Pneumonia

- General term for several types of inflammation
- Unilateral/Bilateral/portion of lung
- Inflammation WITH infection
  - Most common cause of infectious death in US
  - 5th leading cause of death in US
- Bacterial
- Viral
- Other
  - Aspiration

Pneumonia S&S

- Vary
- Cough, fever, SOB, chills, sweating
- Chest pain, cyanosis
- Blood in sputum
Atypical (Walking) Pneumonia

- Marked abnormalities on chest x-ray
- But pt does not appear that ill
- Organisms
  - Legionella
  - Mycoplasma
  - Chlamydia

Bacterial pneumonia

- Pneumococci
- Staphylococci
- Group A hemolytic streptococci
- Haemophilus influenzae type B
- Kebisiella pneumoniae types 1 and 2

- Can be community-acquired
- Nosocomial

Viral pneumonia

- Organisms
  - Adeno viruses
  - Influenza viruses
  - Respiratory syncytial viruses
Other Pneumonia Etiology

- Aspiration
  - Liquids or other material into trachea
  - Serious swallowing problems
  - Elderly
  - Weak
  - Neurologic problems

Pneumonia Dx & Tx

- Diagnosis
  - H&P
  - Chest x-ray
  - ABGs
  - Bronchoscopy
  - Sputum/Blood cultures

- Treatment
  - Underlying cause
  - Antibiotics (bacterial)
  - Penicillin (pneumococcal)
  - Tetracycline
  - Erythromycin
  - Sulfonamides
  - Analgesics
  - O2
  - Bed rest, inc. fluids, high-calorie diet, postural drainage

Pneumonitis

- Lung Inflammation WITHOUT infection

- S&S
  - SOB
  - Dry cough
  - Chronic pneumonitis
    - Fatigue
    - Loss of appetite
    - Weight loss (unintentional)
    - Scarred tissue (fibrosis)

- Etiologies
  - Hypersensitivity/Chemical
  - Irritating substances inflame alveoli
    - Bird feathers/excrement
    - Dusts
    - Molds
      - Hot Tub lung, Farmer's lung
    - Chemicals
    - Chemotherapy/Radiotherapy
    - Medications – aspirin overdose
    - Humidifiers
**Pneumonitis Dx & Tx**

- **Diagnosis**
  - Imaging (x-ray/CT)
    - Through all 5 lobes
  - PFTs
  - Bronchoscopy w/lavage, bx

- **Treatment**
  - Avoid irritants
    - Mask/respiratory
    - Stopping hobby
  - Corticosteroids
  - O₂
  - Antibiotics
    - IF infection present

**Pneumothorax**

- **Collection of air in pleural cavity (between two layers)**
  - May cause collapsed lung

- **Spontaneous**
  - Air leaks from lung
    - Pulmonary disease
    - Tumor
    - Pulmonary tissue tear

- **Traumatic**
  - Air enters from outside body
    - GSW
    - Stabbing
    - Crushing injury
    - Rib fx

**Tension pneumothorax**

- **Particularly dangerous form**
- **Occurs when air escapes into the pleural cavity from a bronchus**
- **Air cannot regain entry into the bronchus**

- **Continuously increasing air pressure in the pleural cavity**
- **Causes progressive collapse of the lung tissue**
- **Mediastinal shift**
Pneumothorax S&S

- Depend on severity of lung collapse
- Complete collapse
  - Sudden, severe chest pain
  - Severe dyspnea
  - Symptoms of shock
    - Weak, shallow respirations
    - Sucking sounds at trauma site
    - Mediastinal shift to unaffected side (emergency)

Pneumothorax Dx & Tx

- **Diagnosis**
  - H&P
  - Chest x-ray
- **Treatment**
  - Emergency
    - Occlusive dressing over sucking chest wound
  - Thoracentesis
  - Oxygen tx
  - Analgesics

