ACC Latin America Conference 2017

Pearls in Acute Heart Failure Management

Best Practices

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Disclosures: Nothing to disclose.

UF UNIVERSITY of FLORIDA

Comparison of US and Latin America Heart Failure Patients

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	USA	Latin America
Age (years)	>65 #1 reason for hospitalization 1.1 million	↑ age >60 999,990
Length of Stay	3 to 7 days	4 to 10 days
HFPEF (ADHERE) Age	48% 77.2 (66-84)	45.7% 71 (59-71)

Seven Major Classes of Biomarkers Contributing to the Biomarker Profile in Heart Failure

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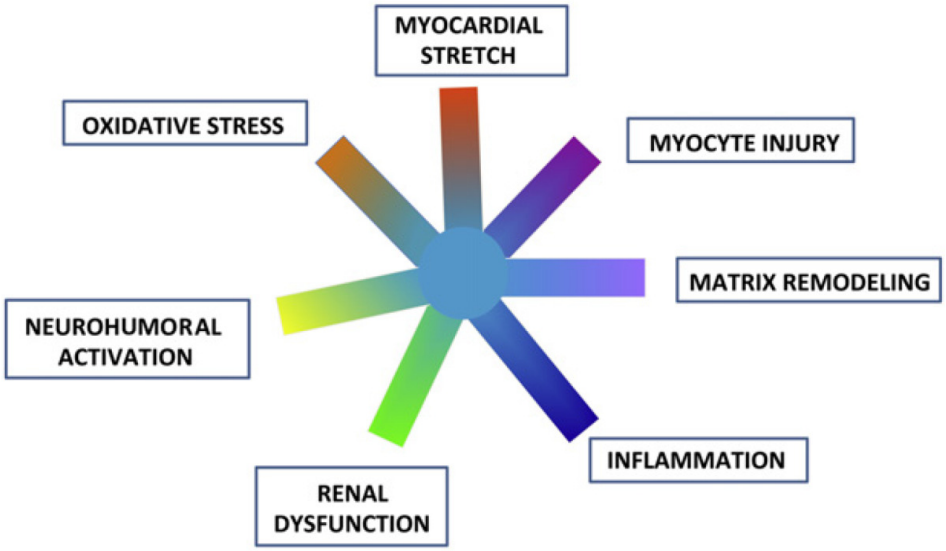

Figure 7 **Seven Major Classes of Biomarkers Contributing to the Biomarker Profile in HF**

Adapted with permission from Braunwald E. Preface. Heart Fail Clin 2009;5:xiii–xiv.

Braunwald E. J Am Coll Cardiol HF 2013;1:1–20.

Medical Management of Acute Heart Failure

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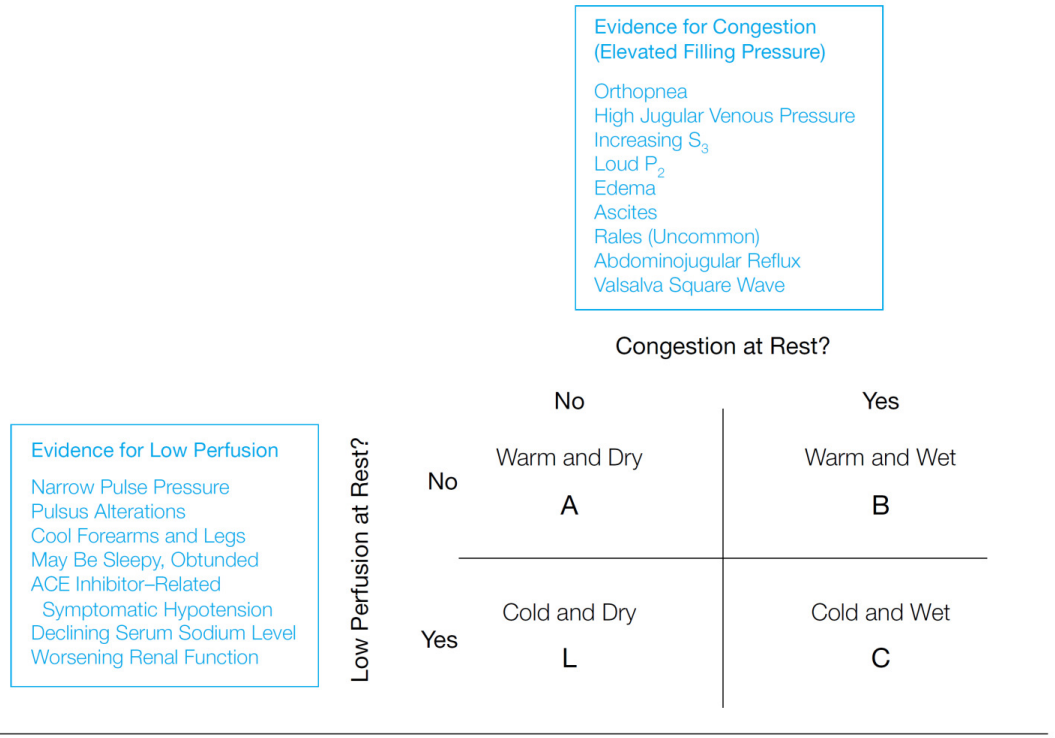
Figure 1. Two-Minute Assessment of Hemodynamic Profile



Nohria A, et al. JAMA 2006;287:628-640.

SBP in AHF: Higher is Better?

