CONGESTIVE HEART FAILURE

Congestive Heart Failure

- 5 million Americans affected
- 500 000 new cases dx'd every year
- Causes one million hospitalizations every year
- Cause of 250 000 deaths each year in the USA
- Only heart condition on the rise

Congestive Heart Failure

- Medicare spends more on CHF than all forms of Cancer combined
- Medicare spends approx 56 billion dollars annually on CHF
- Heart Failure hospitalizations has tripled over the last 25 years.
- We need to educate the pt and family in order to increase compliance with plan of care.

Heart failure:definition and key issues

DEFINITION

-a pathphysiologic state in which an abnormality of cardiac function is responsible for the failure of the heart to pump blood at a rate commensurate with the requirements of the metabolizing tissues

Key issues

- incidence rate is high and increasing
- managing heart failure pt's is extremely costly
- Readmission rate for HF pt's is high
- Dx of HF is subjective and problematic

Blood flow

- Blood enters the L atrium from the R and L pulmonary veins and flows into the L ventricle
- The L ventricle pumps blood into the systemic circulatation through the Aorta
- From systemic circulation, blood returns to the heart through the superior and inferior vena cava
- The R ventricle pumps blood to the lungs through the R and L pulmonary arteries

Heart Valves

- Tricuspid valve, between and the R atrium and R ventricle
- Pulmonary valve, between the R ventricle and the entrance of the pulmonary artery
- Mitral valve, between the L atrium and the L ventricle
- Aortic valve, between the L ventricle and the entrance to the aorta

Arteries

- Aorta, the main artery that carries O2 rich blood from the L side of the Heart to the body
- Pulmonary artery, carries blood from the R side of the heart to the lungs to pick up O2
- The heart has arteries on its outside surface called coronary arteries. These arteries supply the heart muscle itself with o2 rich blood

Heart Chambers

- The heart has 4 chambers
  -the upper chambers are called the atria
  -lower chambers are called the chambers
- Atria collects the blood as it comes into the heart
  Ventricles pump the blood out of the heart

FYI

- The size of the heart is about the size of your fist
- The average heart beats 100 000 times per day

Systolic dysfunction

- Most common form of HF
- Hallmark of systolic HF is depressed L ventricular ejection fraction (<40%)
- Coronary artery disease is the cause of HF in 2/3 of pt's with LV systolic dysfunction

Ejection fraction

- The fraction of blood ejected by the ventricle relative to its end diastolic volume
  - -EF=(SV/EDV) X 100
- Ef index of systolic function
  - -normal EF is = >60%
- Most commonly measured with echocardiography
- EF <40% is associated with systolic dysfunction

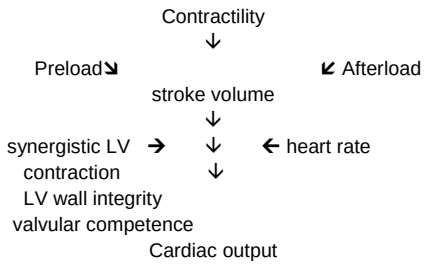
Cardiac output

- The volume of blood ejected from the heart over 1 minute
- Cardiac output= HR x STROKE VOLUME
- Normal = 4-8 L/min
- Cardiac index = CO/BSA
- Normal 2.2-4 L/min/m2

Hemodynamic terms

- Preload- the degree of stretch on the muscle at end of diastole. Filling presure. LVEDP
- Afterload-the impedance that the ventricle must overcome to eject blood. The ventricular wall tension during ejection. SVR
- Inotropy-force of contraction

Determinants of ventricular function



Potential causes of heart failure

- Primary cardiomyopathy
- Myocardial ischemia/MI
- Valvular disease
- Hypertension
- Hyperthyroidism
- Cor pulmonale
- Congenital heart disease
- Diabetes

Who gets heart failure?

Heart failure can happen to anyone, but is more common in:

- people 65 years of age and older

* most common reason people of this are group are admitted to the hospital

Who gets heart failure?

- African Americans

*blacks are more likely to have heart failure and suffer more severely from it.

