

# Hypertension

Goals according to the JNC 7 Guidelines:

- ▶ **Treat BP to keep less than 140/90 in most patients.**
- ▶ **Treat BP to keep less than 130/80 in patients with diabetes or chronic kidney disease.**
- ▶ **Elderly – same goal of  $< 140/90$ , but may be more sensitive to medications.**

# Lifestyle Modification

Modification	Recommendation	Avg. SBP Reduction Range
Weight reduction	Maintain normal body weight (body mass index 18.5–24.9 kg/m <sup>2</sup> ).	5–20 mmHg/10 kg
DASH eating plan	Adopt a diet rich in fruits, vegetables, and lowfat dairy products with reduced content of saturated and total fat.	8–14 mmHg
Dietary sodium reduction	Reduce dietary sodium intake to <100 mmol per day (2.4 g sodium or 6 g sodium chloride).	2–8 mmHg
Aerobic physical activity	Regular aerobic physical activity (e.g., brisk walking) at least 30 minutes per day, most days of the week.	4–9 mmHg
Moderation of alcohol consumption	Men: limit to <2 drinks* per day. Women and lighter weight persons: limit to <1 drink* per day.	2–4 mmHg

# Hypertension

- ▶ **Hypertension Stage I** (SBP 140–159 or DBP 90–99 mmHg)
- ▶ Thiazide-type diuretics for most. May consider ACEI, ARB, BB, CCB or combination.
- ▶ **Hypertension Stage II** (SBP  $\geq 160$  or DBP  $\geq 100$  mmHg)
- ▶ 2-drug combination for most (usually thiazide type diuretic and ACEI or ARB, or BB, or CCB).

# Hypertension

- ▶ Heart failure – THIAZ, BB, ACEI, ARB, ALDO ANT
- ▶ Post myocardial infarction – BB, ACEI, ALDO ANT
- ▶ High CVD risk – THIAZ, BB, ACEI, CCB
- ▶ Diabetes – THIAZ, BB, ACEI, ARB, CCB
- ▶ Chronic kidney disease – ACEI, ARB
- ▶ Recurrent stroke prevention – THIAZ, ACEI
- ▶ Key: THIAZ = thiazide diuretic, ACEI= angiotensin converting enzyme inhibitor, ARB = angiotensin receptor blocker, BB = beta blocker, CCB = calcium channel blocker, ALDO ANT = aldosterone antagonist
- ▶ Source: <http://www.nhlbi.nih.gov/guidelines/hypertension/phycard.pdf>

**Anatomy and Physiology**

Heart Failure is

**Signs and Symptoms**

**Nursing Diagnosis/Client Problem**

**Interventions**

**Lab /Diagnostic Tests**

**Medical Diagnosis: Heart Failure**

**Nursing Diagnosis/Client Problem**

**Interventions**

**Nursing Diagnosis/Client Problem**

**Interventions**

## Anatomy and Physiology

Heart Failure is a state in which the heart cannot pump enough blood to meet the metabolic needs of the body. (Black and Hawks, 2009, p. 1430). It can involve the heart's left or right ventricle or both. **Left Sided Failure** - The left ventricle loses the ability to contract normally, **systolic failure**. The pump will fail to push enough blood out to the body. The ventricle loses its ability to relax normally, **diastolic failure**, because the muscle has become stiff, the heart can't properly fill during diastole. Blood backs up producing pulmonary edema. **Right Sided Failure** – the right ventricle fails and blood backs up showing JVD and edema to the feet. (AHA,2008, online americanheart.org).

## Lab /Diagnostic Tests

- ABGs – for hypoxemia and hypercapnia and respiratory acidosis later signs.
- Preload – PAWP > 15 or CVP > 12mmHg.
- Hypotension
- BNP - < 400 – goal at discharge, < 100 is normal
- AST and ALT – elevated liver function tests
- BUN and Cr – elevation kidney function tests
- CK-MB and Troponin for elevations
- Chest X-Ray for whitening patches
- 2D Echocardiogram for low EF < 40%
- Drug levels that may decrease Cardiac Output, i.e. digoxin, opiates

## Signs and Symptoms

The stretch of the ventricle releases BNP. The decrease blood flow to the kidneys releases renin. Renin-Angiotension system is stimulated producing sodium and H2O retention and vasoconstriction. Remodeling occurs telling the cells in the heart to change for ongoing problem. It does by enlarging and pumping harder (stiffening occurs over time) producing decreased cardiac output and fluid retention over time.

- Increase in Preload and decrease in C.O.
- Dyspnea, SOA, frothy sputum, anxiety or confusion and weight gain
- Bilateral crackles heard on auscultation
- Dysrhythmias
- S3 or new murmurs: heart sounds
- PMI shifted, JVD, foot edema, ascites

## Medical Diagnosis: Heart Failure

### Nursing Diagnosis/Client Problem

#### Decreased Cardiac Output

#### Interventions

- **Monitor BP for hypotension or for decrease in Urine Output < 30 mL/hr**
- **Administer ACE-I (prils) and Beta-blockers (olols) as ordered if BP is normo or hypertensive and no contraindications exist to dec. workload on the heart i.e. acute decompensated HF**
- **Monitor and report arrhythmias and T-wave inversion and ST elevation and administer medications to treat dysrhythmias as ordered such as diltiazem for A.fib or Amiodarone for Vent. Arrhythmias (Digoxin – not been shown to reduce mortality, but does help with symptoms in some pts)**
- **Assess and report abnormal lab values in the lab/diagnostic tests section**
- **Administer positive inotropes such as Dopamine or Dobutamine to inc. C.O. as ordered**