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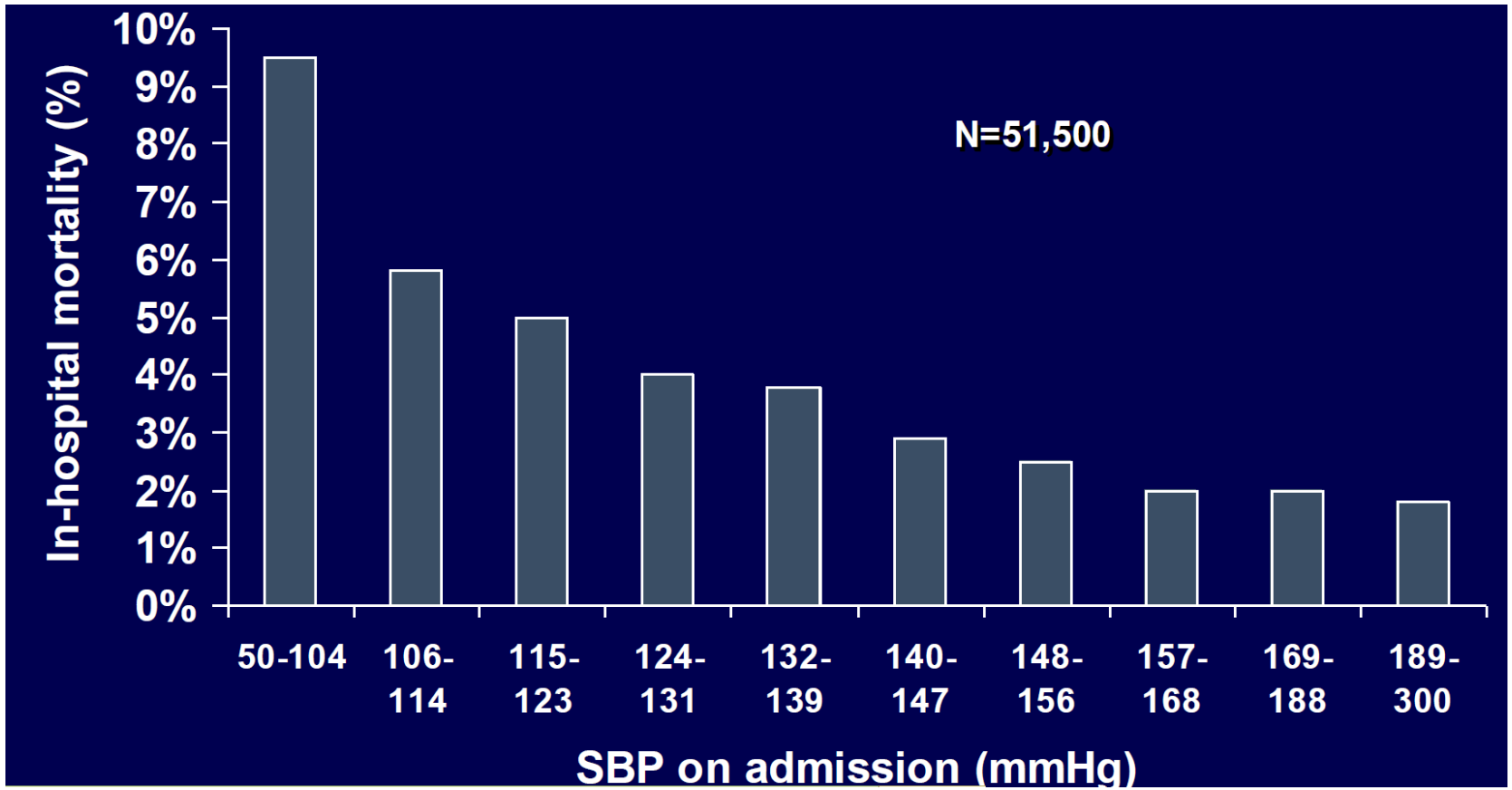
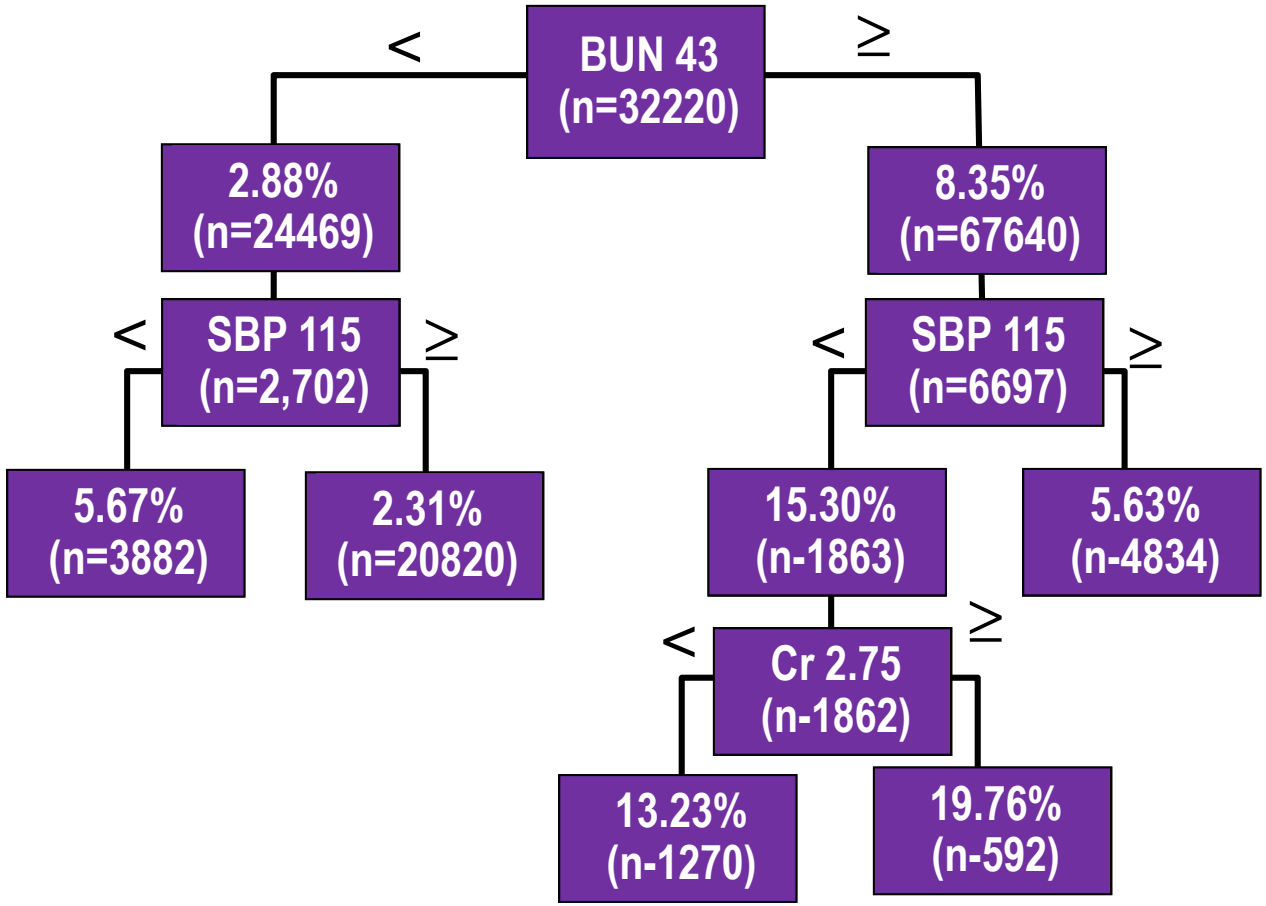


Gheorghiade M, et al. JAMA 2007

Inpatient mortality from ADHERE Registry Based on admission BUN, creatinine and BP



Analysis of patients in the National Acute Decompensated Heart Failure National Registry (ADHERE)
BUN=blood urea nitrogen, Cr=serum creatinine, SBP-systolic blood pressure
Fonarow GC et al. J Cardiac Fail 2003;9(suppl 1):S79.

