Managing Heart Failure:
Case Study

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Background

Congestive heart failure (CHF) is an imbalance in pump function in which the heart fails to maintain the circulation of blood adequately. The most severe manifestation of CHF, pulmonary edema, develops when this imbalance causes an increase in lung fluid secondary to leakage from pulmonary capillaries into the interstitium and alveoli of the lung.
CHF can be categorized as forward or backward ventricular failure. Backward failure is secondary to elevated systemic venous pressure, while left ventricular failure is secondary to reduced forward flow into the aorta and systemic circulation.
Furthermore, heart failure can be subdivided into systolic and diastolic dysfunction. Systolic dysfunction is characterized by a dilated left ventricle with impaired contractility, while diastolic dysfunction occurs in a normal or intact left ventricle with impaired ability to relax and receive as well as eject blood.
**Normal**

**Enlarged Heart**
A type of cardiomyopathy. An enlarged heart is a sign that the heart may be overworked.

- Left ventricle
- Right ventricle
- Thin, weakened left ventricle

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Etiologies of pulmonary edema may be placed in the following 6 categories

1. Pulmonary edema secondary to altered capillary permeability—includes acute respiratory deficiency syndrome (ARDS), infectious causes, inhaled toxins, circulating exogenous toxins, vasoactive substances, disseminated intravascular coagulopathy (DIC), immunologic processes reactions, uremia, near drowning, and other aspirations.
2. Pulmonary edema secondary to increased pulmonary capillary pressure—comprises cardiac causes and noncardiac causes, including pulmonary venous thrombosis, stenosis or veno-occlusive disease, and volume overload.
3. Pulmonary edema secondary to decreased oncotic pressure found with hypoalbuminemia.

4. Pulmonary edema secondary to lymphatic insufficiency.

5. Pulmonary edema secondary to large negative pleural pressure with increased end expiratory volume.
6. Pulmonary edema secondary to mixed or unknown mechanisms including high altitude pulmonary edema (HAPE), neurogenic pulmonary edema, heroin or other overdoses, pulmonary embolism, eclampsia, postcardioversion, postanesthetic, postextubation, and post–cardiopulmonary bypass
Mortality/Morbidity

- **Sex:** (1) Prevalence is greater in males than in females for patients aged 40-75 years. (2) No sex predilection exists for patients older than 75 years.

- **Age:** Prevalence of CHF increases with increasing age and affects about 10% of the population older than 75 years.
Case study

- A 60-year-old man was admitted to intensive care unit because of dyspnea and pulmonary vascular congestion.
- The patient had reportedly been well until seven days earlier, when he began to have dyspnea during moderate exertion. Four days before admission, he felt a nonradiating, "heavy" discomfort in the lower retrosternal and epigastric areas when he stooped, bent over, or walked short distances. There was NO orthopnea, sweating, nausea, or edema.
Patient admitted to the hospital. The blood pressure was 150/80 mm Hg. The pulse was 90 to 100 bpm. Inspiratory crackles were heard at both lung bases. The abdomen was normal, and there was no peripheral edema.

Laboratory tests were performed, levels of CK and CK MB were normal, as was the level of troponin. The levels of urea nitrogen, creatinine, glucose, calcium, magnesium, electrolytes, LFT were normal.
An electrocardiogram showed sinus rhythm.

A chest radiograph was said to have shown cardiac enlargement and lower-lobe infiltrates, findings that suggested the presence of congestive heart failure.
Arterial blood gases showed,

- pH 7.410
- pCO₂ 38.7 mmHg
- pO₂ 69.8 mmHg
- HCO₃ 24.0 mmol/L
- BE -0.7 mmol/L
- O₂ SAT 89.3%
Investigations to undergo

- A major barrier to optimum management of heart failure is the difficulty in securing a confident diagnosis of heart failure, and where possible identify the underlying cause or causes.
The definitive diagnostic tool in heart failure diagnosis is the use of echocardiography, the reliance on a patient’s response to diuretic therapy, often relied upon in a primary care setting is fraught with opportunities for misdiagnosis or the opportunity to correct an underlying cause such as valvular dysfunction.
An ECG should be undertaken to identify arrhythmias or recent or ongoing ischemia events,

auscultation of the chest may identify abnormal heart sounds which may require further investigation,

full blood counts should be taken to identify the contribution of anemia of various causes and thyroid function may all elicit physiological contributors to a patients worsening symptoms
Cont.d

- Baseline electrolytes and creatinine / urea should be obtained particularly prior to introduction of ACE – inhibitor therapy.

