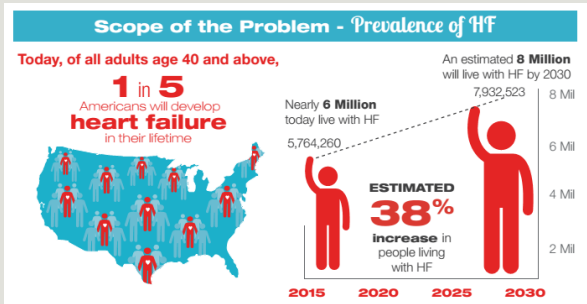


# Acute Heart Failure for MS 4

เอกราช อริยะชัยพาณิชย์

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HEART FAILURE AND TRANSPLANT CARDIOLOGY



At least 1 person

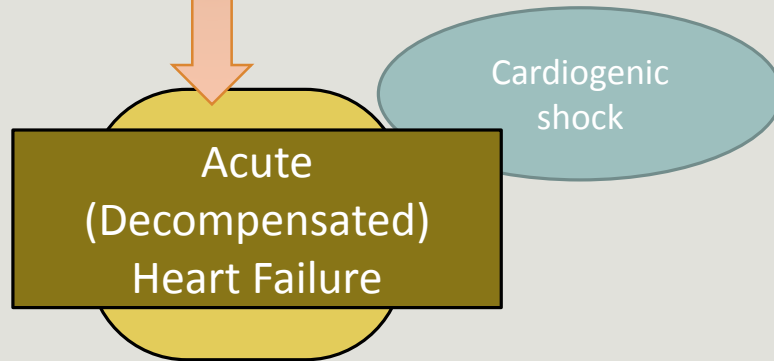
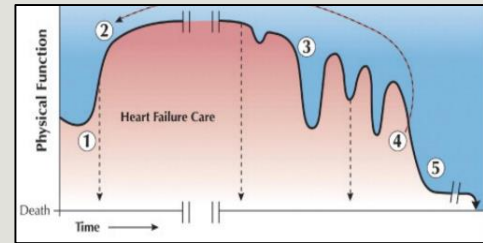
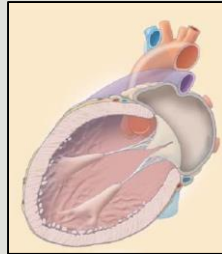
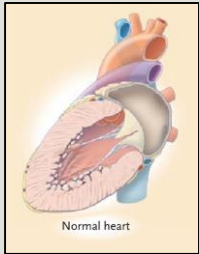
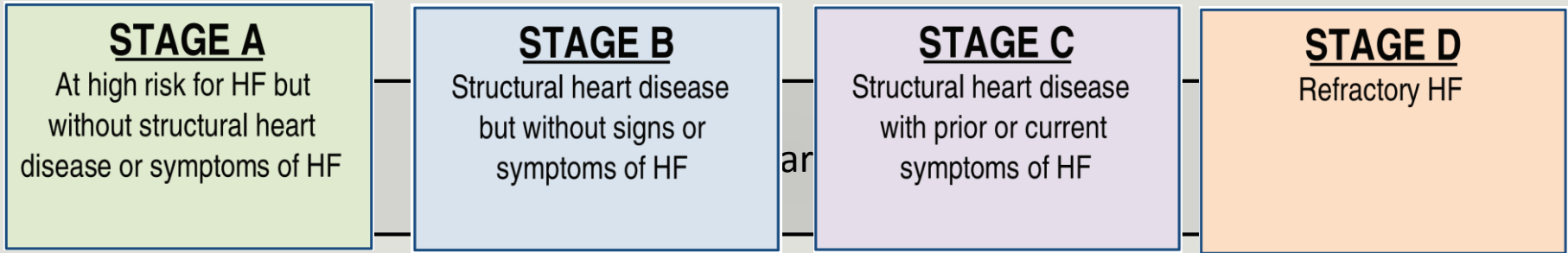
**EVERY** minute → is **diagnosed** with **HF**



**ONLY 54%** Can **CORRECTLY name** the symptoms

Hmm...

- Shortness of Breath
- Chest Discomfort
- Confusion
- Chronic Coughing or Wheezing
- Build Up of Fluid
- High Heart Rate
- Fatigue or Lightheadedness



# Acute Heart Failure

- Change in signs and symptoms of HF resulting in a need for urgent therapy
- Most common cause of hospitalization in pts > 65 yo

Circulation. 2013;127:e6–245

- High mortality
  - 4% in-hospital mortality
  - 50% re-hospitalization at 6 months.

ADHERE. Am Heart J. 2010;160:885–92

# Confused terminology

- Acute HF
  - Worsening HF (may be known or unknown chronic HF)
  - Usually rapid
- Acute decompensated HF
  - Worsening HF (of known chronic HF)
- De novo acute HF
  - The first episode of acute HF of that patient
  - Left/Right side failure → not helping with treatment
  - ~~Congestive HF~~



