

# My Breath is Barely There!

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for

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# Objectives

- Define asthma
- Describe pathophysiology
- Identify asthma “triggers”
- Describe the assessment of the asthma patient
- Describe Signs and Symptoms
- Identify appropriate pre-hospital treatments

# Case 1

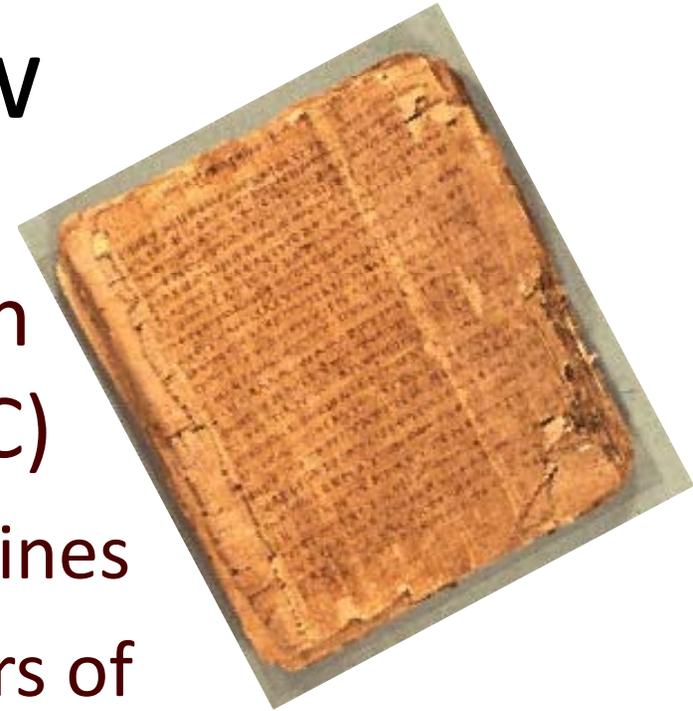
- 32 year old female
- Chief complaint of shortness of breath
- Assessment : audible expiratory wheezes, HR: 114, RR: 28, BP: 144/92, SAO<sub>2</sub>: 88%
- How severe an asthma exacerbation is this?
- What would be your treatment?

# Asthma

- A diffuse airway disease
- Result of partial or completely reversible bronchoconstriction
- Very prevalent medical condition worldwide
  - In US, 20 million reports of symptoms compatible with asthma
  - 4000 – 5000 deaths per year
  - Over 300 million people worldwide have asthma

# It's Not So New

- First written description found in the Ebers Papyrus (circa 1500 BC)
  - 110 page scroll of Egyptian medicines
  - Listed treatment as inhaling vapors of Henbane

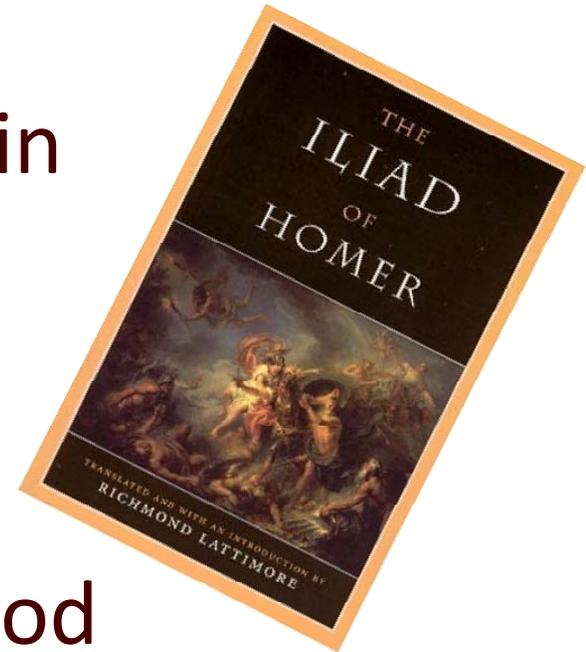


# It's Not So New

- Maimonides wrote a treatise on asthma
- Some of his findings include
  - No magic cure for asthma
  - Asthma often starts with a common cold during the rainy season
  - Air pollution in Cairo may in part be responsible
- Written in the 12<sup>th</sup> Century!

