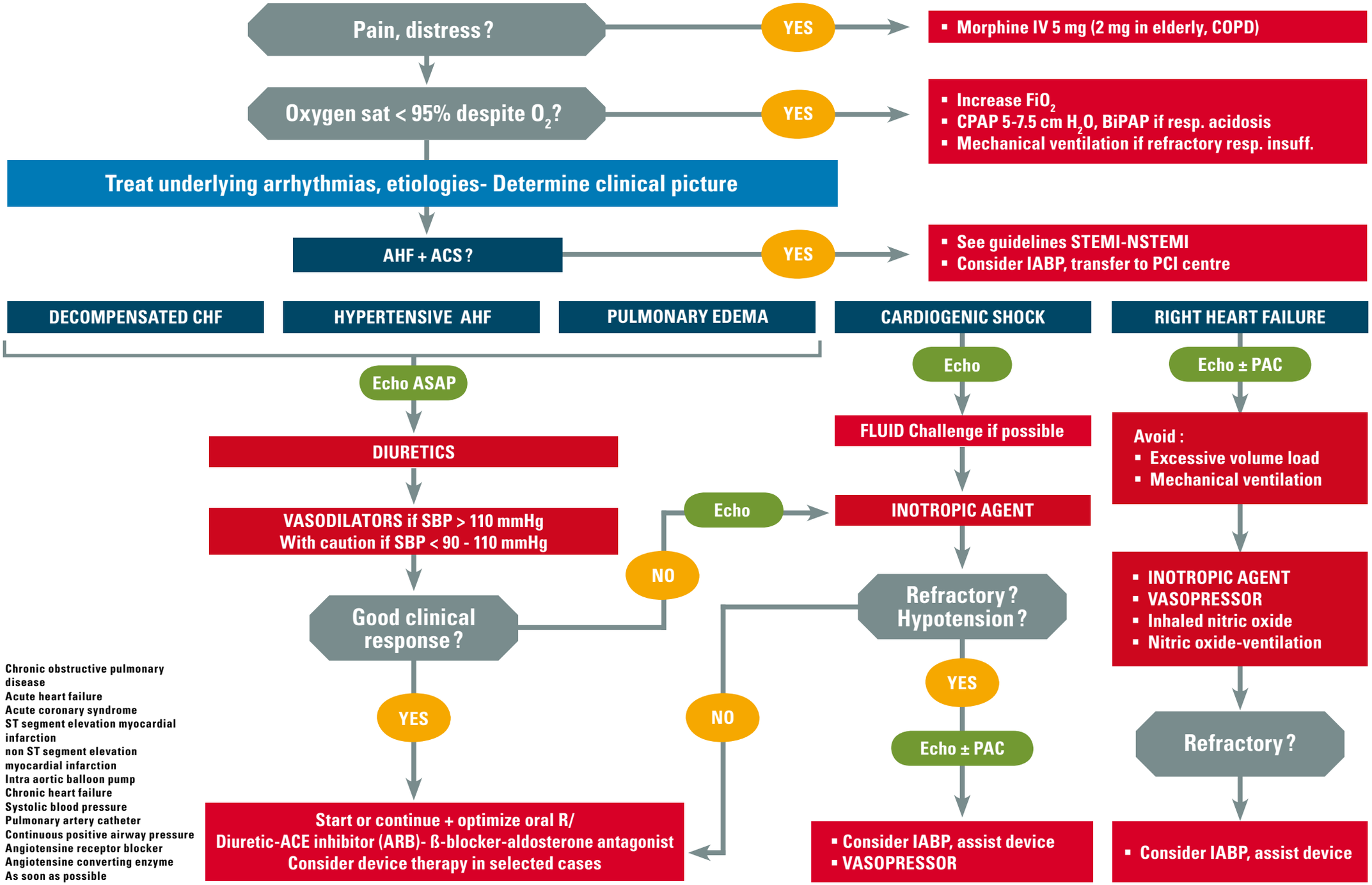

COPD	Chronic obstructive pulmonary disease
AHF	Acute heart failure
ACS	Acute coronary syndrome
STEMI	ST segment elevation myocardial infarction
NSTEMI	non ST segment elevation myocardial infarction
IABP	Intra aortic balloon pump
CHF	Chronic heart failure
SBP	Systolic blood pressure
PAC	Pulmonary artery catheter
CPAP	Continuous positive airway pressure
ARB	Angiotensine receptor blocker
ACE	Angiotensine converting enzyme
ASAP	As soon as possible

Pharmacological treatment 'Acute Heart Failure'

Initial treatment

Diuretics

Loopdiuretics: dosing according to severity fluid overload

- Low dose in case of flash pulmonary edema, hypertensive heart failure
- Higher dose or continuous infusion in case of important fluid overload

