea
  - Elevation of pulmonary venous & cap pressures
  - Wakening from sleep

Pulmonary Edema – more S/S

- Noisy Labored Breathing
- Fine crackles/Rales
- Wheezes
  - Reflex airway spasm
  - "Cardiac asthma"
- Coarse crackles/Rhonchi (larger airways)
- Coughing
- Blood Tinged Sputum
- Pink Frothy

So, What to do?

- Decide – Sick/NotSick?
- Vitals
- Look
  - Skin – wet/dry, color, temp
  - JVD
  - Peripheral edema
  - Subtle signs

- Listen
  - Breath sounds
  - Pulse x 6
  - Skin
**Treatment of RVF & LVF**
- CHF a circumstance not a Dx
- Treatment objectives
  - Decrease myocardial Workload
  - Oxygen demand
  - Reduce fluid retention

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**Treatment**
- OMI
  - Oxygen, Monitor, IV
- MONA if appropriate
  - Morphine, Oxygen, Nitro, ASA (Not in that order)
- Don’t let patient walk!
- Position of comfort
- Reassure
- Positive Pressure Ventilations if necessary

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**Differential Diagnosis**
- Pneumonia
- Herpes Zoster
- Pleurisy
- COPD
- Rib fracture
- Asthma
- Angina
- MI
- Pneumothorax
- Pancreatitis
- Hepatitis
- Salicylate OD

**Pneumonia**

**The statistics**
- Community acquired pneumonia
- 4.5 million cases annually in US
- Winter months/Colder climates
- More men than women
- 20% require hospitalization
- 6th leading cause of death
- Most common infectious cause of death
Viral
- Upper and lower respiratory infections
- Untreated, mortality > 30%
- 37.7% in elder > 80 y/o
- Sudden onset of S/S & rapid progression suggest bacterial pneumonia

S/S
- Productive cough
  - Sputum may be
    - Green
    - Rust-colored
    - Current jelly
    - Foul smelling
  - Rigor or shaking chills
- Headache
- Malaise
- N/V/D
- Exertional dyspnea
- Pleuritic chest pain, friction rub
- Abdominal pain

S/S, cont.
- Fever
- Tachypnea
- Tachycardia
- Cyanosis
- Wheezes, coarse & fine crackles
- Anorexia & weight loss
- Dullness to percussion
- Altered mentation
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Nosocomial pneumonia
- Aspiration or inhalation; ~45% of healthy people aspirate during sleep; even higher in severely ill patients; often bilateral

Typical pneumonia
- Generally resides in the nasopharynx
- Carried asymptomatically
- In approximately 50% of healthy individuals

Pneumocystis carinii pneumonia

Bacterial pneumonia

Viral pneumonia
Host Factors
- DKA
- Alcoholism
- Sickle Cell
- HIV

So — how do we tell the difference?????

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pulmonary Edema</th>
<th>COPD/Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>N/A</td>
<td>HTN, Heart problems</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>Orthopnea</td>
<td>Orthopnea</td>
</tr>
<tr>
<td>Recent</td>
<td>Acute Wt. gain</td>
<td>Chronic dyspnea</td>
</tr>
<tr>
<td>Cough</td>
<td>Foamy sputum</td>
<td>Productive (bronchitis)</td>
</tr>
<tr>
<td>Onset</td>
<td>Rapid</td>
<td>Gradual</td>
</tr>
<tr>
<td>BP</td>
<td>High</td>
<td>Normal</td>
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<tr>
<td>Meds</td>
<td>Diogxin, antiHTN, diuretics</td>
<td>Bronchodilators</td>
</tr>
<tr>
<td>Treatment</td>
<td>Oxygen, Med- neb, IV fluids</td>
<td>Oxygen, Med- neb Rx</td>
</tr>
</tbody>
</table>

Treatment summary
- Pulmonary Edema
  - OMI
  - MONA if approp.
  - Position of comfort
  - Nitroglycerin 0.4 mg SL per protocol
  - Morphine 2-10 mg Lasix per protocol (commonly 40 mg)
- Pneumonia
  - OMI
  - Limit IV fluids if hx of cardiac disease
  - CPAP if available

Medications for Pulmonary edema
- Nitroglycerine
- Morphine
- Lasix

Nitroglycerin
- Drug Class: Nitrate vasodilator
  - Relieves myocardial workload
  - Dilates the arterial and venous systems
    - Reduces preload to the already overworked ventricles
    - Reduces blood pressure to reduce afterload
  - Allows pressure and fluid to move into the venous system
  - Sublingual doses start at 0.4mg
Morphine Sulfate
- Drug Class: Narcotic Analgesic
  - Relieves myocardial workload as well
  - Dilates the venous and arterial systems
  - Reduces preload and afterload
  - May cause hypotension

Furosemide
- Class: Loop Diuretic
  - Moves sodium out of the blood vessels early in the kidney
  - Water follows sodium into the kidney tubules
  - The site pulls out potassium as well
  - Provides some vasodilation within 5 min.
  - Diuresis within 20-30 min.

Morphine Sulfate: Other Actions
- Mechanism of action
  - Binds to opiate receptors throughout the CNS
  - Slows respiratory rate at the medulla
  - Stimulates the nausea center in the brain

Furosemide Administration
- 20-40mg IVP over 1-2 minutes
- Double the dose if the patient is currently taking a diuretic
- Relief of symptoms should begin within 5 minutes
  - If no relief, consider BVM
SHOPS drugs – CHF patients
- Street drugs
- Herbal drugs
- OTC drugs
- Prescription drugs
- Sexual enhancement

Street drugs may contribute to CHF
- Cocaine
- Meth
- Inhaled solvents
- PCP

Herbal remedies
- Possibly helps
  - High-rite
  - Aqua-rite
  - L-arginine
  - Magnesium
  - Berberine
- Possibly hurts
  - St. Johns Wort
  - Ephedra
  - Ginkgo Biloba
  - Kava Kava
  - Licorice
  - Ginseng
  - Aconite
  - Alisma plantago
  - Bearberry Buchu
  - Couch grass
  - Dandelion
  - Horsetail rush
  - Juniper

Over-the-counter drugs (OTC)
- None found

Common Prescription medication for CHF/Pulmonary Edema
- (Calcium channel blocker)
  - Amiodarone
  - Norvasc
- Ace Inhibitors
  - Vasotec
  - Capoten
  - Lotensin
  - Accupril
  - Altace
- Angiotension II receptor blockers
  - Cozaar
  - Avapro
- Beta Blockers
  - Coreg

Sexual enhancement drugs
- Viagra
  - 24 hours
- Cialis
  - 36 hours
- Levitra