WHAT IS CONGESTIVE HEART FAILURE?

Congestive heart failure (CHF) is a term used to describe the heart's inability to pump enough blood to meet the body's needs. Heart failure does not mean that the heart has failed completely, but rather that the heart is not strong enough to meet the body's needs at times of stress or increased activity. The left ventricle normally receives blood from the lungs and pumps blood through the arteries to the brain, internal organs and extremities. When the left ventricle is weak the patient may experience symptoms of low cardiac output: fatigue and dizziness, and symptoms of congestion: shortness of breath on exertion, inability to lay flat and awakening at night-time with shortness of breath. If the CHF becomes severe fluid may leak into the lungs causing "pulmonary edema" and severe respiratory (breathing) difficulties. When the right ventricle fails the patient may also have symptoms of low cardiac output but also experience fluid build-up in the tissues of the body resulting in leg swelling (edema) and congestion of the internal organs.

Causes of CHF

Weakness of the left ventricle can be caused by:

- Longstanding uncontrolled hypertension
- Heart attacks — damage to the heart muscle due to coronary artery disease (blocked arteries)
- Valvular heart disease — longstanding leaking or narrowing of the aortic or mitral valves
- Viral, toxic or metabolic disturbances damaging the heart muscle. Alcohol is the commonest culprit
- Longstanding rapid heart beating (racing) due to some form of arrhythmia
- Congenital abnormalities e.g. ventricular septal defect (a hole between the left and right ventricles)

Weakness of the right ventricle may be caused by:

- Failure of the left ventricle
- High blood pressure within the lungs
- Valvular heart disease — pulmonary valve stenosis (narrowing)/tricuspid valve leaking
- Right ventricular infarction (heart attack) due to coronary artery disease
- Congenital abnormalities e.g. atrial septal defect (a hole between the left and right atria)
- Disease affecting the sac surrounding the heart (the pericardium) such as fluid accumulation (effusion) or abnormal thickening (constriction)

Is CHF dangerous?

Untreated CHF can lead to severe respiratory difficulties which can be life threatening. Fortunately there are many medications which are effective in treating the symptoms and improving the prognosis of CHF. Lifestyle modifications including proper diet and salt restriction can help reduce or eliminate the symptoms of CHF.

It is important for you to recognize the symptoms of heart failure and to alert your physician to any deterioration in your condition. If you act early on, severe heart failure and the need for hospitalization may be avoided.

Heart Failure Do's and Don'ts

Do:

1) Get plenty of rest
2) Avoid salt in your diet, at the table and in your canned or processed foods
3) Keep as active as you can
4) Take all your medicines as directed
5) Weigh yourself frequently and keep a weight diary – increasing weight can be an early sign of worsening heart failure
6) Report any change in symptoms to your doctor
7) Drink alcohol only in moderation or not at all if your doctor directs
8) Learn about your condition
9) Obtain yearly flu shots
10) Control other cardiac risk factors and conditions

Do Not:

1) Eat a lot of salt (salt leads to fluid retention)
2) Drink excessive fluids — in general no more than 6-8 cups of fluid/day
3) Smoke
4) Drink excessive alcohol
5) Skip your medications or adjust them without the direction of your physician
6) Take over the counter medications, particularly anti-inflammatory agents, without alerting your physician

DAILY WEIGHT RECORD / HOW TO ADJUST YOUR DIURETIC DOSE

Date Y/M/D	Weight (Lbs/kg)	Target Hr	Exercise Duration	RPE 1-10	Symptoms Better/Worse/Unchanged	Edema* (Swelling)

How to Adjust Your Diuretic Dose

Congestive heart failure is not a static (unchanging) condition. Heart failure may deteriorate for a variety of reasons. For instance: excessive salt or fluid intake, intercurrent illness such as flu or pneumonia, cardiac arrhythmias, anemia, medications which cause salt retention such as anti-inflammatory medications, episodes of angina, heart attacks etc. all may worsen heart failure. Sometimes however, the patient with heart failure worsens for no apparent reason. The educated patient must know how to anticipate deterioration, and to know how to react to it in order to correct the deterioration before it becomes serious. Just as when steering a car, the heart failure patient must adjust to changes in their condition in order to stay on course. A little too wet and they become congested and short of breath. A little too dry and they become weak, fatigued and dizzy.