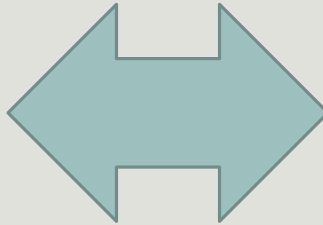
# Pathophysiology of acute HF

- Sudden worsening of hemodynamics

Δ preload

Δ contractility

Δ afterload

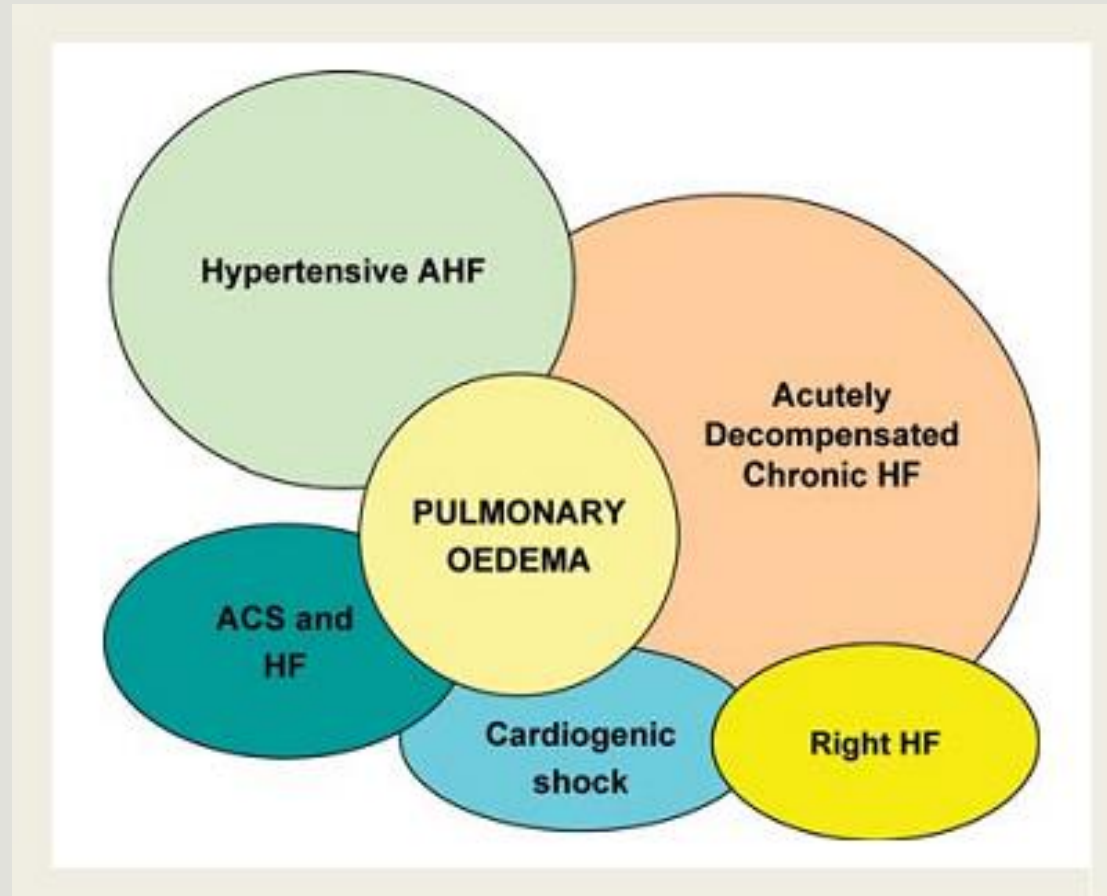


Δ systemic demands

- Vicious cycle of end organ damage, inflammation



AHF = Changing in HF S&S resulting in a need for urgent therapy



Not all acute pulmonary edema are acute HF  
Not all acute HF has pulmonary edema



# Symptoms





# Dyspnea

- NYHA class
  - PND (paroxysmal nocturnal dyspnea)
  - Orthopnea
- 
- รู้สึกแข็งแรงครั้งสุดท้ายเมื่อไร
  - เมื่อ .... เดือน (ปี) ที่แล้ว มีอะไรที่เคยทำได้ แต่ตอนนี้ทำไม่ได้
  - เล่าให้ฟังหน่อยชอบทำอะไร แล้วทำครั้งสุดท้ายเมื่อไร
  - ถามคนที่อยู่ด้วย



# Bendopnea

JACC: Heart Failure  
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Published by Elsevier Inc.

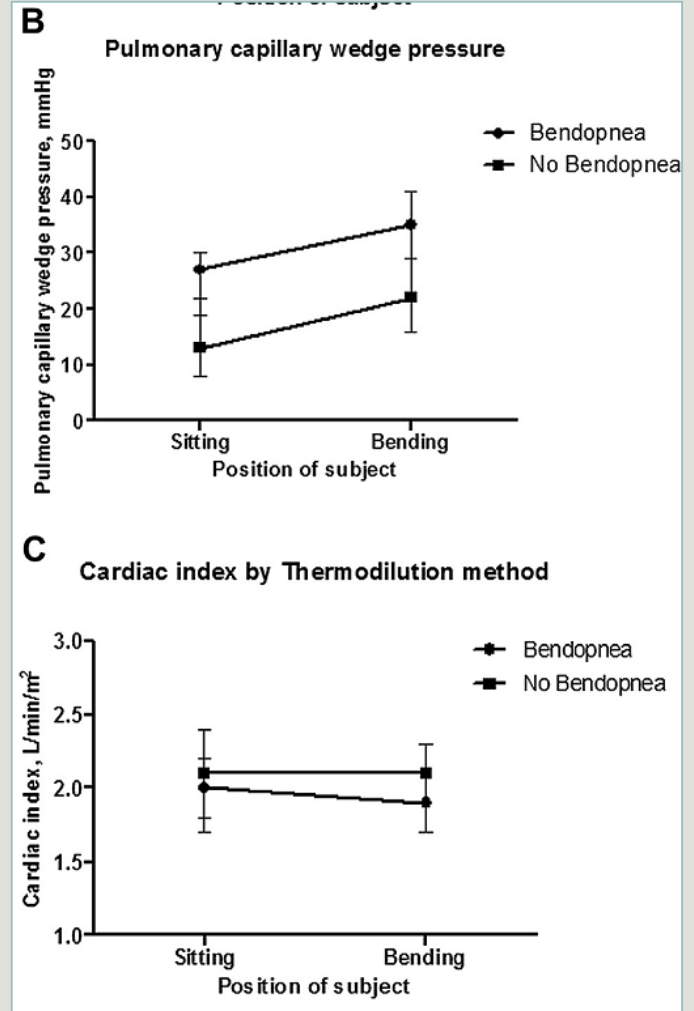
Vol. 2, No. 1, 2014  
ISSN 2213-1779/836.00  
<http://dx.doi.org/10.1016/j.jchf.2013.07.009>

## Characterization of a Novel Symptom of Advanced Heart Failure: Bendopnea

Jennifer T. Thibodeau, MD, MSc, Aslan T. Turer, MD, MHS, Sarah K. Gualano, MD, Colby R. Ayers, MS, Mariella Velez-Martinez, MD, Joseph D. Mishkin, MD, Parag C. Patel, MD, Pradeep P. A. Mammen, MD, David W. Markham, MD, MSc, Benjamin D. Levine, MD, Mark H. Drazner, MD, MSc

Dallas, Texas

- 28% of HFrEF
- Relate with higher RA and PCWP
- Bending
  - Increased RAP and PCWP
  - CI did not change



# Δ NYHA functional class

**Table 1. New York Heart Association classification of HF**

<b>Class</b>	<b>Description</b>
I	Patient with cardiac disease, but no limitation on ordinary physical activity
II	Comfortable at rest, ordinary activity results in symptoms (slight limitation)
III	Comfortable at rest, less than ordinary activity results in symptoms (marked limitation)
IV	Symptomatic at rest, increased discomfort with any physical activity



# NYHA class



ออกกำลังกายได้  
ขึ้นสะพานลอยได้

บันไดเหนื่อย  
เดินเหนื่อย

อาบน้ำเหนื่อย  
แต่งตัวเหนื่อย  
กินข้าวเหนื่อย

อยู่เฉยๆ เหนื่อย

ทำงานได้ ไปเที่ยวได้

ออกจากบ้านได้  
แต่เหนื่อย

อยู่รอบบ้าน

ติดบ้าน



# Why the patient has dyspnea

- **Real feeling of dyspnea** but less to do with intrinsic respiratory function or pulmonary edema
  - Mismatch between the efferent of the respiratory center in the brain and the afferent
- Afferent signals from
  - Mechanical receptors in the airways, lungs, chest wall
  - Chemoreceptors in the blood – Hypoxia, acid
  - Mechanical receptors in left atrium
- Physiologic factor
  - Systemic demand, increased weight , anemia
  - Usually resp alkalosis



