2016 recommendations on cardiogenic shock management: what inotropes?

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Conflicts of interest

Honoraires pour conférence:

- Orion, AbbVie, Alere, Edwards, Novartis, Roche, Vifor

Consultant:

- Cardiorentis, Novartis, Sphingotec

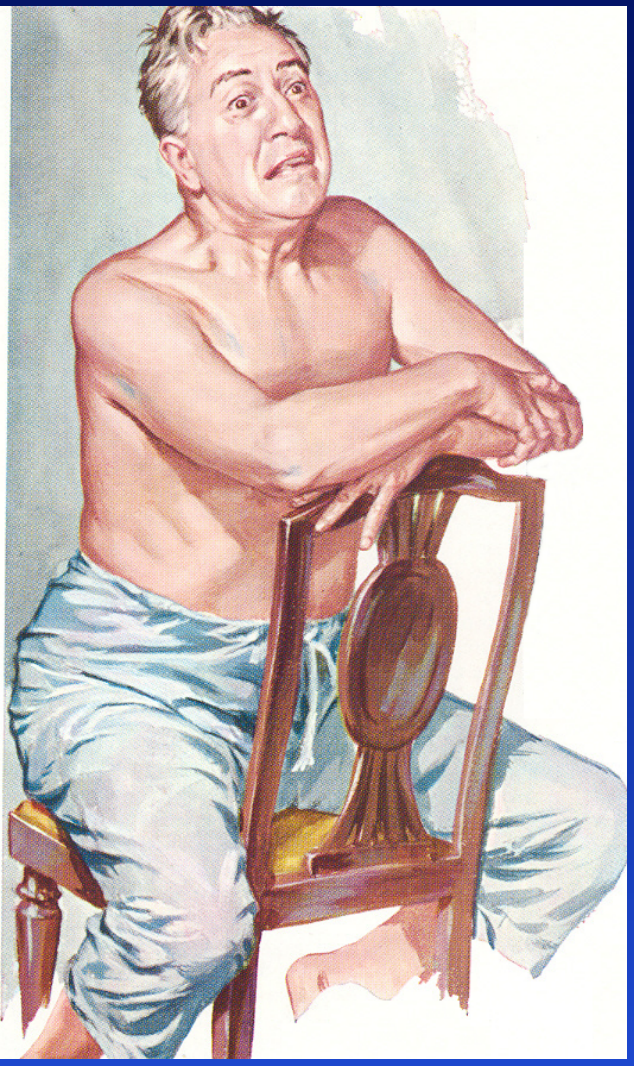
Main message

- **AHF with no shock:**
  - **Congestion**
  - Vasodilators

- **Cardiogenic shock**
  - **Low cardiac output and myocardial ischemia**
  - Cath lab + inotrope + norepinephrine (if needed); epinephrine/adrenaline: toxic

- « **Time is muscle** »

CS1: ED: Dyspnea and/or Other Signs of Congestion + Elevated SBP (> 150 mmHg)



Acute pulmonary edema

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- Dyspnea develops abruptly
- Diffuse pulmonary edema
- Minimal systemic edema