Typical 6-Day HF Journey

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Day 1

- Admission
- Most of day in ER
- Diuretic regimen not established until evening

Day 2

- Diuresis begins

Day 5

- Patient feels better
- Wants to go home

Day 6

- Discharge
- Patient converted to PO meds
- Feels better
- Still volume overloaded

More than 50% of Patients Have Little or no Weight Loss During Hospitalization

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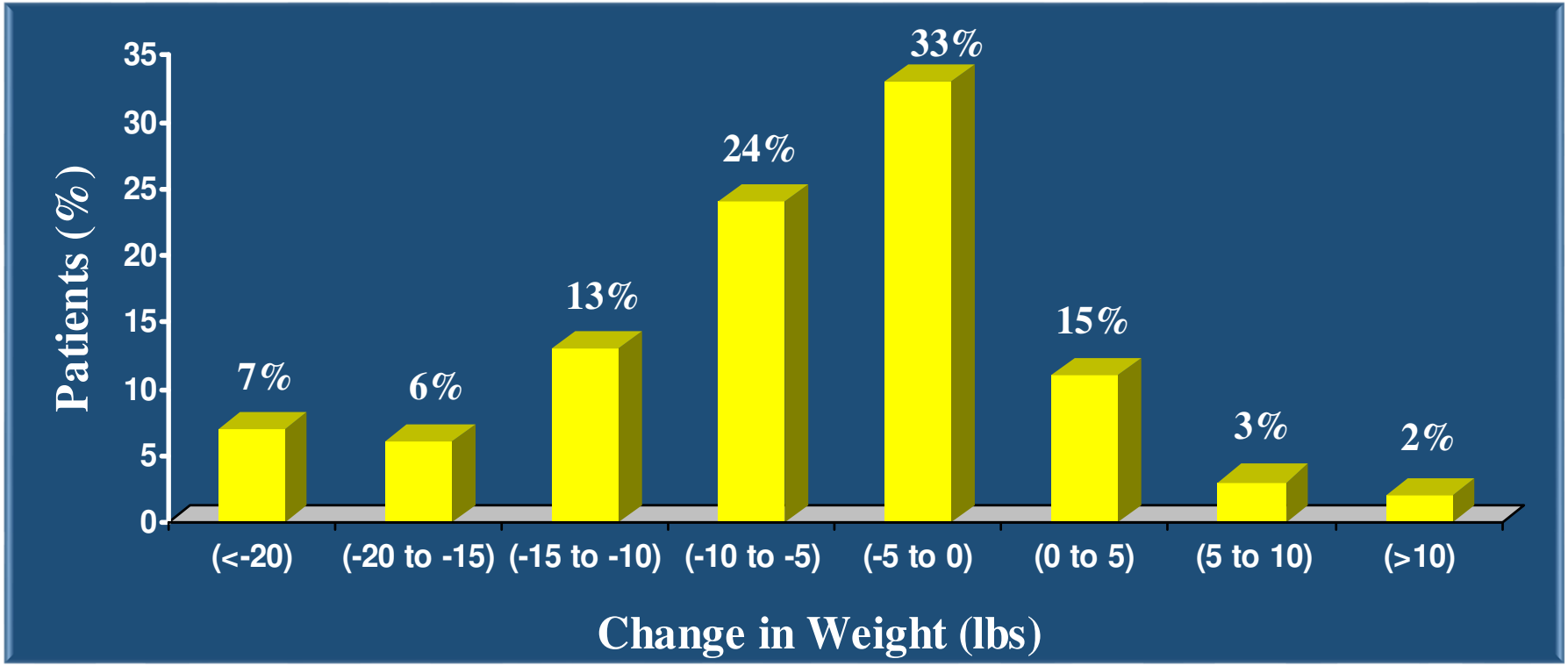
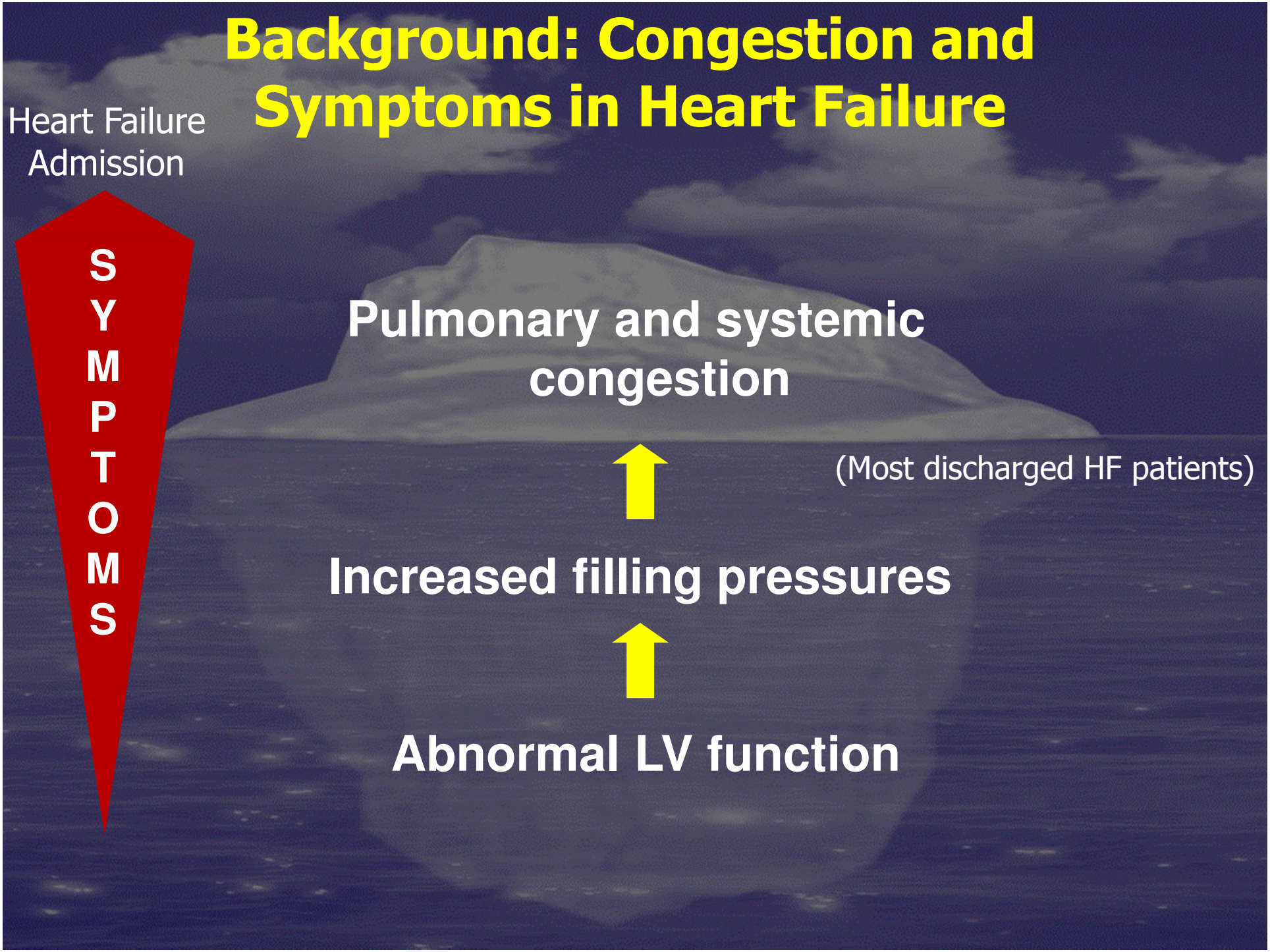


Fonarow GC. Rev Cardiovasc Med. 2003; 4 (Suppl. 7): 21

Background: Congestion and Symptoms in Heart Failure



High CVP ≅ Elevated Creatinine

Journal of Cardiac Failure Vol. 18 No. 12 2012

Review Article

Congestive Renal Failure: The Pathophysiology and Treatment of Renal Venous Hypertension

EDWARD A. ROSS, MD

Gainesville, Florida

Proposed Pathophysiology of Renal Venous Hypertension (Backward flow)