# History

Dyspnea

Orthopnea, PND (Bendopnea)

NYHA

Cardiac symptoms

- Chest pain
- Congestion
  - Swollen, ascites
  - Weight gain
- Fatigue
- Palpitation, dizziness
- Syncope
- ICD shock

Look of precipitating factors of acute HF

Life style

- Diet
- Adherence of med
- NSAIDs

Anorexia

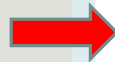
- Poor appetite
- Weight loss



**Table 12.1** Factors triggering acute heart failure

Acute coronary syndrome.
Tachyarrhythmia (e.g. atrial fibrillation, ventricular tachycardia).
Excessive rise in blood pressure.
Infection (e.g. pneumonia, infective endocarditis, sepsis).
Non-adherence with salt/fluid intake or medications.
Bradyarrhythmia.
Toxic substances (alcohol, recreational drugs).
Drugs (e.g. NSAIDs, corticosteroids, negative inotropic substances, cardiotoxic chemotherapeutics).
Exacerbation of chronic obstructive pulmonary disease.
Pulmonary embolism.
Surgery and perioperative complications.
Increased sympathetic drive, stress-related cardiomyopathy.
Metabolic/hormonal derangements (e.g. thyroid dysfunction, diabetic ketosis, adrenal dysfunction, pregnancy and peripartum related abnormalities).
Cerebrovascular insult.
Acute mechanical cause: myocardial rupture complicating ACS (free wall rupture, ventricular septal defect, acute mitral regurgitation), chest trauma or cardiac intervention, acute native or prosthetic valve incompetence secondary to endocarditis, aortic dissection or thrombosis.

precipitating factors

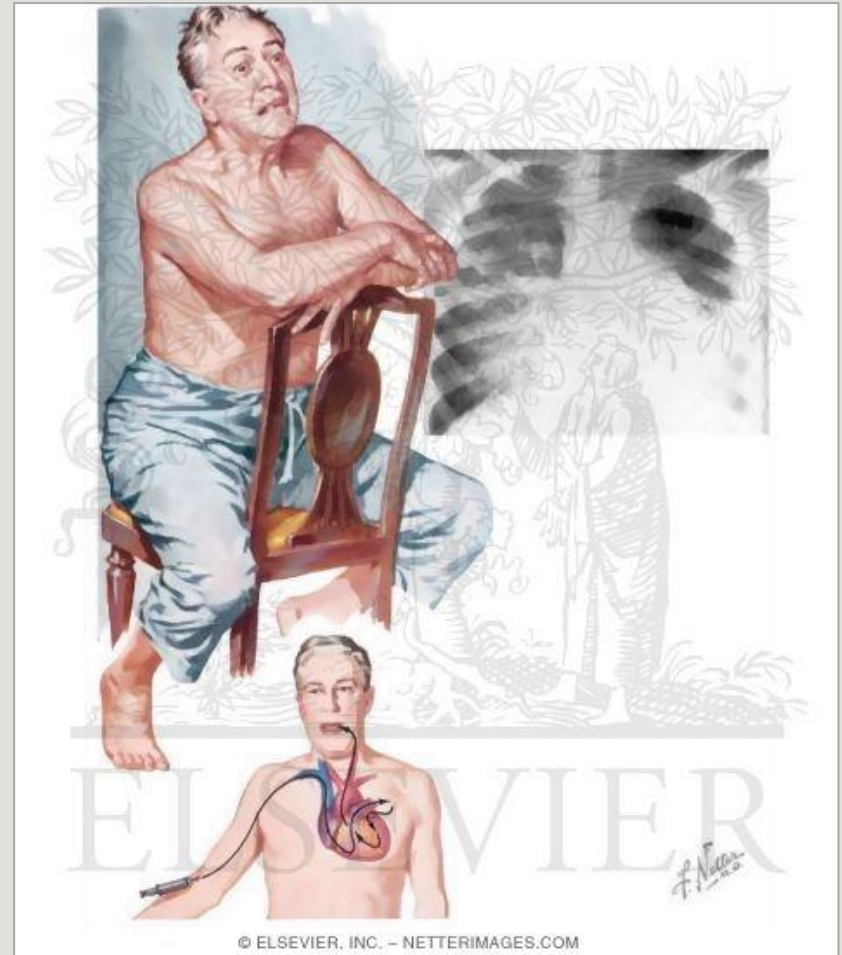
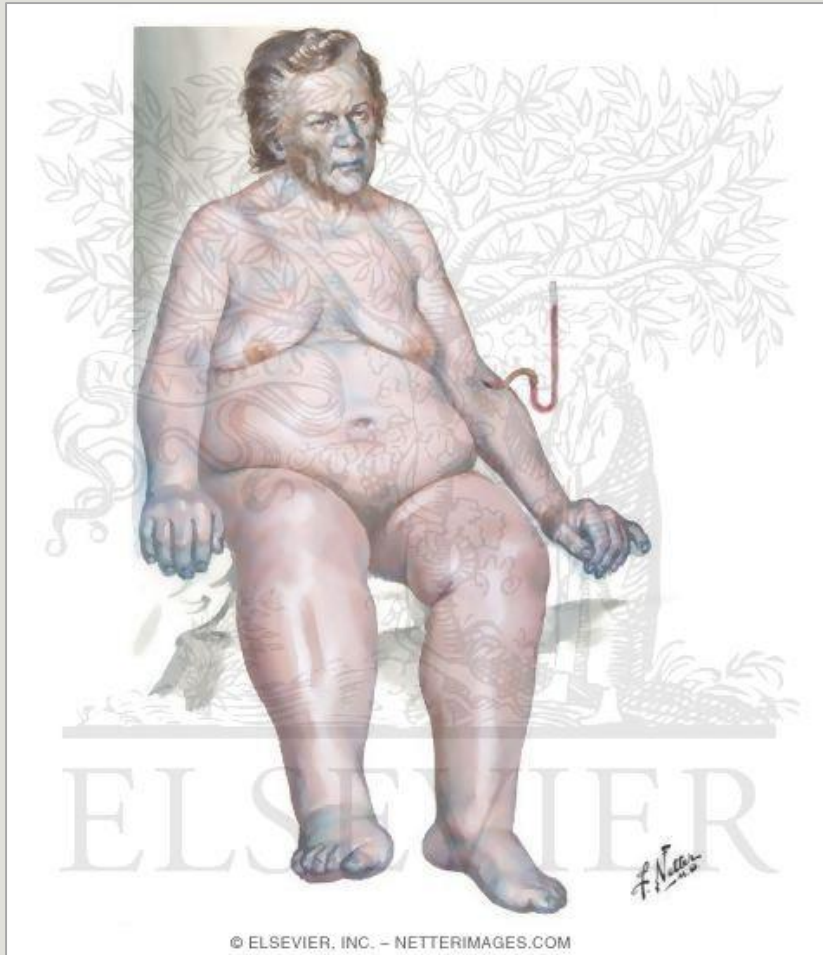


ACS = acute coronary syndromes; NSAIDs = non-steroidal anti-inflammatory drugs.





