Chronic Diseases of the Elderly

- homeostenosis = gradual declining changes in the functional capacity of body systems due to biological aging
  - begins in 3rd decade
  - gradual and linear downward slope
  - rate of organ decline is variable
  - environmental factors
  - diet
  - heredity
  - habits
  - disease

- chronic =
  - chronic diseases of heart & lungs account for a major portion of deaths in later life

- HEART DISEASE
Heart Disease
- include disorders of the heart & vascular system
- like other muscles – heart muscle develops increasing amounts of __________________________
- also is a gradual sclerosis & thickening of heart valves
  - mitral valve becomes __________________________
- decline in cardiac reserves
- fibrosis of muscle and conduction system → __________________________
- vascular system → atherosclerotic → hypertension, coronary artery occlusion
  - many feel ________ is more important than aging in this process

Coronary Artery Disease
- ischemia = inadequate flow of oxygenated blood to any body part
- obstruction or progressive narrowing of coronary arteries

Coronary Artery Disease
- ________
Coronary Heart Disease

- 2 major contributing factors
  - accumulation of fat, cholesterol, fibrous connective tissue in the walls of the arteries → progressive narrowing
  - can also be caused by thrombosis or clotting
  - not necessarily age-related

- thickening & hardening of arterial walls → loss of elasticity → ischemia
  - age-related

- both develop gradually

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Coronary Heart Disease

- angina pectoris
  - = __________________________
  - results from
    - myocardial ischemia
    - aortic stenosis
    - pulmonary stenosis

- treatment
  - = _____________
    - vasodilate
  - _____________
    - reduce HR, contractility, BP → decrease cardiac workload → reduce oxygen requirement

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CONGESTIVE HEART FAILURE
Congestive Heart Failure

- variety of conditions
- 1 cause of decreased cardiac output
- chronic or acute
- most common causes in elderly
  - left ventricular failure
  - right ventricular failure
  - left & right ventricular failure
  - hypertension
  - cardiomyopathy
  - valve disease
  - ischemic heart disease

Left Ventricular Failure

- seriously reduces
- \[ \text{LV} \rightarrow \text{PV pressure} \rightarrow \text{PCP} \rightarrow \text{pulmonary congestion} \rightarrow \text{stimulation of the J receptors in the interstitium (dyspnea, rapid, shallow breathing)} \rightarrow \text{pulmonary edema} \]
Left Ventricular Failure

- 1st symptom: __________________________
  - fatigue, weakness, fainting, dyspnea at rest, paroxysmal nocturnal dyspnea, orthopnea

- may also present with: __________________________
  - thought to result from the decrease in circulation ▸ delays normal transmission of messages from chemoreceptors in the brain

  Arrow

Left Ventricular Failure

- treatment
  - mild blood thinner ▸ (Lanoxin) ▸ increases contractility**
  - (nitroglycerin, isosorbide) ▸ vasodilator ▸ reduces cardiac work
  - (propranolol, Lopressor, Toprol, Coreg) ▸ block action of adrenalin, epinephrine ▸ reduces cardiac work
  - (Capoten, Prinivil, Lisinopril, Vasotec) ▸ prevents formation of a vasoconstricting hormone ▸ reduces cardiac work
  - (furosemide) ▸ helps body excrete excessive fluid and salts ▸ reduces blood volume ▸ reduces cardiac work

Right Ventricular Failure

- also a __________________________
  - fluid accumulates upstream ▸ edema in neck, liver, extremities
Right Ventricular Failure

- symptoms
  - distended neck veins, pitting extremity edema
  - swelling of organs, esp. liver, kidneys, GI tract to the point of abdominal distention
  - on lower extremities

- causes
  - left heart failure
  - pulmonary disease
  - pulmonary hypertension

Right Ventricular Failure

- treatment

  - correction of hypoxemia: eliminates or reduces pulmonary vasoconstriction which reduces cardiac work

Pulmonary Diseases

- several mechanisms
  - 1 – chronic hypoxia

Pulmonary Diseases

- 2 - polycythemia

chronic hypoxia → production of more RBC → polycythemia → increased blood viscosity

- 3 – pulmonary embolism

PTE → hypoxia → pulmonary vasoconstriction → elevated pulmonary pressures

- 3 – emphysema

emphysema → destruction of alveolar tissue and capillary bed → reduced surface area for gas exchange
Pulmonary Diseases