## Nursing Diagnosis/Client Problem

### Impaired Gas Exchange

#### Interventions

- **Monitor and report ABGs for hypoxemia(N-PaO2 80-100), hypercapnia (N-PaCO2 35-45), and low pH (N-pH 7.35-7.45) – may initially have inc. RR and low PaCO2 due to hyperventilation - Monitor and report O2 sats < 90%**
- **Elevate HOB > 30% providing no contraindications exist such as spinal injury**
- **Administer O2 as ordered to maintain O2 sats > 90%**
- **Collaborate with respiratory therapy to develop a plan of care**
- **Assess RR, pattern, cyanosis, lung sounds**

## Nursing Diagnosis/Client Problem

### Excess Fluid Volume

#### Interventions

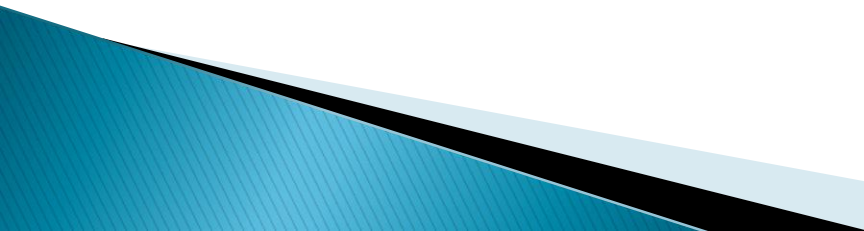
- **Monitor heart sounds for changes such as S3 or new murmurs and restrict IVFs as ordered and monitor for edema and crackles in lung sounds and JVD**
- **Administer loop diuretics as ordered such as furosemide and bumetanide (watch K+ for low levels) – Monitor urine output > 30 mL/hr**
- **Perform, monitor, and report daily wts for increase of 2 lbs per day**
- **Restrict fluids as ordered**
- **Restrict sodium diet as ordered (2-3 gram/daily)**
- **Monitor serum Albumin 3.5 - 5.0 mg/dl or Prealbumin levels 15-40mg/dl to maintain nutrition and oncotic pressure (keep electrolytes in the vessel-prevents shifts)**

# Heart Failure

Goal of Chronic Systolic Heart Failure is to prevent disease progression.

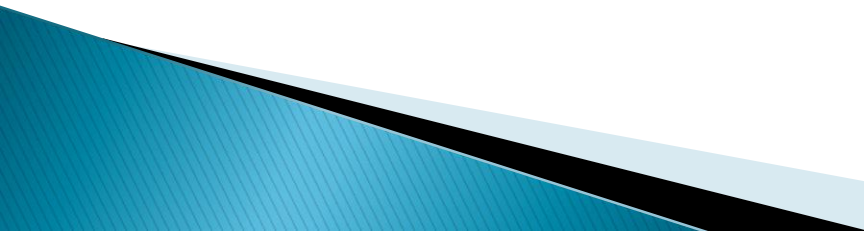
- ▶ Stages of Heart Failure – New York Heart Association list 4 Stages (I–IV)
- ▶ The American College of Cardiology (ACC) and the American Heart Association (AHA) have identified the Stages of Heart Failure. The four stages are: Stages A–D.

# New York Heart Association Functional Classification


- ▶ Class I: no limitation is experienced in any activities; there are no symptoms from ordinary activities.
  - ▶ Class II: slight, mild limitation of activity; the patient is comfortable at rest or with mild exertion.
  - ▶ Class III: marked limitation of any activity; the patient is comfortable only at rest.
  - ▶ Class IV: any physical activity brings on discomfort and symptoms occur at rest.
- 



# American College of Cardiology/ American Heart Association

- ▶ Stage A: Patients at high risk for developing HF in the future but no functional or structural heart disorder;
  - ▶ Stage B: a structural heart disorder but no symptoms at any stage;
  - ▶ Stage C: previous or current symptoms of heart failure in the context of an underlying structural heart problem, but managed with medical treatment;
  - ▶ Stage D: advanced disease requiring hospital-based support, a heart transplant or palliative care.
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# Heart Failure Medications

- ▶ ACE-I (ends in pril) – stops the remodeling caused by the renin–angiotension system.
  - ▶ Beta–blockers (lol) – reduces workload on the heart
  - ▶ Diuretics – thiazide diuretics may move to loop diuretics
  - ▶ Digoxin – has not been shown to reduce mortality but can improve symptoms in some patients.
  - ▶ Spironolactone – reduces mortality by blocking the aldosterone system and preventing remodeling.
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Drug – AHA guideline	Stage A	Stage B	Stage C
<b>ACE Inhibitors (prils)</b>			
Benazepril	H	–	–
Captopril	H, DN	Post MI	HF
Enalapril	H, DN	HF	HF
Fosinopril	H	–	HF
Lisinopril	H, DN	Post MI	HF
Perindopril	H, CV Risk	–	–
Quinapril	H	–	HF
Ramipril	H, CV Risk	Post MI	Post MI
Trandolapril	H	Post MI	Post MI
<b>Angiotensin Receptor Blockers (ARBs – sartans)</b>			
Candesartan	H	–	HF
Eprosartan	H	–	–
Irbesartan	H, DN	–	–
Losartan	H, DN	CV Risk	–
Valsartan	H, DN	Post MI	Post MI, HF
<b>Aldosterone Blockers</b>			
Eplerenone	H	Post MI	Post MI
Spironolactone	H	–	HF
<b>Beta Blockers (lols)</b>			
Acebutolol	H	–	–
Atenolol	H	Post-MI	–
Bisoprolol	H	–	HF
Carvedilol	H	Post-MI	HF, Post-MI
Labetalol	H	–	–
Metoprolol succinate	H	–	HF
Metoprolol tartrate	H	Post-MI	–
Propranolol	H	Post-MI	–
Timolol	H	Post-MI	–
<b>Digoxin</b>	–	–	HF

