AUTOMATIC STOP ORDERS

ORAL ANTICOAGULANTS—	AFTER 24 HOURS
ALBUMIN—	AFTER 24 HOURS
LARGE VOLUME INTRAVENOUS—	AFTER 24 HOURS
INJECTABLE ANTICOAGULANTS (SC)—	AFTER 5 DAYS
CONTROLLED SUBSTANCES—	AFTER 5 DAYS
CORTISONE PRODUCTS—	AFTER 5 DAYS

MD Date of Order	Hour of Order	Nurse's Signature

NURSE: PLEASE X IN COLUMN ON LINE, FOR MEDICATIONS REQUIRED FROM PHARMACY
PHYSICIAN MUST ENTER DATE, HOUR, AND SIGN EACH SET OF ORDERS.

ALLERGIES:

INITIAL ORDERS FOR HEART FAILURE

(Check appropriate boxes and fill in the blanks)

1. Admit to Dr. _____ 's Service
   ❑ Regular Floor ❑ Telemetry ❑ CCU ❑ Other: _____
2. Diagnosis: Heart Failure _____
   Code Status: ❑ Full Code ❑ DNR or Partial DNR – see DNR Order Sheet
3. Laboratory Tests:
   ❑ All preliminary lab tests and studies done in ETD (if not order on separate page)
   ❑ If initial troponin done, recycle Q8hr X 2. Call PMD if results are positive.
4. ❑ Echocardiogram Reason: ❑ Heart Failure ❑ Other _____
   or ❑ Pt has recent Echo, please call 2310 and place on chart
   or ❑ Patient's most recent Ejection Fraction _____%
6. Activity: ❑ Per CareMap® ❑ Other: _____
7. Diet: ❑ 2Gm Na^+, low cholesterol ❑ _____ Calorie ADA diet
   ❑ Other: _____
   ❑ Refer to Registered Dietician when pt on unit ❑ Restrict fluids to _____ mL in 24hrs
8. ❑ Insert IV: ❑ Solution: _____ Rate: _____ mL/hr ❑ Saline Lock
9. Vital signs: ❑ Per CareMap® ❑ Other: _____
   ❑ Monitor pulse oxymetry every shift and PRN _____
   ❑ Daily weights ❑ Strict intake/output ❑ Insert Foley Catheter
10. Medications (include name, dose, frequency and route of administration):
    ❑ O_2 (check one): ❑ Nasal cannula @ _____ L/min ❑ _____ FiO2 by mask
    ❑ Nitroglycerin ointment to chest wall _____ inch(es) Q _____
    ❑ Nitroglycerin gtt. 50mg / 250cc D_5W @ _____ mcg/min ❑ hold for B/P < 90/syst
    ❑ Nesiritide (Natrecor) 1.5 mg in 250 mL D_5W ❑ hold for B/P < 90/syst
    ❑ Bolus 2mcg / kg= _____ mL (use dosing table), withdraw bolus from the infusion bag and administer IV push over 60 seconds
    ❑ Infusion rate @ 0.01 mcg / kg / min = _____ mL / hr (use dosing table)

ETD Attending Signature: _____

Attending Physician Signature: _____

These orders are good for 8 hours only unless countersigned by the primary care physician

DO NOT WRITE IN THIS AREA

THIS SPACE IS FOR PHARMACY

New 6/17/03

978

PLEASE DO NOT RETURN CHARTS WITH NEW ORDERS TO RACK-FLAG CHART

AUTOMATIC STOP ORDERS

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MD Date of Order	Hour of Order	Nurse's Signature	NURSE: PLEASE X IN COLUMN ON LINE, FOR MEDICATIONS REQUIRED FROM PHARMACY PHYSICIAN MUST ENTER DATE, HOUR, AND SIGN EACH SET OF ORDERS.

ALLERGIES:

INITIAL ORDERS FOR HEART FAILURE

(Check appropriate boxes and fill in the blanks)

11. Medications continued (include name, dose, frequency and route of administration):
    - ❑ ACE Inhibitor _____
    - ❑ Angiotensin Receptor Blocker _____
    - ❑ Aspirin _____
    - ❑ Beta blocker _____
    - ❑ Digoxin _____
    - ❑ Diuretic _____
    - ❑ Spironolactone 12.5 mg PO qd or _____
    - ❑ Warfarin _____

12. If Patient Develops Chest Pain:
    - ❑ Call Admitting Physician STAT
    - ❑ STAT ECG, give Nitroglycerin 1/150 SL q 5 min x 3 if systolic BP >100mmHg

13. ☒ Notify Heart Failure team of patient's admission X5770

14. Additional orders: _____

ETD Attending Signature: _____

Attending Physician Signature: _____

These orders are good for 8 hours only unless countersigned by the primary care physician

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EVIDENCE BASED MANAGEMENT OF ACUTE HEART FAILURE

Robert Berkowitz M.D., Ph.D.,FACC; Sidney Glasofer B.S.E, MS (IV)

DIAGNOSIS OF ACUTE HEART FAILURE

- Early identification of heart failure and risk stratification in the emergency room using clinical assessment[a] and BNP assay[b]

BNP<100

- Heart failure unlikely, look for another cause for dyspnea

BNP≥480 with symptoms of dyspnea and volume overload

100<BNP<480

- Heart failure likely
- Clinical assessment should guide decision between admission vs. short term IV diuresis in ER
- Outpatient work-up if previously undiagnosed heart failure