Pyothorax

- **DIAGNOSIS**
  - purulent pleuritis; Empyema thoracis
  - Pus collection in chest cavity
  - Due to
    - Ruptured lung abscess or ulcerated tumor
    - Consequence of pneumonia
  - Less common today due to antibiotics
- **S&S**
  - Coughing, dyspnea, unilateral chest pain
- **DX**
  - Thoracentesis and chest x-ray
  - Cultures to id organism
Elliptical fluid collection in major fissure
Fissure location supports empyema versus lung abscess.

http://radiology.med.sc.edu/empyema.htm

Respiratory Failure

• Impaired Gas Exchange
  – Too little O₂ in blood (Hypoxemic)
  – Too much CO₂ in blood (Hypercapnic)
  – OR both at same time


Respiratory Failure

• Acute
  – Short term
  – Can develop quickly
  – May require emergency tx

• Chronic
  – On-going
  – Develops more slowly
  – Lasts longer
Respiratory Failure S&S

- Shortness of breath (hypoxemia)
- Tachypnea (hypercapnea)
- Air hunger (hypoxemia)
  - feeling that can't breathe in enough air
- Cyanosis (hypoxemia)
- Confusion (hypercapnia)
- Sleepiness (hypoxemia)
- Arrhythmias (hypoxemia)

Respiratory Failure Dx & Tx

- Diagnosis
  - H&P
  - Pulse oximetry
  - ABGs
  - Chest x-ray (underlying condition)
  - EKG
- Treatment
  - Underlying condition
  - Acute
    - ICU
    - O2
      - Tracheostomy
      - Ventilator
  - Chronic
    - Home/LTC
    - Portable O2
    - CPAP/Rocking bed

SARS

- Severe Acute Respiratory Syndrome
- 2003 –first outbreak in China
- Corona virus mutation
- 8,098 people worldwide; 774 died
- US – 8 people w/infection
  - All had traveled outside US
- Airborne droplets; touching contaminated surfaces and then face/eyes

http://udel.edu/~cmcmill/corona_virus.html
Tuberculosis (A15-18)

- Acute, subacute, or chronic inflammation
- *Mycobacterium tuberculosis* infection
  - Human-ONLY infection – 5,000+ years
  - Tubercle bacillus; Spread by inhaling droplets
  - Can remain suspended in air for many hours
  - Dry form can survive for months (if no sunlight)
  - Primary lesion in lung; Any body tissue can be affected
- M. bovis in cattle/buffalo/deer – we can get
- M. avium in birds – we can get

Pulmonary TB

- Tubercle
  - any small, rounded mass produced by infection with *Mycobacterium tuberculosis*
- TB can go to other/multiple body areas
  - almost any part of the body
  - bone marrow, bones, CNS, joints, muscles, lymphatic system, urinary tract
- 1/3 of humans have TB infection!
- 2 million deaths every year

TB Stages and S&S

- Latent stage
  - Macrophages wall-off
  - Positive PPD test
  - No S&S
  - Can’t transmit to others
  - 10% will progress to active stage
  - More if immuno-compromised
    - HIV
    - Elderly, infants
  - Meds can prevent active stage - isoniazid (INH)
- Active stage
  - Can transmit
  - Expelled saliva
    - cough, sneeze, talk, spit
  - S&S
    - Bad cough 3+ weeks
    - Weight loss
    - Coughing up blood/mucus
    - Weakness or fatigue
    - Night sweats
    - Fever and chills
TB Diagnosis

- H&P
- Chest x-ray
- Mantoux (PPD) test
  - False positive
  - False negative
- Acid-fast bacilli (AFB) smear
- \( + \) \( M. \) \textit{tuberculosis} culture
  - confirms TB Dx

Active TB Medications

- 4 medications at same time
  - Nydrazid® or INH (isoniazid)
  - Rifadin® (rifampin)
  - Myambutol® (ethambutol)
  - pyrazinamide
- Many other meds/combinations due to multidrug-resistant TB (MDR-TB) strains