It is a <u>vascular</u> illness

+ Warning !
Patient is very often
normovolemic
or hypovolemic

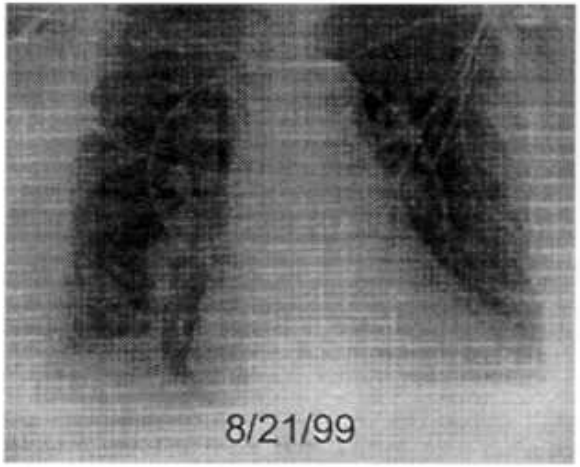
always

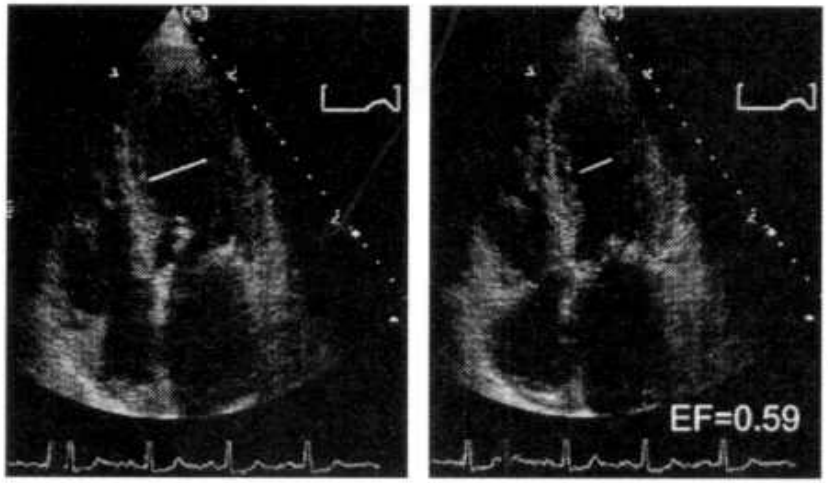
During Acute Pulmonary Edema

Blood pressure, 240/144 mm Hg

After Treatment

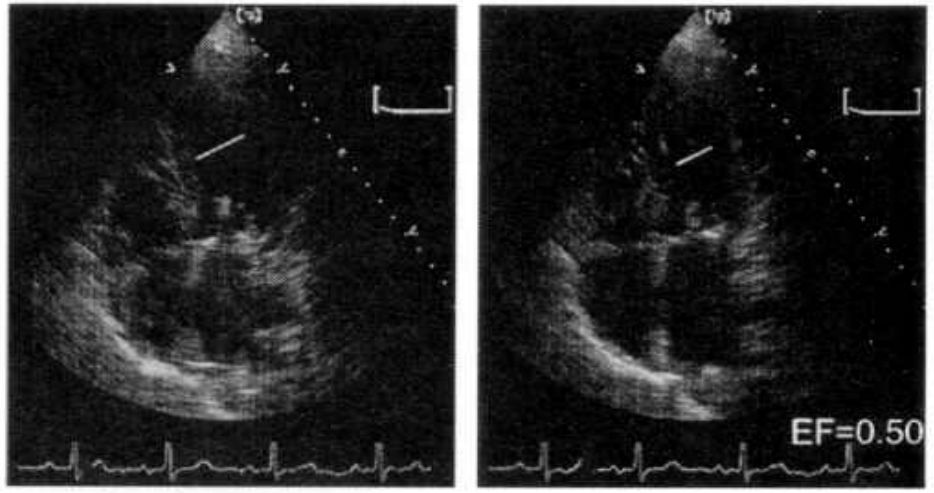
Blood pressure, 149/75 mm Hg





End Diastole

End Systole

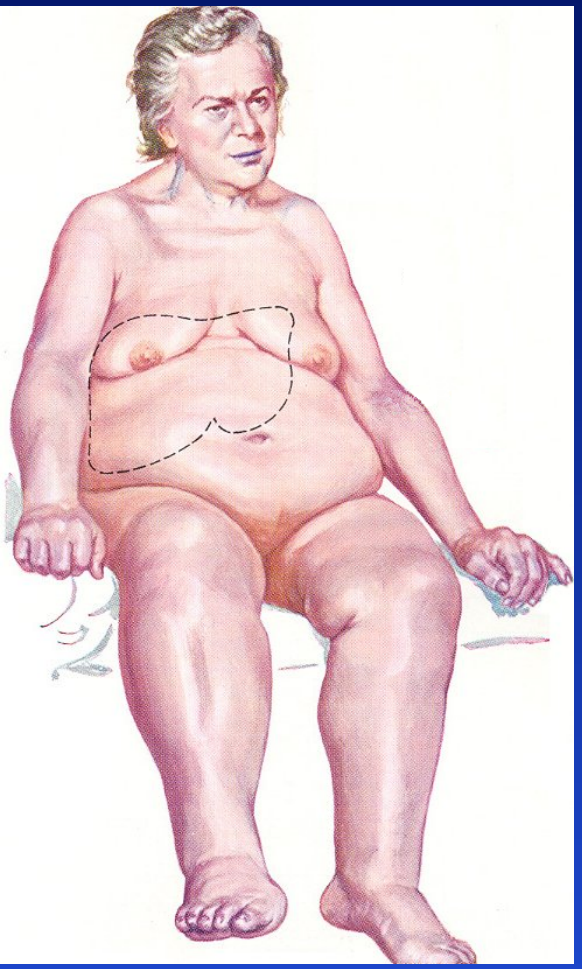


End Diastole

End Systole

SK Ghandi, NEJM 2001, 344: 17-22

CS2: CCU, Dyspnea+SBP 110 – 150mmHg



Decompensated chronic heart failure

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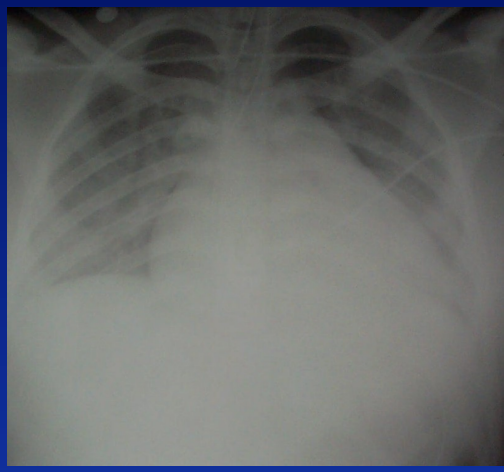
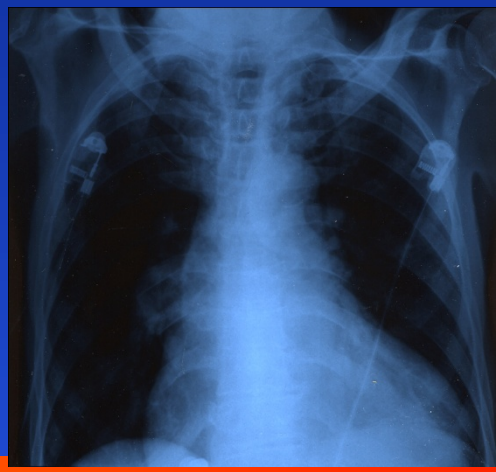
- Dyspnea develops gradually
- Gradual increase in body weight
- Systemic edema
- Minimal pulmonary edema

It is a systemic illness:

- Possible Renal dysfunction
- Anemia
- Low albumin
- Increased Pulmonary Congestion
- Systemic Congestion



or



European Heart Journal
doi:10.1093/eurheartj/ehv066

CURRENT OPINION

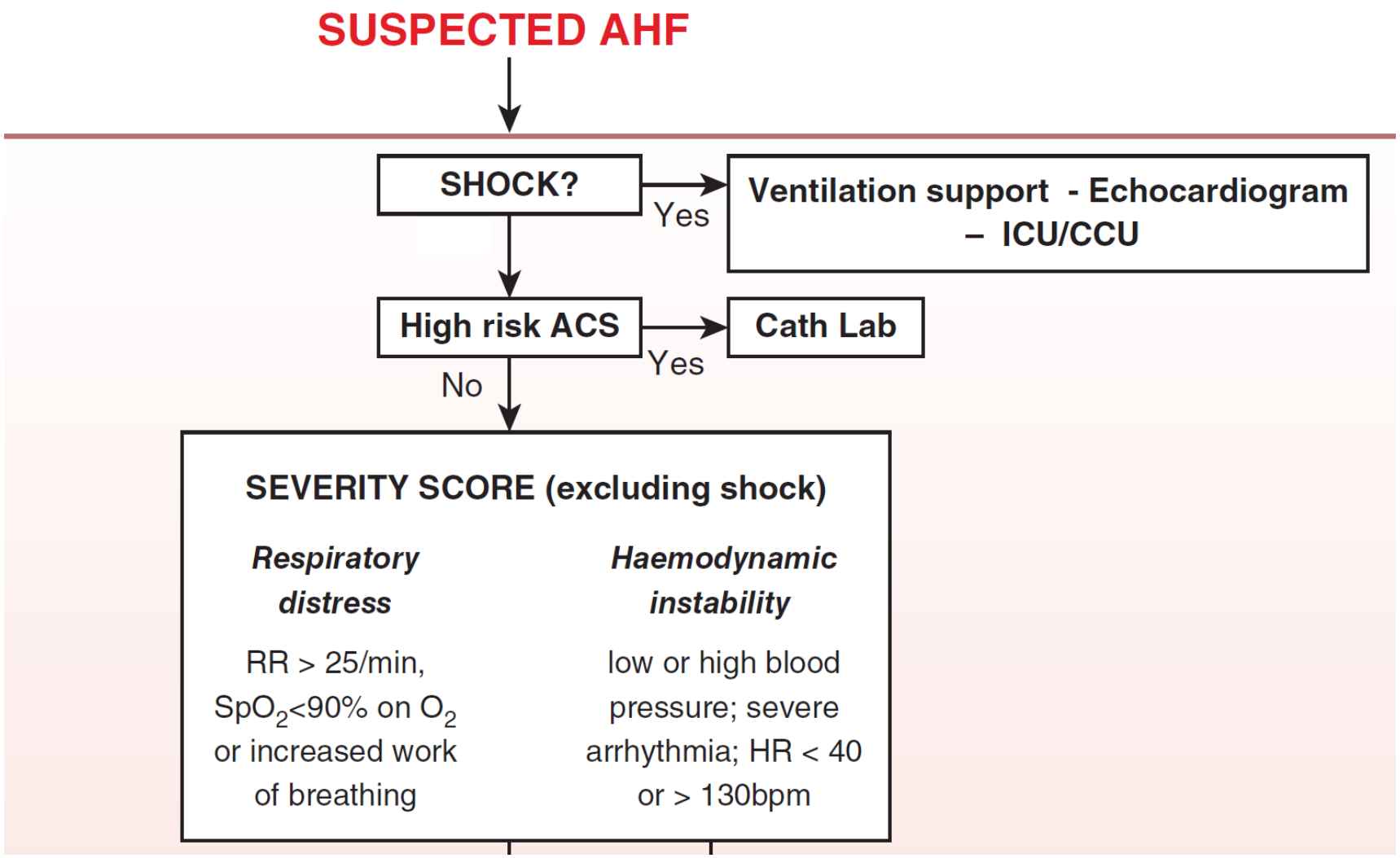
Online, free access

Recommendations on pre-hospital and early hospital management of acute heart failure: a consensus paper from the Heart Failure Association of the European Society of Cardiology, the European Society of Emergency Medicine and the Society of Academic Emergency Medicine – short version

Alexandre Mebazaa[1]*, M. Birhan Yilmaz[2], Phillip Levy[3], Piotr Ponikowski[4], W. Frank Peacock[5], Said Laribi[6], Arsen D. Ristic[7], Ekaterini Lambrinou[8], Josep Masip[9], Jillian P. Riley[10], Theresa McDonagh[11], Christian Mueller[12], Christopher deFilippi[13], Veli-Pekka Harjola[14], Holger Thiele[15], Massimo F. Piepoli[16], Marco Metra[17], Aldo Maggioni[18], John J.V. McMurray[19], Kenneth Dickstein[20], Kevin Damman[21], Petar M. Seferovic[22,23], Frank Ruschitzka[24], Adelino F. Leite-Moreira[25,26], Abdelouahab Bellou[27,28], Stefan D. Anker[29,30], and Gerasimos Filippatos[31]