When your doctor examines your neck, he is looking at your veins to assess how much fluid is in the circulatory system. Although the patient cannot do this, paying attention to your condition, particularly how you feel, how much swelling is present at the ankles and your body weight can give a pretty good indication of your fluid status. A little bit of swelling of the ankles at the end of the day is normal and indicates sufficient fluid in the circulatory system to allow a weakened heart to pump normally. More than a trace of swelling at the ankles indicates fluid excess. This fluid may re-enter the central circulation when you lie down, awakening you with shortness of breath or forcing you to sleep on several pillows for comfort. Similarly if your weight goes up by more than 2-3 pounds (1.0 kg) in one day or by 5 pounds (2.5 kg) over a week, the body may be retaining too much fluid and worsening heart failure may ensue.

To monitor your own fluid status:

1) Weigh yourself daily
2) Weigh yourself at the same time every day — before breakfast is best.
3) Use the same scale all the time
4) Wear the same amount of clothes when you weigh yourself
5) Empty your bladder before weighing
6) Record your weight on a daily record
7) The weight at which there is just a little bit of swelling in the ankles at the end of the day is your ideal weight-try and maintain it
8) When taking diuretics avoid drinking too much in the way of fluids, even if your mouth is dry and you feel thirsty. This could counter the effect of the diuretic and dilute the body's salts causing weakness and confusion.
9) You should drink no more than 2000 ml (8 glasses or cups) of fluid per day, or whatever amount is prescribed for you.
10) If your weight goes up by more than 2-3 pounds (1.0 kg) in one day or by 5 pounds (2.5 kg) over a week adjust your diuretic according to the diuretic sliding scale or call your nurse or doctor.

Diuretic 1:

Take extra furosemide according to following sliding scale.

Diuretic Dose	Dosing Frequency	Sliding Scale Adjustment
Furosemide 20 mg	AM daily	Extra 20 mg in PM
Furosemide 40 mg	AM daily	Extra 40 mg in PM
Furosemide 80 mg	AM daily	Extra 40 mg in PM. If needed ↑ to extra 80 mg in PM
Furosemide 20 mg	Twice daily	Extra 20 mg in AM
Furosemide 40 mg	Twice daily	Extra 40 mg in AM
Furosemide 80 mg	Twice daily	Extra 40 mg at noon. If needed ↑ to extra 80 mg at noon.
Cut back to usual diuretic dose as weight, swelling and symptoms permit		

Diuretic 2:

Some times one diuretic medication is insufficient to control fluid overload. A second diuretic is needed. This diuretic is usually taken in low dose and intermittently as required (PRN). Combining diuretics can produce a very potent effect resulting in excess dehydration. Only your physician should make adjustments of these diuretics unless otherwise instructed.

Diuretic Dose mg	Dosing Frequency	Sliding Scale Adjustment
HCT* 12.5		
HCT 25 ** hydrochlorthiazide*		
Indapamide 1.25		
Indapamide 2.5		
Indapamide 5.0		
Metalozone 1.25		
Metalozone 2.5		
Metalozone 5		
Spironolactone 12.5		
Spironolactone 25		
Spironolactone 50		
Dyazide		
Moduret		
Aldactazide 25		

When you are taking several diuretics, it is necessary for your physician to monitor your blood work including sodium, potassium and creatinine (a measure of kidney function). Low blood sodium can lead to confusion and weakness and may require fluid restriction. Low blood potassium may lead to cardiac arrhythmias and may require a potassium replacement diet or or a potassium medication. If the serum creatinine rises excessively it may be necessary to reduce your diuretic dose on instruction of your physician. This increase in creatinine does not indicate kidney damage but merely reflects reduced blood flow to the kidney due to over-diuresis. Controlling heart failure is often a balancing act between being too wet and too dry.