*their heart failure get worse faster

*have more hospital visits

*are more likely to die from heart failure

Common causes of episodic decompensation in pts with HF

- **Sodium retention**

-Dietary indiscretion
-Medication noncompliance
-NSAIDS
-Worsening renal function

Myocardial ischemia
-worsening of CAD
-Anemia

Arrhythmia
-paroxysmal or sustained AFIB
-prolonged bradycardia

Emotional stress

Thyroid disease

Exposure to extreme environmental conditions

Clinical Manifestations of Right and Left Sided Failure

- **LEFT**

Tachypnea
Tachycardia
Cough
Bibasilar crackles
S3 or/+ S4
↑ Pulmonary arterial pressure
Hemoptysis
Cyanosis
Pulmonary edema
Fatigue
Dyspnea
Orthopnea

- **RIGHT**

peripheral edema
Hepatomegaly
Splenomegaly
Hepatojugular reflux
Ascites
JVD
↑ CVP
Pulmonary hypertension
Weakness
Anorexia
Indigestion
Weight gain
Mental status change

SIGNS AND SYMPTOMS

- AUDIBLE CONGESTION
- RALES
- ORTHOPNEA
- ASCITES/EDEMA
- SHORTNESS OF BREATH
- OBTUNDATION
- ELEVATED BNP
- JUGULAR VEIN DISTENSION
- HEPATIC TENDERNESS
- HYPONATREMIA
- HYPOTENSION
- COOL EXTREMITIES
- NARROW PULSE PRESSURE
- SLEEPINESS
- ELEVATED BUN/CR

Diagnose CHF?

- Chest x-ray
- Chest CT scan
- Observe signs and symptoms sob, JVD, peripheral edema, vital signs, elevated BNP
- BNP- *B* type naturiuretic protein- a cardiac hormone released by the heart ventricles in response to ventricular volume expansion and pressure overload

WHY measure BNP?

- Is an excellent hormonal marker of ventricular systolic and diastolic dysfunction
- BNP levels differentiate COPD and CHF facilitating appropriate plan of care
- Used in combination with a physical assessment, may prevent the ordering of other expensive diagnostic testing
- Circulating BNP concentrations ↑ with severity of CHF
- BNP concentrations, at admission, have been shown to more accurately reflect final dx than an echo's ejection fraction

BNP

- The triage BNP test has 98% specificity using a 100 pg/ml cutoff.

  -in initial studies, it provided 98% diagnostic accuracy versus all other clinical findings in pt's with or without disease hx and corrected 96% of misdiagnoses of pt's with suspected CHF

TREATMENT OBJECTIVES

- ↑ SURVIVAL
- ↓ MORBIDITY
- ↑ EXERCISE CAPACITY
- ↑ QUALITY OF LIFE
- ↓ HOSPITALIZATIONS
- ↓ PROGRESSION OF CHF
- ↓ SYMPTOMS

GOALS OF HEART FAILURE MANAGEMENT

- IDENTIFY AND CORRECT PRCECIPITATING CAUSES
  - smoking, diet, medication compliance/Non-compliance
- RELIEVE SYMPTOMS
  -swelling/sob etc.
- ENHANCE CARDIAC PERFORMANCE
  -reduce cardiac workload
  -control fluid retention
  -enhance myocardial contractility
  -reduce preload &/or after load
  -reduce the neurohormonal components of heart failure

Treatment of CHF

- Pharmacological
  - diuretics
  - ACE inhibotors
  - Beta blockers
  - Aspirin therapy
  - statins
  - vasodilators
  - neurohormonal antagonists
  - anticoagulant therapy
  - antiarrhymics

Diuretics

- Loop
  -excretes 15-20% of filtered NA+
  -↑ elimination of K+, Ca+, and Mg++
  Lasix- “lasts six hours” ☺
  Bumex- bumetadine
  Demadex

  INHIBITS EXCHANGE OF CL,NA, AND K+ IN THE THICK SEGMENT OF THE ASCENDING LOOP OF HENLE.

Diuretics

- K+ sparing
  aldactone-
  Dyrenium-
  ✱ inhibits reabsorbtion of Na+ in the distal convoluted and collecting tubule

Mechanisms of action

-eliminate less than 5% of filtered Na+
-inhibit the exchange of Na+ for K or H+
-aldactone= competitive antagonists for the aldosterone receptor
-amiloride and triamterene blocks Na+ channels blocked by aldosterone

Diuretics

- Thiazides
  HCTZ
  inhibits active exchange of CL, NA+ in the cortical diluting segment of the descending Loop of Henle

MECHANISM OF ACTION

-Excretes 5-10% of filtered NA+
-↑ Elimination of K+
-inhibit carbonic anhydrase: increase elimination of HCO3
-↑ excretion of uric acid, Ca and MG

Diuretics
Adverse Reactions

- Thiazide and Loop Diuretics
  - -change in electrolytes
    - ↓ volume
    - ↓ Na+, K+, Ca++, Mg+
  - -metabolic changes
    - ↑ glycemia, uremia, gout
    - ↑LDL-C and TG
  - -cutaneous allergic reactions
  - -ototoxicity with Loop diuretics

