PHÙ PHỔI CẤP
(ACUTE PULMONARY EDEMA)

Prof Pham Nguyen Vinh, MD, PhD, FACC
Pham Ngoc Thach University of Medicine
Tam Duc Heart Hospital
Tan Tao University of Medicine

Pham Nguyen Vinh

Definition and causes

- Pulmonary edema: fluid accumulation in the tissue and air spaces of the lungs
- Acute pulmonary edema (APE):
  - Cardinal feature of congestive heart failure
- Causes:
  - Heart
  - Lungs (eg: Acute Respiratory Distress Syndrome ARDS)

Pham Nguyen Vinh

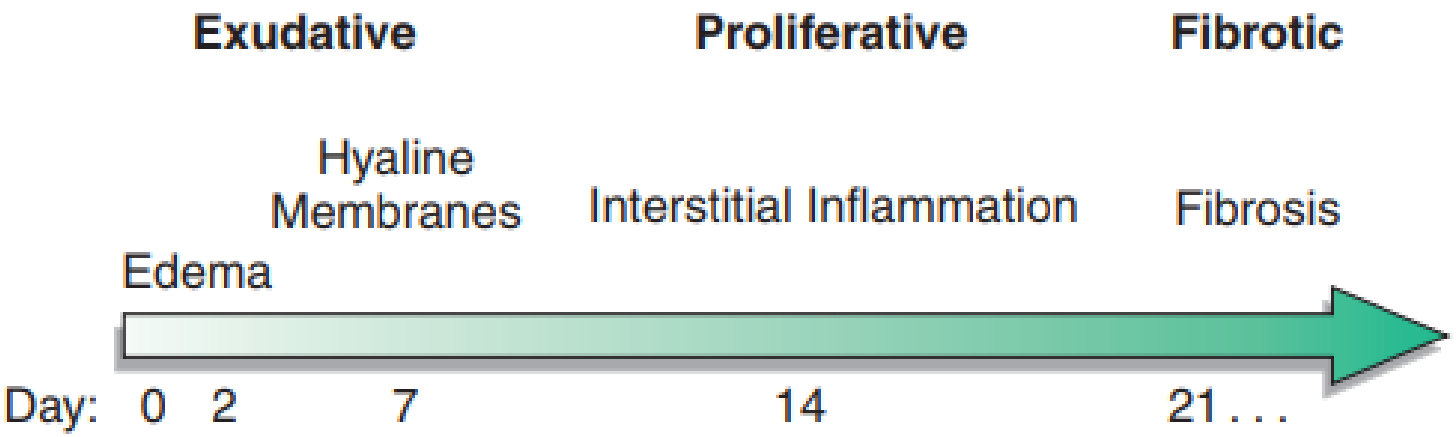
Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

Clinical disorders commonly associated with ARDS

Direct Lung Injury	Indirect Lung Injury
Pneumonia	Sepsis
Aspiration of gastric contents	Severe trauma
Pulmonary contusion	Multiple bone fractures
Near-drowning	Flail chest
Toxic inhalation injury	Head trauma
	Burns
	Multiple transfusions
	Drug overdose
	Pancreatitis
	Postcardiopulmonary bypass

Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

Time course for the development and resolution of ARDS

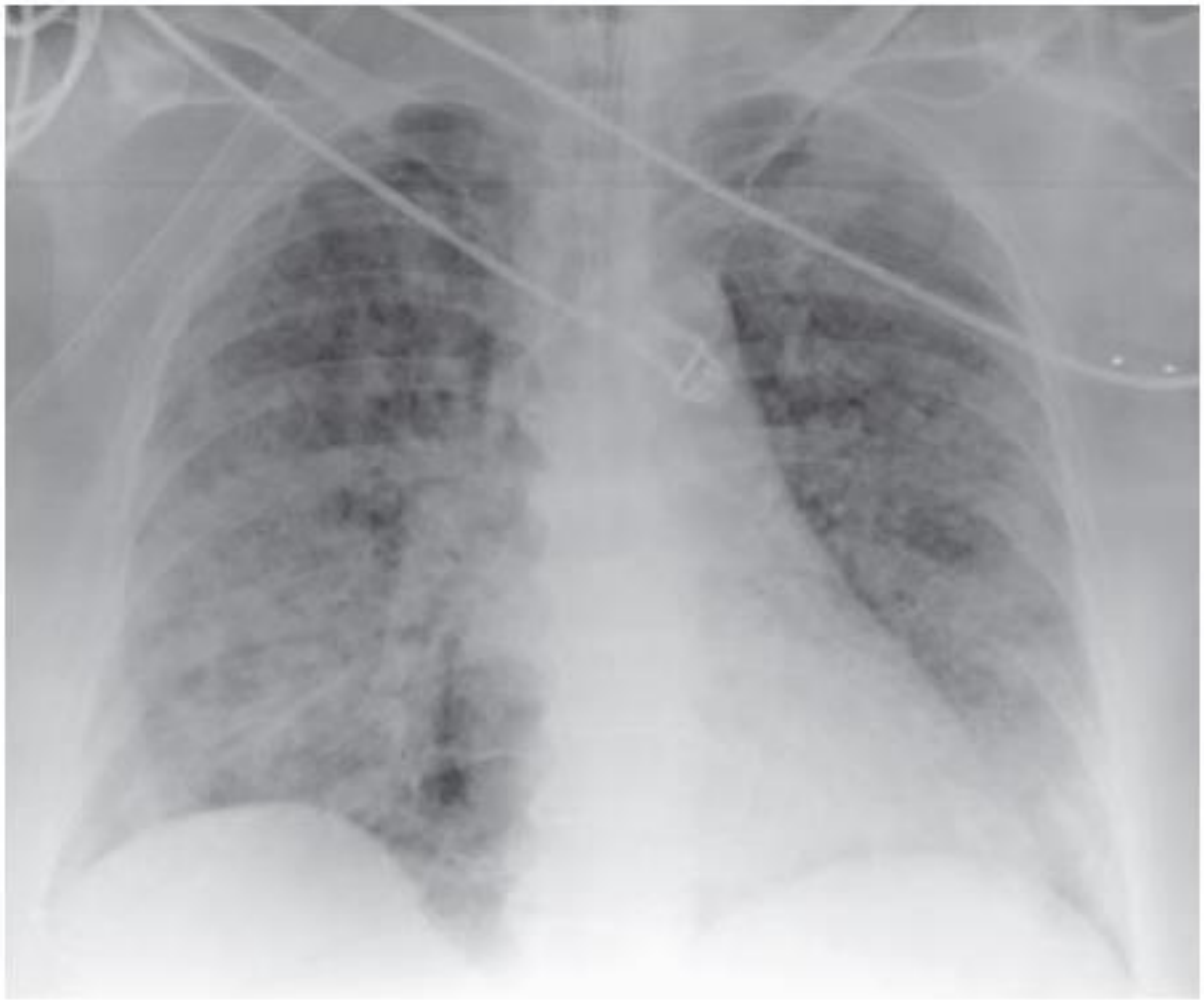


- Exudative phase (7 days):
  - Alueolar edema
  - Neutrophil infiltration
- Proliferative phase:
  - Interstitial inflammation
  - Early fihotic change
- Recovery: after 3 weeks

