

Acute Decompensated Heart Failure: An Emergency Department Pathway

Attila Nemeth, MD
Staff Physician, Emergency Department
Louis Stokes Cleveland DVAMC
Clinical Instructor
Case Western Reserve University SOM

ADHF: An ED Pathway

Why Develop This Pathway?

- No HF pathway was available
- Assessment was not standardized
- Provide education for the House Staff

ADHF: An ED Pathway

Assessment of a HF patient

Does the patient have signs/symptoms of volume overload?:

- DOE/SOB
- Orthopnea/PND
- Elevated JVP
- Gallop (S3)
- Rales
- Pulmonary Congestion
- Hepatomegaly
- Ascites
- Weight Gain
- Edema

Does the patient have signs/symptoms of decreased cardiac output/perfusion?:

- Perioral Cyanosis
- Nail Bed Cyanosis
- Cool Extremities
- Altered Mental Status
- Fatigue
- Pre Renal Azotemia
- Decreased Urine Output
- Narrow Pulse Pressure

ADHF: An ED Pathway

Based upon the Stevenson Classification, patients are:

1. Warm and Dry (adequate perfusion and euvolemic)
2. Dry and Cool (volume depleted and inadequate perfusion)
3. Wet and Cool (volume overloaded and inadequate perfusion)
4. Wet and Warm (volume overloaded and adequate perfusion)

ADHF: Dry and Cool

ADHF Pathway Cardiac Assessment Done

Does the patient have signs/symptoms of volume overload?:

- DOE/SOB
- Orthopnea/PND
- Elevated JVP
- Gallop (S3)
- Rales
- Pulmonary Congestion
- Hepatomegaly
- Ascites
- Weight Gain
- Edema

Does the patient have signs/symptoms of decreased cardiac output/perfusion?:

- Perioral Cyanosis
- Nail Bed Cyanosis
- Cool Extremities
- Altered Mental Status
- Fatigue
- Pre Renal Azotemia
- Decreased Urine Output
- Narrow Pulse Pressure

Laboratory Orders

- ADHF Panel
- ABG
- TSH

Imaging Orders


- CXR (2 View) PA and Lateral
- CXR Portable Stat

Continue home medication as clinically indicated otherwise follow pathway

Medications

Based upon your assessment what is the fluid and cardiac status?:

- Dry and Cool
(Volume depleted and signs/symptoms of inadequate perfusion)
- Wet and Cool
(volume overloaded and signs/symptoms of inadequate perfusion)
- Wet and Warm
(volume overloaded and signs/symptoms of adequate perfusion)



Dry and Cool: Volume Depleted and Signs/Symptoms of Inadequate Perfusion

**Assumed by careful history and examination to be secondary to
volume depletion/dehydration**

[Click here to continue](#)

Assumed to be secondary to progression of heart failure

[Click here to continue](#)

Dry and Cool: Assumed By Careful History and Examination To Be Secondary To Volume Depletion/Dehydration

NS 500cc Bolus order
(Remember to immediately sign orders)

Is there improvement?

YES
NO

YES

Discharge
Review/Adjust meds
Encourage fluids
[Click here for discharge questions](#)

NO

Pump Failure
ICU Admission (order)
Consider positive inotropes/vasopressor therapy
Dopamine premix 400MG in D5w 250ML 5MCG/KG/MIN IV
Dobutamine premix 500MG in D5w 250ML 2MCG/KG/MIN IV
Milrinone premix 20MG in D5w 100ML 0.1MCG/KG/MIN IV
Consider hemodynamic measurements

Does the patient have follow up in 1 to 2 weeks?
[Click to place Congestive Heart Failure Evaluation](#)

Are the meds optimized?
[Medications Menu](#)

Assessment of function
NYHA Class I: Symptoms of HF only at activity levels that would limit normal individuals
NYHA Class II: Symptoms of HF with ordinary exertion
NYHA Class III: Symptoms of HF with less than ordinary exertion
NYHA Class IV: Symptoms of HF at rest

Dry and Cool: Assumed By Careful History and Examination To Be Secondary To Progression of Heart Failure

Pump Failure

ICU Admission (order)