# It's Not So New

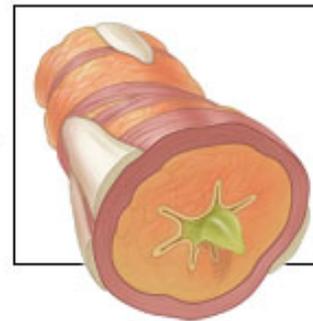
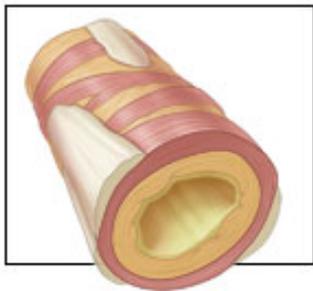
- Asthma, as a descriptive word for shortness of breath first appeared in the Iliad of Homer
- Early 1800's started to be understood as a medical disease explained through its pathology.
  - Thank you Paris Hospitals





# Pathophysiology

- Reduction in airway diameter
- Three major components
  - Airway inflammation
  - Intermittent airflow obstruction
  - Bronchial hyper responsiveness



# Inflammatory Response

- Inflammatory Cells
  - Mast Cells
  - Eosinophils
  - Macrophages
  - Activated T lymphocytes
    - Play an important role in regulation through the release of numerous cytokines

# Intermittent Airflow Obstruction

- Bronchi and bronchioles very responsive to irritants
  - Leads to bronchoconstriction, edema, increased secretion of mucous.
    - Mucous plugs
- May totally or partially block the airway

# How Dose this Present?

- Pulmonary Function Changes
  - Increased work of breathing
  - Abnormal distribution of pulmonary blood flow
  - Bronchospasm/Bronchoconstriction cause wheezing

They must be doing better, I can't hear anything?



# Air Trapping

- Air passes into the areas distal to the obstruction
- Exhalation is a passive process
  - Less force is available to move air out
  - Forced expiration often collapses the bronchial wall
  - Residual volume increases
  - Becomes harder and harder to inhale or cough to remove mucous.

# Proof This Stuff Makes Sense

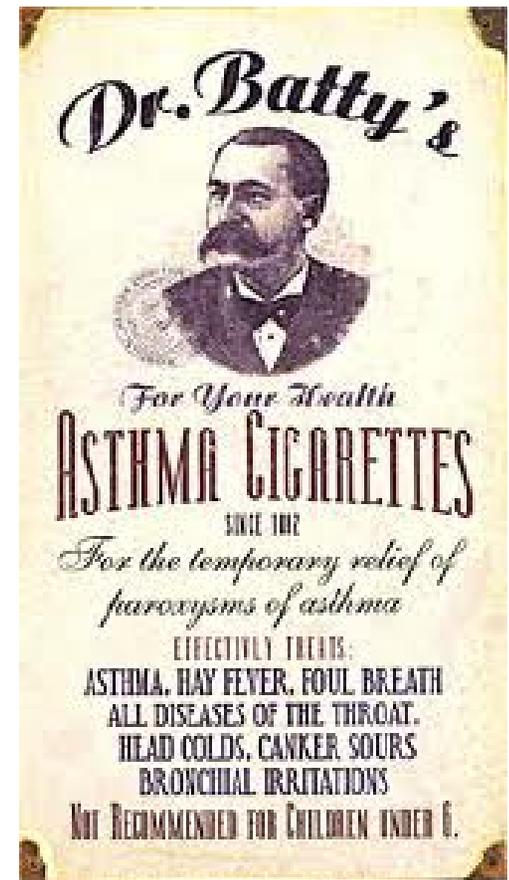
- Over time, asthma can damage tissues
- Autopsy findings in asthma fatalities
  - Increased smooth muscle mass in the airways
  - Increased wall thickness
  - Increased inflammation

# Types of Asthma

- Extrinsic
  - Immune response to inhaled irritants that the patient has an allergy to.
  - Onset of extrinsic asthma is usually in childhood or early adolescence.