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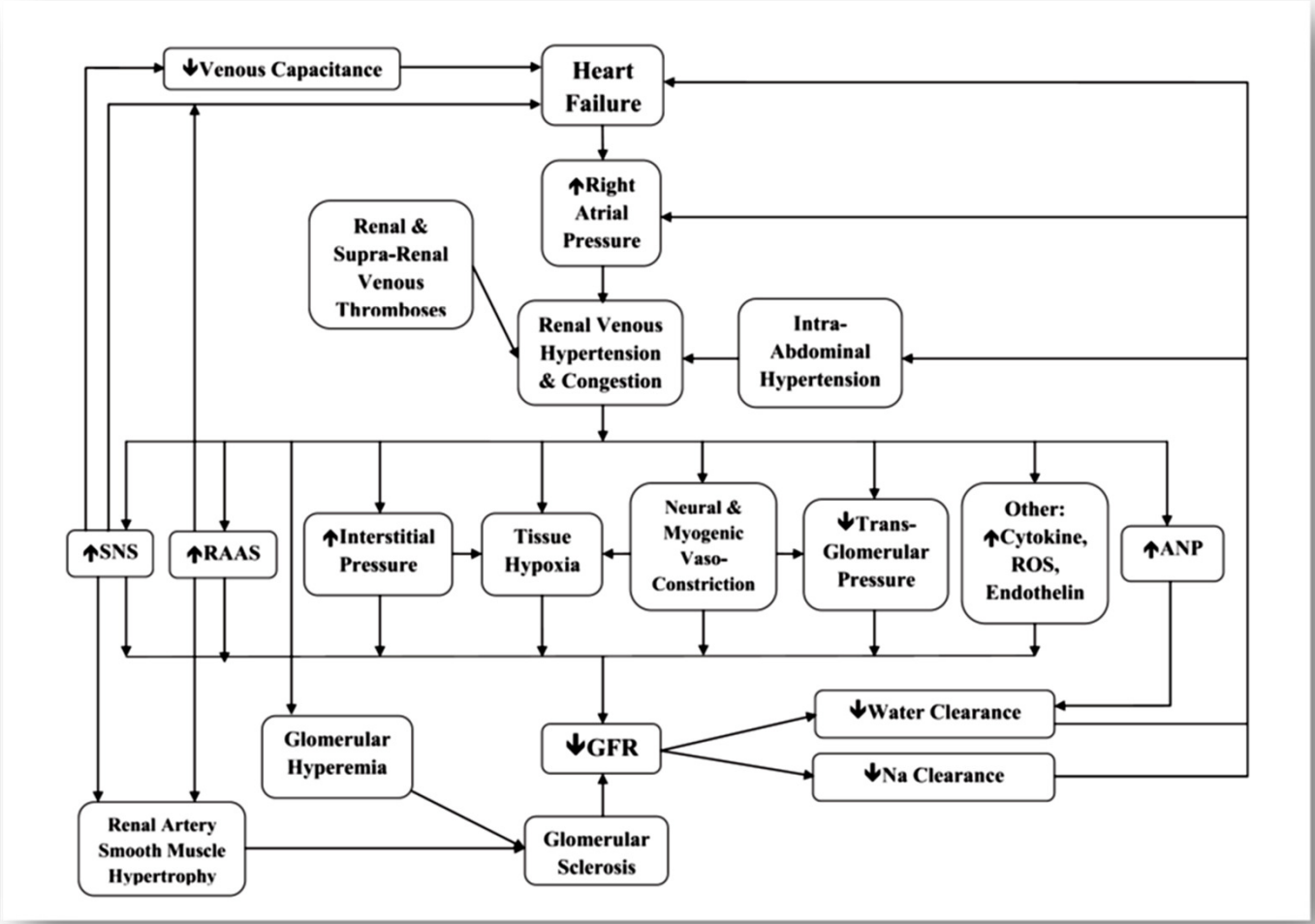

Ross EA. J Cardiac Failure 2012;18:930-938.