Mebazaa et al Eur Heart Journal 2015

What to do in the first 30-60 min (1)



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What to do in the first 30-60 min (2)

SEVERITY SCORE

Yes

RESUSCITATION AREA/CCU/ICU

To stabilize vital signs (echo if needed) and/or immediate non-invasive ventilation

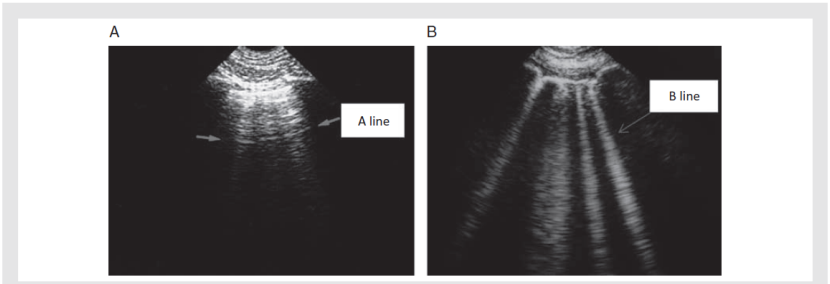
No

DIAGNOSTIC TESTS

- ECG,
- Lab tests (refer to text)
- Echo (lung, heart)
- Chest Xray

IV THERAPY

SBP<110 mmHg	***SBP>110 mmHg***
• Diuretics, 1st line therapy	• Vasodilators / Diuretics



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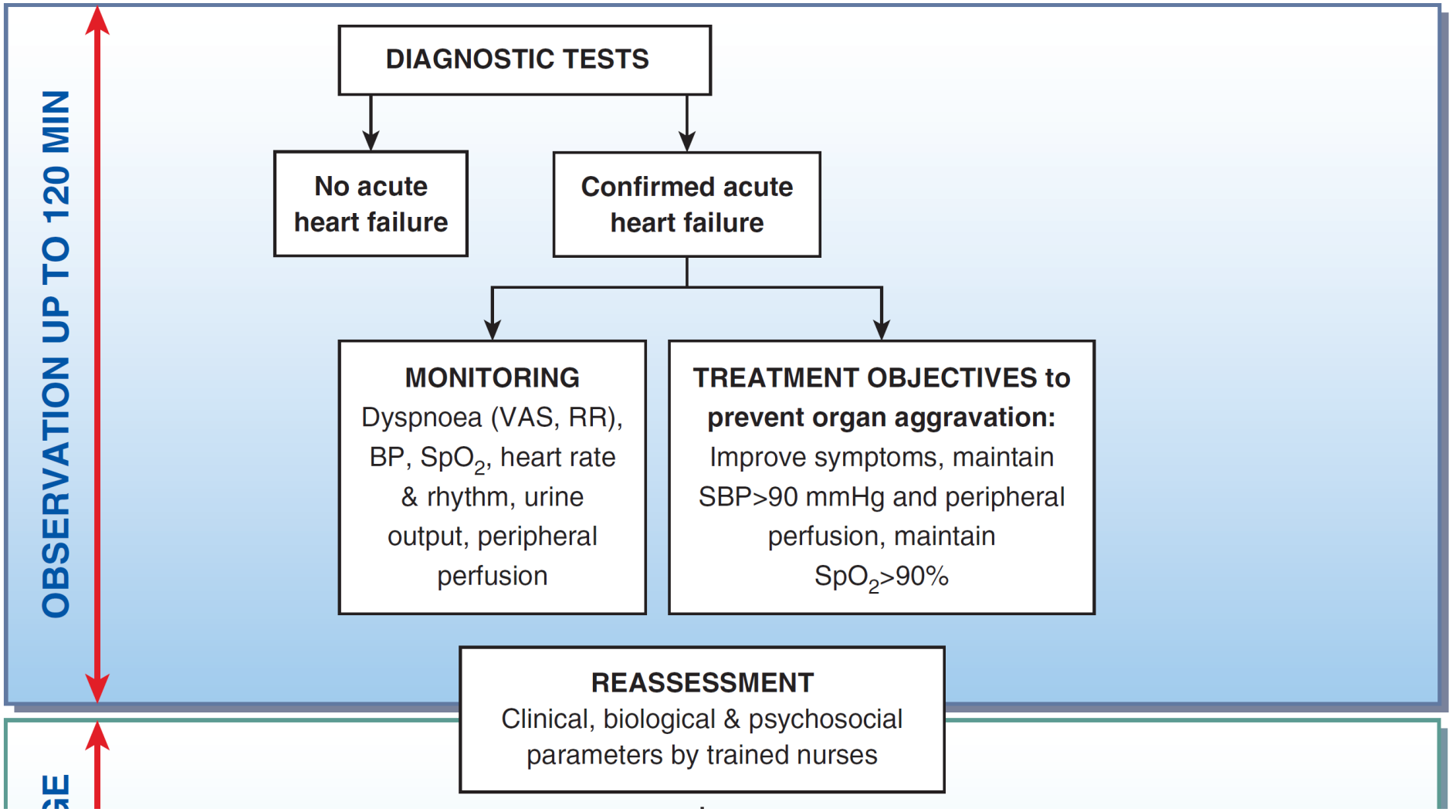
Next 120 min



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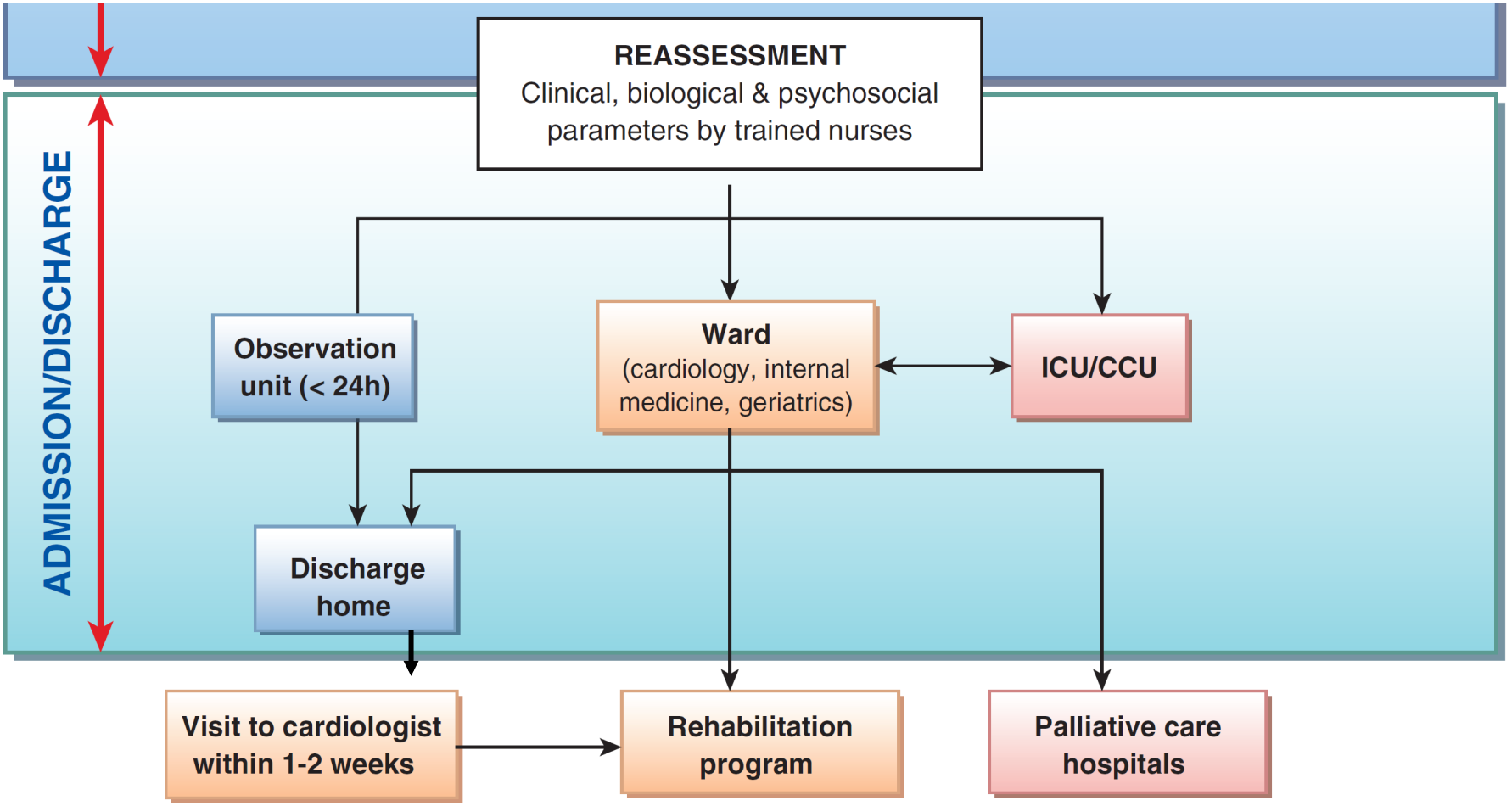
Admission/ discharge



