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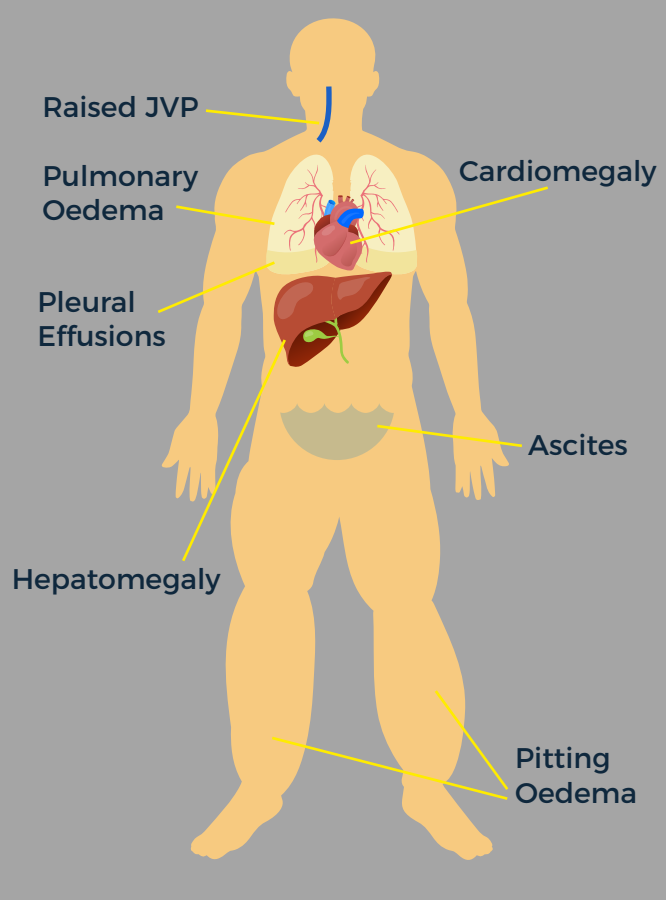
Standard Treatment Workflow (STW) for the Management of
HEART FAILURE: A BREATHLESS PATIENT
ICD-10-I50.9

SYMPTOMS
1. Dyspnea/ orthopnea/ PND
2. Pink frothy sputum
3. Dependent pedal edema
4. Recent weight gain
5. Easy fatiguability
6. H/o CHF/ MI

SIGNS
1. Tachypnoea
2. Tachycardia or irregular pulse
3. Basal crepitations
4. Cardiomegaly
5. Presence of murmurs
6. Systemic desaturation



ADDITIONAL INFORMATION
- Prior history of respiratory illness like asthma or COPD
- Known patient of CHF/ similar illness in past with response to therapy
- Prior history of RHD, CAD, pregnancy, cancer chemotherapy
- Risk factors: HT, DM, smoking, hyperlipidemia or premature CAD in first degree relatives

COMMON ETIOLOGY AND INDICATORS
1. Ischemic cardiomyopathy: past MI
2. Diabetic cardiomyopathy
3. RHD: existing valvular disease
4. Post-viral: acute onset breathlessness within last 3 months
5. Peri-partum cardiomyopathy-onset in last trimester or after delivery
6. Idiopathic cardiomyopathy
7. Post-cancer chemotherapy

MANAGEMENT AT PHC
- Rule out respiratory cause: Breathlessness with fever, cough and expectoration or known patient of asthma or COPD
- Likely CHF: Decongest with furosemide

REFER IF FOLLOWING:
- BP < 90 mmHg or > 200 mmHg
- Heart rate < 50/min or > 120/min
- Respiratory rate > 30/min or cyanosis
- Oliguria
- Altered sensorium

→ **REFER TO COMMUNITY HEALTH CENTRE**

MANAGEMENT AT CHC
- Admit and stabilize
- Send for routine investigations
- ECG: Rule out acute ST-Elevation MI
- X-ray chest: Rule out respiratory etiology
- Decongest with intravenous furosemide
- O2 therapy if systemic saturation < 90%
- Start enalapril and spironolactone orally
- Consider carvedilol after decongestion

KEEP WATCHING
1. Respiratory distress and oxygen saturation
2. BP and heart rate
3. Electrolytes and renal parameters

→ **REFER TO A DISTRICT HOSPITAL**

MANAGEMENT AT DISTRICT HOSPITAL
- Admit and re-assess
- Optimise therapy with furosemide/ enalapril/ spironolactone/ O2 and stabilize
- Consider non-invasive ventilation if marked respiratory distress and O2 saturation < 90%
- Echocardiography: confirm diagnosis of HFrEF: LV ejection fraction < 35%
- Search for etiological diagnosis
- Consider carvedilol after decongestion
- Refer back to CHC/ PHC after stabilization