Pham Nguyen Vinh

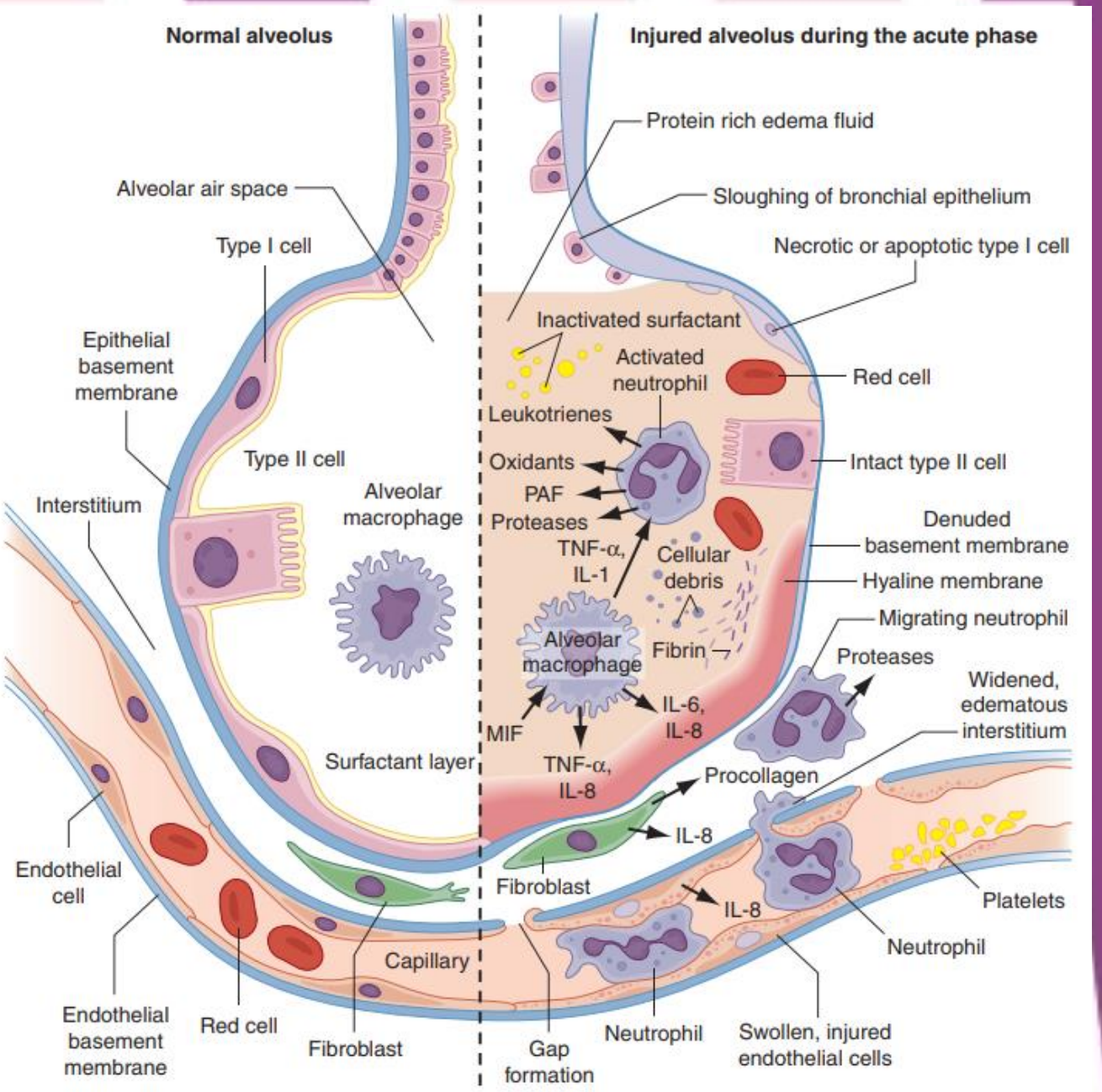
Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