# Types of Asthma

- Intrinsic
  - Response to stimuli other than allergies that initiate the attack
    - Infections
    - Cold air
    - Exertion
    - Medications
    - Stress
    - Cigarette smoke
    - Occupational exposure



# Occupational Asthma

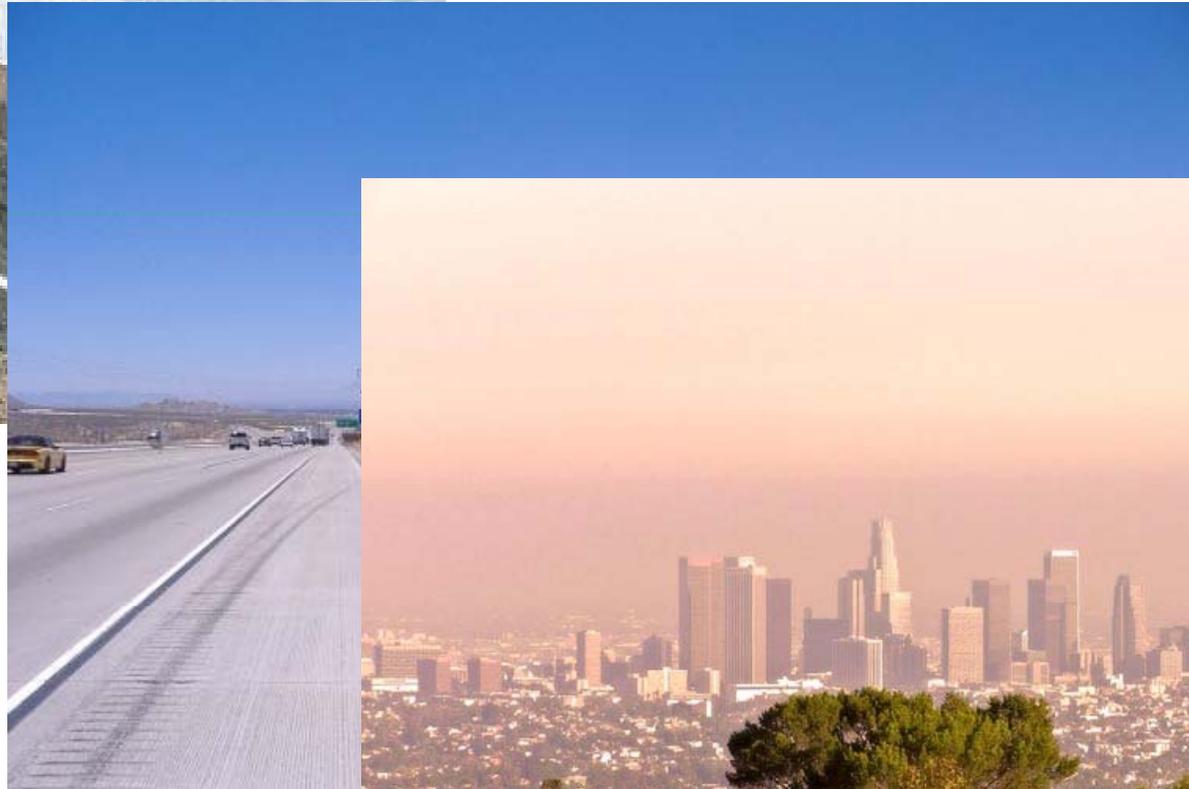
- Asthma as a result of workplace stimuli
  - Patients will often worsen in the workplace
- One of the most common occupational lung diseases in developed countries

# Asthma Triggers

- Viral URI's
- Smoking
- Non-compliance
- Emotional stress
- Weather changes
- Heavy allergen exposure
- Air pollution

# Air Pollution

- Remember Maimondies? Bet he was right!



# Case 2

- 28 year old female
  - Chief complaint of tightness in chest and difficulty breathing.
  - Assessment: Loud expiratory wheezes audible without auscultation, speaking single words only , dyspnea, pale, oxygen saturation is 67% on room air, HR – 128, RR – 28, labored
- How severe an asthma exacerbation is this?
- What would be your treatment?

# Case 2 Continued

- Patient administered 100% oxygen and provided albuterol/atrovent svn, x2 20 minutes apart.
- Follow up assessment reveals oxygen saturation is not improving, increased work of breathing, decreased lung sounds in all fields, alterations in mentation
- How severe an asthma exacerbation is this?
- What would be your treatment?