TB in Montana

- 6 new cases in MT in 2010
- State Tuberculosis Sanitarium at Galen
  - 1913-1993
  - Relatively close to Butte
    - Death rate from TB in Butte was 2x national average
URIs
• Univ. of Maryland Medical Center website
• Common cold
  – http://www.umm.edu/ency/article/000678.htm
• Rhinitis
  – http://www.umm.edu/allergies/rhinitis.htm
• Sinusitis
  – http://www.umm.edu/patiented/articles/sinusitis_000062.htm
• Pharyngitis
  – http://www.umm.edu/ency/article/000655.htm
• Laryngitis
  – http://www.umm.edu/altmed/articles/laryngitis-000099.htm

Aging and Respiratory System
• Increased risks in elderly
• Less effective immune system
• Loss of elasticity & weaker muscles
• Less efficient
• Less reserve
• Changes in posture
• = Lower tolerance for exercise

Review of ICD-10-CM Ch10
• Organization (acute vs chronic; upper/lower)
• Guidelines (minimal)
  – COPD and Asthma
  – Acute Respiratory Failure
  – Influenza
  – Ventilator associated pneumonia (VAP)
• Excludes1 and Excludes2 notes
• Combination and Multiple coding (External causes)
ICD-10-CM Organization

- Chapter
- Blocks
  - (J00-J06 Acute URIs)
- Category –
  - 3 alphanumeric characters (J01)
- Subcategory – 4 or 5 alphanumeric characters
  - Decimal AFTER 1st 3 characters
- Codes – 3-7 characters
  - X = 5th/6th digit placeholders for future expansion
  - T36.0x1 = Poisoning by, adverse effect of and underdosing of penicillins
- 7th character
  - A initial encounter
  - D subsequent encounter
  - S sequela

Chapter 10 Blocks

- J00-J06 Acute URIs
- J09-J18 Flu and pneumonia
- J20-22 Other acute lower resp. inf.
- J30-J39 Other diseases of URT
- J40-47 Chronic LR diseases
- J60-J70 Lung diseases due to external agents
- J80-84 Other resp. dis. princ. Affecting interstitium
- J85-J86 Suppurative/ necrotic conditions of LRT
- J90-J94 Other disease of pleura
- J95 Intraoperative / postprocedural complications NEC
- J96-99 Other respiratory diseases

Chapter 10 Guidelines

- COPD and Asthma
  - With and without acute exacerbation
  - Definition of acute exacerbation
- Acute Respiratory Failure
  - Principal dx sequencing, As 2ndary dx
  - Sequencing of ARF & another acute condition
- Influenza – avian/H1N1 code only confirmed cases (exc. Inpatient guideline)
- VAP (2011)
  - Dr. documentation, sequencing
Acute Exacerbation (ICD-10-CM)

- A worsening or a decompensation of a chronic condition
- NOT equivalent to an infection superimposed on a chronic condition
- Exacerbation may be triggered by an infection
- Increase in seriousness of a disease or disorder, marked by greater intensity in S&S
  - Mosby's Medical Dictionary, 8th ed.

Chapter 10 Notes

- Location of notes
- Beginning of chapter
  - Multiple sites not specifically indexed, code to lower site
  - Use add'l code for exposure to/use of tobacco smoke
- Excludes2 note (multiple codes)
  - Perinatal, infectious disease, injury, etc.