# Sign





<b>Blood pressure</b> <b>Heart rate</b>	<b>too low // too high // ↓ pulse pressure</b> <b>tachycardia</b>
BMI	↑ weight Obesity
Jugular venous pressure	↑ JVP, abnormal hepatojugular reflex
Apex PMI, apical impulse	Lateral shift (cardiomegaly) Diffused (hypertrophy)
Extra heart sounds S3 murmurs	Systolic dysfunction PSM
Pulse	weak, tachy, irregular ? pulsus alternant
Respiratory	Crepitation, wheezing Pleural effusion
Abdomen	Ascites, hepatomegaly
Extremities	Pitting edema 1+, 2+, 3+, 4+ Cool, mottle skin



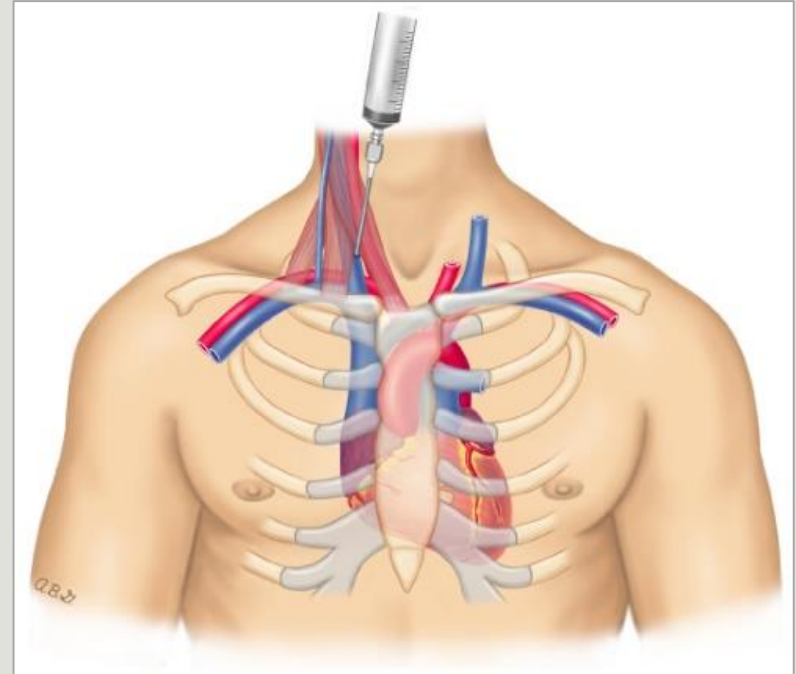
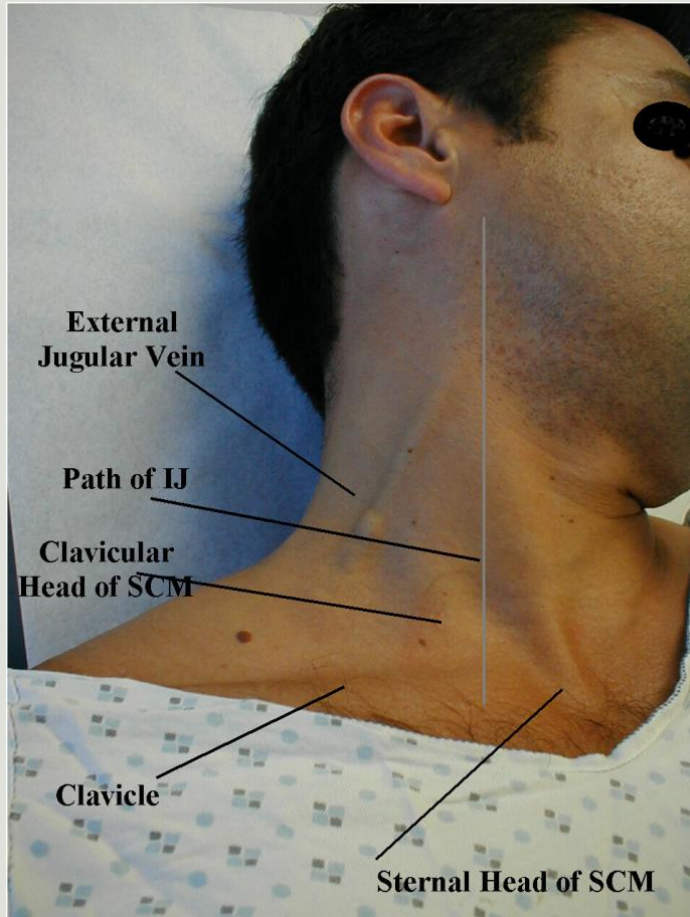
# Jugular venous pressure

- JVP reflects RA pressure
  - Represents RV filling pressure or preload of the RV.

<b>Venous</b>	<b>Arterial</b>
<b>sucking in biphasic, diffuse, overall</b>	<b>pushing out single, sharp</b>
<b>Δ with position, inspiration</b>	<b>no variation</b>
<b>non-palpable</b>	<b>palpable</b>

