

COMPLICATIONS OF HEART DISEASE

By R.Thomas

Heart Failure #1

- ❖ Cardiovascular disease is the leading cause of death in the United States
- ❖ Heart disease remains a chronic and often progressive condition, associated with serious comorbidities, such as heart failure
- ❖ Heart failure (HF) is a clinical syndrome resulting from structural or functional cardiac disorders that impair the ability of a ventricle to fill or eject blood; the heart is unable to pump enough blood to meet the body's metabolic demands or needs

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Heart Failure #2

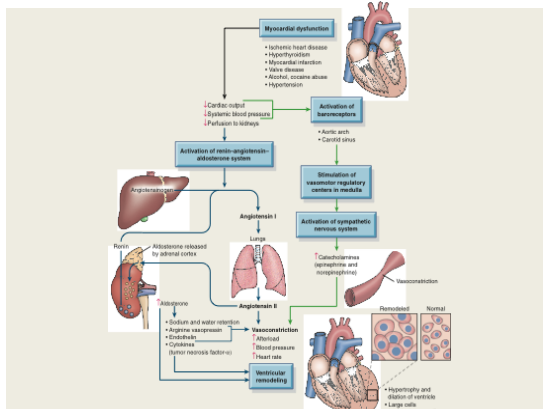
- ❖ The term heart failure indicates myocardial disease, in which there is a problem with the contraction of the heart (systolic dysfunction) or filling of the heart (diastolic dysfunction) may cause pulmonary or systemic congestion
- ❖ Some cases are reversible depending on the cause
- ❖ Most HF is a chronic, progressive condition managed with lifestyle changes and medications

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WHAT IS HEART FAILURE?

- Heart unable to pump
- Inadequate cardiac output
- Myocardial hypertrophy
- Pulmonary/ systemic congestion
- Etiology
 - MI, HTN, pulmonary HTN, dysrhythmias, valvular disorders, pericarditis, cardiomyopathy



Chronic Heart Failure

- ❖ The incidence of HF increases with age
- ❖ Approximately 6 million people in the United States have HF, and 870,000 new cases are diagnosed each year
- ❖ Most common reason for hospitalization of people older than 65 years and the second most common reason for visits to a provider's office
- ❖ Approximately 20% of patients discharged after treatment for HF are readmitted to the hospital within 30 days and nearly 50% are readmitted to the hospital within 6 months

NEW YORK HEART ASSOCIATION CLASSIFICATION

- Class I
- Class II
- Class II
- Class IV

HEART FAILURE

- Left-sided heart failure
 - Systolic heart failure
 - EF ↓ 40%, pulmonary and systemic congestion
 - Diastolic heart failure
 - "stiffening"
- Right sided heart failure
 - ↓ right ventricle output
 - Systemic venous congestion

RISK FACTORS

- Left side heart failure
 - HTN
 - CAD, angina, MI
 - Valvular disease
- Right side heart failure
 - Left side failure
 - Right ventricle MI
 - Pulmonary disease (COPD, ARDS)

DIAGNOSTIC TEST

- BNP
- Hemodynamic monitoring
- Echocardiogram- 2D or 3D
 - Ejection fraction
 - Left ventricle 55- 70%
 - Right ventricle 45-60%
- CXR
- ECG
- Cardiac Enzymes, CBC, Chemistry

Clinical Manifestations of Heart Failure

Right Sided

- ❖ Viscera and peripheral congestion
- ❖ Jugular venous distention (JVD)
- ❖ Dependent edema
- ❖ Hepatomegaly
- ❖ Ascites
- ❖ Weight gain

Left Sided

- ❖ Pulmonary congestion, crackles
- ❖ S₃ or "ventricular gallop"
- ❖ Dyspnea on exertion (DOE)
- ❖ Low O₂ sat
- ❖ Dry, nonproductive cough initially
- ❖ Oliguria