Ace Inhibitors

Angiotensin converting enzyme

- All pt's with heart failure caused by a weak left ventricle should take an ace inhibitor, unless they truly cannot tolerate med
- The start of admin. of ace inhibitor should not be delayed.
- Disease progression may slow down with ACE inhibitor use even if symptoms don't improve
- Early side effects should not prevent long term use

Ace inhibitors

-improves hemodynamics measurements and congestive symptoms

-reduce cardiovascular events and hospitalizations due to CHF

-improve survival

❋ ***less than ½ of all eligible pt's are receiving them***

Ace inhibitors

angiotensin converting enzyme

Captopril	Monopril
Lisinopril	Univasc
Enalapril	Accupril
Lotensin	Altace

Beta blockers

- Along with ace inhibitors are the cornerstone of HF Rx
- All pt's with stable class 2 or class 3 HF caused by a weak L ventricle should be on a BB
- Disease progression may be slowed down with BB use even if symptoms don't improve

❋ **Fewer than 1/3 of eligible pt's are treated with BB or are treated with inadequate dose.**

Beta Blockers Possible Beneficial effects

- ↑ Density of beta receptors
- ↓ neurohormonal activation
- ↓ heartrate
- Antihypertensive and antianginal
- Antioxidant
- Antiproliferative

Beta-blockers

- Toprol xl
- Metoprolol
- Atenolol
- labetalol
- Nadolol
- Propanolol

Digitalis

- Digoxin is recommended to improve symptoms in HF pt's with a weak L ventricle
- Digoxin increases the contractility of the heart thus the heart does not have to work as hard to pump

-By educating the patient, we allow them to become independent, take control of their health and live a more productive lifestyle.

-Education may prevent the pt from a long term hospital stay and even the possibility of eventually needing a heart transplant or death

Education objectives

- To assist staff in learning the importance of educating their pt's with CHF and provide tools to help with instructions

Long term goals

- Comply with JCAHO and state regulations and to aid in the ↓ hospital admissions for CHF

Patient Teaching/Education

- A. **<u>weight control…diet…exercise</u>**
  - Fluid restriction- weigh yourself every day
  - Limit Alcohol
  - Avoid foods with high salt/sodium levels (sodium free labels)
  - Choose fresh foods-fruits and vegetables
  - Rest after meals/exercise (if recommended)

Patient Education/Teaching

- **Medication regimen**… *Helps your blood flow easier and reduces the work your heart has to do…….*
  -importance of taking meds on time-same time every day
  -never run out- refill one week before you run out
  -do not take any medications (including otc) without consulting your physician…report any side effects

Patient Education/Teaching

- C. **Follow up with Doctors**
  -keep phone numbers readily avail.
  -post discharge f/u – listens to heart and lungs
  -lab work, listen to c/o's, check meds
  - md's can help with plan to quit smoking
  -exercise regimen
  -literature that may be helpful
  -flu and pneumonia vaccine-prevention

Patient Education/Teaching

- D. Symptoms to report immediately
  -chest pain or pressure
  -dyspnea, waking up sob
  -fever, constant cough
  -swelling of feet or ankles
  -weight gain of 2-5 lbs

JCAHO COMPLIANCE

1. #1 BURDEN ON HEALTH CARE SYSTEM
2. EDUCATING PATIENT ABOUT THEIR ILLNESS

   PROVIDES INFO TO HELP THE PT BETTER CONTROL THEIR HEALTH, REDUCES HOSP. READMISSIONS

KEEPING IN COMPLIANCE

3. <u>RIH HEART FAILURE GUIDE</u>

   A. JCAHO COMPLIANCE- Proper documentation of CHF education.

   -purple sticker on back of pamphlet should be placed on pt's RIH education sheets in kardex, and as teaching on flow sheets

KEEPING IN COMPLIANCE

B. Lifespan Internet

1. sign on
2. click on medical
3. click on micromedex
4. click on PATEINT CARE NOTES

   TYPE IN *<u>Congestive Heart Failure</u>*

KEEPING IN COMPLIANCE

Many Options:

-causes, signs and symptoms

-what to expect in the hospital

-medications, tests, fluid restriction

-discharge instructions

-in English and Spanish

EDUCATION IS THE KEY TO BETTER HEALTH AND STAYING OUT OF THE HOSPITAL

-By educating the pt., we allow them to become independent, take control of their health and live a more productive lifestyle.

-Education may prevent the pt from a long term hospital stay and even the possibility of eventually needing a heart transplant

Education cont.

….if u have a pt in severe CHF, in advanced stages, symptoms usually get worse and may lead to death. If a pt does not have advanced directives/orm on file, contact the physician to discuss this with the pt and family

….Advocate for your pt. Offer information on a living will, power of attorney and aid the pt in expressing spiritual needs. Offer support and arrange for clergy guidance if requested.

The

End