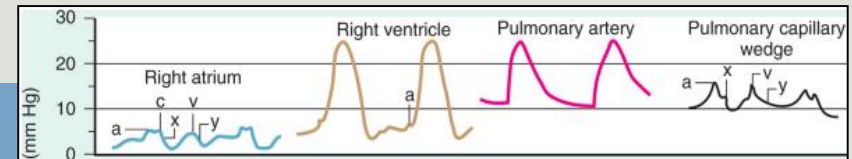
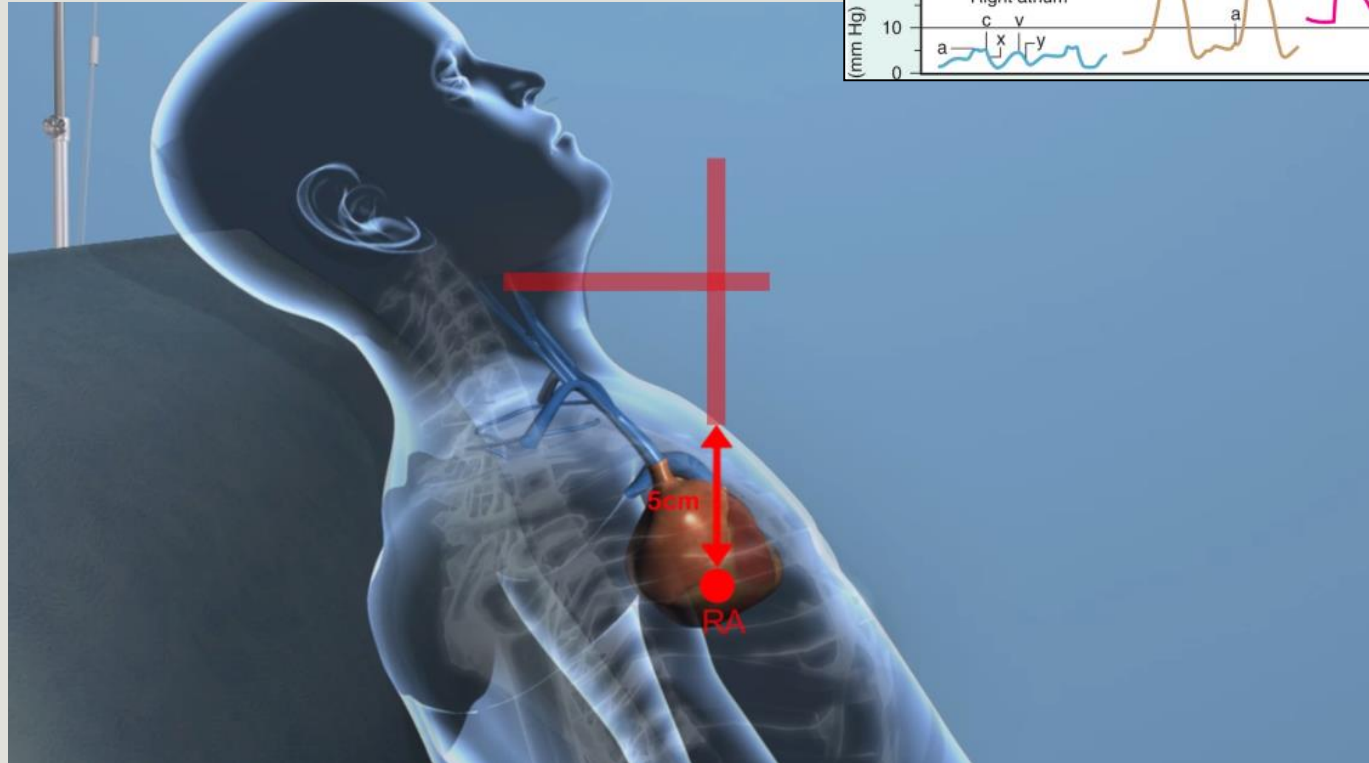


# position: Internal jugular vein





# Measure vertical distance



- “the JVP is xx cm above sternal angle at \_\_\_ degree”
- “CVP is (xx+5) cm above RA”



# Jugular venous pressure

- PPV of 70-80% to predict RA pressure when  $< 8$  or  $> 12$

Circ HF 2008;1:170–177

- A prognostic marker for HF death and hospitalization

NEJM 2001;345:574-81

## Pitfall

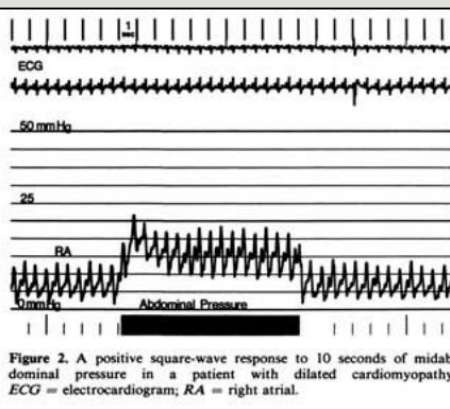
- Inappropriate angle: Too high or too low
- Overestimation
  - giant V wave, cannon A wave, tricuspid stenosis.
- JVP  $\neq$  HF.
- Not always concordance with elevated PCWP or LVEDD.



# Abdominojugular reflux (Hepatojugular reflux)

- Apply steady pressure → changes in the JVP.
- Normal
  - No change or a transient (few seconds) increase (< 3 cm) in JVP.
- Abnormal
  - Sustained elevation of the JVP
- Associated with elevated PCWP and RA pressure (80% Se 90% Sp).

*Ann Int Med 1988:109:456*



Acute HF is a  
clinical diagnosis





# Diagnosis

- Clinical
- May consider
  - CXR
  - BNP
  - ECG
  - BUN, Cr, electrolyte, CBC, LFT
  - ABG



# Exclude other causes of dyspnea if suspected

**Immediate phase  
(initial 60–120 minutes)**

## Identification of acute aetiology:

- C** acute **C**oronary syndrome
- H** **H**ypertension emergency
- A** **A**rrhythmia
- M** acute **M**echanical cause<sup>†</sup>
- P** **P**ulmonary embolism

# Investigation

- Lab:
  - CBC, UA, CMP, Ca, Mg, lipid profile, LFT, TSH
  - BNP
- CXR, ECG, Echocardiogram





**CONGESTION (-)**

**CONGESTION (+)**

- Pulmonary congestion
- Orthopnoea/paroxysmal nocturnal dyspnoea
- Peripheral (bilateral) oedema
- Jugular venous dilatation
- Congested hepatomegaly
- Gut congestion, ascites
- Hepatojugular reflux

**HYPOPERFUSION (-)**

- HYPOPERFUSION (+)**
- Cold sweated extremities
  - Oliguria
  - Mental confusion
  - Dizziness
  - Narrow pulse pressure



Hypoperfusion is not synonymous with hypotension, but often hypoperfusion is accompanied by hypotension.



**ตารางที่ 1** อาการและอาการแสดงของ HF

<b>Congestion ("wet")</b>	<b>Hypoperfusion ("cold")</b>
Orthopnea, PND, weight gain, RUQ discomfort, bloating, satiety	Fatigue, light headedness, exercise intolerance, poor mentation, cachexia
↑ JVP, abnormal hepatojugular reflux, S3, rales, pleural effusion, hepatomegaly, ascites, edema, square wave BP response to valsalva	Narrow pulse pressure, hypotension, pulsus alternans, cool & pale extremities



# Treatment

- To improve symptoms
- To improve hemodynamics
- To prevent complication
  - ARF, Acute liver injury, DVT
  
- No treatment have shown to improve survival !!!