# Assessment

- Pretty obvious
  - Do they have an airway that is maintainable?
  - Is their breathing productive?
  - What is the pulse like?
  - Vital signs, to include pulse oximetry and ETCO<sub>2</sub>.
- **ASSESSMENT MUST BE CONTINUOUS**

# History

- You must know the history and medications of asthma patients.
- Most people with asthma are aware of their condition and can adequately self manage an attack.
- Usually on a regimen of medications to control various stages of an attack.

# Home Asthma Medications

- Albuterol
- Atrovent
- Xopenex
- Glucocorticosteroids
- Advair
- Pulmacort
- Singular
- Theophylline

# Home Remedies

- Steambaths
- Honey in a glass of water 3 times per day
- Garlic cloves boiled in milk once per day
- Ginger tea with garlic cloves
- Mustard oil and camphor rubbed on back
- Licorice root tea
- Dried grapes, soaked in milk overnight, then chew
- Chewing fennel
- Pomegranite

# Don't Forget These!

- Allergies
  - Prescription
  - OTC
  - Homeopathic
  - Illegal???
- Last oral intake
- Events leading up to the crisis

# Assesment



# Assessment Findings

- Generally dyspneic, scared, sweaty
  - If they are solemn, expect a crash!
- Tripoding
- May have a non-productive cough
  - What would we like to see?
- Tachycardic and tachypneic
- Wheezes
  - Not all that wheezes is asthma!

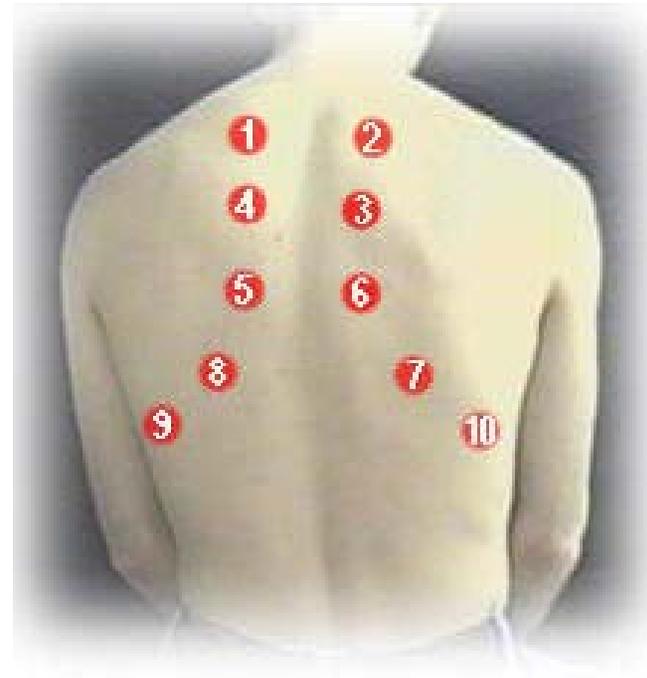
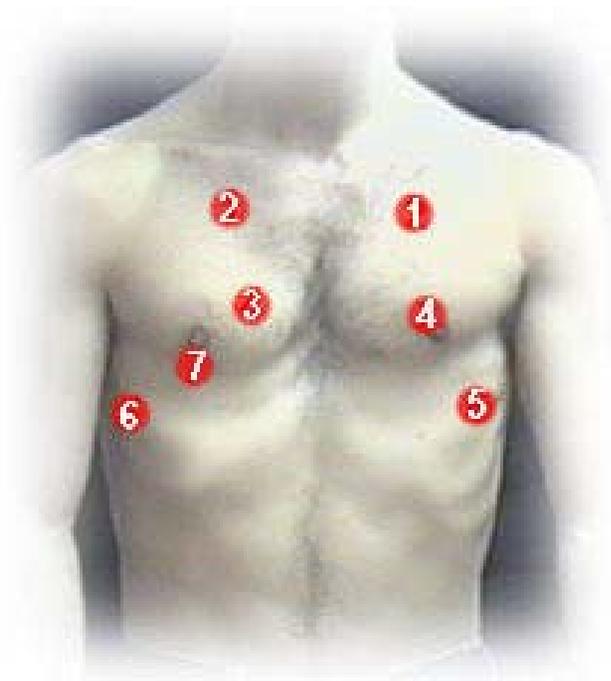
# Wheezing

- Are they wheezing on expiration, inspiration, or both?