Concept of Plasma Refill Rate in ADHF

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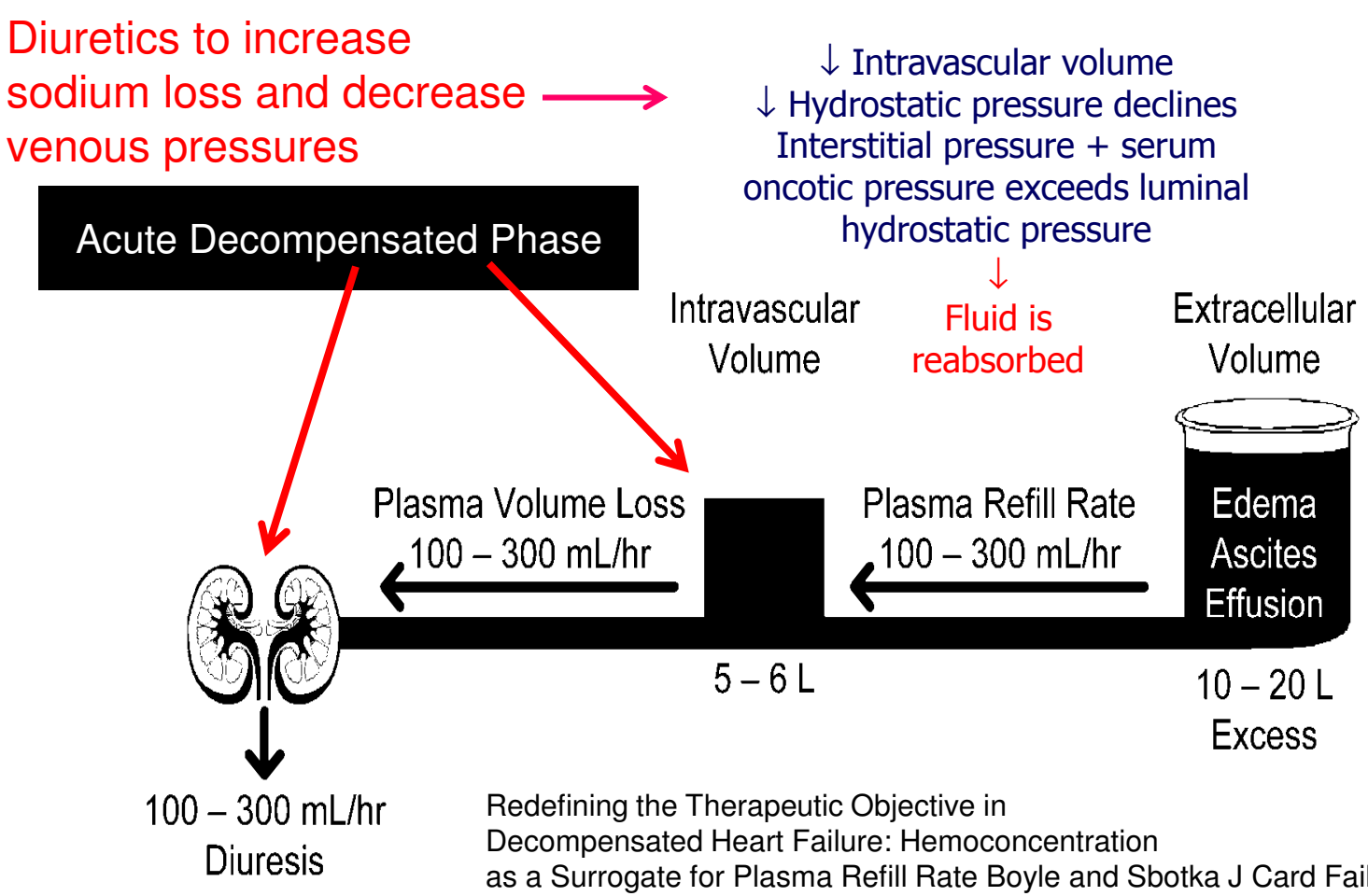
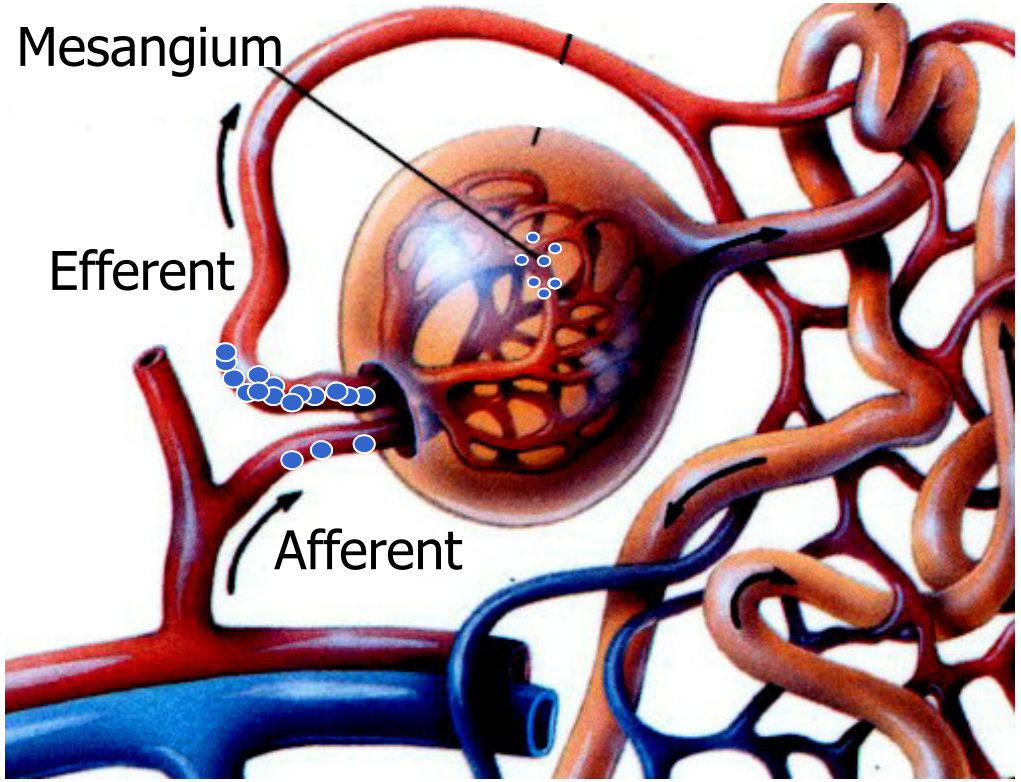


Redefining the Therapeutic Objective in Decompensated Heart Failure: Hemoconcentration as a Surrogate for Plasma Refill Rate Boyle and Sbotka J Card Failure May 2006

Renal Effects of Angiotensin II

Efferent > Afferent Arteriolar Constriction
(PRESSURE EFFECT)
Glomerular hypertension / hyperfiltration Proteinuria

Mesangial/Glomerular Constriction
(ENDOTHELIAL EFFECT)
↓ Glomerular Surface Area
↓ Filtration Constant K_f
Proteinuria
Production renal cytokines,
(eg TGF_{BETA})
Proximal tubule Na reabsorption



AT1 Receptors

Adapted from Douglas JG, American Journal of Physiology 1987.

SOLVD

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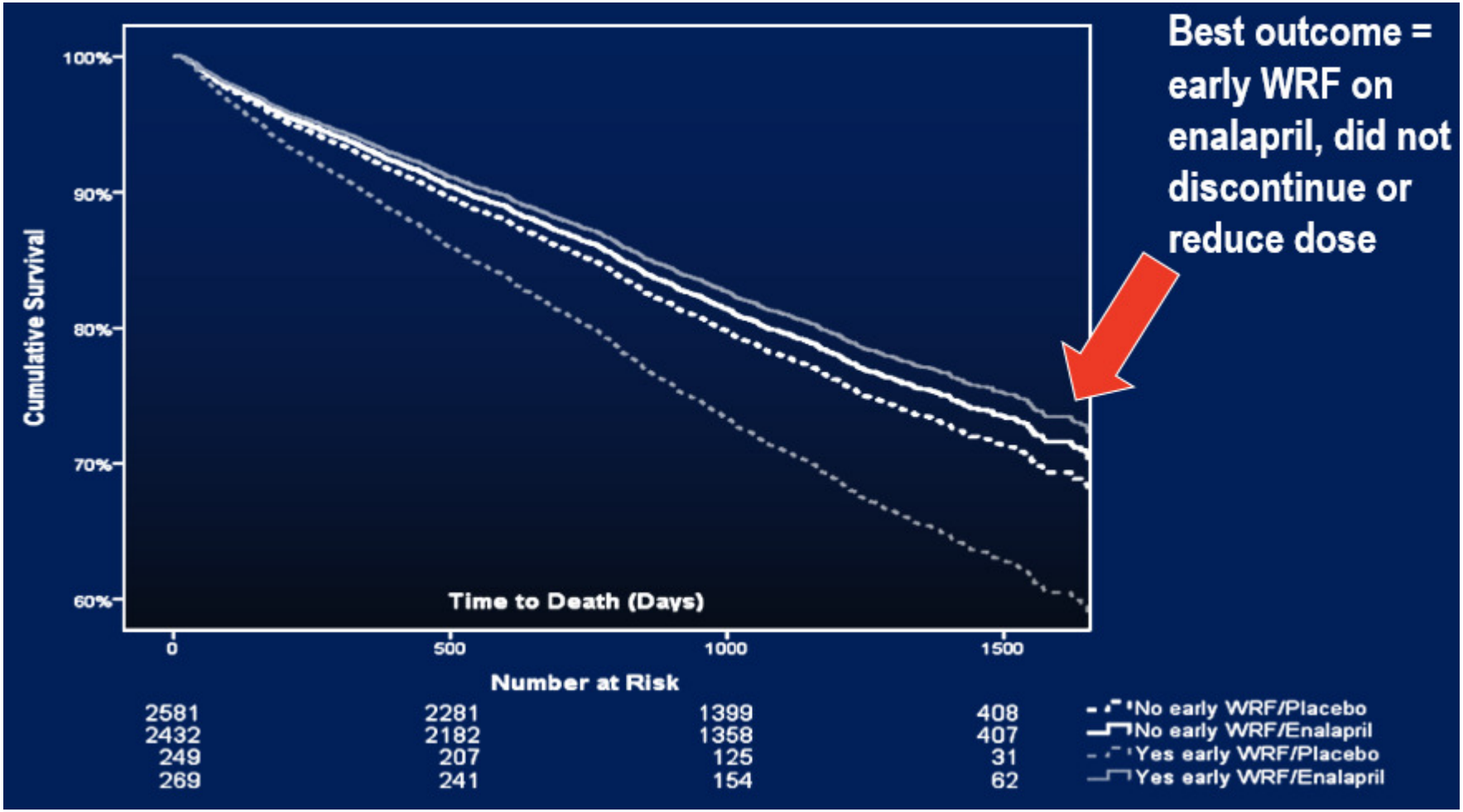

Early Worsening Renal Function Status: Legend in lower right

Testani JM et al. *Circ Heart Fail.* 2011;4:685-691.