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SIGNS & SYMPTOMS

Left Sided HF

- Dyspnea, orthopnea, nocturnal dyspnea
- Fatigue
- Displaced apical
- S₃
- Pulmonary congestion
- Frothy sputum
- AMS
- S/S of organ failure
- Hemodynamic findings:
 - CVP/ right atrial pressure
 - PAP
 - PAWP
 - Cardiac Output

Right Sided HF

- JVD
- Dependent edema
- Abdominal distention, ascites
- Fatigue, weakness
- Nausea & anorexia
- Polyuria
- Hepatomegaly & tenderness
- Weight gain
- Hemodynamic findings:
 - CVP/right arterial pressure

LEFT SIDED ♥ FAILURE

- PAROXYSMAL NOCTURNAL DYSPNEA
- RESTLESSNESS
- CONFUSION
- ELEVATED PULMONARY CAPILLARY WEDGE PRESSURE
- COUGH
- CRACKLES
- WHEEZES
- BLOOD TINGED SPUTUM
- ORTHOPNEA
- TACHYCARDIA
- EXERTIONAL DYSPNEA
- CYANOSIS

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RIGHT SIDED ♥ FAILURE

(Cor Pulmonale)

- Fatigue
- May be secondary to chronic pulmonary problems
- ↑ Peripheral Venous Pressure
- Distended Jugular Veins
- Ascites
- Anorexia & Complaints of GI Distress
- Enlarged Liver & Spleen
- Weight Gain
- Dependent Edema

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ASSESSMENTS

- O2 sat
- Vital signs
- Heart rhythm
- Lung sounds
- Dyspnea
- Electrolytes
- Daily weight
- LOC
- I & O
- Sx of drug toxicity
- Support systems

Medical Management of the Patient with Heart Failure

- ❖ Vary according to the severity of the patient's condition, comorbidities, and cause
- ❖ Treatment may include
 - Oral and IV medications
 - Lifestyle modifications
 - Supplemental O₂
 - Surgical interventions: ICD and heart transplant
- ❖ Comprehensive education and counseling to patient and family is needed

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Medications Used to Treat HF #1

- ❖ Diuretics: decreases fluid volume, monitor serum electrolytes
- ❖ Angiotensin-converting enzyme (ACE) inhibitors: vasodilation; diuresis; decreases afterload; monitor for hypotension, hyperkalemia, and altered renal function; cough
- ❖ Angiotensin II receptor blockers: prescribed as an alternative to ACE inhibitors; work similarly
- ❖ Beta-blockers: prescribed in addition to ACE inhibitors; may be several weeks before effects seen; use with caution in patients with asthma

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Medications Used to Treat HF #2

- ❖ Ivabradine: decreases rate of conduction through the SA node; observe for decrease HR and BP
- ❖ Hydralazine and isosorbide dinitrate: alternative to ACE inhibitors; observe for decreased BP
- ❖ Digitalis: improves contractility; monitor for digitalis toxicity especially if patient is hypokalemic

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Medications Used to Treat HF #3

- ❖ IV medications: indicated for hospitalized patients admitted for acute decompensated HF
 - Dopamine: vasopressor to increase BP and myocardial contractility; adjunct with loop diuretics
 - Dobutamine: used for patients with left ventricular dysfunction; increases cardiac contractility and renal perfusion
 - Milrinone: decreases preload and afterload; causes hypotension and increased risk of dysrhythmias
 - Vasodilators: IV nitro, nitroprusside, nesiritide; enhance symptom relief

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Gerontologic Considerations

- ❖ May present with atypical signs and symptoms such as fatigue, weakness, and somnolence
- ❖ Decreased renal function can make older patients resistant to diuretics and more sensitive to changes in volume
- ❖ Administration of diuretics to older men requires nursing surveillance for bladder distention caused by urethral obstruction from an enlarged prostate gland

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INTERVENTIONS

- O2
- High fowler's
- Bedrest till stable
- Dietary restrictions- NA an fluid
- Medications
 - Diuretics
 - To decrease preload
 - ↓ afterload
 - ACE inhibitors, beta blockers, ARB's
 - Inotropic Agents
 - ↑ contractility → ↑ cardiac output
 - Vasodilators
 - Anticoagulants