# Lung Sound Assessment

- One of the most important and difficult skills you must master.
- You have to know:
  - Where to place the stethoscope
  - Identify various sounds
  - Know the potential problems the lung sounds indicate
  - How to properly address their presence in the field

# Lung Sound Assessment



# Lung Sound Assessment

- Normal

- 

- 

Wheezes



- 

Stridor

- 

- 

Rales

# Lung Sound Assessment

- Normal



Wheezes



Stridor



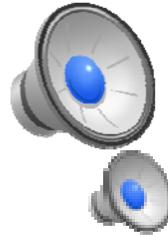
Rales

# Lung Sound Assessment

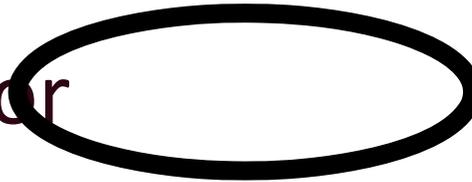
- Normal



- Wheezes



Stridor



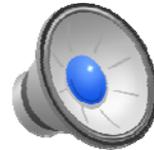
- Rales

# Lung Sound Assessment

- Normal

- 

- Wheezes



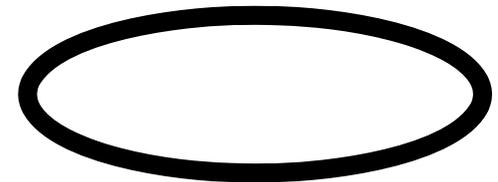
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Stridor

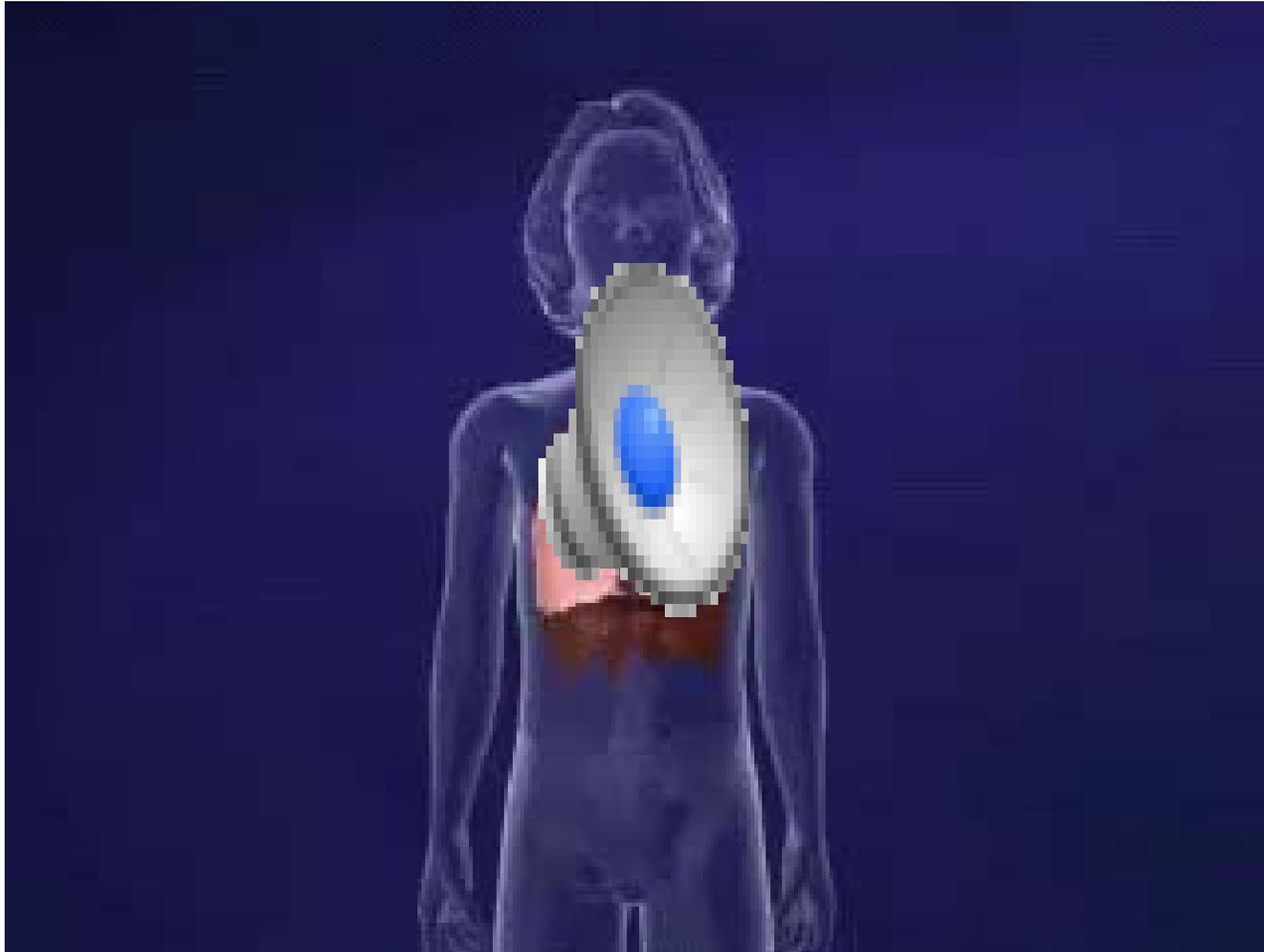
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Rales