H–Hypertension, DN–Diabetic Neuropathy, HF–Heart Failure, MI–Myocardial Infarction

**Anatomy and Physiology**

Myocardial Infarction is

**Signs and Symptoms**

**Nursing Diagnosis/Client Problem**

**Interventions**

**Lab /Diagnostic Tests**

**Medical Diagnosis: Myocardial Infarction**

**Nursing Diagnosis/Client Problem**

**Interventions**

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## Anatomy and Physiology

Acute Coronary Syndrome – explains signs and symptoms related to ischemia to the heart. The most common cause is plaque formation over time that develops then ruptures, triggers inflammatory processes, enlarges by thrombus formation, and occludes or partially occludes a coronary artery (Black and Hawks, 2009, p. 1488-89). Risk Factors:

- Age > 65
- Male
- Heredity – children of parents with CAD
- Race: African Americans, Mexican Americans, American Indians, native Hawaiians and some Asian Americans
- Tobacco smoke
- High blood cholesterol, High blood pressure,
- Physical inactivity, obesity and overweight, Diabetes mellitus

## Lab /Diagnostic Tests

- 12 – Lead ECG within 10 min. of ED arrival looking for inverted t-waves (injury), ST – elevation (ischemia), Q wave (infarction), or a new LBBB (left bundle branch block)
- Cardiac biomarker labs drawn such as Troponin > 1ng/mL or CK-MB (>6%)/CKP and Rel. Index (gen. > 2.5-3)
- CBC (for infection and bleeding issues), Basic Metabolic Panel (for electrolytes), PT/PTT (for bleeding times)
- Portable chest X-Ray
- May see Thallium stress test done and other radiology procedures such as an MRI, TEE, 2D Echo (but these should not be done if reperfusion will be delayed)

## Signs and Symptoms

- Continuous, enduring, severe chest pain or pressure lasting more than 20 min.
- Pain is usually felt in the retrosternal area sometimes radiating to left shoulder, arm, neck, and jaw.
- Sensation is described as pressure, squeezing or heaviness on the chest.
- Diaphoresis, nausea and vomiting may occur
- Epigastric pain or feelings of indigestion that is not relieved by antacids or food
- Feelings of impending doom and shortness or breath, Syncope
- Women often present with less common signs such as back or stomach pain, shortness of breath and anxiety, palpitations or paleness

## Medical Diagnosis: Myocardial Infarction

### Nursing Diagnosis/Client Problem

#### Acute Pain

#### Interventions

**MONA greets everyone at the door of everyone with a suspected MI**

- **Assess 5<sup>th</sup> vital sign, pain on a 0-10 scale – goal is 0.**
- **Perform a 12-lead ECG on patient's having chest pain and notify the provider of the results**
- **Give nitroglycerin (0.4mg) Sublingual as ordered every 5 min. X 3 as long as SBP > 90**
- **Adm. Morphine (2-4 mg) as ordered for pain not relieved by nitroglycerin**
- **Educate patient on ABCDE goals unless contraind.: ASA within 24 hrs, ACE-I prescription by discharge if EF < 40%, B-blocker within 24 hrs, chol. check and chol. lowering prescription by discharge, diet of low fat (< 25% of total calories) and 2 gram low Na/day., education on diet, exercise, and smoking cessation**

## Nursing Diagnosis/Client Problem

### Ineffective Tissue Perfusion: Coronary

#### Interventions

**Goals: PCI within 90 mins/door or Fibrinolytic therapy within 30 mins if PCI is not possible within 90 mins (< 12 hours of symp. onset)**

- **Oxygen 2-4 L/NC placed on patient as ordered, titrate as ordered to maintain O2 sats > 90%**
- **Administer aspirin (have patient chew up) 160-325 mg or ASA suppository as ordered if pt cannot take PO**
- **Adm. beta-blocker such as metoprolol 5 mg IV q 5 min. X 3 as ordered if BP stable and no contraind. exist such as restrictive lung disease**
- **Adm. Heparin or LMWH SQ like enoxaparin (Lovenox), Consider GP IIB-IIIa Inhibitor-Integrilin (eptifibatide)**
- **Assess contraind. of fibrinolytic therapy**

### Nursing Diagnosis/Client Problem

#### Decreased Cardiac Output R/T Dysrhythmias

#### Interventions

- **Assess vital signs for a baseline and every 5 minutes with administration of nitroglycerin**
- **Monitor for tachycardia and bradycardia causing a drop in blood pressure**
- **Monitor for urine output < 30 mL/hr**
- **Place patient on a continuous heart monitor and monitor for dysrhythmias such as Ventricular Tachycardia, V. Fib., less critically-Premature Vent. Contractions (PVCs) and A.Fib w/rapid response**
- **Administer medications, Sync. Cardioversion or Defibrillation to treat dysrhythmias as ordered: Amiodarone or Lidocaine for vent. dysrhythmias & diltiazem for atrial dysrhyth.**
- **Assess for reperfusion dysrhythmias after administration of fibrinolytic therapy**

# Myocardial Infarction

Goal of Myocardial Infarction is to find a reperfusion strategy.

Pain needs to be 0 - time is tissue!

MONA - initially

12-lead ECG and Troponin

12 hour window for thrombolytic therapy

ABCDE - within 24 hours and prior to discharge

Note: Aspirin is contraindicated in kids < 21

Thygesen K, Alpert JS, White HD, et al. Universal definition of myocardial infarction.