# Treatment

## Congestion “WET”

- IV loop diuretics
  - $\geq$  home dose
  - Bolus or iv drip
- Add 2<sup>nd</sup> diuretics
  - HCTZ, spironolactone, tolvaptan
- Dialysis



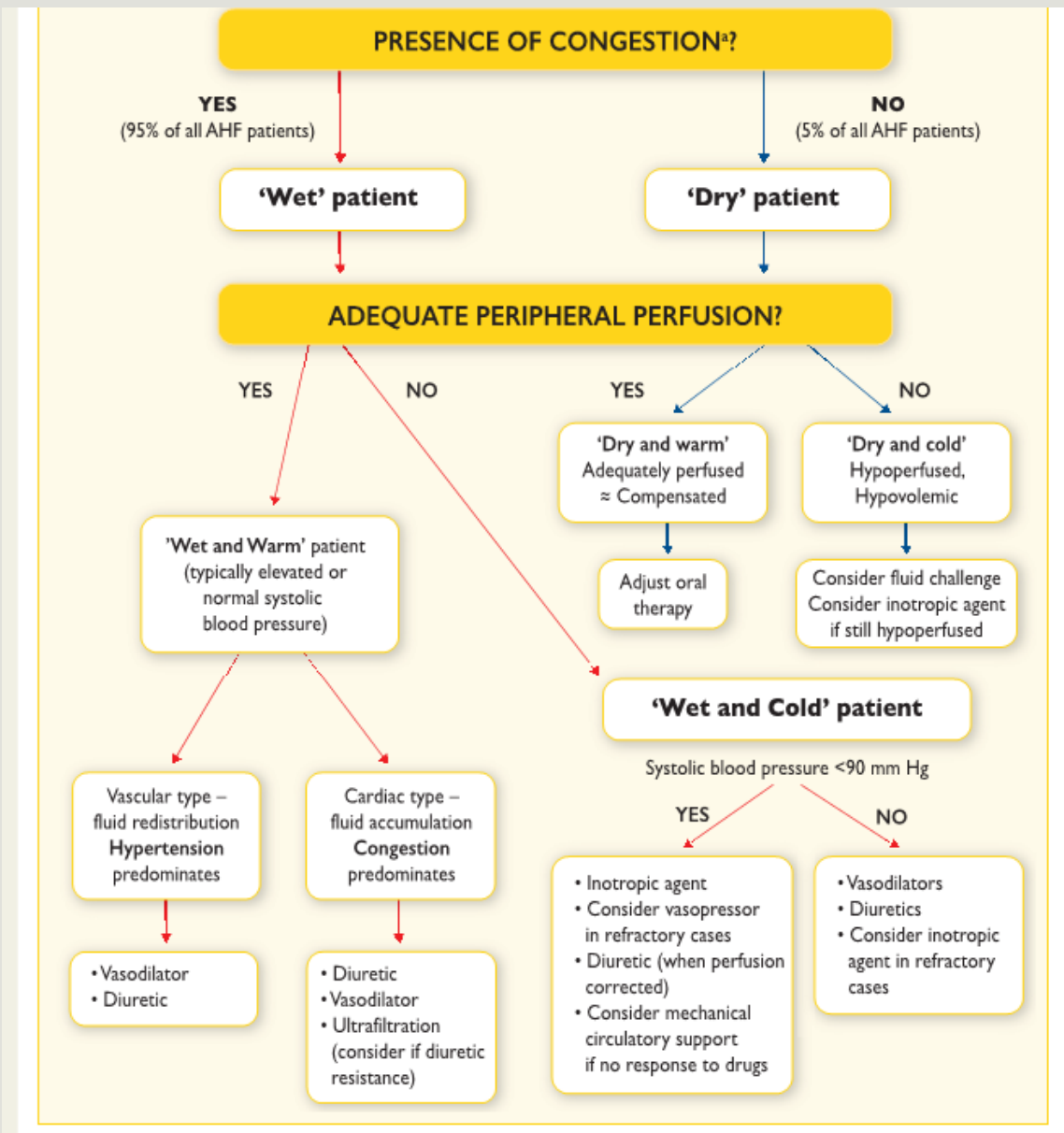


# Treatment

## Poor perfusion “COLD”

- Vasodilaator
  - Prefer
  - Caution in hypotension
  - NTG, Nitropusside
- Inotrope
  - Risk of arrhythmia, MI
  - Dobutamine, milrinone





**Figure 12.3** Management of patients with acute heart failure based on clinical profile during an early phase

<sup>a</sup>Symptoms/signs of congestion: orthopnoea, paroxysmal nocturnal dyspnoea, breathlessness, bi-basilar rales, an abnormal blood pressure response to the Valsalva maneuver (left-sided); symptoms of gut congestion, jugular venous distension, hepatojugular reflux, hepatomegaly, ascites, and peripheral oedema (right-sided).



# Treatment

## Supporting care

- Na, H<sub>2</sub>O restriction
  - Weight monitoring
  - Electrolyte monitoring
  - DVT prophylaxis
- 
- In severe cardiogenic shock
    - CCU, ventilator, mechanical circulatory support



# Treatment

## In severe cardiogenic shock

- CCU
- Invasive monitor
  - Arterial line, PA catheter (swan cath)
- Intubate/ ventilator
- Mechanical circulatory support (MCS)
  - IABP, LVAD, ECMO
- Heart transplant
- Palliative care



# Prior to discharge

- Identify and treat correctible cause
  - Precipitating factor
  - Cause (etiology of HF) in de novo HF
    - Coronary angiogram?, MRI?
- Initiate BB, ACEI, MRA if indicate
- HF education / HF program
- Clinic (follow up within 7 days)





**SERVICE**  
Inpatient  
Outpatient  
Procedure

**HF PROGRAM**  
Advanced Heart Failure  
Mechanical Circulatory Support  
Heart Transplantation

**RESEARCH**  
Registries  
Industrial sponsor  
Care delivery

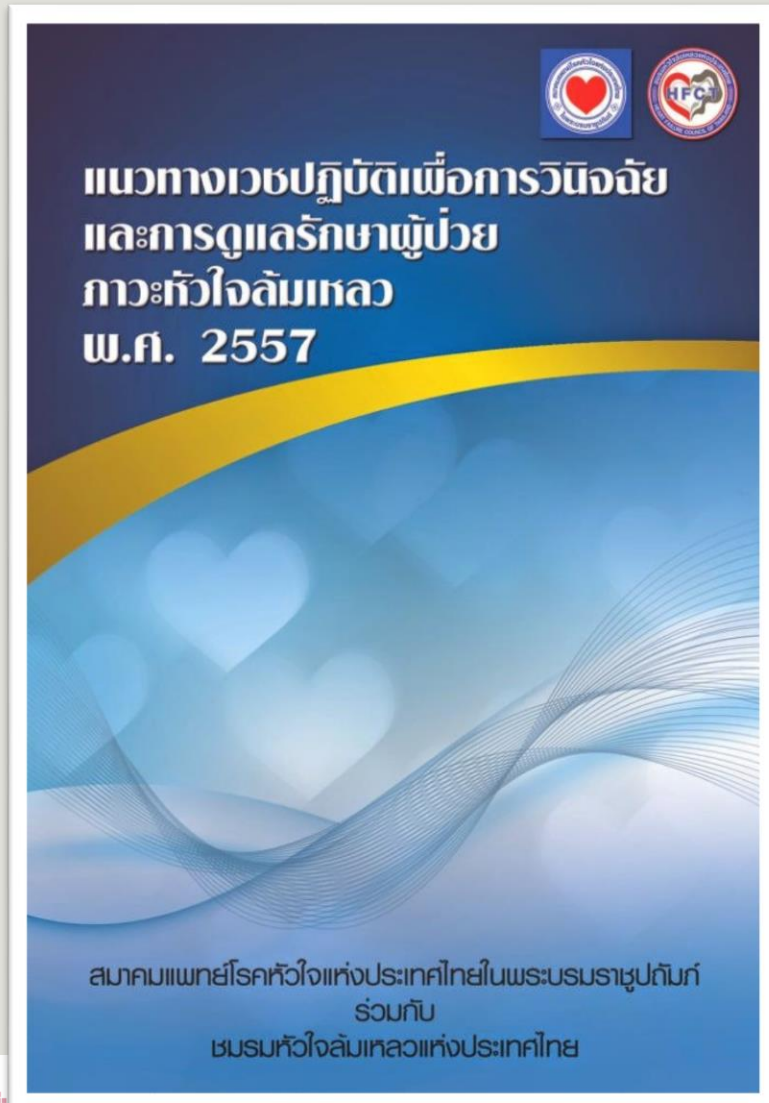
**ADVOCACY**  
HFCT (heart failure council of Thailand)  
Patient booklet  
HF network