# Accessory Muscle Use



# Accessory Muscle Use



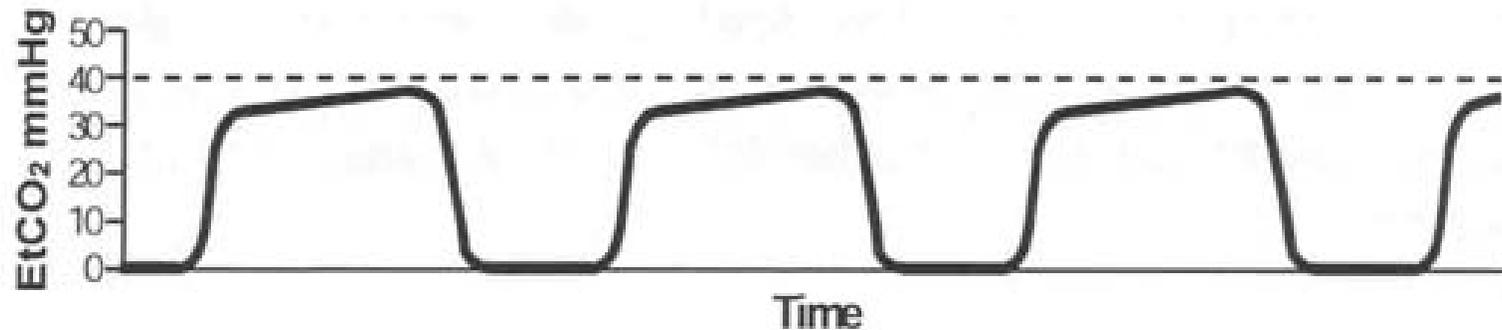
- May be obvious
- May be not so obvious
  - Put a hand on their abdomen

# Pulsus Paradoxus

- Refers to the loss or diminishing strength of the radial pulses on inhalation.
- Air trapping will cause an increase in the pressure inside the chest.
- Increased pressure on the vena cava reduces blood flow to the heart.
- May note this condition upon assessment of the patients blood pressure.