*Circulation*, published online before print October 19, 2007. DOI:

10.1161/CIRCULATIONAHA.107.187397

**TABLE 2. Contraindications and Cautions for Fibrinolysis Use in ST-Elevation Myocardial Infarction\***

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**Absolute contraindications**

- Any prior ICH
- Known structural cerebral vascular lesion (eg, AVM)
- Known malignant intracranial neoplasm (primary or metastatic)
- Ischemic stroke within 3 months EXCEPT acute ischemic stroke within 3 hours
- Suspected aortic dissection
- Active bleeding or bleeding diathesis (excluding menses)
- Significant closed head or facial trauma within 3 months

**Relative contraindications**

- History of chronic severe, poorly controlled hypertension
- Severe uncontrolled hypertension on presentation (SBP greater than 180 mm Hg or DBP greater than 110 mm Hg)†
- History of prior ischemic stroke greater than 3 months, dementia, or known intracranial pathology not covered in contraindications
- Traumatic or prolonged (greater than 10 minutes) CPR or major surgery (less than 3 weeks)
- Recent (within 2 to 4 weeks) internal bleeding
- Noncompressible vascular punctures
- For streptokinase/anistreplase: prior exposure (more than 5 days ago) or prior allergic reaction to these agents
- Pregnancy
- Active peptic ulcer
- Current use of anticoagulants: the higher the INR, the higher the risk of bleeding

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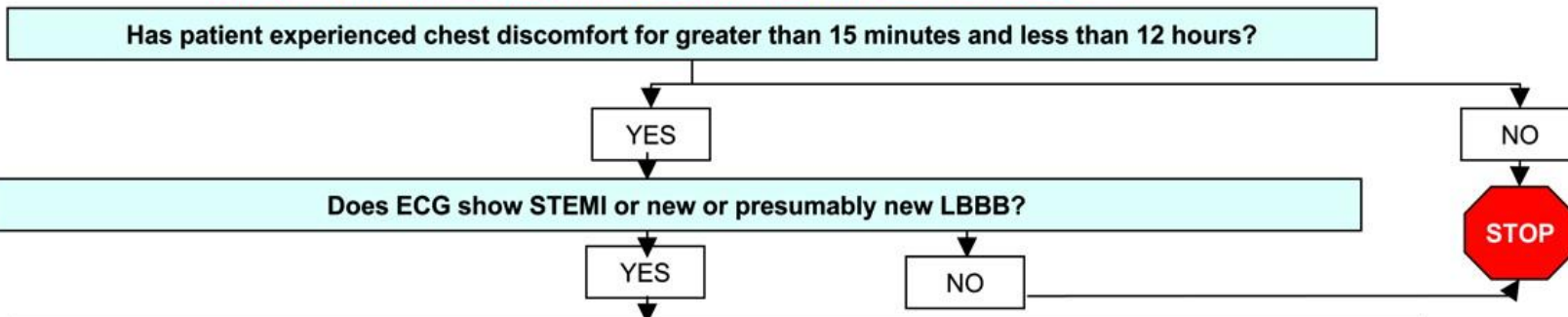
AVM indicates arteriovenous malformation; SBP, systolic blood pressure; DBP, diastolic blood pressure; ICH, intracranial hemorrhage; CPR, cardiopulmonary resuscitation.

\*Viewed as advisory for clinical decision making and may not be all-inclusive or definitive.

†Could be an absolute contraindication in low-risk patients with ST-elevation myocardial infarction (see Section 6.3.1.6.3.2 of the full-text guidelines).

## CHEST PAIN CHECKLIST FOR STEMI FIBRINOLYTIC THERAPY

**Step One:**



**Step Two:**

**Are there contraindications to fibrinolysis?**  
**If ANY of the following is CHECKED YES, fibrinolysis MAY be contraindicated.**

- |   |                       |     |    |
|---|-----------------------|-----|----|
| Systolic BP greater than 180 mm Hg  | <input type="radio"/> | YES | NO |
| Diastolic BP greater than 110 mm Hg   | <input type="radio"/> | YES | NO |
| Right vs. left arm systolic BP difference greater than 15 mm Hg                         | <input type="radio"/> | YES | NO |
| History of structural central nervous system disease                                    | <input type="radio"/> | YES | NO |
| Significant closed head/facial trauma within the previous 3 months                      | <input type="radio"/> | YES | NO |
| Recent (within 6 wks) major trauma, surgery (including laser eye surgery), GI/GU bleed  | <input type="radio"/> | YES | NO |
| Bleeding or clotting problem or on blood thinners                                       | <input type="radio"/> | YES | NO |
| CPR greater than 10 minutes   | <input type="radio"/> | YES | NO |
| Pregnant female   | <input type="radio"/> | YES | NO |
| Serious systemic disease (eg, advanced/terminal cancer, severe liver or kidney disease) | <input type="radio"/> | YES | NO |

**Step Three:**

**Is patient at high risk?**  
**If ANY of the following is CHECKED YES, CONSIDER Transport/ Transfer to PCI Facility**

- |  |                       |     |    |
|--|-----------------------|-----|----|
| Heart rate greater than or equal to 100 bpm <b>AND</b> systolic BP less than 100 mm Hg | <input type="radio"/> | YES | NO |
| Pulmonary edema (rales)  | <input type="radio"/> | YES | NO |
| Signs of shock (cool, clammy)  | <input type="radio"/> | YES | NO |
| Contraindications to fibrinolytic therapy  | <input type="radio"/> | YES | NO |



**Table 1** Clinical classification of different types of myocardial infarction

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**Type 1**

Spontaneous myocardial infarction related to ischaemia due to a primary coronary event such as plaque erosion and/or rupture, fissuring, or dissection

**Type 2**

Myocardial infarction secondary to ischaemia due to either increased oxygen demand or decreased supply, e.g. coronary artery spasm, coronary embolism, anaemia, arrhythmias, hypertension, or hypotension