**EDUCATION**  
C-HF annual meeting  
HF fellow (2017)  
RN training (2017)

เราช่วยกันเพื่อความสำเร็จ ในการดูแลภาวะหัวใจล้มเหลว



# Guideline



Logo of the Thai Society of Cardiology (TSC) and the Thai Heart Failure Society (THFS) are located at the top right of the cover.

**แนวทางเวชปฏิบัติเพื่อการวินิจฉัย  
และการดูแลรักษาผู้ป่วย  
ภาวะหัวใจล้มเหลว  
พ.ศ. 2557**

สมาคมแพทย์โรคหัวใจแห่งประเทศไทยในพระบรมราชูปถัมภ์  
ร่วมกับ  
ชมรมหัวใจล้มเหลวแห่งประเทศไทย

## ACCF/AHA Practice Guideline

### 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

*Developed in Collaboration With the American College of Chest Physicians, Heart Rhythm Society and International Society for Heart and Lung Transplantation*

*Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation*

European Heart Journal Advance Access published May 20, 2016



European Heart Journal  
doi:10.1093/eurheartj/ehw128

**ESC GUIDELINES**



### 2016 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)

HFSA 2010 Guideline Executive Summary

### Executive Summary: HFSA 2010 Comprehensive Heart Failure Practice Guideline

HEART FAILURE SOCIETY OF AMERICA

*St. Paul, Minnesota*



## Acute Decompensated Heart Failure (ADHF)

### Introduction

- Clinical diagnosis of the worsening sign and symptoms of HF.
- No specific definition, other terms include acute heart failure (AHF), acute heart failure syndrome (AHFS), de novo HF (if the 1<sup>st</sup> episode of acute HF).

### Epidemiology

- Most common cause of hospitalization in pts  $\geq 65$  yo (Circ 2013;127:e6).
- High mortality and morbidity (50% re-hospitalization at 6 months. (Am Heart J 2010;160:885).
- Heterogeneous groups of patients: ACS, HTN crisis, shock, RV failure, preserved EF (50%) etc.

### Precipitating factor (OPTIMIZE-HF. Arch Intern Med 2008;168:847)

- Medication noncompliance, diet noncompliance, MI (15%), pulmonary process (15%), arrhythmia (15%), infection, HTN, worsening HF, NSAIDs, thyroid, anemia, PE, pregnant, iatrogenic, unknown (30-40%) etc.

### Prognosis (ADHERE. JAMA 2005)

- Overall in-hospital mortality = 4%. 30% mortality at 1 year.
- If BUN  $\geq 43$ , SBP  $\leq 115$  and Cr  $\geq 2.75$ , in-hospital mortality rate of 20%.

### Evaluation

- Assess patient's clinical hemodynamics status. "Warm - Wet - Cold - Dry"

**↑ Congestion:** Orthopnea, ↑JVP, rales, (+) HIR, ascites, edema, PSM, S3, square wave BP response to Valsalva.

**↓ Perfusion:** ↓Mentation, narrow pulse pressure (PPP  $\leq 25\%$  - CI  $\leq 2.2$ . JAMA 1989;261:884), pulsus alternans, hypotension, cool extremities, ↑Cr, ↑LFT, ↑Lactic acid. (Nohria A. JACC 2003;41:1797).

	CONGESTION	
	-	+
ADEQUATE PERFUSION	A dry-warm (N=123)	B wet-warm (N=222)
	L dry-cold (N=16)	C wet-cold (N=91)

- Crepitation or cephalization on CXR has low sensitivity (<30%) in pt with history of chronic HF.
- BNP  $>100$  has 90% Se, 76% Sp for diagnosis of ADHF in pt presented to ED with dyspnea (BNP. NEJM 2002). BNP should not be used in isolation from clinical. May compare to "dry BNP"
- Goal of therapy: 1. Improve symptoms; 2. Prevent and restore end-organ damages by shift hemodynamics to "Dry and warm"; 3. Transition to outpatient chronic care.

### To Decrease Preload

#### Loop Diuretic

- Sigmoid dose-response curve. No response until threshold dose is reached. Minimal additional response after that.

- Once effective dose established, increased frequency of dosing for more urine output.

- Initial IV dose should be  $\geq$  home daily dose.
- Furosemide 80 PO = 40 IV = torsemide 40 PO = bumetanide 1 PO = 1 IV.

#### Diuretics resistant

- ↑ Dose, ↑ frequency, change to IV infusion
- Adding 2<sup>nd</sup> diuretic (thiazide, spironolactone).
- Tolvaitan - Vasopressin receptor blocker: Greater weight loss and less symptoms at 1 day but no  $\Delta$  CV

death or rehospitalization at 10 months. (EVEREST. JAMA 2007).

- Ultrafiltration: Greater control but no greater weight loss compared to diuretics. More adverse effect (CARRESS-HF. NEJM 2012).

- "Renal dose (low-dose) dopamine": Not selectively ↑renal blood flow or prevent renal failure (ROSE. JAMA 2013).
- Serelaxin - Recombinant human relaxin-2: ↓dyspnea, ↓length of stay, ↓CV death at 180 days in both HFpEF and HFpEF with AHF (RELAX-AHF. Lancet 2013).