MANAGEMENT AT TERTIARY HOSPITAL
1. Re-assess and confirm diagnosis of HF
2. Categorize acute (< 3 months) vs chronic (> 3 months) and HFrEF (EF 35%) vs HFpEF (EF 35-50%)
3. Optimize therapy with furosemide, enalapril, carvedilol, spironolactone and O2
4. Consider ARNI and ivabradine
5. Pneumococcal and influenza vaccines
6. Investigate for etiology and manage
7. Consider non-pharmacological invasive therapy
   a. ICD: In selected patients (Ref Arrhythmia STW)
   b. BiV: Consider in NYHA class II/ III Symptomatic patient , EF <35%, QRS >150msec in sinus rhythm with LBBB morphology and optimal medical therapy of >3 months
8. Etiology based Interventions
   a. PCI
   b. Valve replacement
   c. CABG

REFER TO TERTIARY CARE IF
- CHF uncontrolled,
- Unstable hemodynamics
- Suspected ongoing ischemia
- Abnormal electrolytes
- Abnormal renal functions
- Structural heart disease
- Unclear etiology

CONSIDER AT ALL LEVELS
Smoking Cessation | Salt restriction | Physical activity | Weight Reduction | Moderation of alcohol | Control of DM/ HTN/ Lipids | Secondary CVD prevention with aspirin and statins

INVESTIGATIONS:

BASIC INVESTIGATIONS
- Hemogram, ESR
- Blood sugar
- Urine examination
- Urea/ Creatinine
- Sodium/ Potassium
- ECG
- Chest X-ray PA view

WHAT TO LOOK FOR IN X RAY
- Cardiomegaly
- Pulmonary venous congestion
- Pneumonia or other lung pathology

WHAT TO LOOK FOR IN AN ECG?
- Pathological Q wave
- Conduction abnormalities, especially LBBB
- Chamber enlargement
- Atrial fibrillation

Note: If ST elevation present, manage as STEMI

DESIRABLE INVESTIGATIONS
- 2D Echocardiography
- BNP/NT pro-BNP
- Troponin
- Lipid profile
- Thyroid function test
- Iron profile

OPTIONAL INVESTIGATION
- Prolonged ECG monitoring
- Coronary angiography
- Radionuclide imaging
- CT scan
- MRI
- PET
- Myocardial biopsy
- Electrophysiological study

COMMON DRUGS AND DOSAGE FOR CHF

FUROSEMIDE
- Dose 20-80 mg daily PO
- Intravenous 10-40 mg SOS in acute stage
- Change to oral when symptoms subside
- Monitor serum electrolytes, creatinine and uric acid on therapy

SPIRONOLACTONE
- Dose 25-50 mg once daily PO
- Keep watch on serum potassium and creatinine every 2-4 weekly

CARVEDILOL
- Dose 3.125 to 25 mg twice daily PO
- Start after decongestion with low dose with BP > 100 mmHg and HR >60/ min
- Uptitrate dose 1-2 weekly till maximum tolerable dose
- Keep watch on BP, heart rate and recipitation of CHF symptoms
- Increase diuretics and reduce carvedilol to manage reappearance of CHF

ENALAPRIL
- Dose 2.5 to 10 mg twice daily PO
- Start with low dose with BP >100 mmHg, normal electrolyte and creatinine less than 2.5 mg/dl
- Uptitrate dose 1-2 weekly till maximum tolerable dose
- Keep watch on BP and electrolytes before every increment and on follow-up

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

ABBREVIATIONS
ICD: Implantable Cardioverter defibrillator
BiV: Bi-Ventricular Pacing
PND: Paroxysmal Nocturnal Dyspnea
PCI: Percutaneous Coronary Intervention
CABG: Coronary Artery Bypass Graft
CVD: Cardiovascular Diseases
RHD: Rheumatic Heart Disease
CAD: Coronary Artery Disease
HFrEF: Heart Failure with reduced Ejection Fraction
HFpEF: Heart Failure with preserved Ejection Fraction
STEMI: ST elevation Myocardial Infarction
LV: Left Ventricle
COPD: Chronic Obstructive Pulmonary Disease

REFERENCES

1. *Management Protocols for Chronic Heart Failure in India. Mishra S, Mohan JC, Nair T et al. Indian Heart J.2018;70:105-127,*
2. *ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. Ponikowski P, Voors AA. Anker SD et al. European Heart Journal. 2016;37:2129–2200*
3. *Chronic heart failure in adults: diagnosis and management. NICE guideline [NG106] Published date: September 2018*
4. *2013 ACCF/AHA Guideline for the Management of Heart Failure. A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Yancy CW, Jessup M, Bozkurt B. J Am Coll Cardiol. 2013;62-16: e150-e210*