**Type 3**

Sudden unexpected cardiac death, including cardiac arrest, often with symptoms suggestive of myocardial ischaemia, accompanied by presumably new ST elevation, or new LBBB, or evidence of fresh thrombus in a coronary artery by angiography and/or at autopsy, but death occurring before blood samples could be obtained, or at a time before the appearance of cardiac biomarkers in the blood

**Type 4a**

Myocardial infarction associated with PCI

**Type 4b**

Myocardial infarction associated with stent thrombosis as documented by angiography or at autopsy

**Type 5**

Myocardial infarction associated with CABG

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**Anatomy and Physiology**

Stroke is

**Signs and Symptoms**

**Nursing Diagnosis/Client Problem**

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**Medical Diagnosis: Stroke**

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**Nursing Diagnosis/Client Problem**

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## Anatomy and Physiology

**Stroke** is seen as a **brain attack** described by the sudden loss of blood circulation to an area of the brain, producing a loss of neurologic function. Other terms that may be seen are cerebrovascular accident (CVA) or stroke syndrome. Strokes can be classified as **ischemic** from thrombosis (plaque occludes vessel) or embolism (breaks off from an existing thrombus) or can be **hemorrhagic** (bleeding into the brain tissue). Ischemic strokes account for 83% of all strokes and 17% are hemorrhagic (Black and Hawks, 2009, p. 1443).

**Risk Factors:** Age > 55, Family history, Race-African Americans, Men > women, but more women die from stroke, Prior stroke/TIA/heart attack/heart failure, HTN, Smoking, Diabetes mellitus, Atrial fibrillation, Sickle cell disease, High cholesterol, and Physical inactivity and Obesity

## Signs and Symptoms

### Cincinnati Stroke Scale

- Have pt smile (see one sided facial drooping or unable for that side to smile)
- Have pt hold out arms directly in front of them (one arm drifts away or unable to lift at all)
- Have pt say, "You can't teach an old dog new tricks." (Patient will slur words, Dysarthria, or will not be able to say certain words or communicate at all, Aphasia). Call 9-1-1 or stroke team - Time
- Motor changes – one sided weakness or paralysis (contralateral hemiparesis or hemiplegia)
- Sensory changes – neglect or unable to feel or decreased feeling on one side of the body
- Mental/Speech changes – dysarthria, aphasia, dysgraphia (inability to write), dysphagia (inability to swallow), confusion, dec. LOC
- Visual changes – loss of vision in one aspect of eye or deviated eye movement, or pupil changes

## Nursing Diagnosis/Client Problem

### Ineffective Tissue Perfusion: Cerebral

#### Interventions

- Place O2 on pt as ordered to maintain sats > 90%
- Assess for ischemic/hem. stroke
- Administer thrombolytic therapy as ordered provided no contraindications exist – use a check-off list (tPA is only FDA approved drug at this time for isch. stroke) – Must be adm. within 3 hours of symptom onset
- ASA within 48 hrs of symptom onset 325mg/d-for ischemic stroke
- Assess for signs of inc. ICP such as changes in mental state include lethargy, irritability, slow decision making and abnormal social behavior, vomiting, hyperthermia, headaches, hypoxia, Cheyne-Stokes Respirations, Cushing's Triad (late sign of high ICP) – of increased SBP, widening pulse pressure, and bradycardia

## Lab /Diagnostic Tests

- Non-contrast CT of the brain to rule out hemorrhagic stroke (MRI – may not show ischemic changes for 8-12 hrs of sympt. onset)
- ECG to rule out A. Fib., Echocardiogram and Angiography, Doppler - carotid arteries and lower legs
- NIH stroke scale (42 point scale) – stroke > 4 indicates acute stroke, > 20 profound neurologic deficit (need special training to perform consistently)
- CBC (for infection and bleeding issues), Basic Metabolic Panel (for electrolytes), PT/PTT (for bleeding times), lipid panel
- Cardiac biomarker labs drawn such as Troponin > 1ng/mL or CK-MB (>6%)/CKP and Rel. Index (gen. > 2.5-3) for cardiac cause

## Medical Diagnosis: Stroke

### Nursing Diagnosis/Client Problem

#### Impaired Physical Mobility or Unilateral Neglect

#### Interventions

- Assess degree of muscle strength
- Collaborate with physical and occupational therapy to determine appropriate activity levels
- Collaborate with speech therapy to determine appropriate swallow and communication exercises, elevate HOB > 30 degrees
- Assist with feeding to maintain nutrition and prevent aspiration with incentive spirometry and coughing/deep breathing to prevent pneumonia
- Assist with transfers, assist with getting pt up as soon as possible (assess environ. to prevent falls)
- Assess skin integrity q 2hrs esp. if patient immobile
- Perform ROM exercises (enc. use of affected side)
- Assess self-care deficits & allow to accomplish tasks

## Nursing Diagnosis/Client Problem

### Risk for Injury

#### Interventions

- Ineffective Airway Clearance/Risk for aspiration  
Risk for Hemorrhage/Risk for Seizures
- Assess whether pt. w/dec. LOC can maintain their own airway – 1<sup>st</sup> priority; NPO-assess swallow with bedside dysphagia screening prior to any PO intake
  - Assess for hypertension to treat (for those receiving tPA) keep SBP < 180 and DBP < 110mmHg. HTN to treat (for those who do not receive tPA) keep SBP < 220 or DBP < 120mmHg, assess for bleeding (H&H)
  - Adm. BP meds (labetelol/nitroglycerin) as ordered to above parameters
  - Adm. antiseizure medications as ordered
  - Assess blood glucose levels and provide Insulin as ordered to maintain < 140.
  - Apply compression devices to prevent DVT.

# Stroke

Goal of stroke is to determine whether ischemic or hemorrhagic, find the cause, and to find a reperfusion strategy.