B-Type Natriuretic Peptide - A Window to the Heart

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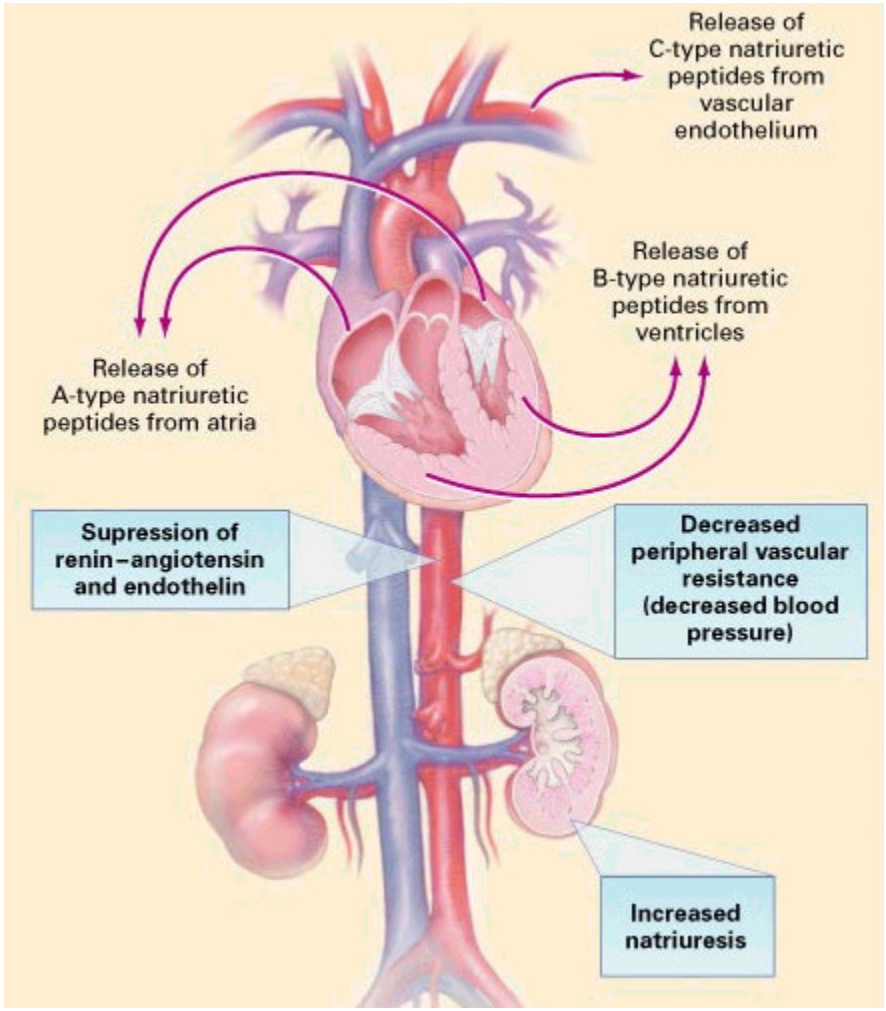

Baughman KL. N Engl J Med 2002;347:158-9.

2017 ACC/AHA/HFSA Focused Update Biomarkers: Recommendations for Prognosis

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IIa	**B-NR**	**During a HF hospitalization, a predischarge natriuretic peptide level can be useful to establish a postdischarge prognosis (93, 96, 104-113).**	**NEW**: Current recommendation reflects new observational studies.
See Online Data Supplements A and B.			

Predischarge natriuretic peptide biomarker levels and the relative change in levels during hospital treatment are strong predictors of the risk of death or hospital readmission for HF (93, 96, 104-113). Several studies have suggested that predischarge natriuretic peptide biomarker levels had higher reclassification and discrimination value than clinical variables in predicting outcomes (96, 106, 108-111). Patients with higher predischarge levels and patients who do not have a decrease in natriuretic peptide biomarker levels during hospitalization have worse outcomes (96, 106, 108-111). Although observational or retrospective studies have suggested that patients with natriuretic peptide biomarker reduction had better outcomes than those without any changes or with a biomarker rise (93, 107, 112, 113), targeting a certain threshold, value, or relative change in these biomarker levels during hospitalization may not be practical or safe for every patient and has not been tested in a prospective large-scale trial. Clinical assessment and adherence to GDMT should be the emphasis, and the prognostic value of a predischarge value or relative changes does not imply the necessity for serial and repeated biomarker measurements during hospitalization.

IIb	**B-NR**	**In patients with chronic HF, measurement of other clinically available tests, such as biomarkers of myocardial injury or fibrosis, may be considered for additive risk stratification (27, 95, 98, 99, 103, 114-119).**	**MODIFIED**: 2013 recommendations have been combined into prognosis section, resulting in LOE change from A to B-NR.
See Online Data Supplements A and B.			

Biomarkers of myocardial fibrosis (e.g., soluble ST2 receptor, galectin-3, high-sensitivity cardiac troponin, and others) are predictive of hospitalization and death in patients with HF and also are additive to natriuretic peptide biomarker levels in their prognostic value (117, 119-126). A combination of biomarkers may ultimately prove to be more informative than single biomarkers (127).

Yancy CW, et al. J Am Coll Cardiol 2017; doi: 10.1016/j.jacc.2017.04.025.