ICD-10- CM Excludes Notes

- Two types
  - Excludes1 – “pure” - NOT coded here
    - Indicates MUTUALLY EXCLUSIVE codes
    - One code OR the other, never both
  - Excludes2 – Not included here
    - Permitted assignment of two+ codes
    - Assign more than one code IF documentation
Ch 10 combination codes

- Many very specific codes that include
  - Location
    - J01.00 Acute maxillary sinusitis, unspec.
    - J43.1 Panlobar emphysema
  - Etiology
    - J03.011 Acute recurrent strep tonsillitis
    - J61 Pneumoconiosis due to asbestos ...
  - Stages
    - J45.31 Mild persistent asthma with (acute) exacerbation
  - W/Wo
    - J04.10/11 Acute tracheitis w/o, w obstruction

Ch 10 multiple coding

- Code also any assoc. FB in respiratory tract
- Code also type of asthma (COPD)

- Code first any associated
  - Lung abscess (J85.1)
  - Therapy (T45.1x- Y84.2))

Chapter 10 Multiple coding

- Code first any underlying disease
  - Rheumatic fever (100)
  - Underlying neoplasm
  - Appropriate code from T41

- Code first
  - (T51-T65) to identify cause
  - (T36-T50 w 7th char. S) to id drug
  - (T51-T65) to identify external agent
  - (T51-T65) to identify substance
Chapter 10 Multiple coding

• Use additional code to id
  – Drug (T36-T50)
  – External cause (W88-W90, X39.0-)
  – Infectious agent (B95-B97)
  – Virus (flu) (B97)
  – Type of pneumonia (B95-97)
  – Disorder

ICD-10-CM Coding Example

• D/C Dx: Moderate persistent asthma with status asthmaticus, COPD, acute bronchitis
• Pt w/gradual increase in SOB, unresponsive to home nebulizer. Pt had malaise, coughing, fever. In ER, he rec. respiratory tx, but did not improve. At admission, theophylline level was 5.9. Chest x-ray - no infiltrates. Bolused with IV steroids and rec. frequent RT. IV antibiotics for acute bronchitis.
• IV aminophylline boluses & drip increased theophylline to therapeutic range.
• Ventolin tx decreased to q 4 hr. and steroids rapidly tapered back to 10 mg of Prednisone as he improved

Coding Example, cont.

• J44.0 Disease, lung, obstructive (chronic), with acute, bronchitis
  – Excludes1 chronic bronchitis
  – Code also type of asthma, if applicable
• J45.42 Asthma, moderate persistent, with, status asthmaticus
  – Excludes2 asthma with COPD
• J20.9 Bronchitis, acute or subacute
  – Excludes2 acute bronchitis with COPD
1. Which feature is found only in the left lung?
   - Cardiac notch
   - Horizontal fissure
   - Oblique fissure
   - Superior lobar bronchus
   - Three lobes

2. Which part of the left lung might partially fill the costomediastinal recess in full inspiration?
   - Apex
   - Cupola
   - Hilum
   - Lingula
   - Middle lobe
3. The oblique fissure of the right lung separates which structures?
   - Lower lobe from lingula
   - Lower lobe from upper lobe only
   - Lower lobe from both upper & middle lobes
   - Lower lobe from middle lobe only
   - Upper from middle lobe

4. A 4-year-old girl is coughing, and mother states she was playing with some beads and had apparently aspirated one. Where would it most likely be?
   - Apicoposterior segmental bronchus of L lung
   - Left main bronchus
   - Lingular segment of left lung
   - Right main bronchus
   - Terminal bronchiole of right lung, lower lobe

5. Which statement is true about the right lung?
   - It is slightly smaller than the left lung
   - It has a lingular segmental bronchus
   - It occupies the rightmost portion of mediastinum
   - Its upper lobar bronchus lies behind and above the right pulmonary artery
   - It has the right phrenic nerve passing posterior to the lung root
6. A 10-y-o boy had a tonsillectomy. At home he lay supine in bed for 2 weeks, developing a fever, chest pain, & cough. He returned to the hospital and was diagnosed w/R lung pneumonia due to aspiration during tonsillectomy. In which broncho-pulmonary segment of the lung would fluid (pus) most likely accumulate by the force of gravity?