Drug	Initial Dose	Maximum Single Dose
<b>Loop Diuretics</b>		
Bumetanide	1.0 mg	4 to 8 mg
Furosemide	40 mg	160 to 200 mg
Torsemide	30 mg	100 to 200 mg
<b>Thiazide Diuretics</b>		
Chlorthalidone	500 mg	2000 mg
<b>Sequential Nephron Blockade</b>		
Chlorthalidone	500 to 2000 mg (IV) once or twice plus loop diuretics once or multiple doses per day	
Melastoline (as Zaroxin or Duclor)	2.5 to 5 mg PO once or twice daily with loop diuretic	
<b>IV Infusions</b>		
Bumetanide	1-mg/IV load then 0.5 to 2 mg per hour infusion	
Furosemide	40mg/IV load then 30 to 40 mg per hour infusion	
Torsemide	20-mg/IV load then 5 to 20 mg per hour infusion	

### To increase perfusion (by ↓ afterload and/or ↑ contractility)

#### IV vasodilator

- Arterial dilation → ↓afterload → ↑cardiac output → ↓PCWP
- Veno dilation → ↓preload → rapid symptom relief
- No side effect of inotrope/pressors eg. arrhythmia (AF, VT/VF), MI (from ↑MVO2), vasospasm
- Should be avoid in hypotension, MS, AS

	Nitroglycerin	Nitroprusside	Nesiritide
<b>Mechanism</b>	Nitric Oxide	Nitric Oxide	BNP
<b>Onset of action</b>	mins	mins	hours
<b>Usual dose</b>	10 - 200 mcg/min	0.1 - 5 mcg/kg/min	2 mcg/kg iv bolus then 0.01 - 0.03 mcg/kg/min
<b>S/E</b>	Headache (20%) Hypotension	Thiocyanate Hypotension	? worsening HF Hypotension
<b>Expense</b>	\$	\$\$	\$\$\$\$
<b>Note</b>	V > A Decrease preload Tachyphylaxis	V = A Very fast onset	? Diuresis effect Cannot measure BNP VMAC. JAMA 2002 ASCEND-HF. NEJM 2011

#### IV inotropes

- ↑contractility → ↑cardiac output → ↓PCWP
- Choosing based on hemodynamic effects. No data consistently shows improving clinical outcome.
- Use only when needed (severe hypoperfusion with hypotension). Wean off as soon as possible.
- Bridge to definite treatment eg. resolution of precipitating factors, optimization of preload and afterload stage.

	Dopamine	Dobutamine	Milrinone
<b>Action</b>	$\alpha 1$ $\beta 1$ $\beta 2$ DA adrenergic agonist	$\beta 1$ $\beta 2$ ( $\alpha 1$ ) adrenergic agonist	PDE-3 inh increase cAMP
<b>Onset of action</b>	mins	mins	hours
<b>Usual dose</b>	2-20 mcg/kg/min	2-20 mcg/kg/min	0.125 - 0.625 mcg/kg/min
<b>Effect on afterload</b>	↑↑	↓↓	↓↓↓
<b>S/E</b>	VT/VF AF/Abuter	VT/VF AF/Abuter may ↓ hospitalization ↑ CoL but ↑ mortality	Pt who was on beta blocker 10% hypotension 5% Abuter/Abuter OPTIME-HF

- Other inotropes that may be consider: Norepinephrine, Levosimendan (Calcium-sensitizing agents: Positive inotropic with vasodilator. Uncertain clinical efficacy and safety)

### Other management

- Treat and modified precipitating factors.
- Na/fluid restriction. Carefully monitor I/Os, weight daily, check electrolytes
- O2 if hypoxia. CPAP or NIPPV may have some benefits (3CPO NEJM 2008). Opiate if needed, DVT prophylaxis.
- Chronic HF meds should be continued unless there are contraindications or hemodynamic instability.
- If hypotension, severe hypoperfusion, may consider PA cath and/or arterial line.
- When inotrope is not enough consider mechanical circulatory support (MCS eg. IABP, LVAD), OHT or palliative.
- Transition to chronic outpatient care
  - Education, self care, HF program/clinic
  - Guideline directed medical treatment (start, uptitrate to optimal doses)
  - Identified patient who may benefit from CRT/ICD device, revascularization.
- Guideline: ACC/AHA, ESC, HFSA, Thai Heart.
- Registry: ADHERE, OPTIMIZE-HF, ESCAPE, EHFS II, THAI-ADHERE



# Thank you

## TREATING CONGESTIVE HEART FAILURE



- **U**PRIGHT POSITION
- **N**ITRATES (low Dose)
- **L**ASIX
- **O**XYGEN
- **A**MINOPHYLLINE
- **D**IGOXIN

- **F**LUIDS (DECREASE)
- **A**FTERLOAD (DECREASE)
- **S**ODIUM RESTRICTION
- **T**EST (DIG LEVEL, ABG's, POTASSIUM LEVEL)



# ACC/AHA: 2013 HF guideline

**Table 28. Recommendations for Therapies in the Hospitalized HF Patient**

Recommendations	COR	LOE	References
HF patients hospitalized with fluid overload should be treated with intravenous diuretics	I	B	737, 738
HF patients receiving loop diuretic therapy should receive an initial parenteral dose greater than or equal to their chronic oral daily dose; then dose should be serially adjusted	I	B	739
HF/EF patients requiring HF hospitalization on GDMT should continue GDMT except in cases of hemodynamic instability or where contraindicated	I	B	195, 735, 736
Initiation of beta-blocker therapy at a low dose is recommended after optimization of volume status and discontinuation of intravenous agents	I	B	195, 735, 736
Thrombosis/thromboembolism prophylaxis is recommended for patients hospitalized with HF	I	B	21, 770–774
Serum electrolytes, urea nitrogen, and creatinine should be measured during titration of HF medications, including diuretics	I	C	N/A
When diuresis is inadequate, it is reasonable to	IIa	B	38, 739
a. give higher doses of intravenous loop diuretics; or		B	740–743
b. add a second diuretic (eg, thiazide)			
Low-dose dopamine infusion may be considered with loop diuretics to improve diuresis	IIb	B	744, 745
Ultrafiltration may be considered for patients with obvious volume overload	IIb	B	752
Ultrafiltration may be considered for patients with refractory congestion	IIb	C	N/A
Intravenous nitroglycerin, nitroprusside, or nesiritide may be considered an adjuvant to diuretic therapy for stable patients with HF	IIb	A	760–763
In patients hospitalized with volume overload and severe hyponatremia, vasopressin antagonists may be considered	IIb	B	787, 788

COR indicates Class of Recommendation; GDMT, guideline-directed medical therapy; HF, heart failure; HF/EF, heart failure with reduced ejection fraction; LOE, Level of Evidence; and N/A, not available.

**Table 2** Clinical presentation and initial investigations in Thai ADHERE heart failure patients.

Presentation and investigation	<i>n</i> = 2041	<i>n</i> (%)
Dyspnea	1973	(96.7)
Dyspnea at rest	1283/1973	(65.0)
NYHA class assessed	1857	(90.7)
NYHA class II	272/1857	(14.7)
NYHA class III	298/1857	(16.2)
NYHA class IV	1283/1857	(69.1)
Fatigue	735	(36.0)
Rales	1726	(84.6)
Peripheral edema	1215	(59.5)