Biomarkers: Indications for Use

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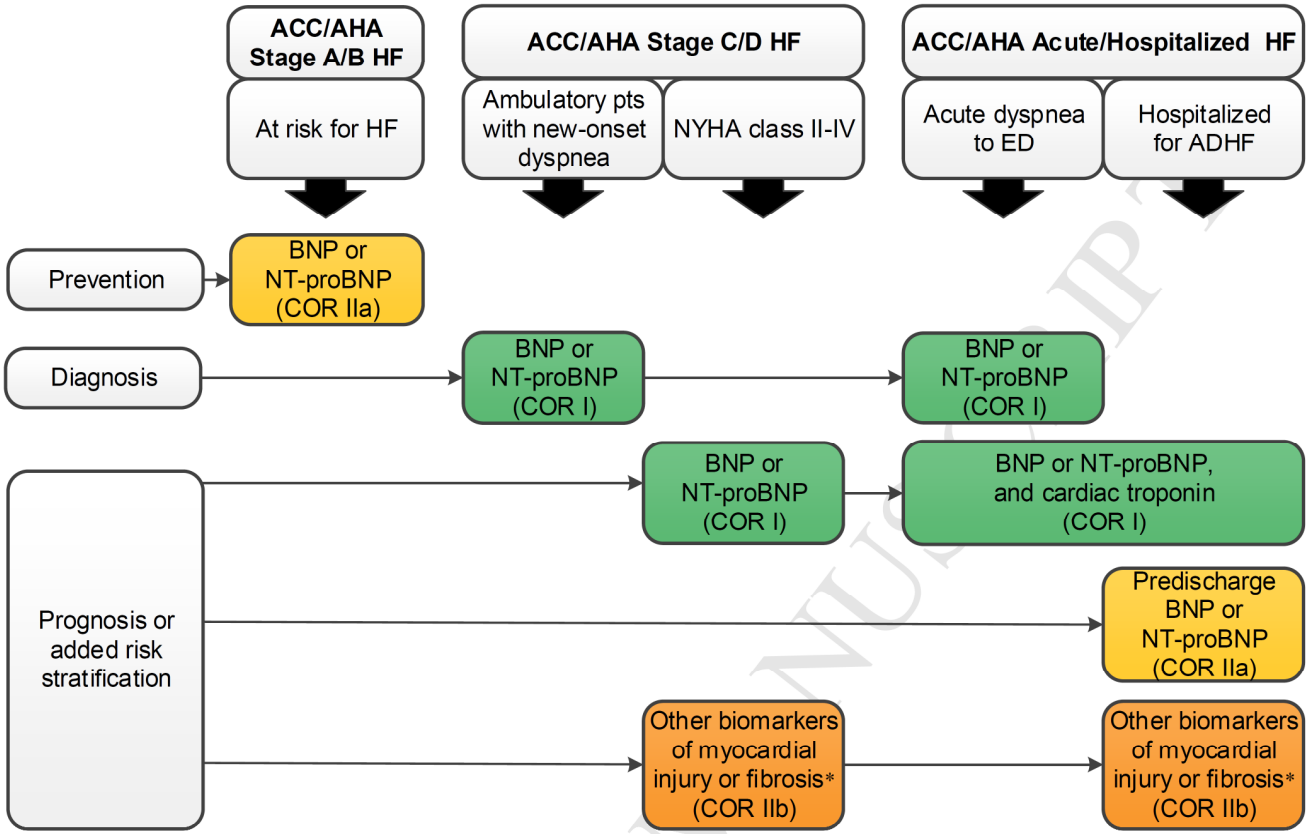

Yancy CW, et al. J Am Coll Cardiol 2017; doi: 10.1016/j.jacc.2017.04.025.

Precipitating Factors for HF Decompensation

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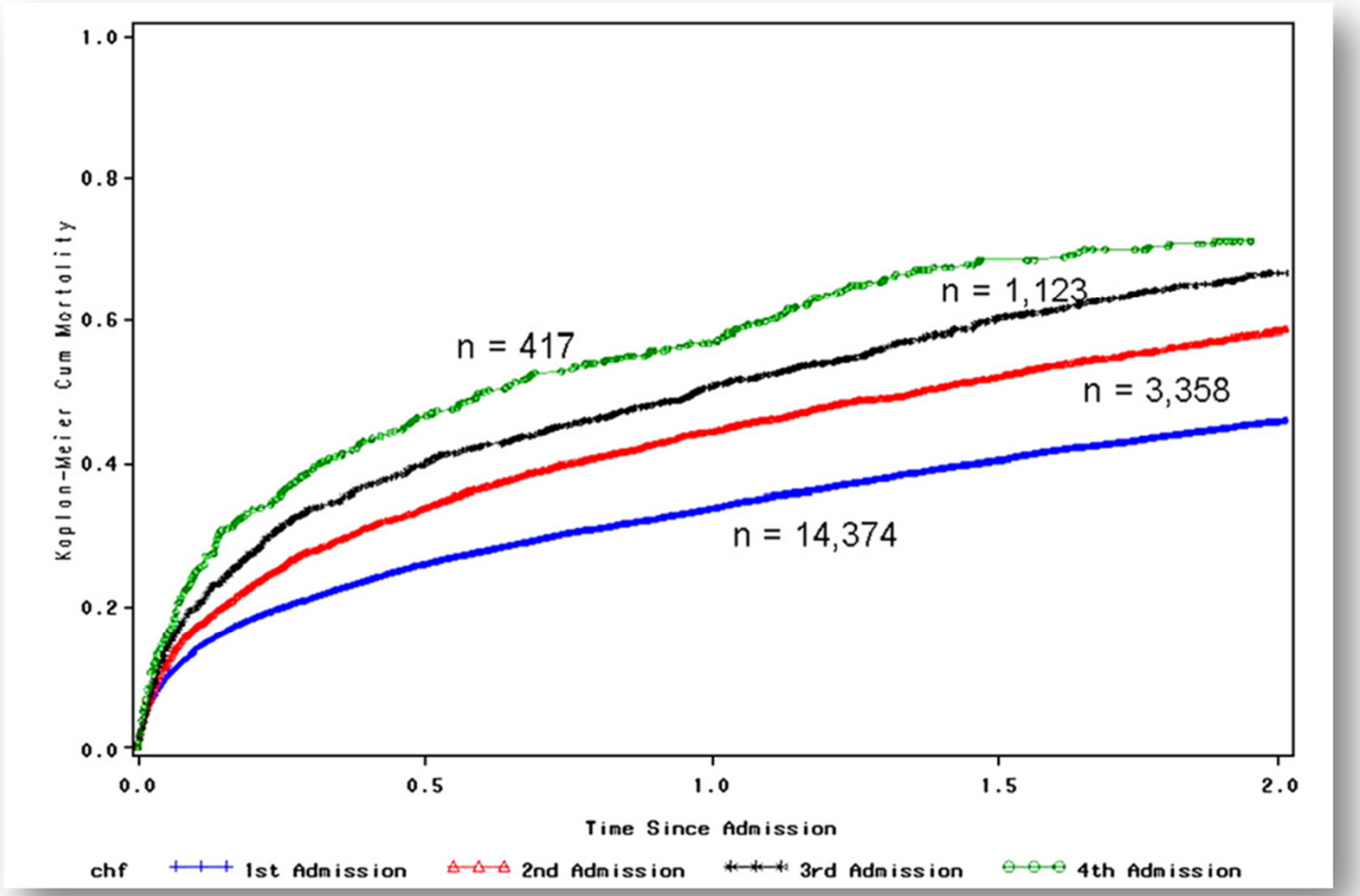
- Variety of dysrhythmias
- Acute coronary syndromes
  - Chest pain and nonischemic cardiomyopathies
- Rapid need for increased CO of the failing heart
  - Infection
  - Anemia
  - PE superimposed on chronic HF
- Discontinuation of chronic HF meds
- Progression of underlying disease
- CHAMP {ACS, HBP, Arrythmias, Mechanical Cause, PE} ESC HF guidelines 2016

Key Strategies to Lower HF Readmission Rates

✔	During initial HF hospitalization diuresis to euvolemic state
✔	Interogate ICD or CRT pacemaker to identify arrhythmias, right ventricular pacing, or suboptimal CRT
✔	Identify reason for HF decompensation (anemia, infection, arrhythmias, ischemia, pulmonary embolism, noncompliance)
✔	Discharge education on diet, exercise, medications, weight monitoring, diuretic titration for congestion
✔	Post-discharge early follow-up within ten days.

