NewYork-Presbyterian Hudson Valley
Acute Heart Failure Management Guidelines Card

1. DECONGEST WITH LOOP IV DIURETIC

a. Use 2x home dose IV bid with rapid escalation if not responding (e.g., Home Furosemide 40mg daily-> 40mg IV furosemide BID)
b. Admission labs, BNP, Q8-12 lytes; keep K> 4.0 (add aldo blocker early)
c. Target 2-3L daily urine output or 2-5lbs daily weight loss as tolerated
d. Use standing daily weights; or accurate ins and outs
e. IF weight not decreasing by 2lbs/day, add thiazide and increase dosing IV loop diuretics BID/TID/drip

Loop Diuretic Equivalence Table (mg)			
	IV* bid-tid	**ORAL** q24h-bid	**NOTES**
Furosemide	20-100 IV Push >100-200 IVPB over 30 min	40-200	Max recommended daily dose 600 mg IM administration available
Bumetanide	1-2 IV Push >2-5 IVPB over 30 min	1-5	Max recommended daily dose 10 mg IM administration available
Torsemide	n/a	20-200	Max recommended daily dose 200 mg No IV formulation available in US
Ethacrynic acid/ Ethacrynate sodium	50	50-100	Ethacrynate sodium IV is restricted to the following 3 criteria: 1. True allergy to furosemide, torsemide, bumetanide or thiazide (i.e. anaphylaxis, rash, itching, urticaria); NOT a sulfa allergy **AND** 2. NPO, contraind to enteral access or GI malabsorption **AND** 3. Pharmacy manager approval required prior to initiation.
Equivalent dosing Furosemide 40mg PO =Furosemide 20mg IV = Bumetanide 1mg (IV/PO) = Torsemide 20mg = Ethacrynic acid 50mg			
Thiazides for combination diuretic Rx (mg)			
Metolazone	n/a	2.5-10	Give 30 minutes before IV loop diuretic Max recommended daily dose 20 mg Monitor for hypokalemia
Chlorothiazide	500 IV Push over 3-5 min	250-500	*IV where available Extravasation is extremely irritating to tissues Monitor for hypokalemia
Chlorthalidone	n/a	12.5-25	Monitor for hypokalemia
Hydrochlorothiazide	n/a	25	Monitor for hypokalemia

2. WORK UP DECOMPENSATION

a. Review recent TTE or perform
b. Telemetry for arrhythmia
c. Consider pacer/ICD interrogation
d. Ischemia evaluation, myocarditis workup
e. r/o co-morbidity ie, infection, PE, TFTs, HIV and OSA
f. Other (diet, alcohol, NSAIDS, meds, Utox, etc.)

3. CONSIDER CARDIOLOGY CONSULT AND/OR HEART FAILURE OUTPATIENT REFERRAL

a. CHF readmission
b. SBP <100 or syncope
c. Hypoperfusion: Cr >1.8 or increase by 25%, rising LFTs, ▲MS, cool extremities or inotrope
d. Na <130
e. Persistent elevated troponin
f. No weight change 48 hours
g. EF <35%
h. Difficult to manage or atypical HFpEF
i. Age <50
j. Intolerance or down titration neurohormonal blockade
k. Pre-discharge pro-BNP >4,000, or BNP >700, trigger HF outpatient referral
l. HFrEF w/LBBB, QRS>150, or RV paced
m. Appropriate ICD shock

Cardiology Consult: **914-736-0703**
Advanced HF Outpatient: **Columbia 212-305-9268; (if questions Dr. Colombo: 646-207-8377)**

4. CONSIDER HEART FAILURE CONSULT OR TRANSFER

a. ≥2 of above criteria listed in #3
b. Persistent shock: SBP <90, Cardiac Index <2, or cold extremities or inotropes
c. Challenging atrial/ventricular arrhythmias
d. EF <20% or recent inotrope (outpatient, if stable)
e. Mod PH: PASP >50 (or if SBP <90 then >40mmhg) or mPAP >35
f. >2 admissions in 6mo for medical reasons
g. Complicated valvular or congenital heart disease

Transfer Center: **1-800-NYP-STAT**

V1 9/2017

5. GUIDELINE MEDICATIONS FOR HFrEF AND HFpEF

Class	Indications		Contraindications
	HFrEF (LVEF ≤ 40%)	**HFpEF (LVEF ≥50%)**	
ACEI or ARB	All pts (COR I), for RR 17/31%* Use caution during IV diuresis. After IV diuresis, test/retest low dose & begin uptitration. If BP ↓ or Cr ↑, hold/reduce diuretic & retest	SBP > 130 after euvolemic (COR I)	AKI or significant CKD K > 5.0 Hx of angioedema (ACEI) Hold for anesthesia & dye studies
ARNI Sacubitril/valsartan	Replaces ACEI/ARB in stabilized Class 2/3 pts (COR I) for additional RR 16/20% vs. ACEI.* Consider hold/reduce diuretic for test dose	Unknown	AKI or significant CKD or K > 5.0 ACEI within 36 hrs Hx of angioedema Hold for anesthesia & dye studies
Beta-blocker	All pts (COR I), for RR 34/41%* Consider ½ home dose in decompensation if BP stable. Once euvolemic, resume cautious titration	Use limited to HTN, ischemia, MI, arrhythmias, HOCM	Bronchospasm HR < 55, heart block Cardiogenic shock Do not give IV BB in acute HFrEF
Aldo blocker	All pts (COR I), for RR 30/35%* Consider during IV diuresis for K-sparing. Consider higher dose for HTN, ↓K, or diuretic resistance	May be cardioprotective (COR IIb). May start during IV diuresis for K-sparing. Consider higher dose for HTN or ↓K	AKI or eGFR < 30 K > 5.0 Unable to monitor well
Hydralazine-nitrates	Add for refractory sx on optimal diuretic, ACEI/ARB & BB +/- aldo blocker (COR I) for RR 43/33%* esp. in Blacks. Alternative to ACEI/ARB when RAS blocker contraindicated, i.e. AKI (COR IIa)	Unknown	Intolerance Use caution before anesthesia