- Anterior basal segment--inferior lobe
- Anterior segment--superior lobe
- Lateral segment--middle lobe
- Superior segment--inferior lobe
- Superior lingual segment--lingula

7. You are observing a doctor perform a bronchoscopy. As he passes the scope down the trachea, a cartilagenous structure is seen separating the R and L main stem bronchi. He asks what it is called. You reply that it really does look like a ship's keel and that it is called the

- Carina
- Cricoid cartilage
- Costal cartilage
- Pulmonary ligament
- Tracheal ring

8. Because of its angle with the trachea and size of the main bronchus, a bronchoscope would pass more readily into which lung?

- Left
- Right
9. How do the lungs stay inflated?
   – Each lung is ribbed with cartilage to prevent collapse on exhalation
   – The lungs are tethered to the ribcage with a network of connective tissue
   – The lungs rely on a vacuum within the chest, maintained by the diaphragm

10. Our breathing is controlled by the part of the brain called the
    cerebrum
    medulla oblongata
    spinal cord

11. Which of these structures has NO cartilage around it?
    – primary bronchus
    – secondary bronchus
    – terminal bronchiole
    – larynx
    – trachea
12. If a person's vital capacity is 4000mL, and her expiratory reserve volume is 1000mL and her inspiratory reserve volume is 2500mL, then her tidal volume is

- 3500mL
- 3000mL
- 1500mL
- 1000mL
- 500mL

13. A segment of lung tissue that is bounded by connective tissue partitions and supplied by a single bronchiole is called

- a lobe.
- an alveolar sac.
- an alveolar duct.
- a lobule.

14. The mucous membrane lining the nasal cavity and upper pharynx has a protective function that relates to which of the following organ systems?

- nervous system
- endocrine system
- lymphoid system
- integumentary system
15. Activity of which of the following organ systems generates carbon dioxide?

- muscular system
- nervous system
- skeletal system
- endocrine system

General Resources


ICD 10 CM

- 2011 release of ICD 10 CM http://www.cdc.gov/nchs/icd/icd10cm.htm
  - Preface [PDF - 93 KB]
  - ICD-10-CM Guidelines [PDF - 494 KB]
  - ICD-10-CM PDF Format
  - ICD-10-CM XML Format
  - ICD-10-CM 2010 to 2011 Addenda
  - ICD-10-CM List of codes and Descriptions
  - General Equivalence Mapping Files
### Asthma Resources

- **Asthma.** Interactive tutorial. MedlinePlus.  
- **Asthma.** CDC.  
  [http://www.cdc.gov/asthma/default.htm](http://www.cdc.gov/asthma/default.htm)
- **Subbarao, P. et.al.** Asthma: epidemiology, etiology and risk factors. CMAJ.  
  [http://www.cmaj.ca/cgi/content/full/181/9/E181](http://www.cmaj.ca/cgi/content/full/181/9/E181)
- **S. Agarwal, MD, S. Kache, MD.** Status Asthmaticus.  

### Resources

- **Bronchiectasis.** National Heart Lung and Blood Institute.  
- **Coughing.** MedlinePlus. Video.  
- **Evaluation of the Patient with Chronic Cough - May 1, 2004**  
- **Breath sounds.** MedlinePlus  
- **Costochondritis.** Mayo Clinic  
- **LungLab Tour.** Lawrence Berkeley National Laboratory.  
Resources

• Pneumonitis. Mayo Clinic.
  – http://www.mayoclinic.com/health/pneumonitis/DS00962
• Severe Acute Respiratory Syndrome (SARS). Fact Sheet. US CDC.
  – http://www.cdc.gov/ncidod/sars/factsheet.htm

Hanta Resources

• Hanta virus (ppt). Center for Food Security and Public Health. Iowa State University.
• Hanta virus Fact Sheet. Washington State Dept. of Health.

TB Resource

• Tuberculosis. Natural Standard Research Collaboration. 2009?
  – http://www.righthealth.com/topic/Tuberculosis/overview/NaturalStandard2007did=NaturalStandard_9963952962731a4165257f53dc080d64&section=Full_Article
Questions ???

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Thank You!