Consider positive inotropes/vasopressor therapy

Dopamine premix 400MG in D5w/ 250ML 5MCG/KG/MIN IV

Dobutamine premix 500MG in D5w/ 250ML 2MCG/KG/MIN IV

Milrinone premix 20MG in D5w/ 100ML 0.1MCG/KG/MIN IV

Consider hemodynamic measurements

ADHF: Warm and Cool

ADHF Pathway Cardiac Assessment Done

Does the patient have signs/symptoms of volume overload?:

- DOE/SOB
- Orthopnea/PND
- Elevated JVP
- Gallop (S3)
- Rales
- Pulmonary Congestion
- Hepatomegaly
- Ascites
- Weight Gain
- Edema

Does the patient have signs/symptoms of decreased cardiac output/perfusion?:

- Perioral Cyanosis
- Nail Bed Cyanosis
- Cool Extremities
- Altered Mental Status
- Fatigue
- Pre Renal Azotemia
- Decreased Urine Output
- Narrow Pulse Pressure

Laboratory Orders

- ADHF Panel
- ABG
- TSH

Imaging Orders


- CXR (2 View) PA and Lateral
- CXR Portable Stat

Continue home medication as clinically indicated otherwise follow pathway

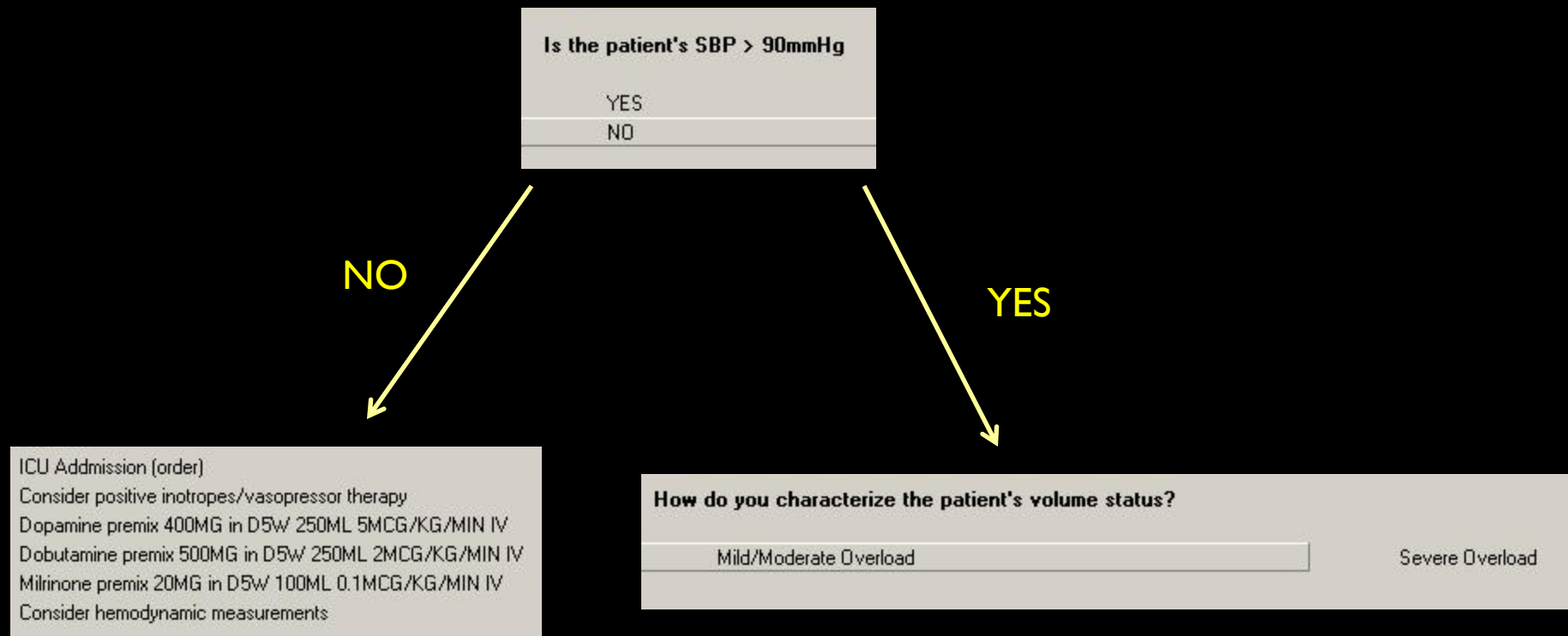
Medications

Based upon your assessment what is the fluid and cardiac status?:

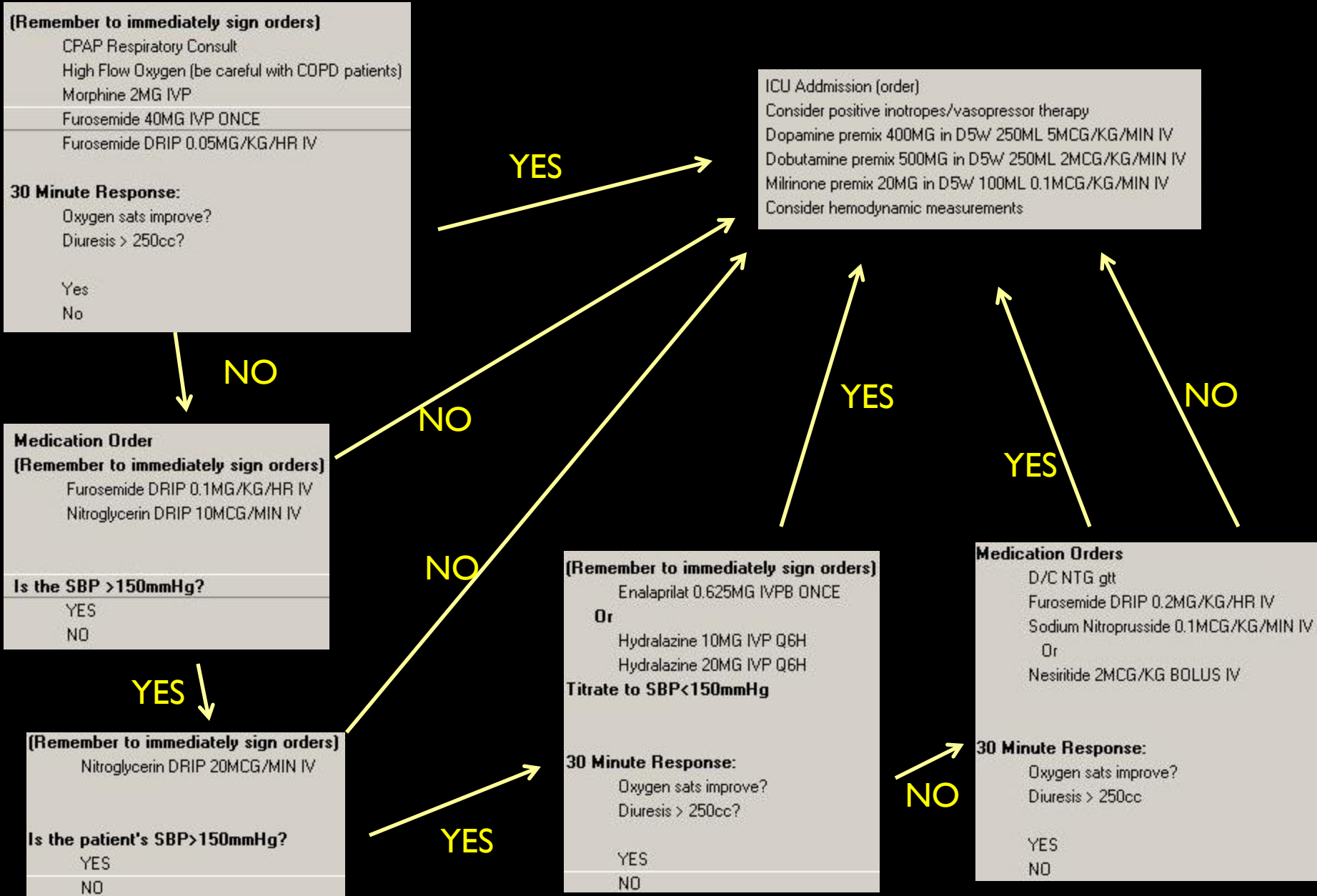
- Dry and Cool
(Volume depleted and signs/symptoms of inadequate perfusion)
- Wet and Cool
(volume overloaded and signs/symptoms of inadequate perfusion)
- Wet and Warm
(volume overloaded and signs/symptoms of adequate perfusion)