COMPLICATIONS OF HEART FAILURE

- Pulmonary Edema
- Cardiogenic Shock
- Pericardial Effusion/ Pericardial tamponade
- Systemic and pulmonary emboli (Thromboembolism)
- Organ failure
- Cardiac arrest

Assessment of the Patient with Heart Failure

- ❖ Focus
 - Effectiveness of therapy
 - Patient's self-management
 - S&S of increased HF
 - Emotional or psychosocial response
- ❖ Health history
- ❖ PE
 - Mental status; lung sounds: crackles and wheezes; heart sounds: S₃; fluid status or signs of fluid overload; daily weight and I&O; assess responses to medications

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Collaborative Problems and Potential Complications of the Patient with HF

- ❖ Pulmonary edema
- ❖ Hypotension, poor perfusion, and cardiogenic shock (see Chapter 11)
- ❖ Arrhythmias (see Chapter 22)
- ❖ Thromboembolism (see Chapter 26)
- ❖ Pericardial effusion

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Planning and Goals for the Patient With Heart Failure

❖ Goals

- Promote activity and reduce fatigue
- Relieve fluid overload symptoms
- Decrease anxiety or increase the patient's ability to manage anxiety
- Encourage the patient to verbalize his or her ability to make decisions and influence outcomes
- Educate the patient and family about management of the therapeutic regimen

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Nursing Interventions for the Patient with Heart Failure #1

❖ Promote activity tolerance

- Bed rest for acute exacerbations
- Encourage regular physical activity; build up to about 30 minutes daily
- Exercise training
- Pacing of activities; wait 2 hours after eating for physical activity
- Avoid activities in extreme hot, cold, or humid weather
- Modify activities to conserve energy
- Positioning; elevation of the head of bed to facilitate breathing and rest, support of arms

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Nursing Interventions for the Patient with Heart Failure #2

❖ Manage fluid volume

- Assess for symptoms of fluid overload
- Daily weight
- I&O
- Diuretic therapy; timing of meds
- Fluid intake; fluid restriction
- Maintenance of sodium restriction

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Patient Education for the Patient with Heart Failure

- ❖ Medications
- ❖ Diet: low-sodium diet and fluid restriction
- ❖ Monitor for signs of excess fluid, hypotension, and symptoms of disease exacerbation, including daily weight
- ❖ Exercise and activity program
- ❖ Stress management
- ❖ Prevention of infection
- ❖ Know how and when to contact health care provider
- ❖ Include family in education

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Pulmonary Edema

- ❖ Acute event reflecting a breakdown of physiologic compensatory mechanisms
- ❖ As LV begins to fail, blood backs up into the pulmonary circulation, causing pulmonary interstitial edema
- ❖ Results in hypoxemia, often severe
- ❖ Clinical manifestations: restlessness, anxiety, tachypnea, dyspnea, cool and clammy skin, cyanosis, weak and rapid pulse, cough, lung congestion (moist, noisy respirations), increased sputum production (sputum may be frothy and blood tinged), decreased level of consciousness

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PULMONARY EDEMA

- Fluid in the lungs
- Etiology
- Risk Factors
- S/S
 - Persistent cough, pink frothy sputum, tachypnea, dyspnea, orthopnea, restless, anxiety, unable to sleep, hypoxemia, cyanosis (late sx), crackles, tachycardia, confusion, stupor, S3
- Dx- ABG, CXR, hemodynamic monitoring
- Assessment
- Treatment

Management of Pulmonary Edema

- ❖ Easier to prevent than to treat
- ❖ Early recognition: monitor lung sounds and for signs of decreased activity tolerance and increased fluid retention
- ❖ Minimize exertion and stress
- ❖ Oxygen; nonrebreather
- ❖ Medications
 - Diuretics (furosemide), vasodilators (nitroglycerin)



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Nursing Interventions for the Patient with Pulmonary Edema