+++NURSES +++

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European Journal of Heart Failure (2015) **17**, 501–509
doi:10.1002/ejhf.260

Clinical picture and risk prediction of short-term mortality in cardiogenic shock

Veli-Pekka Harjola[1]*,†, Johan Lassus[2†], Alessandro Sionis[3], Lars Køber[4], Tuukka Tarvasmäki[5], Jindrich Spinar[6], John Parissis[7], Marek Banaszewski[8], Jose Silva-Cardoso[9], Valentina Carubelli[10], Salvatore Di Somma[11], Heli Tolppanen[2], Uwe Zeymer[12], Holger Thiele[13], Markku S Nieminen[2], and Alexandre Mebazaa[14], for the CardShock study investigators and the GREAT network

VP Harjola et al, Eur J Heart Failure 2015

CardShock: patients characteristics

Characteristic	All ($n = 219$)
Systolic blood pressure, mmHg	78 (14)
Diastolic blood pressure, mmHg	47 (10)
Mean arterial pressure, mmHg	57 (11)
Heart rate, b.p.m.	90 (28)
Sinus rhythm	170 (78)
Clinical findings, *n* (%)	
Cold periphery	207 (95)
Confusion	148 (68)
Oliguria	121 (55)
Lactate >2 mmol/L	155 (71)

VP Harjola et al, Eur J Heart Failure 2015

Intensive Care Med
DOI 10.1007/s00134-015-4041-5

REVIEW

A. Mebazaa
H. Tolppanen
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D. J. Choi
A. Cohen Solal
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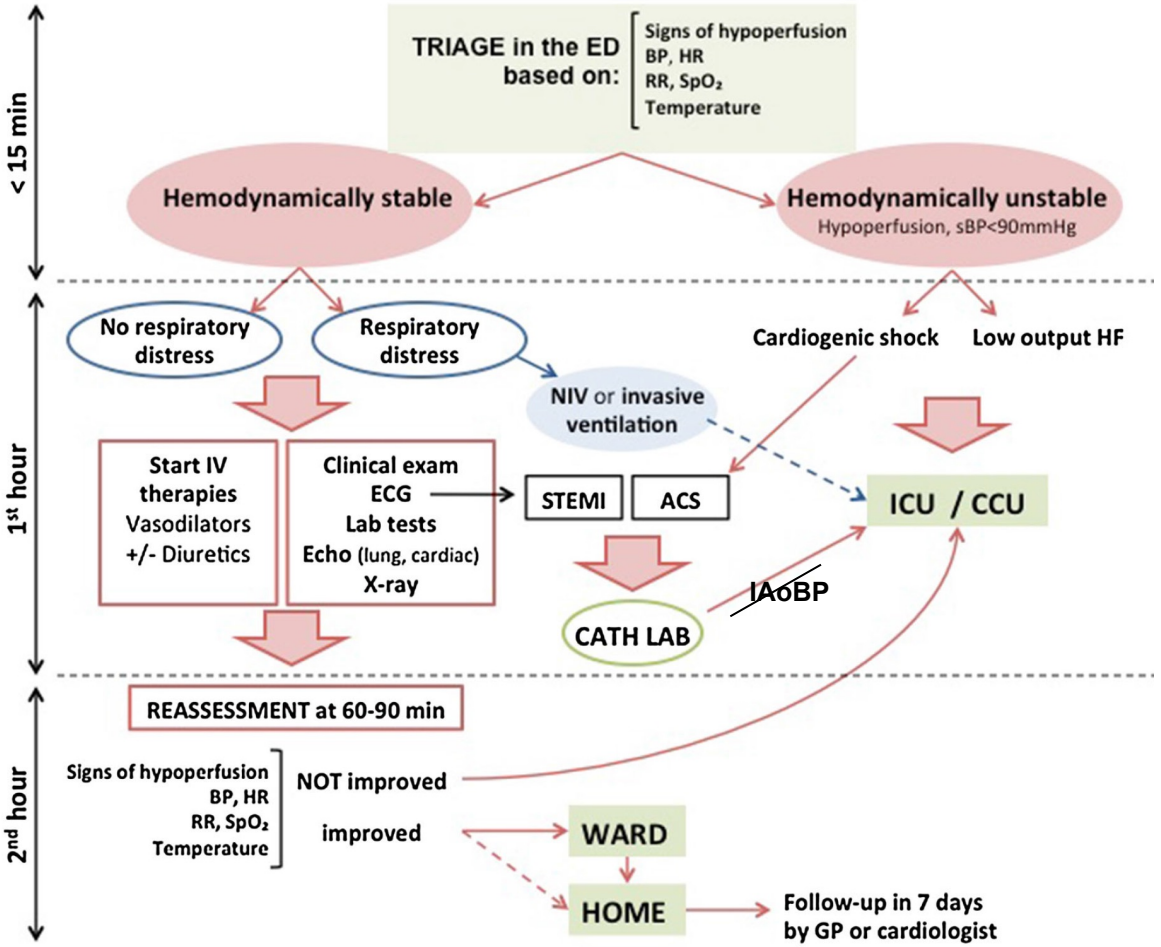
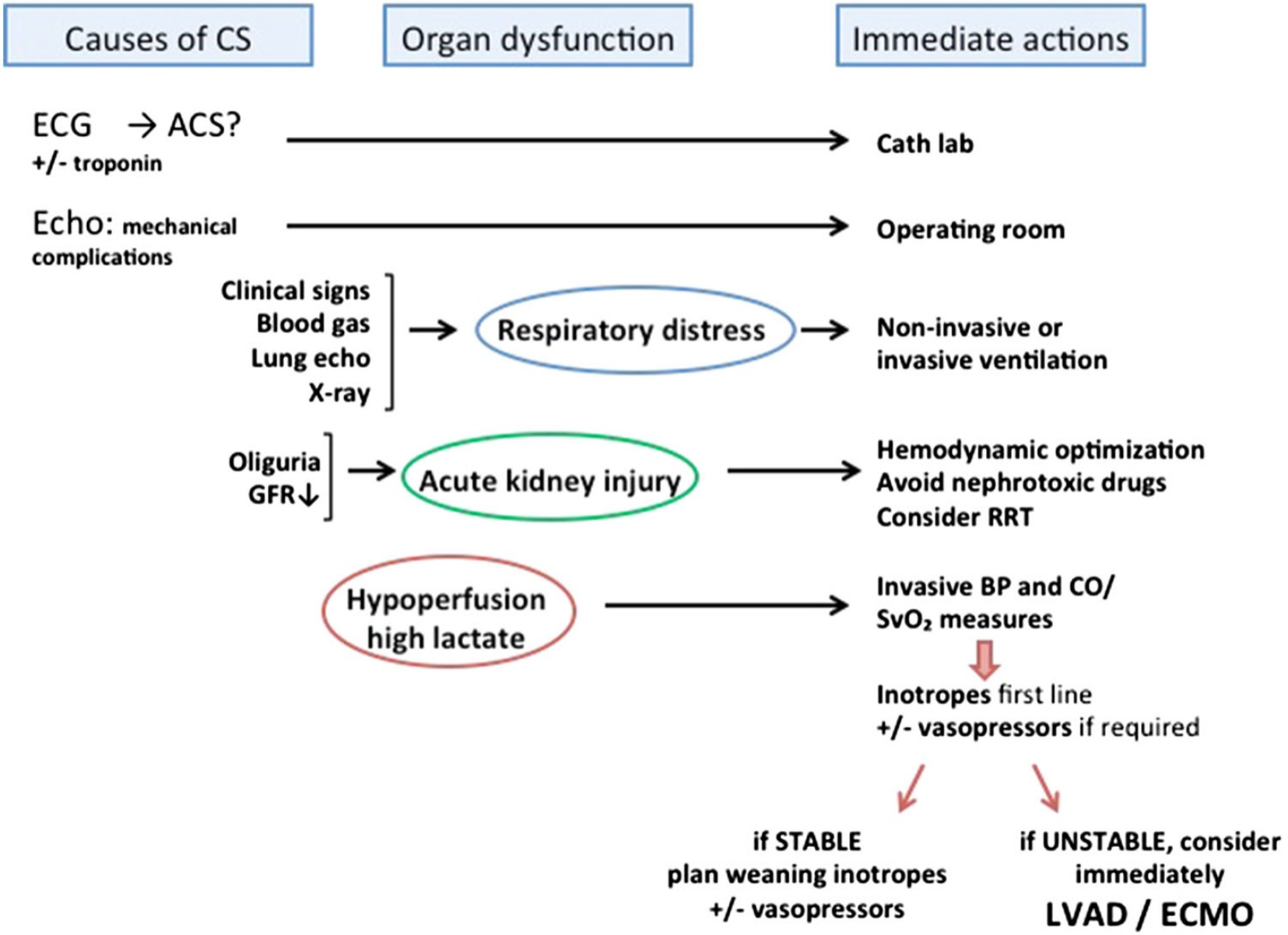
Acute heart failure and cardiogenic shock: a multidisciplinary practical guidance