Generally clinically determined – Cincinnati Stroke Scale, NIHSS, Glasgow Coma Scale

Non-contrast CT of the head – to rule out a bleed (to progress with thrombolytic therapy)

3 hour window for thrombolytic therapy

Becker, J., Wira, C., and Arnold, J. (2008). Ischemic Stroke. *Neurology, Emergency Medicine, eMedicine Specialties*. Retrieved November 5, 2008 from <http://www.emedicine.com/EMERG/topic558.htm>.

Sauerbeck, L. (2006). Primary stroke prevention. *American Journal of Nursing*. 106 (11). p. 40-49.

# Stroke

- ▶ Supplemental oxygen is generally applied to patients with stroke where airway compromise have been found or when pulse oximetry show an oxygen saturation lower than 90–92%, but there is no supporting evidence that oxygen therapy alone improves outcomes (Adams, Zoppo, Alberts, Bhatt, Brass, Furlan, et. al., 2007, p. 1673).

# Stroke

- ▶ Differentiate between ischemic versus hemorrhagic.
- ▶ This is important to determine because treatment will be directed differently based on this finding.
- ▶ Once a hemorrhage has been ruled out, the next consideration would be to implement recombinant tissue plasminogen activator (rtPA). It has been shown to improve outcomes in ischemic stroke patients if given intravenously within the first three hours of symptom onset (Saver & Yafeh, 2007, 418).

# Stroke

- ▶ Heparin has been the mainstay of therapy in the past for treating acute ischemic stroke. According to the current guideline studies have not shown an improvement in outcome of the stroke patient, but has shown an increase in intracranial hemorrhage

# Stroke

- ▶ No recommended use of anticoagulation with Heparin **except** for the use of preventing deep vein thrombosis (DVT) in those patients by day 2 of hospitalization recognizing that there are nonpharmacologic methods to prevent DVT (Adams, Zoppo, Alberts, Bhatt, Brass, Furlan, et. al., 2007, p. 1667).



# Stroke

- ▶ The patients with acute ischemic stroke presenting within 48 hours of symptom onset should be given aspirin (325 mg/day) to reduce stroke mortality and decrease morbidity, provided contraindications such as allergy and gastrointestinal bleeding are absent, and the patient has or will not be treated with rtPA (Adams, Zoppo, Alberts, Bhatt, Brass, Furlan, et. al., 2007, p. 1681).
- ▶ The Chinese Acute Stroke Trial (CAST) and the International Stroke Trial (IST) are 2 large studies which evaluated aspirin 160–300 mg/d within 48 hours of ischemic stroke symptom onset.
- ▶ **Compared with no treatment, they confirmed aspirin resulted in a 1% absolute reduction in risk of stroke and death in the first few weeks. Aspirin reduced mortality in about 1% at 6 months (Silver and Lorenzo, 2007).**

# Stroke

- ▶ Hypertension to treat (for those receiving rtPA) SBP < 180 and DBP < 110mmHg. HTN to treat (for those who do not receive rtPA) SBP > 220 or DBP > 120mmHg.
- ▶ The guidelines offer only approaches to treat elevated BP for rtPA administration including with Labetalol 10–20mg IV over 1–2 minutes or Nitropaste 1–2 inches or Nicardipine infusion 5mg/hr to maximum dose of 15mg/hr in the acute phase. A clinical approach is recommended to restarting patient's home blood pressure medications at least 24 hours after the stroke event and to reduce extremely elevated BPs to about 15% in the first 24 hours (Adams, Zoppo, Alberts, Bhatt, Brass, Furlan, et. al., 2007, p. 1671).

# Stroke

- ▶ Hyperglycemia has been thought to cause acidosis and edema in the brain.
- ▶ It is currently recommended to treat patients without dextrose in the IV and infuse normal saline.
- ▶ The current recommendation is to lower the blood glucose levels to less than 140 – 180 mg/dL. This seems to be a liberal estimate of controlling blood sugar with growing evidence in other critically ill patients that blood sugar levels should be in much tighter control (Schrier, 2006, p. 285).

# Stroke

- ▶ The patency of the airway of a patient remains the foremost importance for nonpharmacologic interventions (Adams, Zoppo, Alberts, Bhatt, Brass, Furlan, et. al., 2007, p. 1673).
- ▶ A computed tomography (CT) scan of the brain without contrast is still preferable to Magnetic Resonance Imaging (MRI) in the acute stage because it is quicker and more reliable in detecting intracranial hemorrhage although ischemia may not show up on the CT scan for 24–48 hours after an ischemic stroke (McPhee & Papakakis, eds., 2007, p. 1017, 1019).

# Stroke

- ▶ ECG monitoring, echocardiogram, carotid and venous doppler studies, and prevention of deep vein thrombosis are all items frequently used to determine, treat, and prevent secondary injury in stroke patients.
- ▶ With decreased level of consciousness, difficulty swallowing and speaking, aspiration pneumonia is a risk for the ischemic stroke patient. There is supporting evidence that formal dysphagia screens prevent aspiration pneumonia if they have certain components such as a formal assessment of risk factors for problems swallowing, evaluation to be followed up by a speech therapist, swallowing with a small amount of water if no risks exist, and the patient is to be NPO prior to the screen or evaluation by speech therapy (Hinchey, Shephard, Furie, Smith, Wang, and Tonn, 2005, p. 1973).