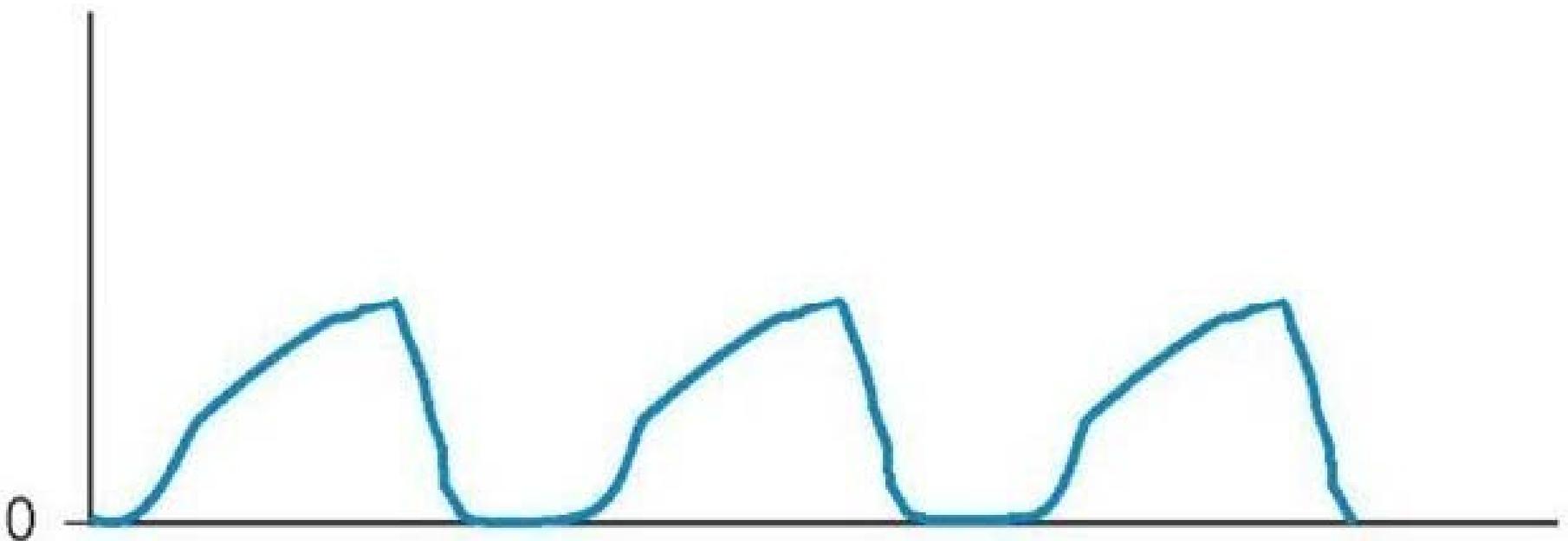
# Capnography

- Excellent assessment tool!
  - Instantaneous assessment of the patient



# Capnography in Asthma

- The expiratory plateau should be flat.
- Inflammation - will be squared
- Bronchospasm - will be curved



# Capnography in Asthma

- Valuable triage tool
  - Can measure severity
  - Can be used for trending.
- A square waveform does not indicate bronchospasm.
  - Carefully assess the side effects of a bronchodilator.

# Case 3

- 8 year old male
- Chief complaint is severe difficulty breathing
- EMS arrives and finds patient face down in the hallway of the residence
- Patient has a history of asthma and numerous allergies. Prescribed several MDI's and Epi-Pen.
- Patient is pulseless, no respirations, peripheral and central cyanosis noted.

# Case 3 continued

- Presenting rhythm is V-fib
  - 2 minutes of chest compressions performed
  - EMT-I crew is on call, performed shock with SAED.
    - After initial shock, patient converts to asystole
    - Requested Paramedic intercept
- What is the underlying cause?
- What would you do?

# Status Asthmaticus

- Progressive respiratory distress due to asthma where conventional therapy has failed.
- Essentially, any patient who is not responding to initial appropriate doses of inhaled bronchodilator agents can be classified.
- Life threat = aggressive treatment