CARDIOGENIC SHOCK (CS)



Mebazaa et al. Intensive Care Medicine 2015

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PLOS ONE

The Effectiveness of Inodilators in Reducing Short Term Mortality among Patient with Severe Cardiogenic Shock: A Propensity-Based Analysis

Romain Pirracchio[1]*, Jiri Parenica[3], Matthieu Resche Rigon[2], Sylvie Chevret[2], Jindrich Spinar[3], Jiri Jarkovsky[3], Faiez Zannad[5], François Alla[6], Alexandre Mebazaa[4], for the GREAT network

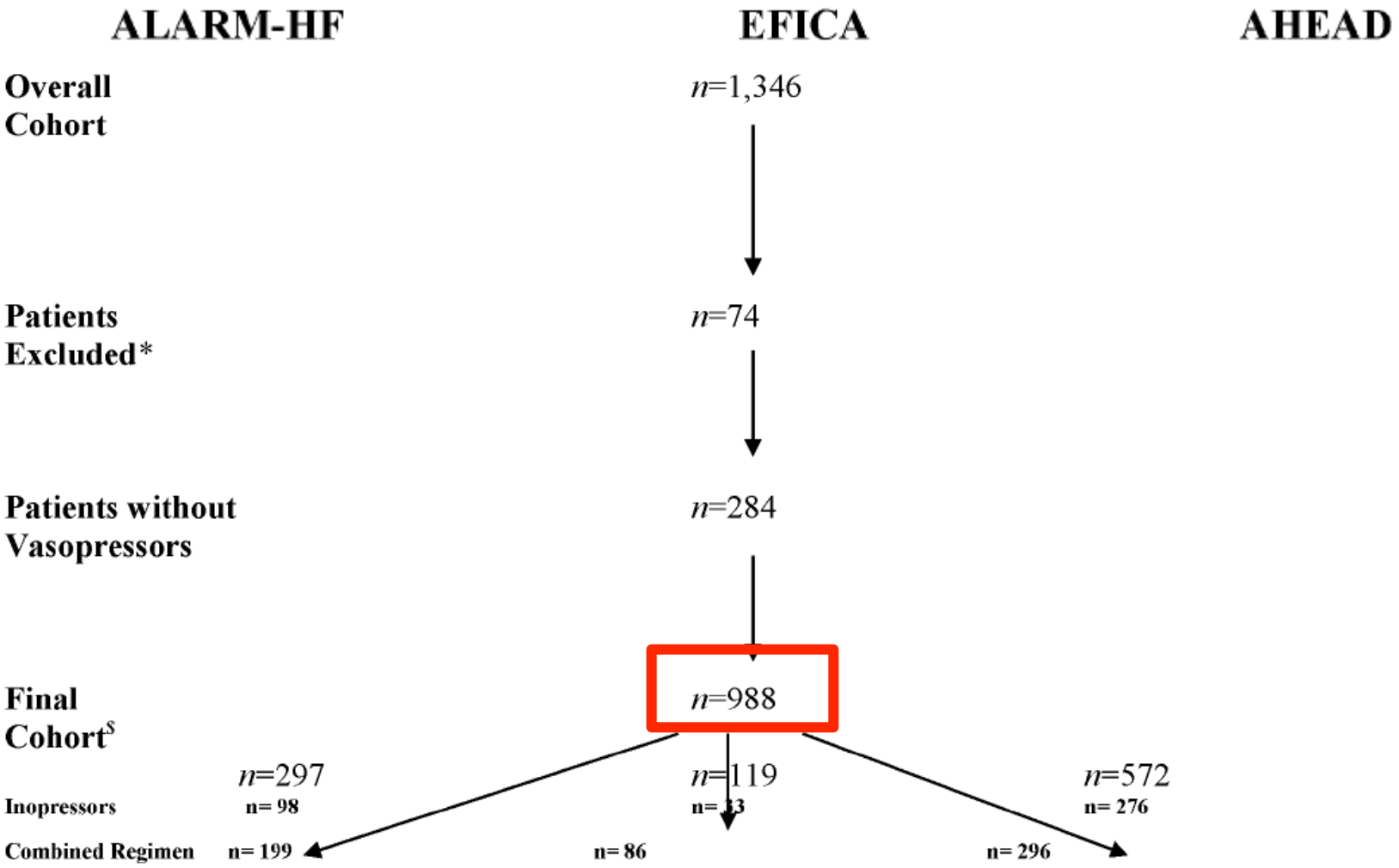
1 Department of Anesthesiology and Critical Care Medicine, Hôpital Européen Georges Pompidou, Paris, France, **2** Department of Biostatistics, INSERM UMR-S717, Hôpital Saint Louis, Paris, France, **3** Internal Cardiology Department, Faculty Hospital Brno, ICRC and Medical Faculty of Masaryk University, Brno, Czech Republic, **4** Department of Anesthesiology & Critical Care Medicine, INSERM UMR-S942, Hôpital Lariboisière, Paris, France, **5** Department of Cardiology, University Hospital of Nancy, Nancy, France, **6** Department of Epidemiology, University Hospital of Nancy, Nancy, France