# Stroke

- ▶ **Summary of Dysphagia screens**
- ▶ 27–50% of stroke patients develop dysphagia
- ▶ 43–54% of stroke patients with dysphagia will experience aspiration. Of those patients, ~ 37% will develop pneumonia
- ▶ There is not a national guideline that endorses a particular dysphagia screen
- ▶ There is supporting evidence that formal dysphagia screens prevent aspiration pneumonia if they have certain components
- ▶ Formal assessment of risk factors for problems swallowing,
- ▶ Evaluation to be followed up by a speech therapist,
- ▶ Swallowing with a small amount of water if no risks exist,
- ▶ NPO prior to the screen or evaluation by speech therapy

# References

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**Anatomy and Physiology**

COPD is

**Signs and Symptoms**

**Nursing Diagnosis/Client Problem**

**Interventions**

**Lab /Diagnostic Tests**

**Medical Diagnosis: COPD**

**Nursing Diagnosis/Client Problem**

**Interventions**

**Nursing Diagnosis/Client Problem**

**Interventions**



## Anatomy and Physiology

**Chronic bronchitis** is the inflammation and scarring of the lining of the bronchial tubes in the lungs. When the bronchi are inflamed less air is able to flow to and from the lungs and heavy mucus builds up placing the patient at risk for pneumonia.

**Emphysema** is the destruction of alveoli in the lungs where gas exchange takes place with the capillaries. The damage is irreversible and the alveoli are not able to transfer oxygen to the bloodstream, producing shortness of breath. The alveoli also lose their elasticity, which is important to keep airways open. The patient has difficulty exhaling.

- **Smoking is the primary risk factor for COPD.**
- **Other pollutants and lung damage from resp. infections**

(American Lung Association, 2008, Chronic Obstructive Pulmonary Disease (COPD) Fact Sheet, online from [www.lungsusa.org](http://www.lungsusa.org)).

## Lab /Diagnostic Tests

- O2 sats < 90% & ABG: PaCO<sub>2</sub> (35-45) > 50% indicates a person is retaining CO<sub>2</sub>.
- Pulmonary function testing (PFTs) using spirometry: Forced Expiratory Volume after 1 second (FEV<sub>1</sub>) and Forced Vital Capacity (FVC). If FEV<sub>1</sub>/FVC ratio < 70% indicates obstruction and an FEV<sub>1</sub> alone the severity of the obstruction: >80%-mild, 50-80%- moderate, 30-49%-severe & <30% very severe. WHO-GOLD (World Health Organization-Global initiative for Chronic Obstructive Lung Disease)
- Chest X-Ray or CT scan of chest – flattened diaphragm & hyperextended chest walls.
- Alpha-1-Antitrypsin (AAT) Level – 78-200 mg/dl, if low indicates emphysema, a genetic trait or caused by severe liver failure

## Signs and Symptoms

- Chronic Bronchitis - presence of a mucus-producing cough most of the month, 3 months of a year for 2 successive years without other underlying disease to explain the cough.
  - chronic cough
  - increased mucus
  - frequent clearing of the throat
  - shortness of breath
- Emphysema – destruction in the bronchioles and/or alveoli produce these symptoms.
  - Increased work of breathing
  - Use of accessory muscles to overcome difficulty breathing
  - Exercise intolerance
  - Wheezing
- Tripod position when sitting
- Barrel chest

**Medical Diagnosis: COPD** (Covers primarily two diseases Chronic Bronchitis and Emphysema)

## Nursing Diagnosis/Client Problem

### Ineffective Airway Clearance

#### Interventions

- **Enc. coughing & deep breathing** (NT suction if unable to clear the airway)
- **Avoid beta-blockers** (some are B<sub>1</sub> selective & don't pose as high a risk, but if severe disease-avoid all)
- **Administer corticosteroids** (beclomethasone-Vanceril) as ordered for exacerbations—not a prn inhaler—use daily as ordered—rinse mouth after use (mainstay of therapy for asthma, but are not recomm. for use in COPD except in acute episodes)
- **Draw & monitor lab as ordered for cultures** (urine, sputum, & blood cultures X 2) – Adm. antibiotics as ord. – if sputum lab or changes indicate an infection

## Nursing Diagnosis/Client Problem

### Impaired Gas Exchange

#### Interventions

- **Oxygen to maintain sats > 90%**
- **Adm. bronchodilator therapy as ordered - beta2 agonist – (albuterol)-rescue inhaler lasts 2-4 hrs & anticholinergic agents- ipratropium bromide (Atrovent)-lasts 6-8 hrs**
- **Collaborate with Resp. Therapy and Pulmonologist for PFTs - FEV<sub>1</sub> > 15% after bronchodilator therapy is significant and may indicate reversible disease**
- **Enc. use of incentive spirometry and pursed lipped breathing, keep HOB > 30%**
- **Monitor O<sub>2</sub> sats and ABG values pH < 7.35, PaCO<sub>2</sub> > 50 or > 5 above baseline**
- **Monitor for cyanosis, dyspnea, wheezing**

## Nursing Diagnosis/Client Problem

### Act. Intol./Imb. Nutrition/Risk for Infection

#### Interventions

- **Encourage smoking cessation – slows progression of disease**
- **Assist w/mobility-exercise 3X/wk-20 min**
- **Allow for frequent rest periods**
- **Allow for O<sub>2</sub> administration if needed**
- **Avoid cough suppressants**
- **Enc. liquid nutritional supplements if pt SOA (bang for buck-fat prod. least CO<sub>2</sub>)**
- **Enc. 6 small meals instead of 3 large ones**
- **Inform and administer influenza and pneumococcal vaccinations as ordered to prevent exacerbations**
- **Educate patient on use of their inhalers, encourage use of a spacer (collaborate with RT to provide spacers & education)**