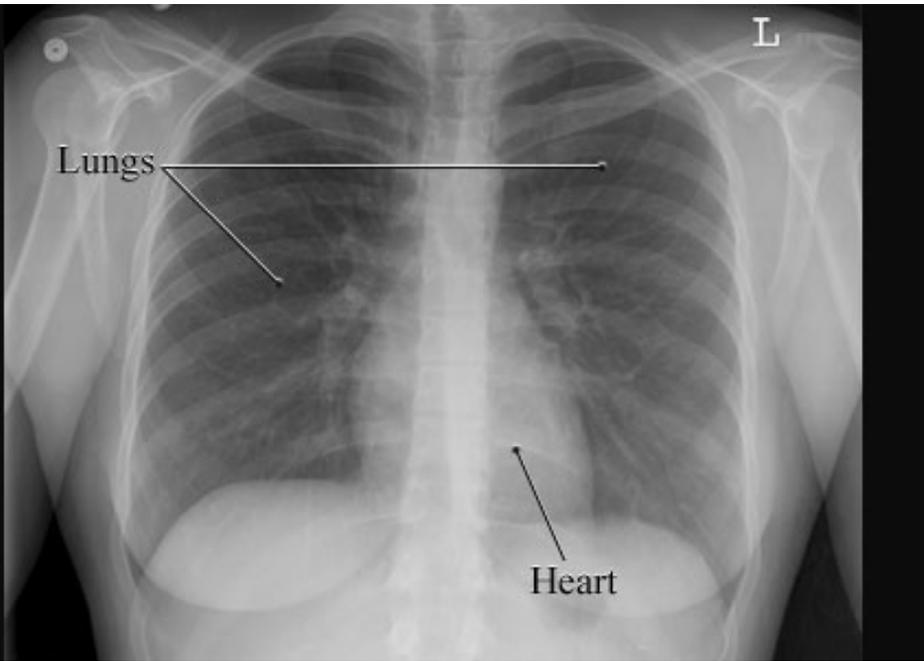
# Acid – Base Changes

- Initial hyperventilation causes increased CO<sub>2</sub> elimination.

# Extra Hospital Stuff

- ABG's
  - Might help
  - Supplemental oxygen will generally correct hypoxia
  - CO<sub>2</sub> might be elevated or decreased
    - A steadily rising PaCO<sub>2</sub> can indicate impending respiratory collapse.
  - Changes in pH

# Extra Hospital Stuff



# Airway

- Hopefully they are able to maintain it
- These patient may cough up mucus
  - This is a good thing
- Advise medical control of airway problem  
ASAP!

# Breathing

- These patients may already oxygen starved
  - Don't hold back?
  - Don't be afraid to assist them
- 
- **BUT WAIT!!!!**

# Alternative Therapy

- Continuous

Positive

Airway

Pressure

-

# Oxygen

- All oxygen should be humidified (if possible)
- Humidified oxygen will help to loosen mucous



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# Other Medications

- Albuterol
  - Bronchodilator
  - Adult dosage
    - 2.5 mg (0.5 ml of a 0.5% solution mixed with 2.5 ml of normal saline) via a SVN.
    - May give up to 5.0 mg
  - Pediatric dosage
    - 2.5 mg (0.5 ml of a 0.5% solution mixed with 2.5 ml of normal saline) via a SVN.

# Other Medications

- Ipratropium (Atrovent<sup>®</sup>)
  - Anticholinergic
  - Indicated for bronchial asthma and reversible bronchospasm in COPD
  - Dosage
    - Administer in conjunction with beta agonist therapy
    - 0.25 – 0.5 mg

# Corticosteroids

- Emerging trend in pre-hospital medicine
- Solumedrol or Prednisone added to the scope
- Not an immediate solution, but will help the patient later.
- 125mg IV solumedrol or 60 mg of Prednisone

# Corticosteroids

- Inhibit inflammation of the airway
- Blocks leukotriene synthesis
- Inhibit cytokine production
- Blocks the late response to inhaled allergens

# Prednisone

- **Contraindications**
  - Systemic fungal infections
  - Hypersensitivity
- **Interactions**
  - Additive hypokalemia with thiazides and loop diuretics.
  - May increase requirements for insulin or oral hypoglycemic agents in diabetics.
  - Phenyton, phenobarbital and rifampin may decrease effectiveness.

# Corticosteroids

- Why give it?
  - Early use often aborts exacerbation
  - Reduces likelihood of hospital admission
  - Reduces chances of relapse
  - Improves recovery rate

# Other Medications

- Epinephrine
  - Sympathomimetic
  - Indicated for severe bronchospasm, bronchospasms unresponsive to albuterol
  - Dosage
    - Adults: 0.3 mg 1:1,000 SQ or IM (if pre-filled device)
    - Adults: 0.3 mg 1:1,000 IV or 1 mg if severe or no response to SQ/IM
    - Pediatric: 0.01 mg/kg 1:1,000 SQ (max 0.3 mg/dose)

# Magnesium

- Bronchodilator
- Does not replace other medications
- 1 to 2 grams IV over 30 minutes

# Summary

- Assess
- Reassess
- Albuterol
- Ipratropium
- Corticosteroids
- Call Medical control for further options on long transport times

# Thank You!

Life is not measured by the number of breaths we take, but by the moments that take our breath away.