- result

- destruction of
  - alveolar tissue
  - capillary bed

- hypoxia-induced pulmonary vasoconstriction

- increased blood viscosity

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CEREBRAL VASCULAR ACCIDENT

Cerebrovascular Disease

- cerebrovascular includes disorders of cerebral blood vessels
- 3rd leading cause of death in U.S.
- most common degenerative disease of CNS = ___________
  - problem is not the mortality rate, but rather the disability rate
  - 1 of the causes of dementia
  - 1 of the most frequent causes of long-term institutionalization
CVA (ABI)
- disruption of blood flow through 1 or more vessels in the brain
- elderly are at risk due to
  - hypertension
  - atherosclerosis
  - heart disease
- smoking, obesity, diabetes are also risk factors
- 3 causes
  - __________________________
  - __________________________
  - __________________________

Cerebral Thrombosis
- most frequent cause of CVA
- usually has a gradual (hours) onset of symptoms
  - faintness
  - dizziness
  - headache
  - weakness
- main culprit = atherosclerosis → narrowing of vascular lumen → a thrombus forms
- produces edema & ischemia of surrounding brain tissue due to lack of

Cerebral Embolism
- clot that forms elsewhere in the body before travelling through the blood vessels and lodging in the brain
  - air bubble
  - blood (thrombus)
  - fat
  - tissue
- sudden onset
- 2nd most common cause CVA
- highest risk factor = heart disease
  - recent MI
  - valve disease or dysfunction
Cerebral Hemorrhage

- = ________ within the brain
- weak spot in vessel
- more common after age 50 yr
- risk factors
  - hypertension
  - atherosclerosis
  - aneurysm
- occur most often in day when person is ________
- cause more damage & slower recovery

Transient Ischemic Attack

- common
- “little” ________ lasting from seconds to hours
- mild form of obstruction due to spasm-like narrowing of vessels
  - fainting
  - dizziness
  - weakness
  - numbness
  - double vision
  - slurred speech
- may be a precursor to __________________________
Prevention
- preferable to treatment
- control or eliminate risk factors
- medical management of chronic conditions
- __________________________

Treatment
- determine cause
- occlusion
  - thrombectomy
  - embolectomy
  - angioplasty & stenting
  - thrombolysis "clot-busting"
  - tissue plasminogen activator (tPA)
    - must be administered within 3 hours
  - prevent further thrombi
    - Coumadin, Plavix
- hemorrhage
  - craniotomy

Rehabilitation
- prognosis depends on __________________________
- goal = return patient to a state as normal as possible
- respiratory care is critical
  - airway patency
  - adequate oxygenation
  - oral care
  - prevention of aspiration
- can be in
  - rehab hospital
  - subacute care facility
  - skilled nursing facility
  - includes RTs, OTs, PTs, Speech Therapists, RNs, Dieticians
  - if return to a functional state is not possible à palliative care
CHRONIC OBSTRUCTIVE PULMONARY DISEASE

COPD
- growth & development of resp system ceases
- peak performance on PFTs between 20-25 yr
- then is slow, progressive decline due to:
  - loss of elastic recoil
  - loss of alveolar surface area
  - increased RV
  - increased air trapping
  - decreased support of small airways
  - decreased resp muscle strength

Emphysema
- characterized by abnormal anatomy of the terminal airways
  - destruction of alveolar septa
  - destruction of respiratory bronchiole support
  - elastase (protease that breaks down elastin)
  - alpha-1 antiprotease (anti-elastase)
Emphysema
- rare in people under 30 yr
- over age 50 yr (on autopsy)
  - 65% of men
  - 15% of women
- 4th leading cause of death in U.S.

Emphysema
- causes
  - heredity
  - alpha-1-protease (alpha 1-antitrypsin) deficiency
  - most common inherited disorders among white persons
  - 1-3% of patients with diagnosed COPD
  - air pollution

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Chronic Bronchitis

- characterized by excessive ___________
- productive cough for at least 3 consecutive months for 2 successive years
- associated with tobacco smoking & age
- tend not to seek medical help because morning cough & sputum production does not interfere with normal lives
- first symptom — ___________
  - most folks then adjust activities

COPD Treatment & Prevention

- prevention, prevention, prevention
- ___________ is the single most important therapy to improve survival
- annual (2004) cost for treatment of COPD in U.S. = $37.2 billion
COPD Treatment & Prevention
- Older patients present special challenges to HCG
  - Compromised immune systems
  - Poor eyesight & hearing
  - Slower responses
  - Memory loss
  - Problems with mobility
- Goal is _____________________________ (where they don’t do well)
- Elderly do not respond as well to immunizations as younger people