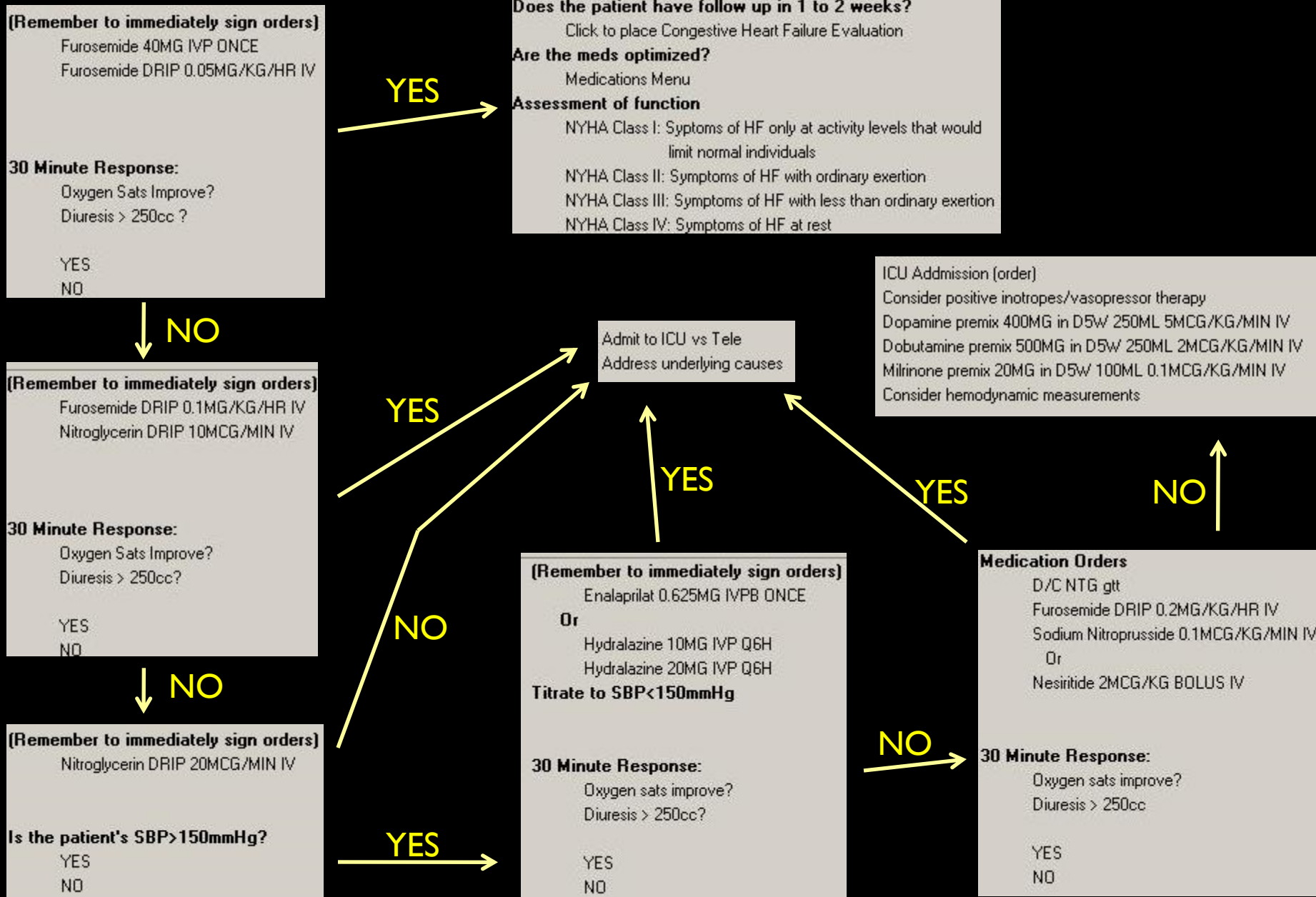
Wet and Cool: Volume Overloaded and Signs/Symptoms of Inadequate Perfusion



Wet and Cool: Severely Overloaded



Wet and Cool: Mildly/Moderately Overloaded



ADHF: Wet and Warm

ADHF Pathway Cardiac Assessment Done

Does the patient have signs/symptoms of volume overload?:

- DOE/SOB
- Orthopnea/PND
- Elevated JVP
- Gallop (S3)
- Rales
- Pulmonary Congestion
- Hepatomegaly
- Ascites
- Weight Gain
- Edema

Does the patient have signs/symptoms of decreased cardiac output/perfusion?:

- Perioral Cyanosis
- Nail Bed Cyanosis
- Cool Extremities
- Altered Mental Status
- Fatigue
- Pre Renal Azotemia
- Decreased Urine Output
- Narrow Pulse Pressure

Laboratory Orders

- ADHF Panel
- ABG
- TSH

Imaging Orders

- CXR (2 View) PA and Lateral
- CXR Portable Stat

Continue home medication as clinically indicated otherwise follow pathway

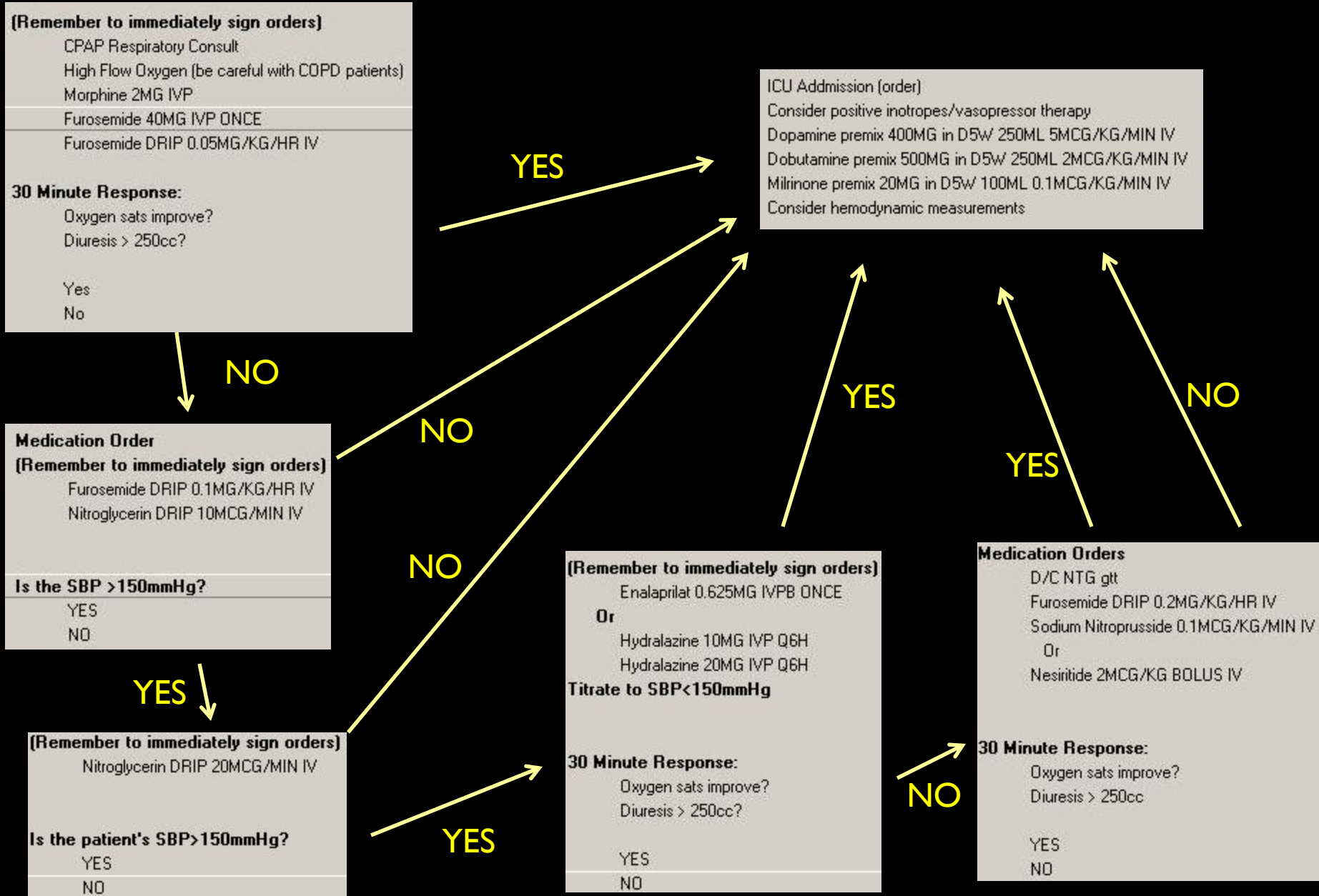
Medications

Based upon your assessment what is the fluid and cardiac status?:

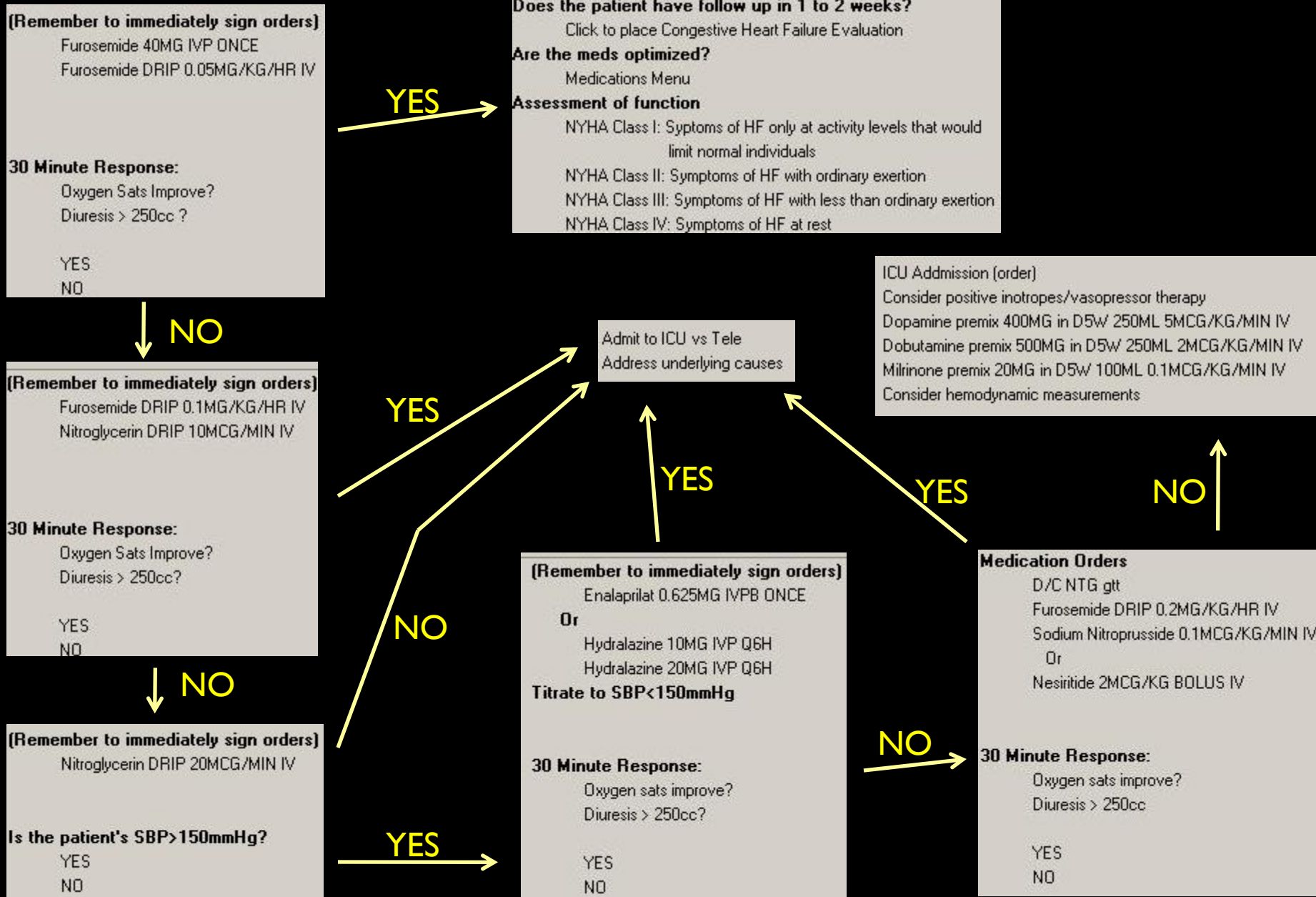
- Dry and Cool
(Volume depleted and signs/symptoms of inadequate perfusion)
- Wet and Cool
(volume overloaded and signs/symptoms of inadequate perfusion)
- Wet and Warm
(volume overloaded and signs/symptoms of adequate perfusion)