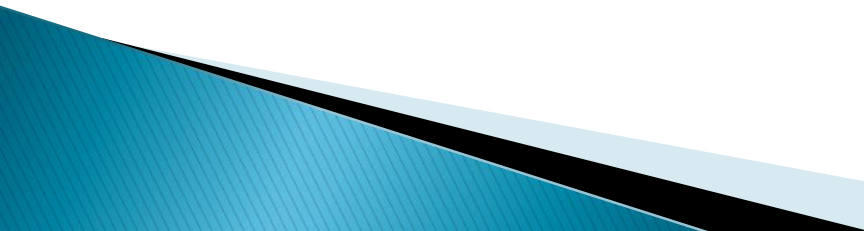
# COPD – primarily Bronchitis and Emphysema

- ▶ **Goals: to improve ventilation and remove lung secretions, to promote best quality of life and to slow decline of disease**
- ▶ **Albuterol – beta2 agonist – Rescue Inhaler lasts 2–4 hrs & anticholinergic agents–ipratropium bromide (Atrovent)–lasts 6–8 hrs**
- ▶ **Steroids and Antibiotics only if needed in acute exacerbation and infection, respectively.**

Kleinschmidt, P. (2008). Chronic Obstructive Pulmonary Disease and Emphysema. Retrieved on November 18, 2008 from <http://www.emedicine.com/emerg/topic99.htm>

American Lung Association. (2008). Chronic Obstructive Pulmonary Disease (COPD) Fact Sheet. Retrieved on November 17, 2008 from <http://www.lungusa.org/site/apps/nlnet/content3.aspx?c=dvLUK9O0E&b=4294229&ct=3052283>

# COPD

- ▶ Encourage/Educate pt to stop smoking
  - ▶ Improve/Maintain Nutrition
  - ▶ Protein for respiratory muscle – strengthening
  - ▶ Reduce Carbohydrates – produces most CO<sub>2</sub>
  - ▶ Increase Fats – produces least CO<sub>2</sub> – careful with this – look at other health concerns
  - ▶ Exercise – start slow and increase to 3 times per week for 20 minutes to improve lung function
- 

# COPD

- ▶ Chronic bronchitis (blue bloaters)
  - Obese
  - Frequent productive cough
  - Use of accessory muscles
  - Share many physical signs of CHF
  - A bedside test for differentiation may be to collaborate with Resp. Therapist to use a peak expiratory flow meter.
  - If patient can only blow 150–200 mL or less, then it is probably COPD and not CHF.

# COPD

- ▶ Emphysema (pink puffers)
  - Thin with a barrel chest
  - No cough or nonproductive cough
  - Pursed lip breathing, use tripod sitting position
  - Lung sounds are often hyperresonant, and wheezing may be heard; heart sounds may be very distant
- ▶ Overall appearance is classic look for a COPD exacerbation

# COPD

## ▶ Antibiotics

- Many times these patients have a number of bacteria, commonly *Haemophilus influenzae* and streptococcal pneumonia that have colonized and are not the cause of new infections. These are often not the instigation of exacerbation.
- Viruses, many times are the culprit to put the pt over the edge – important to get vaccines

# COPD – GOLD standard by WHO

- ▶ **Stage 0: At Risk for COPD.** Symptoms of chronic cough and sputum production may be present, but patients have normal spirometry readings.
- ▶ **Stage 1: Mild COPD.** Characterized by  $FEV^1 \geq 80\%$ ,  $FEV^1/FVC < 70\%$ . Patients may have or not have chronic cough and increased sputum production.
- ▶ **Stage 2: Moderate COPD.** Characterized by a worsening of airflow ( $30\% \geq FEV^1 > 80\%$ ). Patients with stage-2 disease often are symptomatic, seek medical attention, and have shortness of breath with exertion. Stage 2 has 2 subcategories: IIA and IIB. IIA patients have a  $FEV^1$  between 50% and 80%; stage IIB patient have a  $FEV^1$  between 30% and 50%. Patients with  $FEV^1$  below 50% are especially prone to acute exacerbations of disease.
- ▶ **Stage 3: Severe COPD.** Characterized by an  $FEV^1$  below 30%. Patients are also included in stage 3 if they have respiratory failure or right heart failure. The quality of life is severely affected in these patients. Acute exacerbations in this patient population often require hospitalization and are frequently life threatening.
- ▶ World Health Organization. (2007). COPD: Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Retrieved November 18, 2008 from <http://www.goldcopd.com/download.asp?intId=440>.

# COPD – GOLD recommendations

- ▶ Bronchodilator medications are central to the symptomatic management of COPD (**Evidence A**). They are given on an as-needed basis or on a regular basis to prevent or reduce symptoms and exacerbations. The principal bronchodilator treatments are  $\beta_2$ -agonists, anticholinergics, and methylxanthines used singly or in combination (**Evidence A**).
- ▶ Regular treatment with long-acting bronchodilators is more effective and convenient than treatment with short-acting bronchodilators (**Evidence A**).
- ▶ The addition of regular treatment with inhaled glucocorticosteroids to bronchodilator treatment is appropriate for symptomatic COPD patients with an FEV1 < 50% predicted (*Stage III: Severe COPD* and *Stage IV: Very Severe COPD*) and repeated exacerbations (**Evidence A**). Chronic treatment with systemic glucocorticosteroids should be avoided because of an unfavorable benefit-to-risk ratio (**Evidence A**).
- ▶ In COPD patients influenza vaccines can reduce serious illness (**Evidence A**). Pneumococcal polysaccharide vaccine is recommended for COPD patients 65 years and older and for COPD patients younger than age 65 with an FEV1 < 40% predicted (**Evidence B**).
- ▶ All COPD patients benefit from exercise training programs, improving with respect to both exercise tolerance and symptoms of dyspnea and fatigue (**Evidence A**).
- ▶ The long-term administration of oxygen (> 15 hours per day) to patients with chronic respiratory failure has been shown to increase survival (**Evidence A**).