Chronic Asthma
- U.S. population in 2006: 299,300,00
  - 34,000,00 have asthma (11.1%)
  - 2,500,00 are over 65 yr old (7.3%)
- ______ seems to be common
  - Diagnostic testing should include: (to R/O CHF, PE, GI reflux)
    - PFT
    - Radiography
    - If looks normal for degree of impairment + no emphysematous chgs noted
      → consider asthma
    - ABGs
    - CBC
    - If shows eosinophilia → consider asthma
    - Also consider asthma if →
      - Patient has lots of acute allergies
      - Air flow obstruction is episodic

Chronic Asthma
- Pulmonary function studies
  - Test results vary from patient to patient & with same patient
  - If obstruction (measured with PEF2) is present
    - > 215% improvement after bronchodilator → asthma
    - Little improvement after bronchodilator
    - Send patient home for 2-week inhaled bronchodilator + steroid trial
    - If > 215% improvement seen after 2 weeks → asthma
Chronic Asthma

- Management based on _____________________________
  - should be informed that asthma is a very serious health problem
  - evaluated for coexisting problems that may cause complications
  - heart disease
  - hypertension
  - cataracts & glaucoma
  - diabetes
  - aspirin & NSAIDS (nonsteroidal anti-inflammatory)
  - chronic sinusitis, environmental irritants can aggravate symptoms

- every asthmatic must
  - recognize asthma triggers
  - know early warning signs (PEFR)
  - be educated about meds, delivery systems

Bronchiectasis

- irreversible dilation & destruction of ________________
  - inflammatory processes
  - localized infections
- → loss of defense mechanism (cilia)
  - decreases mobility of secretions → ________________
    - Staphylococcus aureus & Pseudomonas

- consequence of recurring pulmonary infections
  - abnormal immune systems
  - defective leukocyte function
  - ciliary dyskinesia (immotile cilia syndrome)
  - TB
  - cystic fibrosis (1/2 of today's bronchiectasis cases)

Bronchiectasis

- onset mainly in childhood
- with improved therapy and antibiotics → living into 60's and beyond
- primary cause of death = ________________

- treatment
  - similar to other COPD: aggressive CPT + antibiotics + surgical resection if localized
Restrictive Lung Diseases

- small, stiff lungs
  - reduced lung volumes, capacities
  - decreased lung compliance
- gas exchange abnormalities at alveolar level
- restrictive disorders
  - pulmonary interstitial disease
  - pleural effusion
  - pneumothorax
  - cardiogenic pulmonary edema
  - noncardiogenic pulmonary edema (ARDS)
  - pneumonia
  - pulmonary embolism
  - most other pulmonary problem that isn’t CBABE

Interstitial Lung Disease

- characterized by excessive tissue formation during healing process of chronic or acute lung injury
- if inflammation is extensive – results in
  - fibrosis
  - granulomas
  - nodular inflammatory lesions & cavitation
- although no ILD affects only the elderly, they are common in later life
Interstitial Lung Disease

- common in all ILD is
  - _____________________
  - _____________________
- diagnosis
  - CXR
  - other: bilateral densities with linear & small nodular markings
  - signs & symptoms
    - fatigue, dyspnea on exertion, chronic nonproductive cough, clubbing, sharp crackles to lungs
  - PFT
    - reduced volumes & capacities
  - Hx & physical
    - occupational Hx

Interstitial Lung Disease

- Arthritis
  - rheumatoid arthritis primarily an inflammatory joint disease but may involve lungs
  - usually mild, requiring no ______________
- Idiopathic Pulmonary Fibrosis
  - unknown etiology
  - usually presents ages ___________________
  - poor prognosis
- Sarcoidosis
  - multisystem, chronic, progressive granulomatous disease
  - may affect any part of body
  - usually Dx in younger people

Interstitial Lung Disease

- Drug-Induced Interstitial Lung Disease
  - may be caused by
    - radiation therapy for tumors of the breast, lung, thorax
    - anticancer agents (e.g. Bleomycin, busulfan)
- Thoracoskeletal factors
  - kyphosis, kyphoscoliosis
  - x-ray
  - osteoporosis
  - irrad therapy
Interstitial Lung Disease

- Neurologic-Neuromuscular Restrictions
  - paraplegia, quadriplegia, hemiplegia
  - stroke, polio

- Abdominal Restrictive Diseases
  - result of limited diaphragmatic excursion due to over-distended or large abdomen
  - obesity
  - ascites

Interstitial Lung Disease

- Therapy
  - complicated by high % of patients having other comorbid conditions
  - younger patient: anti-inflammatory agents (corticosteroids)
  - older patient: corticosteroids may aggravate other nonpulmonary-related diseases
  - dyspnea may be due to
    - diffusion defect
    - comorbid condition, as CHF
    - dust
  - in general – management is directed toward the process or at the component that results in limited lung expansion