STABILIZATION OF PATIENT

- Treatment should begin within one hour of ER arrival with IV vasoactive therapy and aggressive IV diuretics[c]
- If Cardiogenic shock is present, consider invasive monitoring and inotropic therapy[d]

INPATIENT THERAPY AND FURTHER DIAGONOSTIC WORK-UP

- Continued IV therapy with a diuretic and a vasoactive medication
  - Monitor daily weights, electrolytes, BUN, Cr
- ACE inhibitor titration; consider low dose aldactone (class IIIB-IV); consider digoxin[d]
- DVT prophylaxis[d], e.g. enoxaparin 40 mg SQ QD
- Address co-morbidities; e.g. anemia, diabetes, HTN, hyperlipidemia
- Poor response to IV therapy within first 48 hours indicates need for hemodynamic monitoring; patients refractory to treatment may need long term inotropic therapy, LVAD, or cardiac transplantation
- Determination of etiology of heart failure: Echocardiogram, Ischemic work-up, metabolic evaluation[e]

EUVOLEMIA (Goal – Day 3)

- Once euvolemia is achieved, consider obtaining a baseline BNP
- Begin Beta-blocker therapy[d]
- Consider Bi-ventricular pacing and/or Implantable Cardiac Defibrillator in the appropriate patient[f]
- Transition remaining IV medications to PO
- Patient education: low Na+ diet, smoking cessation, exercise, daily weight monitoring[g]

DISCHARGE PLANNING AND FOLLOW UP

- Referral for heart failure home care or tele-monitoring[g]
- Follow up with doctor in 2-4 weeks
- Monitoring of patient with homecare heart failure nurse or tele-monitoring[g]
- Monitor BNP levels in future, rise of BNP to greater than 50% above baseline constitutes decompensated heart failure
- For patients with frequent readmissions associated with chronically decompensated heart failure, outpatient intermittent nesiritide therapy is recommended[d]

*For discussion of the strategies presented in this flow chart refer to addendum a-g.

DIURETIC ALGORITHM

Volume overload is the most common presentation of CHF.[1] Loop diuretics in significant amounts antagonize the RAAS, increase the SVR, decrease the GFR and decrease CO[2, 3] A furosemide drip preceded by a moderate bolus is more effective than IV push lasix and facilitates a continuous diuresis. [3] There is no rebound effect as occurs with IV push lasix alone. [2,3]
In contrast, loop diuretics with vasodilator treatment increase urine output, GFR, CO[4, 5] and when the vasodilator is nesiritide, neurohormonal blockade is obtained. [5,6]. Nesiritide is synergistic with loop diuretics requiring less lasix over time[5] and facilitating renal protection [6] leading to improved creatinine.
Nesiritide with furosemide is recommended for CHF treatment. "Patients who received an vasoactive agent earlier in their treatment had a significantly shorter LOS."[7] It is not necessary to down-titrate beta-blockers when beginning vasoactive therapy.

Recommendations for Acute Decompensated Heart Failure in the ETD

On Admission:

Treat within 1-2 hours with:

- Nesiritide 2mcg/kg bolus followed by infusion at 0.01 mcg/kg/min to be titrated as needed (by addition of .005mcg/kg/min q 3 hours PRN).

  *The higher doses may be required in cases where hypertension exists. The usual duration of treatment with Nesiritide is for 24-72 hours depending on the severity of volume overload).

Concomitant treatment with furosemide:

- Give 40-80 mg IVP furosemide followed by infusion of furosemide 250mg/250mL at **10mg/hour** for moderate fluid overload or **15mg/hour** for severe/extreme volume overload.

- Goal is to achieve urine output of ≥ 1mL/kg/h (about 600mL per shift). If goal is not achieved in 4 hours, increase furosemide drip by 5mg//h to a maximum of 20mg/hr until adequate diuresis is seen. Monitor urine output every hour and every shift. Maintain diuresis until fluid retention is resolved.

Day 2

- Consider decreasing furosemide drip as patient approaches euvolemia. *This may occur quicker in patients with diastolic verses systolic dysfunction.

Day 3

- Transition to PO furosemide when euvolemic:
  40 mg QD to BID or 80 mg AM, 40 mg PM QD depending on degree of initial volume overload.
  * Avoid Zaroxolyn as possible.
  * Note: ACEI titration can begin immediately.
  Beta-blockers initiated when patient euvolemic.

Legend

RAAS- Renin Angiotensin Aldosterone System
SVR- Systemic Vascular Resistance
GFR- Glomerular Filtration Rate
CO- Cardiac Output

References

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(2) Francis GS, Seigel RM, Goldsmith SR, et al. Acute vasoconstrictor response to intravenous furosemide with chronic congestive heart failure. Annals of Internal Med. July 1985; 103:1-6.
(3) Dormans TP, Van Meyel JM, Gerlag GG, Tan Y, Russel GM, Smits P. Diuretic efficacy of high dose furosemide in severe heart failure: Bolus injection versus continuous infusion. JACC Aug 1996; 376-382
(4) Colucci WS, Elkayam U, Horton DP, et al. Intravenous nesiritide, a natriuretic peptide, in the treatment of decompensated heart failure. N engl J Med. 2000; 343:246--253
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