GUIDE FOR HEART FAILURE (HF) MANAGEMENT

✓	Approach	Reccomendations	
	Symptoms & Signs of HF:	Fatigue (low cardiac out-put), SOB, ↑JVP, rales, S3, edema, radiologic congestion, cardiomegaly. Elevated BNP. CXR to r/o infection, interstitial lung disease & PPH (Primary Pulmonary Hypertension)	
	Ejection fraction (echocardiogram, LV gated study, CT angiogram or MRI)	≤ 40% = systolic dysfunction 40-55% = mixed systolic and diastolic dysfunction ≥ 55% = diastolic dysfunction - **treat underlying disorder:** **HPT/ischaemia/pericardial constriction/restrictive CM (cardiomyopathy)/infiltrative disorders**	
	Consider etiology	❍ **Ischemic-CM** ❍ **HPT- CM** ❍ **Valvular HD-CM (AS/AR/MR)** ❍ **Metabolic: hyper/hypo-thyroidism/hemochromatosis/pheochromocytoma** ❍ **Toxins: Alcohol/anthracyclines/cocaine/trastuzumab/amphetamines and other chemotherapy** ❍ **Viral CM** ❍ **Idiopathic Dilated CM**	
	Identify triggers		
	Acute-sudden onset	Ischaemia, arrhythmia, infection, pulmonary embolism, acute valvular pathology	
	Chronic-gradual onset	Anemia, thyrotoxicosis, non-compliance, diet, Rx e.g. NSAID's	
	Treatment:	Correct triggers and precipitants of acute and chronic Heart Failure	
	General measures	• Low sodium diet/protein nutrition • Regular exercise/activity • D/C smoking • Control hypertension	• Treat and control diabetes • Identify & Rx depression • Treat lipid abnormalities • Tx ischemia:PCI,CABG/Valve Sx
	Symptomatic therapy Goals: ↓symptoms ↑ Quality of Life	**Diuretics** - titrate to euvolemic state • Maintain Ideal Body Weight (dry weight = JVP normal/trace pedal edema) • Furosemide 20 mg – 80 mg OD-BID • HCT/Zaroxolyn for refractory congestion	
		Digoxin-for persisting symptoms in NSR (systolic dysfunction) or symptoms and rate control in Afib. Dose: 0.125 mg – 0.25 mg OD (Lower dose in elderly or renal failure: 0.0625 mg OD or less frequently)	
	Therapy to: • Improve prognosis • Prevent progressive LV dysfunction	**ACE Inhibitors-General Guideline: Start low and titrate to the target dose used in the clinical trials or the MAXIMUM TOLERATED DOSE:** • **Captopril 6.25→50 mg BID-TID** • **Enalapril 2.5mg→10 mg BID†** • **Ramipril 2.5 mg → 5 mg BID §** • **Lisinopril 2.5 mg → 30-40 mg OD**	• **Trandolapril 1→4 mg OD‡** • ***Quinapril 10 mg→40 mg OD** • ***Cilazapril 0.5 mg →10 mg OD** • ***Fosinopril 5 mg→40 mg OD** • ***Perindopril 4 mg→8 mg OD** ***No large scale HF outcome trials** **† SoLVD/X-SoLVD § AIRE / AIREX ‡ TRACE** **Consider ISDN 5-40mg QID+Hydralazine 10-75mg QID for ACE-I/ARB intolerance VHeFT**

GUIDE FOR HEART FAILURE (HF) MANAGEMENT (CONT'D)