Furosemide	**Lasix®** 20 mg vial, 250 mg vial	start 20- 40 mg slow bolus continuous infusion: 5-40 mg/h (max 100 mg first 6h, max 240 mg first 24h)
Bumetanide	**Burinex®** 2 mg vial	start 0.5-1 mg bolus continuous infusion: eg 6 vials/50cc glucose, start 2cc/h= 0.48 mg/h

In case of diuretic resistance:

- Combine with

Thiazides (Hydrochlorothiazide)		50-100 mg PO od

and/or

Aldosterone antagonist	**Spinorolactone -Aldactone®**	25-50 mg PO od

- Consider low dose dopamine

or

- Consider ultrafiltration

Vasodilators

Isosorbide dinitrate	**Cedocard®** 10 mg/10 ml vial	- Hypertensive pulmonary edema: start with 2-5 mg boluses - Continuous infusion: start 1 mg/h, up to 10 mg/h
Nitroglycerine	**Nysconitrine®, Solinitra®*** 50 mg vial	- Continuous infusion: start 10-20 µg/min, increase up to 200 µg/min
Nitroprusside	**Nitriate®, Nitropress®*** 50 mg vial	- Especially In hypertensive crises but contra-indicated in ACS - Continuous infusion: start 0.3 µg/kg/min, increase up to 5 µg/kg/min

Positive Inotropic agents

Cave adverse clinical outcome and increased mortality

Bèta-agonists

Dobutamine		2-20 µg/kg/min, initiate at 2-3 µg/kg/min
Indication: Hypotension due to reduced contractility, right ventricular failure		
Dopamine		< 3 µg/kg/min: renal effect
Indication: Diuretic resistance, shock		3-5 µg/kg/min: inotropic effect (ß) > 5 µg/kg/min: inotropic + vasopressive effect (α)

PDE- III inhibitors:

Indication: peripheral hypoperfusion with preserved systemic bloodpressure, can be combined with ß-blocker

Milrinone	**Corotrope®** 10 mg/10 ml vial	bolus 25 µg/kg/min over 10-20 min followed by continuous infusion 0.375-0.75 µg/kg/min
Enoximone	**Perfan®** 100 mg/20 ml vial	bolus 0.25-0.75 mg/kg followed by continuous infusion 1.28-7.5 µg/kg/min

Calcium sensitizer:

*Indication: need for inotropic support (**not if SBP < 85 mmHg**), can be combined with ß– blocker*

Levosimendan	**Symdax®*** 12.5 mg/5 ml vial	bolus 12 µg/kg over 10 min (not if SBP < 100 mmHg) followed by continuous infusion 0.1 µg/kg/min (0.05-0.2 µg/kg/min)

Vasopressors

Only if fluid challenge and inotropic agents fail to restore adequate bloodpressure, at the lowest dose and as short as possible

Norepinephrine	0.2-1.0 µg/kg/min
Indication: preferred vasopressor if vascoconstrictive effect is rapidly needed	
Epinephrine	bolus 1 mg
Indication: resuscitation setting	0.05-0.5 µg/kg/min (repeat if necessary every 5 min)

Chronic peroral therapy after initial stabilization

Diuretics in function of volume overload

ACE – inhibitors

Captopril	**Capoten®****	start 6.25 mg tid, target dose 50-100 mg tid
Enalapril	**Renitec®****	start 2.5 mg bid, target dose 10-20 mg bid
Lisinopril	**Zestril®****	start 2.5-5 mg od up to 20-40 mg od
Ramipril	**Tritace®****	start 2.5 mg od, target dose 5 mg bid

→ **Intolerance ACE inhibitors: ARB**

Candesartan	**Atacand®**	start 4-8 mg od, target dose 32 mg od
Valsartan	**Diovane®**	start 40 mg bid, target dose 160 mg bid

→ **If contra-indication for ACE-I and ARB or persisting symptoms under ACE-I + ARB or ACE-I + aldosterone antagonist: consider hydralazinehydrochloride + nitrate *****

ß-blocker

Bisoprolol	**Emconcor®****	start 1.25 mg od, target 10 mg od
	Isoten®**	
Carvedilol	**Kredex®****	start 3.125 mg bid, target 25-50 mg bid
Metoprolosuccinate	**Selozok®**	start 12.5 mg od, target 200 mg od
Nebivolol	**Nobiten®**	start 1.25 mg od, target 10 mg od

In selected cases add (see guidelines chronic heart failure)

Aldosterone antagonist

Digoxine

ACE-I + ARB

(*) Import from abroad
(**) Also available in generic form
(***) prescribe magistrally

Edition 2009

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