The message is:

Vasopressors alone are harmful; better combine inotropes+vasopressors

Pirracchio et al. PLOS one 2013

Flow chart



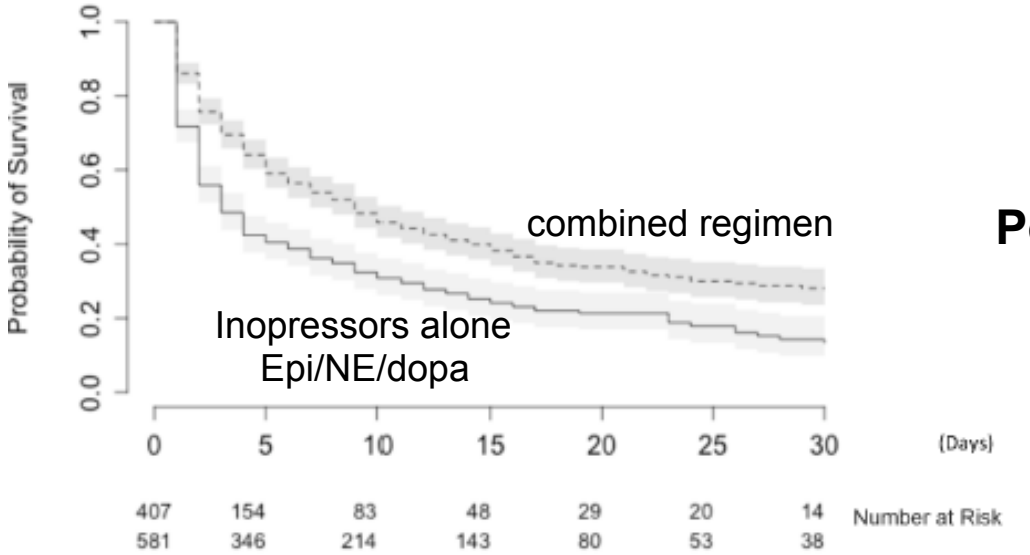
Pirracchio et al. PLOS one 2013

Inotropes/vasoactive agents

	Overall	Inopressors Alone	Inopressors and Inodilators
	n = 988	n = 407	n = 581
Inotropes/Vasoactive drugs (%)			
Epinephrine	464 (47)	234 (57)	230 (40)
Norepinephrine	611 (62)	251 (62)	360 (62)
Dopamine	384 (39)	142 (35)	242 (42)
Dobutamine	442 (45)	0 (0)	442 (76)
Levosimendan	96 (10)	0 (0)	96 (16)
Phosphodiesterase 3 Inhibitor	8 (1)	0 (0)	8 (1)

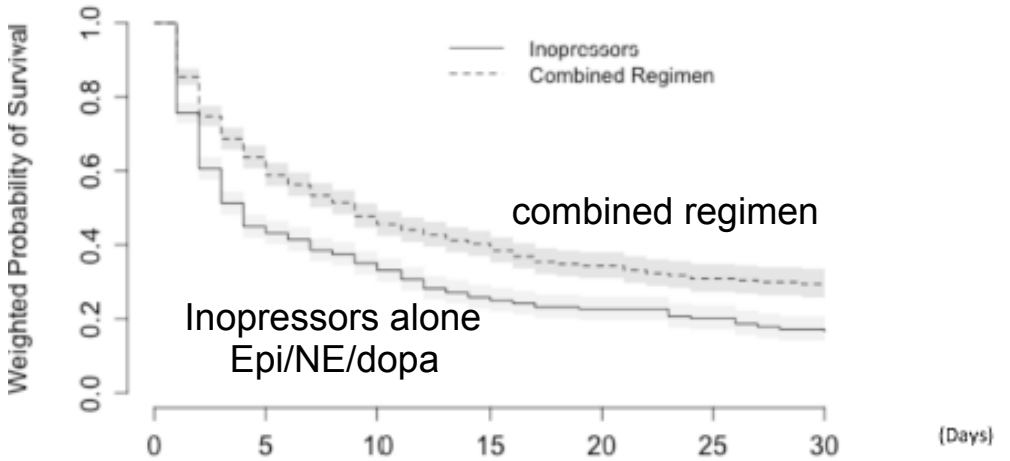
Pirracchio et al. PLOS one 2013

KM: in-hospital mortality



Pooled data: n= 988

B.