Aranda JM, Jr. CVIA 2015; 1:5-12.

All-Cause Mortality After Each Subsequent Hospitalization for HF



Setoguchi S, et al. Am Heart J 2007;154:260-266.

Sleep Disordered Breathing

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COR	LOE	Recommendations	Comment/Rationale
IIa	C-LD	**In patients with NYHA class II–IV HF and suspicion of sleep disordered breathing or excessive daytime sleepiness, a formal sleep assessment is reasonable (200, 201).**	NEW: Recommendation reflects clinical necessity to distinguish obstructive versus central sleep apnea.
See Online Data Supplement G.			
Sleep disorders are common in patients with HF. A study of adults with chronic HF treated with evidence-based therapies found that 61% had either central or obstructive sleep apnea (202). It is clinically important to distinguish obstructive sleep apnea from central sleep apnea, given the different responses to treatment. Adaptive servo-ventilation for central sleep apnea is associated with harm (203). Continuous positive airway pressure (CPAP) for obstructive sleep apnea improves sleep quality, reduces the apnea-hypopnea index, and improves nocturnal oxygenation (200, 201).			
IIb	B-R	**In patients with cardiovascular disease and obstructive sleep apnea, CPAP may be reasonable to improve sleep quality and daytime sleepiness (204).**	NEW: New data demonstrate the limited scope of benefit expected from CPAP for obstructive sleep apnea.
See Online Data Supplement G.			
In patients with sleep apnea, a trial evaluated the impact of CPAP with usual therapy versus usual therapy alone on subsequent cardiovascular events, including HF (204). In this RCT of >2,700 patients, there was no evidence of benefit on cardiovascular events at a mean follow-up of 3.7 years for CPAP plus usual care compared with usual care alone. Improvements in sleep quality were noteworthy and represented the primary indication for initiating CPAP treatment (204). However, in patients with atrial fibrillation (AF) (a frequent comorbidity noted with HF), the use of CPAP for obstructive sleep apnea was helpful. In a trial of 10,132 patients with AF and obstructive sleep apnea, patients on CPAP treatment were less likely to progress to more permanent forms of AF than were patients without CPAP (205).			

Yancy CW, et al. J Am Coll Cardiol 2017; doi: 10.1016/j.jacc.2017.04.025.

2017 ACC/AHAHFSA Focused Update: Anemia Recommendations

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COR	LOE	Recommendations	Comment/Rationale
IIb	B-R	**In patients with NYHA class II and III HF and iron deficiency (ferritin <100 ng/mL or 100 to 300 ng/mL if transferrin saturation is <20%), intravenous iron replacement might be reasonable to improve functional status and QoL(173, 174).**	**NEW**: New evidence consistent with therapeutic benefit.
See Online Data Supplement D.			

Yancy CW, et al. J Am Coll Cardiol 2017; doi: 10.1016/j.jacc.2017.04.025.

Conclusions

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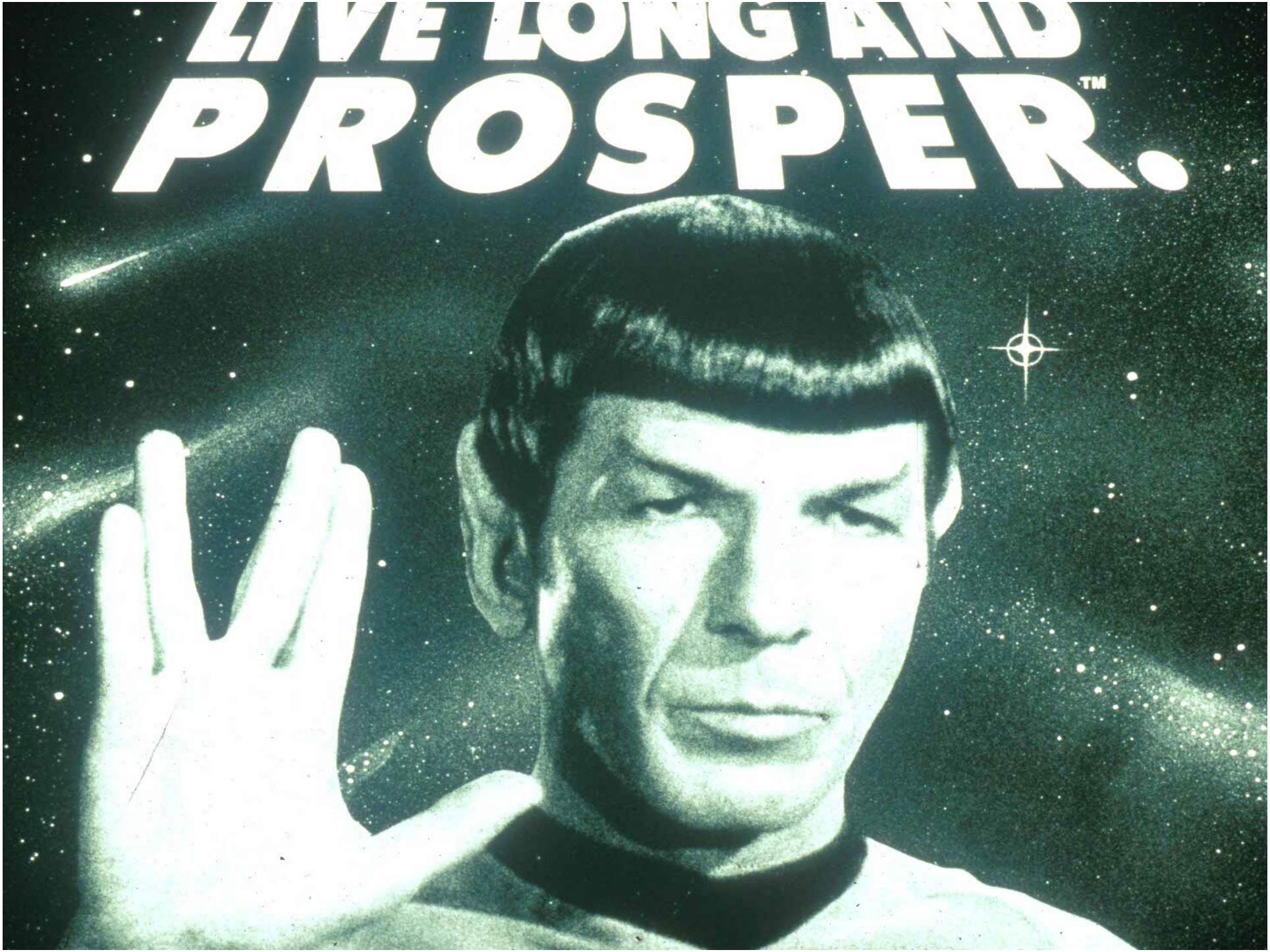
- Acute heart failure: diuresis until euvolemic
- Understand heart-kidney interactions
- Discharge on appropriate neurohormonal blockade
- New recommendations on BNP, predischarge screen for anemia, sleep apnea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