→

Wet and Warm: Severely Overloaded



Wet and Warm: Mildly/Moderately Overloaded



ADHF: An ED Pathway

Hospital to Home:

1. Discharge follow up
2. Medication review
3. Do patients know when to call?
4. Assessment of function

Hospital to Home

I. Discharge Follow Up

- A formal HF consult will be placed in CPRS, to schedule the patient in a Fast Track HF clinic within 1-2 weeks

Hospital to Home

2. Medication Review

-This is performed when the pathway is first initiated and, if the patient is stable to go home, at the time of discharge

Hospital to Home

3. Do patient's know when to call?

-At the time of discharge, patients will be given a HF handbook, providing them with instructions on what foods to avoid, the importance of daily weights, and to call their PCP or cardiologist if their weight increases by more than 3-5lbs.

-The ED Discharge Instructions also instruct contacting a physician if they develop SOB, lower extremity swelling, weight gain or chest pain

Hospital to Home

4. Assessment of function:

-In the assessment section of the I010M template, there is an assessment of function based upon the NYHA Class I to IV

Does the patient have follow up in 1 to 2 weeks?

Click to place Congestive Heart Failure Evaluation

Are the meds optimized?

Medications Menu

Assessment of function

NYHA Class I: Symptoms of HF only at activity levels that would limit normal individuals

NYHA Class II: Symptoms of HF with ordinary exertion

NYHA Class III: Symptoms of HF with less than ordinary exertion

NYHA Class IV: Symptoms of HF at rest

ADHF: An ED Pathway

Acknowledgements

Ileana L. Piña, M.D

Anne Tomolo, M.D.

Jose Ortiz, M.D.

Andy Barcena, M.D.

John Reiger

References:

Mebazaa A. et. al. **Practical Recommendations for Prehospital and Early In-Hospital Management of Patients Presenting with Acute Heart Failure Syndromes.** Crit Care Med. 2008 Jan;36(1 Suppl):S129-39.

Kinugasa Y. etal. **A Simple Risk Score to Predict In-Hospital Death of Elderly Patients With Acute Decompensated Heart Failure.** Circ J. 2009 Oct 13.

Miller, A and Pina I. **Understanding Heart Failure with Preserved Ejection Fraction: Clinical Importance and Future Outlook.** Congest Heart Fail. 2009 Jul-Aug;15(4):186-92.

Tripodskiadis, F etal. **Current Drugs and Medical Treatment Algorithms in the Management of Acute Decompensated Heart Failure.** Expert Opin Investig Drugs. 2009 Jun;18(6):695-707.

Amin A. J Hosp Med. **Hospitalized Patients with Acute Decompensated Heart Failure: Recognition, Risk Stratification, and Treatment Review.** 2008 Nov;3(6 Suppl):S16-24.

Gardetto N. etal. **Critical Pathway for the Management of Acute Heart Failure at the Veterans Affairs San Diego Healthcare System: Transforming Performance Measures into Cardiac Care.** Crit Pathw Cardiol. 2008 Sep;7(3):153-72.

Lepage S. **Acute Decompensated Heart Failure.** Can J Cardiol. 2008 Jul;24 Suppl B:6B-8B.

Adams K, etal. **Clinical Predictors of In-Hospital Mortality in Acutely Decompensated Heart Failure-Piecing Together the Outcome Puzzle.** Congest Heart Fail. 2008 May-Jun;14(3):127-34.

Summers RL, Amsterdam E. Pathophysiology of Acute Decompensated Heart Failure. Heart Fail Clin. 2009 Jan;5(1):9-17, v. Review.

Onwuanyi A, Taylor M. Acute Decompensated Heart Failure: Pathophysiology and Treatment. Am J Cardiol. 2007 Mar 26;99(6B):25D-30D.