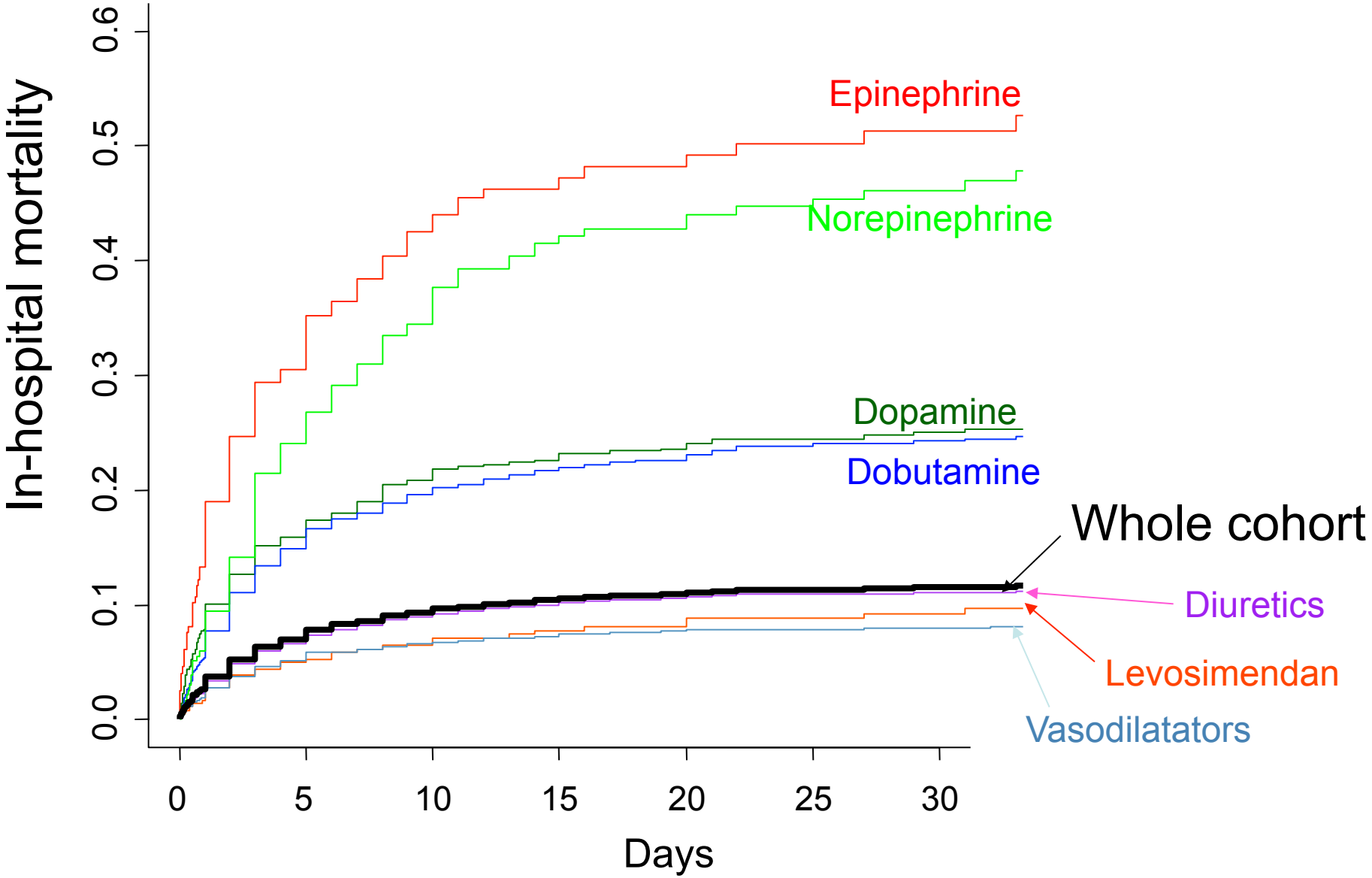


Propensity score

Pirracchio et al. PLOS one 2013

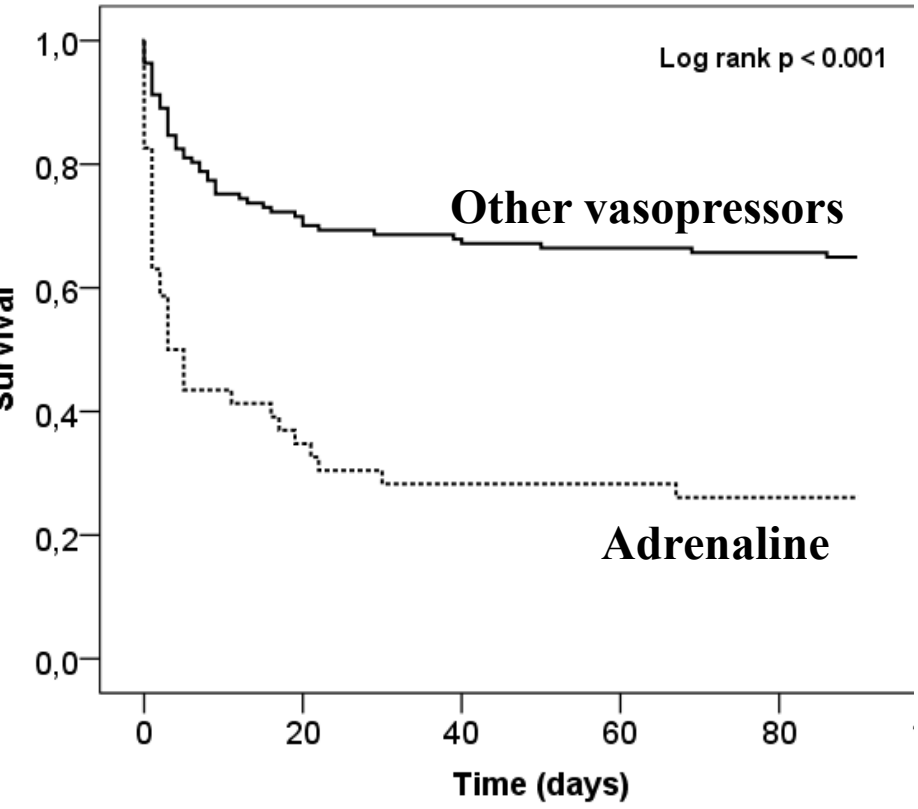
Are all inotropes/vasopressors equal?

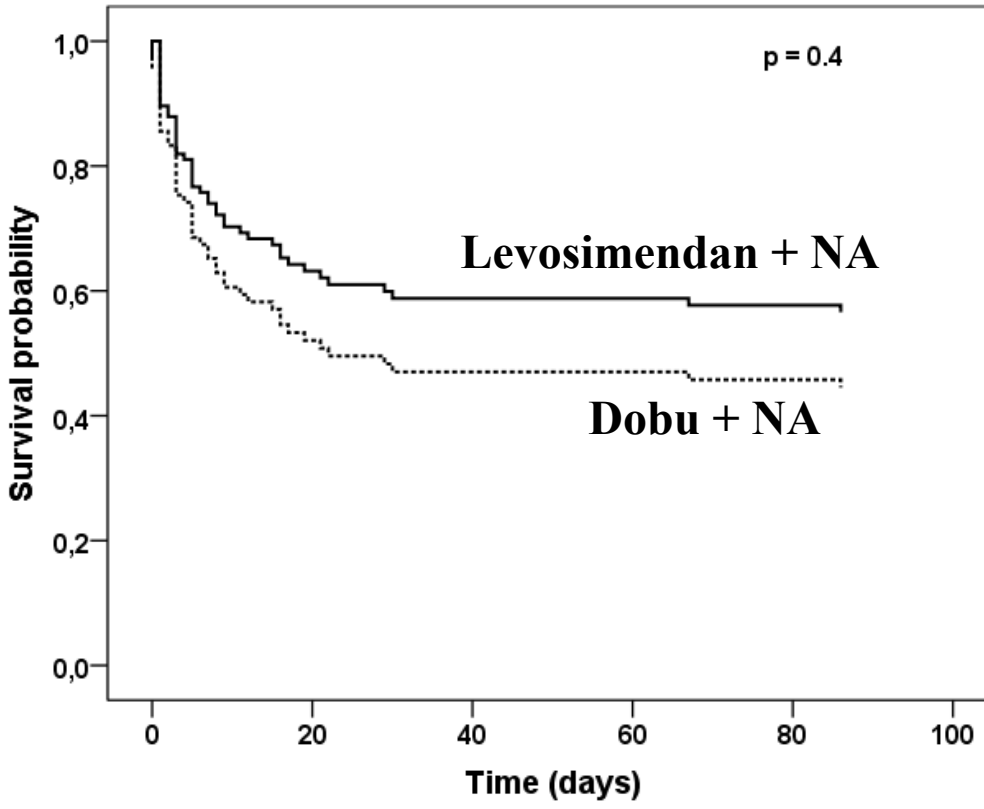
Effects of inotropes and/or vasopressors on short-term outcome



Mebazaa et al Intensive Care Medicine 2011

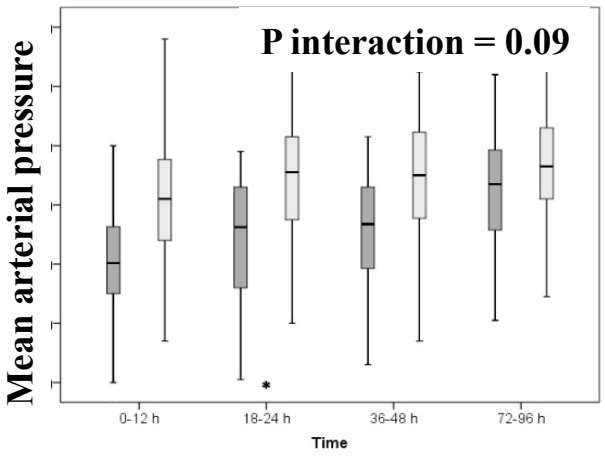
CardShock: Adrenaline is the worse vasopressor in cardiogenic shock