✓	Approach	Reccomendations
	ARB's	**Angiotensin II receptor antagonists (ARB's)** • **ACE-Inhibitors remain first line therapy** • **ARB's indicated in ACE-I intolerant patients** • **(CHARM candesartan 16-32 mg OD) (Val-HeFT /VALIANT valsartan 160 mg BID)**
	Beta Blockers	**General Guidelines** - Add Beta-blocker* to ACE-inhibitor/diuretic/+/- digoxin in stable Class **II-IV** CHF/LVEF < 40% (*No outcome data for other beta-blockers) • Bisoprolol* 1.25→10 mg OD (CIBIS II Trial) • Carvedilol* 3.125 mg BID→25 mg BID (50 mg BID if weight > 85 kg) • Metoprolol* 12.5 mg BID→75 mg BID (MERIT Trial)
	Aldosterone antagonists ***Caution:** diabetics/renal disease/elderly/ NSAIDs & COX-2 inhibitors*	• Spironolactone 12.5-25 mg OD added to ACE-inhibitor/diuretic/+/- digoxin in stable Class **III-IV** CHF/LVEF ≤ 35%/CR<220/K<5.0 (RALES Trial) • Epleronone 25-50 mg OD in post MI HF (heart failure) with LVEF ≤ 40% (EPHESUS Trial) • Follow K/Cr in 3-7 days/↓ furosemide to avoid azotemia)
	Anti-coagulant anti-platelet therapy	**ASA** if CAD (↓ dose to ↓ ACE inhibitor interaction) **Coumadin** for Afib, LV thrombus, ↓ LVEF ≤ 20%, DVT or pulmonary embolism Duration of A/C therapy: Indefinite for Afib/recurring systemic TE or DVT/PE

Consider Internal Medicine/Cardiology or Heart Failure Clinic referral for initiation/titration of ß-blocker. Consider EPS referral for symptomatic sustained or non-sustained ventricular arrhythmia (LVEF 30-40%) or AICD: Prior MI/CAD (LVEF ≤ 30% with IVCD ≥ 0.12 sec: MADIT II) CHF: (NYHA II-III & LVEF <35% SCD-HeFT) Cardiac Resynchronization Therapy(CRT):(NYHA Class III-IV with reduced ejection fractions; LVEF < 35%; QRS duration ≥ 0.13 with IVCD or LBBB: MIRACLE / MUSTIC) or both CRT/AICD: (NYHA III-IV;QRS ≥ 0.12:COMPANION). EECP/Transplant for refractory CHF.

Resources

CCS Heart Failure Consensus Conference (HFCC): http://www.hfcc.ca
Canadian Heart Failure Clinics Network (CCHFCN): http://www.cchfcn.org
Heart Failure society of America (HFSA): http://www.hfsa.org/hf_guidelines.asp
ACC/AHA Heart Failure Guidelines: http://www.americanheart.org/presenter.jhtml?identifier=3004550
European Society of Cardiology Guidelines: http://www.escardio.org/knowledge/guidelines

See also **Beta Blocker Titration Protocol** http://www.cvtoolbox.com/cvtoolbox1/heart_failure/hf_11.html

Other Information and Diet Sheets Available:

- Diet for Type 2 Diabetes
- Diet for Hypertention
- Diet for Congestive Heart Failure
- Potassium Replacement Diet
- Dyslipidemia Package
- Hypertension Package
- Discharge Summary
- Atrial Fibrillation Package

Please visit **www.cvtoolbox.com** for more information.

HEART FAILURE FLOWSHEET

Rx ✓	Date ✓ Achieved	Date ✓ Achieved	Date ✓ Achieved	Date ✓ Achieved	Date ✓ Achieved	Date ✓ Achieved	Date ✓ Achieved
Weight Kg./lbs.							
NYHA Class[1]							
Subjective Symptoms B,W,NC[2]							
HR							
BP (S/D)							
↑ JVP (Y/N)[3]							
S3 (Y/N)[3]							
Rales (Y/N)							
Edema (Y/N)							
ECG							
CXR (Y/N) congestion							
K+ (potassium)							
Creatinine							
BNP <100 pg/mL							
ACE-i agent/dose							
ARB agent/dose							
ß-blocker agent/dose							
Aldactone							
Dig. Dose							
Diuretic[1] agent/dose							
Diuretic[2] agent/dose							
Nitrate agent/dose							
Hydralazine dose							

[1] Class I: No symptoms with ordinary activity/ Class II: Symptoms with ordinary activity/ Class III: Symptoms with less than ordinary activity/ Class IV: Symptoms at rest

[2] B = better, W = worse, NC = no change

[3] Y = present, N = absent

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