- A patients weight at the time of presentation and target ie “dry” weight should be obtained if possible.
Initial drug therapy

- It is essential to initially improve the signs and symptoms of congestion with the judicial use of loop diuretic therapy (frusemide).
- Laxis 60mg IV given.
- Oxygen 6lpm via oxygen mask.
- Isoket infusion 5mcg/min.
The dose of diuretic used should be that which removes excess fluid without causing rapid dehydration or worsening of renal functions. A daily weight loss of about 1 kg in a community setting should not be exceeded.
Nursing Assessment

The focus of nursing assessment for patient with cardiac failure is directed toward observing for signs and symptoms of pulmonary and systemic fluid overload.

- The nurse explore sleep disturbances, particularly sleep suddenly interrupted by shortness of breath.
- Numbers of pillows needed for sleep.
- Activities of daily living, and activities that cause shortness of breath.
Cont.d

- **Urine output**: it is important to measure output to develop baseline to measure against in testing the efficacy of diuretic therapy.
- **Respiratory**: the lungs are auscultated at frequent interval to determine the present or absence of crackles and wheezing.
- **Cardiac**: the heart is auscultated for the present of an $S_3$ or $S_4$ heart sound.
Cont.d

- **Level of consciousness**: as the intravascular volume increase, the circulating blood becomes dilute and its oxygen transport capacity is compromised.
- **Peripheral**: the dependent parts of the patient`s body are assessed for edema, the liver is examined for hepatojugular reflux (HJR), and jugular vain distention (JVD) is assessed.
Nursing Diagnoses

Nursing management of a patient with heart failure incorporates a variety of nursing diagnoses:
(1) Impaired gas exchange related to ventilation / perfusion mismatching or intrapulmonary shunting.
(2) Decreased cardiac output related to alterations in preload, contractility, heart rate and rhythm.
Nursing Diagnoses

(3) activity intolerance related to cardiopulmonary dysfunction,
(4) anxiety related to threat to biology, psychology or social integrity,
(5) disturbed sleep pattern related to circadian desynchronization,
(6) noncompliance related to lack of knowledge.
Nursing management

Optimize Cardiopulmonary function

- ECG is evaluated for any dysrhythmias that may be present or may develop as a result of drug toxicity or electrolytes imbalance.

- Breath sound are auscultated frequently to determine adequacy of respiratory effort and to assess for onset or worsening of congestion.
Oxygen is administered to relieve dyspnea. Diuretics or vasodilators are used to decrease excessive preload and afterload.

Morphine may be administered to decrease hyperventilation and anxiety. If the patient ventilatory status worsens, the nurse must be prepared for endotracheal intubation and mechanical ventilation.
Promote Rest

- During period of breathlessness, activity must be restricted, head of the bed elevated to allow for maximal lung expansions. The arms can be supported on pillows so that no undue stress is placed on the shoulder muscles.
The legs may be placed in a dependent position to encourage venous pooling. Signs of activity intolerance, such as dyspnea, fatigue, sustained increase in pulse, and onset of dysrhythmias, are documented and reported to physician.
Pharmacologic Therapy

Aggressive pharmacologic therapy was required. The nurse must to know the action, side effects, therapeutic levels, and toxic effects of diuretics, the positive inotropic agents to increase ventricular contractility, and vasodilators used to decrease preload. Hemodynamic response to these agents, as well as diuretic therapy and fluid restriction, is closely monitored.
Patients and Family Education

- The nurse should assist the patient to understanding of conservation of energy in planning activities and collaborates with the patient in organizing daily schedule. Fluid balance, low salt diet to reduce fluid retention, daily weight decrease or increase weight in a few days is a singe of fluid gain or loss.
Evaluation

Expected outcomes
1- Experiences reduced fatigue and dyspnea
   a- Obtains adequate physical and emotional rest
   b- Assume positions that reduce fatigue and dyspnea
2- Experiences less anxiety
   a- Avoids situations that produce stress
   b- Sleeps comfortably at night
   c- Reports decrease stress and anxiety
Cont.d

3- Attains normal tissue perfusion
   a- Obtain adequate rest
   b- Perform activities that promote venous return
   c- Skin warm and dry with normal color
   d- Exhibits no peripheral edema
Summary

- The incidence of heart failure is increasing. It is therefore incumbent on healthcare providers to evaluate their heart failure practices and to incorporate the most current knowledge of the pathophysiology, assessment, and treatment modalities for heart failure into their patient care.
Current practice guidelines provide a basis for the treatment of patients with heart failure. Critical to the success of heart failure management is the discharge planning process and follow-up in the outpatient setting.
THANK YOU