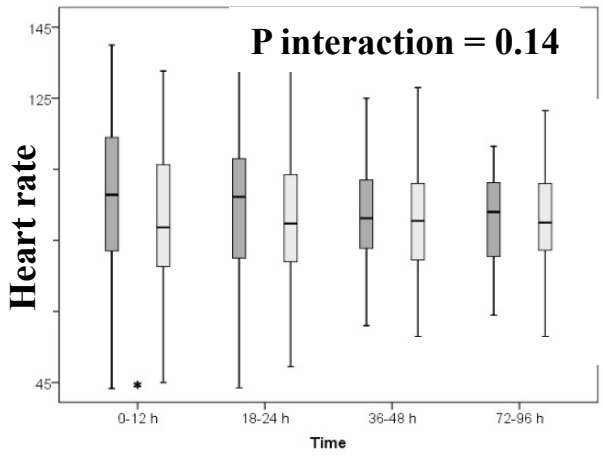


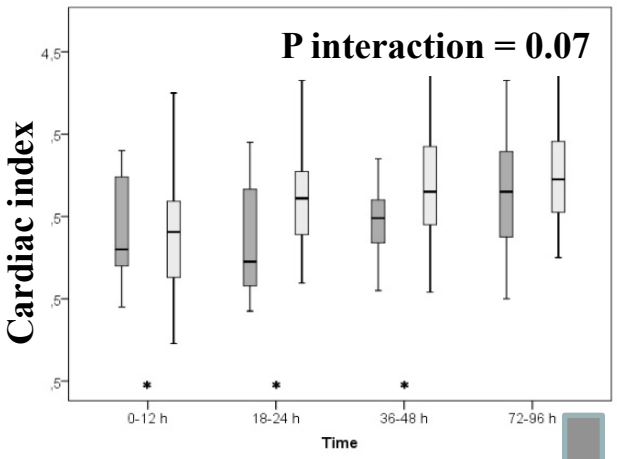


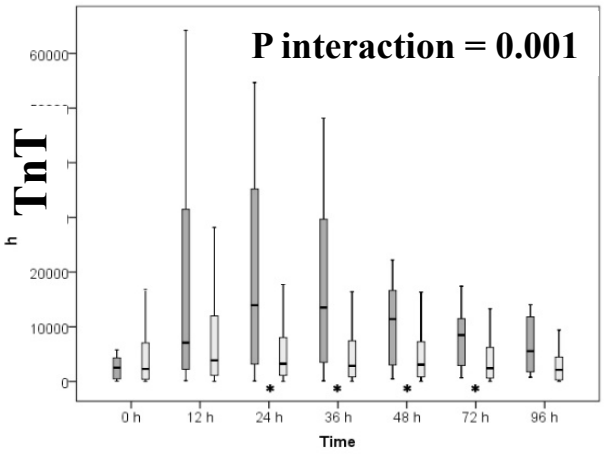
Tarvasmäki T et al. Crit Care 2016 in press

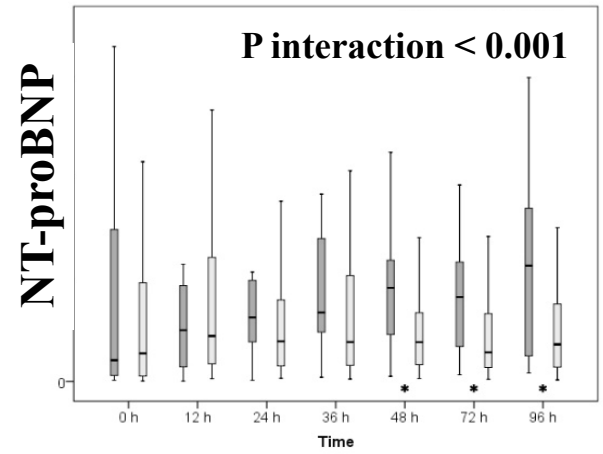
CardShock: Detrimental effect of adrenaline on organ function

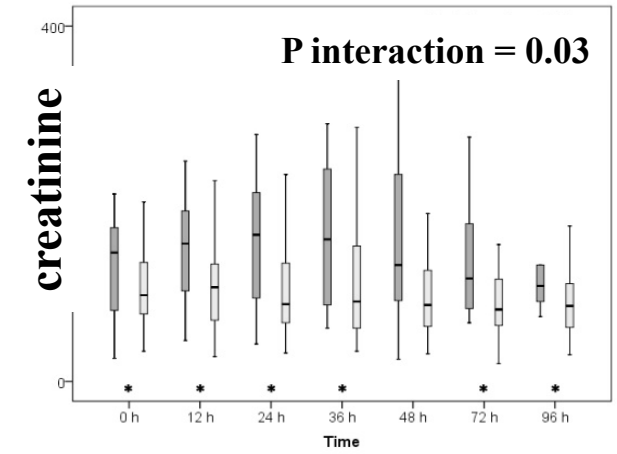












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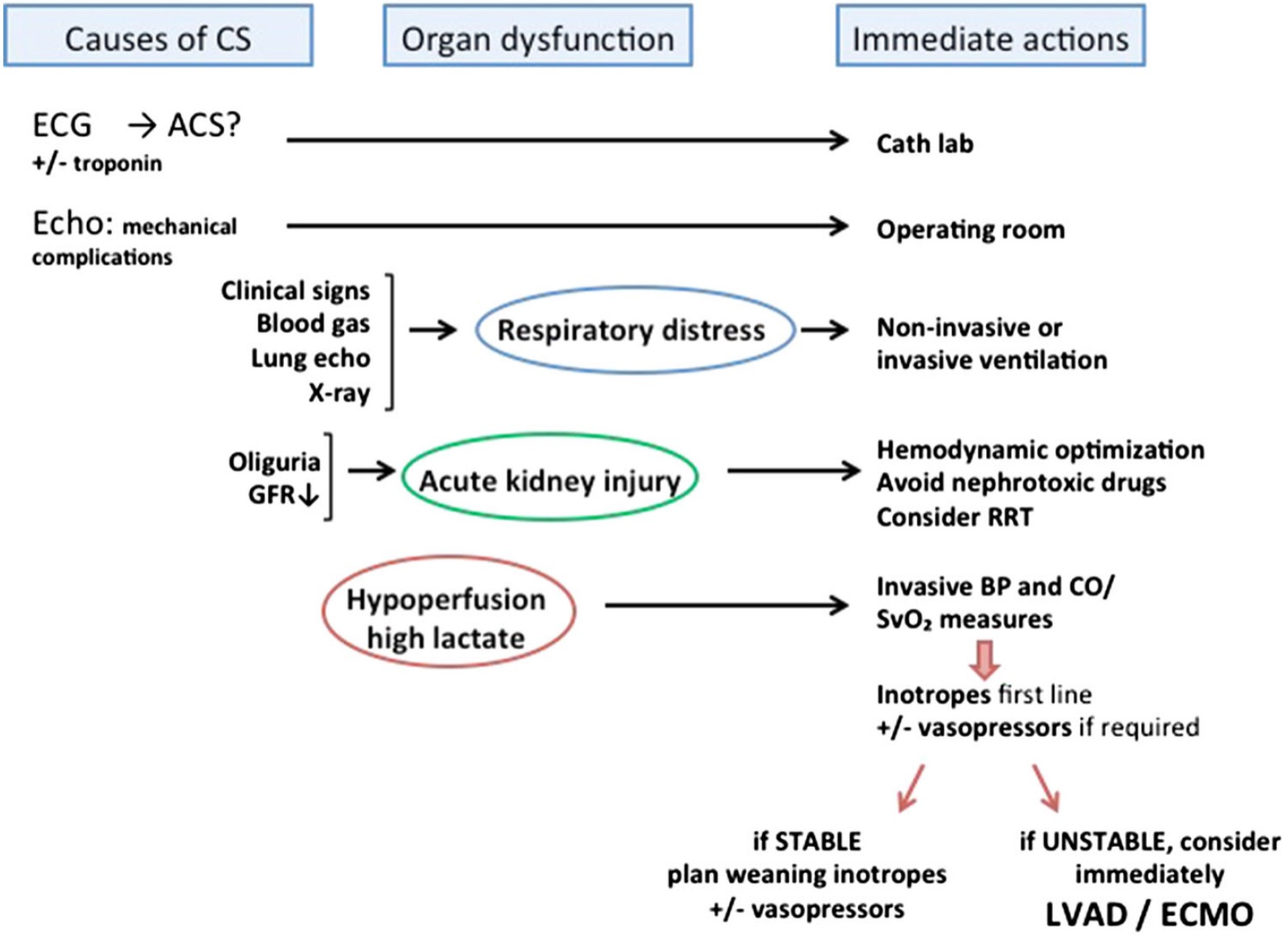

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Main message

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  - Vasodilators

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  - **Low cardiac output and myocardial ischemia**
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- « **Time is muscle** »