COR = ACC/AHA Class of Recommendation: I = Strong, IIa = Moderate, IIb = Weak (www.acc.org)
* Risk Reduction of All-cause mortality / HF hospitalization in clinical trials, with Rx titrated to target dose (medium to high dose, except aldo blockers at low dose). Cautious titration usually completed as out-patient, more slowly for beta-blockers, and as tolerated.
Avoid NSAIDs, steroids, most anti-arrhythmics (other than amiodarone), pioglitazone, gliptins; **and for HFrEF avoid** diltiazem & verapamil

6. DISCHARGE PLANNING: (Provider & Care Coordination)

a. **Hospital day 1-2:**
- Identify Outpatient Follow-up Providers
- Mobilize OOB early; order PT/OT
- Identify high risk patients at interdisciplinary rounds
  - Identify High Risk Care Team (Outpatient MD, Care Transition Provider, Care Manager)
  - Identify Special Needs:
    - home care services • home meals • home IV infusion • outpt IV therapies

b. **Patient Education on Heart Failure:**
- NYP CHF education booklet available on infonet https://infonet.nyp.org/PatientED/Pages/Resources.aspx
- Daily AM weights & call MD for gain of 2 lbs in 2d or 5 lbs in a wk
- Low Na diet and special combo diets
- Fluid restriction
- Medications

c. **Discharge Ready**
- Off inotropes for 24h (or d/c on inotropes)
- Out of bed, ambulating if able
- Repeat BNP 24 hours prior to d/c
- 7-10 days follow-up appt scheduled

d. **Discharge Summary must include:**
- Admission and Discharge Data: wt, exam, Cr, BNP, diuretic doses
- Target weight
- Med titration instructions
- Follow-up appointment with transition provider in 7-10 days. Include specific date, time, location and phone number.

Outpatient Referral Line for Advanced Heart Failure Clinic:
Columbia 212-305-9268 (M-F, 9am–5pm)

DRIP MEDICATIONS						
	Concentration	**Line**	**Bolus**	**Typical Starting Rate**	**Maximum Infusion Rate**	**Special Comments**
Diuretics						
Bumetanide	10 mg/100 mL NS (0.1 mg/mL)	Peripheral	Doses 0.5-2 mg IVP over 2-3 min Doses > 2 mg via IVPB	0.1 mg/h	Soft: 1 mg/h Hard: 2 mg/h	None
Furosemide	100 mg/100 mL NS (1 mg/mL)	Peripheral	≤ 100 mg IVP over 2-5 min (no faster than 20 mg/min) Doses > 100 mg via IVPB	1-5 mg/h	Soft: 20 mg/h Hard: 40 mg/h	None
Other drip medications						
Dobutamine	250 mg/250 mL (1 mg/mL)	Peripheral (large vein)	None	2.5-5 microgram/kg/min	Non-Intensive Areas: Soft: 10 mcg/kg/min Intensive Areas: Soft: 20 mcg/kg/min	Monitor BP, HR at initiation or dosage change: every 15 min x 1 h, every 30 min x 2 h, then every 4 h
Dopamine	200 mg/250 mL (0.8 mg/mL)	Peripheral	None	0.5-5 microgram/kg/min	Non-Intensive Areas: Soft: 5 mcg/kg/min Intensive Areas: Soft: 20 mcg/kg/min Titrate available: 1-3 mcg/kg/min q 5 min	Monitor BP, HR at initiation or dosage change: every 15 min x 1 h, every 30 min x 2 h, then every 4 h
Milrinone	20 mg/100 mL (200 microgram/mL)	Peripheral	12.5-50microgram/kg IVP over 10 min (generally avoid)	0.125 microgram/kg/min	Soft: 0.5 mcg/kg/min Hard: 0.75 mcg/kg/min	Caution with renal dysfunction Monitor BP, HR at initiation or dosage change: q 15 min x 1 h, q 30 min x 2 h, then q 6h
Nesiritide	1500 mcg/250 mL NS (6 microgram/mL)	Peripheral	2 microgram/kg IVP over 60 sec (generally avoid)	0.005 - 0.01 microgram/kg/min	Hard: 0.03 mcg/kg/min	Monitor BP every 15 min x 4 upon initiation & after every dose change. An MD, NP, or PA must be present the first hour after initiation and during every dosage change; then monitor per nursing unit protocol.
Nitroglycerin	25 mg/250 mL (0.1 mg/mL)	Peripheral		5-50 microgram/min	Non-Intensive Areas: Soft: 100 mcg/min Intensive Areas: Soft: 200 mcg/min	None

*Additional Concentrations please refer to Adult Drip Guidelines on Lexicomp (Hospital Formulary)

Writing prescriptions for home infusions with doses of microgram/kg/min:

- Written prescription (printed out) generally required to be provided to home infusion company. Do not e-prescribe to patient's home pharmacy.
- Select Drug that most closely matches current order.
- Select Dosage Units: **mcg/kg** (do NOT select MCG/KG/HR)
- Select Route: **intravenous**
- Select Frequency: **every minute**
- Include dosing weight in Instructions section along with indication. Refer to weight being used to dose current inpatient order; for large discrepancies with current actual weight, consult with HF attending.
- Order weekly labs to be faxed to HF physician. Include BMP, Mg and any other relevant labs (e.g., INR). Indicate day of week on order. Consult with home infusion company whether labs are ordered via written prescription or infusion company ordering form.