- ❖ Positioning the patient to promote circulation
 - Positioned upright with legs dangling
- ❖ Providing psychological support
 - Reassure patient and provide anticipatory care
- ❖ Monitoring medications
 - I&O



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End-of-Life Considerations

- ❖ HF is a chronic and often progressive condition
 - Need to consider issues related to the end of life
 - When palliative or hospice care should be considered



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Cardiogenic Shock

- ❖ A life-threatening condition with a high mortality rate
- ❖ Decreased CO leads to inadequate tissue perfusion and initiation of shock syndrome
- ❖ Commonly occurs following acute MI when a large area of myocardium becomes ischemic and hypokinetic
- ❖ Can occur as a result of end-stage HF, cardiac tamponade, pulmonary embolism (PE), cardiomyopathy, and arrhythmias

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CARDIOGENIC SHOCK

- | | |
|--|---|
| <ul style="list-style-type: none"> ■ Pump failure/ heart failure ■ Etiology ■ S/S <ul style="list-style-type: none"> ■ Initial ■ Compensatory ■ Progressive ■ Refractory ■ Dx <ul style="list-style-type: none"> ■ ECG, echo, CT, cardiac catheterization, CXR, cardiac enzymes | <ul style="list-style-type: none"> ■ Assessments <ul style="list-style-type: none"> ■ VS, output, LOC, cardiac rhythm, skin color, temperature, moisture, capillary refill, turgor, hypoxia, hypotension, tachycardia, weak thready pulse ■ Treatment/ Management <ul style="list-style-type: none"> ■ Decrease afterload ■ Inotropics ■ vasopressors |
|--|---|

Thromboembolism

- ❖ Patients with cardiovascular disorders are at risk for the development of arterial thromboemboli and venous thromboemboli (VTE)
- ❖ Decreased mobility and circulation increase the risk for thromboembolism in patients with cardiac disorders, including those with HF
- ❖ Intracardiac thrombi can form in patients with atrial fibrillation because the atria do not contract forcefully, and increasing the likelihood of thrombus formation
- ❖ Pulmonary embolism: blood clot from the legs moves to obstruct the pulmonary vessels

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Pericardial Effusion and Cardiac Tamponade

- ❖ Pericardial effusion is the accumulation of fluid in the pericardial sac
- ❖ Cardiac tamponade is the restriction of heart function because of this fluid, resulting in decreased venous return and decreased CO
- ❖ Clinical manifestations: ill-defined chest pain or fullness, pulsus paradoxus, engorged neck veins, labile or low BP, shortness of breath
- ❖ Cardinal signs of cardiac tamponade: falling systolic BP, narrowing pulse pressure, rising venous pressure, distant heart sounds

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PERICARDIAL EFFUSION/ CARDIAC TAMPONADE

- Fluid in pericardial sac
- Etiology
- S/S
 - JVD, chest fullness, SOB, low bp, pulsus paradoxus
 - Cardiac tamponade- falling systolic bp, narrowing pulse pressure, JVD, distant or muffled heart sounds
- Dx
 - echo, CXR
- Treatment/Management
 - Pericardiocentesis, pericardiectomy

Medical Management of Pericardial Effusion and Cardiac Tamponade

- ❖ Pericardiocentesis
 - Puncture of the pericardial sac to aspirate pericardial fluid
- ❖ Pericardiectomy
 - Under general anesthesia, a portion of the pericardium is excised to permit the exudative pericardial fluid to drain into the lymphatic system

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Sudden Cardiac Death or Cardiac Arrest

❖ Emergency management: cardiopulmonary resuscitation

- **A:** airway
- **B:** breathing
- **C:** circulation
- **D:** defibrillation for VT and VF

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CARDIAC ARREST

- Ventricular fibrillation (V-fib)
- Asystole
- Pulseless Ventricular Tachycardia (Vtach)
- Pulseless Electrical Activity (PEA)
- S/S
- Treatment
 - IV fluid
 - Medications
 - Epinephrine
 - Vasopressin
 - NaHCO₃
 - Magnesium
 - Antiarrhythmics