CANCER
Cancer

- 2nd leading cause of death in US & among elderly
  - however - leading ______________________ cause of death
- very few types that are not more prevalent as age increases

- abnormal tissue growth or uncontrolled growth & spread of cells
  - human fibroblasts genetically programmed to double 50 times (Hayflick Limit)
  - malignant growths (tumors, neoplasms) continue to double past limit → rapidly take over their host

- Cells regularly regenerate
- Carcinogens damage genetic information
- Altered cells transmit incorrect genetic info
- Altered cells reproduce in abnormal, destructive ways
- Cells become altered
Lung Cancer Facts - 2009

- 15% of diagnosed cancers
- 28% of all cancer deaths
- 90% caused by smoking
- 9% caused by second-hand smoke
- 1-year survival rate = ________________
- 5-year survival rate = ________________
  - 50% for cases detected when the disease is still localized, but only 16% of lung cancers are diagnosed this early

Lung Cancer Treatment

- 3 types
  - surgery
  - radiation
  - chemotherapy
- most common symptoms = cough, hemoptysis, recurrent pneumonias
- ________________ cell carcinoma (non-small cell)
  - most common in elderly patients
  - more localized so more treatable
  - resection + chemo

- ________________ carcinoma
  - not as common in the elderly
  - responds fairly well to radiation
  - chemo risky among older patient due to age-related physiological changes & resulting pharmacodynamics
Lung Cancer Treatment

- new therapies –
  - bevacizumab (Avastin)
  - not chemotherapy – works differently
  - a tumor-starving therapy as it starves the tumor of what it needs to grow and spread
  - works by blocking a protein called VEGF (produced by normal cells and is needed for the formation of blood vessels)
  - tumors rely on blood vessels to get the nutrients and oxygen they need to survive so by blocking VEGF the CA is starved of its food supply
  - erlotinib (Tarceva)
  - targets a protein, EGFR, which helps cells divide & is found at abnormally high levels on CA cells
  - interferes with EGFR to keep tumors from growing
  - neither extends life – just the quality

Lung Cancer Treatment

- as RTs
  - mobilize secretions
  - retained secretions
  - hyperinflation therapy
  - atelectasis
  - alveolar consolidation
  - oxygen therapy
  - all are only ___________________
  - Dx in older patient may be difficult do to comorbidity which may mask symptoms
  - symptoms may be confused with aging process & accepted as normal
  - fear of CA may keep patient from seeking help

Tuberculosis

- once thought to be eradicated in US
- caused by Mycobacterium tuberculosis
- thrives in ______-enriched environment
- spread by direct droplet nuclei

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<th></th>
<th>Infections</th>
<th>Active</th>
<th>Deaths</th>
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<td>World Wide</td>
<td>1 in 3 people</td>
<td>13.7 million</td>
<td>1.8 million</td>
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<td></td>
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<tr>
<td></td>
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<td>1/100,000</td>
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CDC – Centers for Disease Control and Prevention
**Tuberculosis**

- once positive does not mean always positive!
- in a survey of elderly adults
  - most were TB inflected and had tested positive
  - further investigation revealed most had at 1 time or another been infected and had tested positive
  - appears that with advanced age, the immune system can have a “memory loss”
  - T cells lose memory for antigen
  - TB a possibility in an older person with a pulmonary infection if they tested positive in the past
- older persons in long-term facilities may be at
  - close living quarters
  - missed diagnoses

**Prevention**

- vaccine available – BCG (Bacillus Calmette-Guerin)
- maintain good health, avoid exposure, participate in testing
- long-term facilities
- sputum culture on any patient who has respiratory infection

**Treatment**

- multidrug regimen is most effective
- Dx made on suspicion & drugs started before bacteriologic confirmation
- directly observed therapy (DOT) - patients are observed to ingest each dose of antituberculosis medications (to maximize the likelihood of completion of therapy)
- regular sputum cultures until AFB culture is negative
- monitor liver function with SGOT (AST)

**Summary**

- we have discussed several diseases that while they don’t directly affect the CP system but may complicated pulmonary function
- can lead to another
- older people may consider signs & symptoms of chronic illness simply a part of the aging process
Summary

- Caring for the elderly involves direct communication with an individual that may have some degree of sensory impairment → make modifications!
  - Always ID yourself in an unhurried & calm manner
  - Direct eye contact & a lower tone of voice
  - Be patient
  - If P & RR are irregular → count for full minute
  - If frightened by strapping mask to face → don’t!
  - If cannot actuate MDI → find a way to modify (if going home with MDI → get return demonstration)
  - Be culturally sensitive (language)
  - Never underestimate the power of touch
  - Be diligent about hand washing