Chest xray in the exudative phase of ARDS



Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

The normal alveolus (left) and the injured alveolus in ARDS

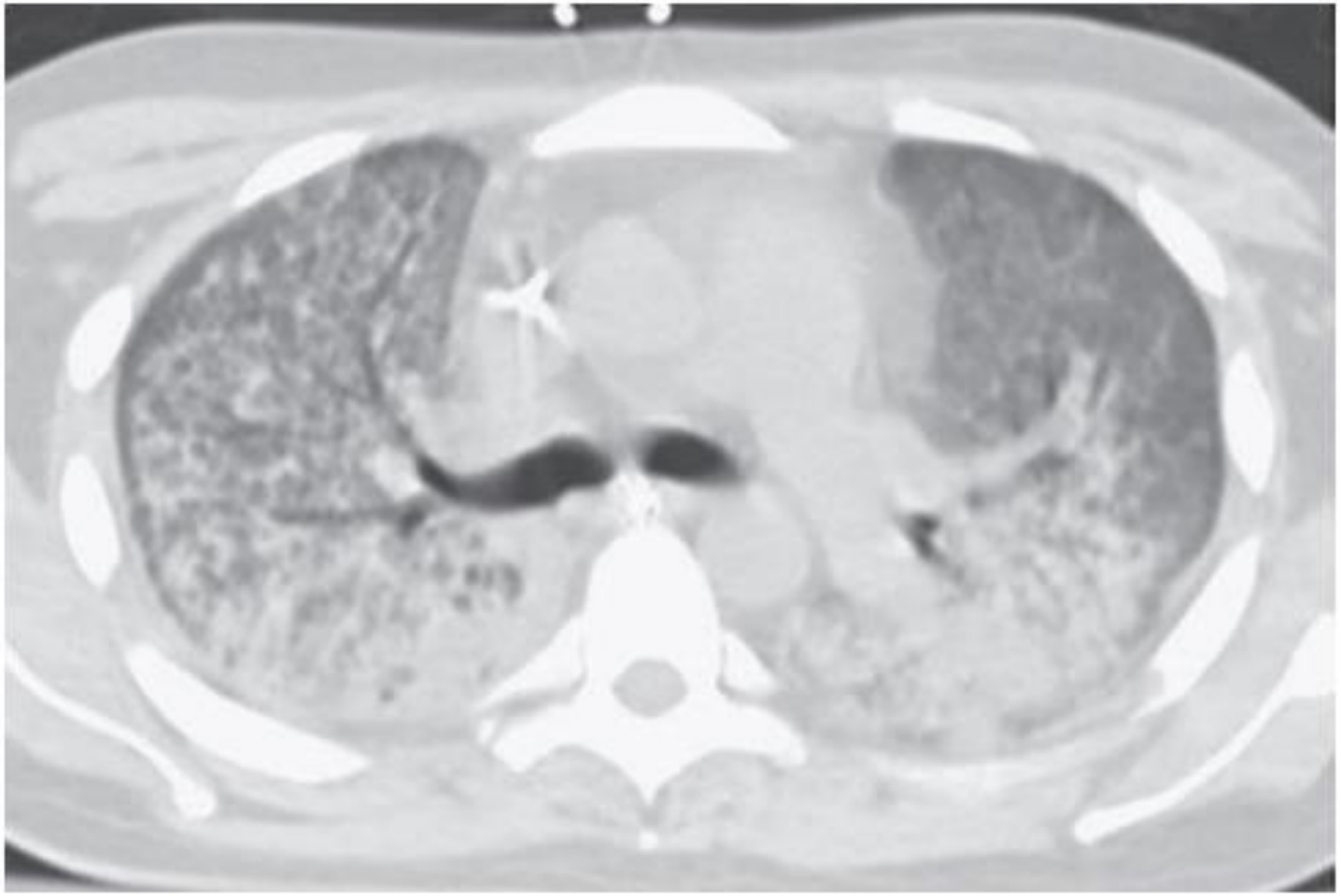


Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

Pham Nguyen Vinh

CT scan of the chest during the exudative phase of ARDS

- Dependent alvcolar edema and atelectasis predominante



Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

Treatment of ARDS

- Mechanical ventilation
- Fluid management
  - Low LA filling pressure (by diuretics)
- Neuromuscular blockade with Cisatracurium besilate for 48 hours
- Glucocorticoids: not recommended

Pham Nguyen Vinh

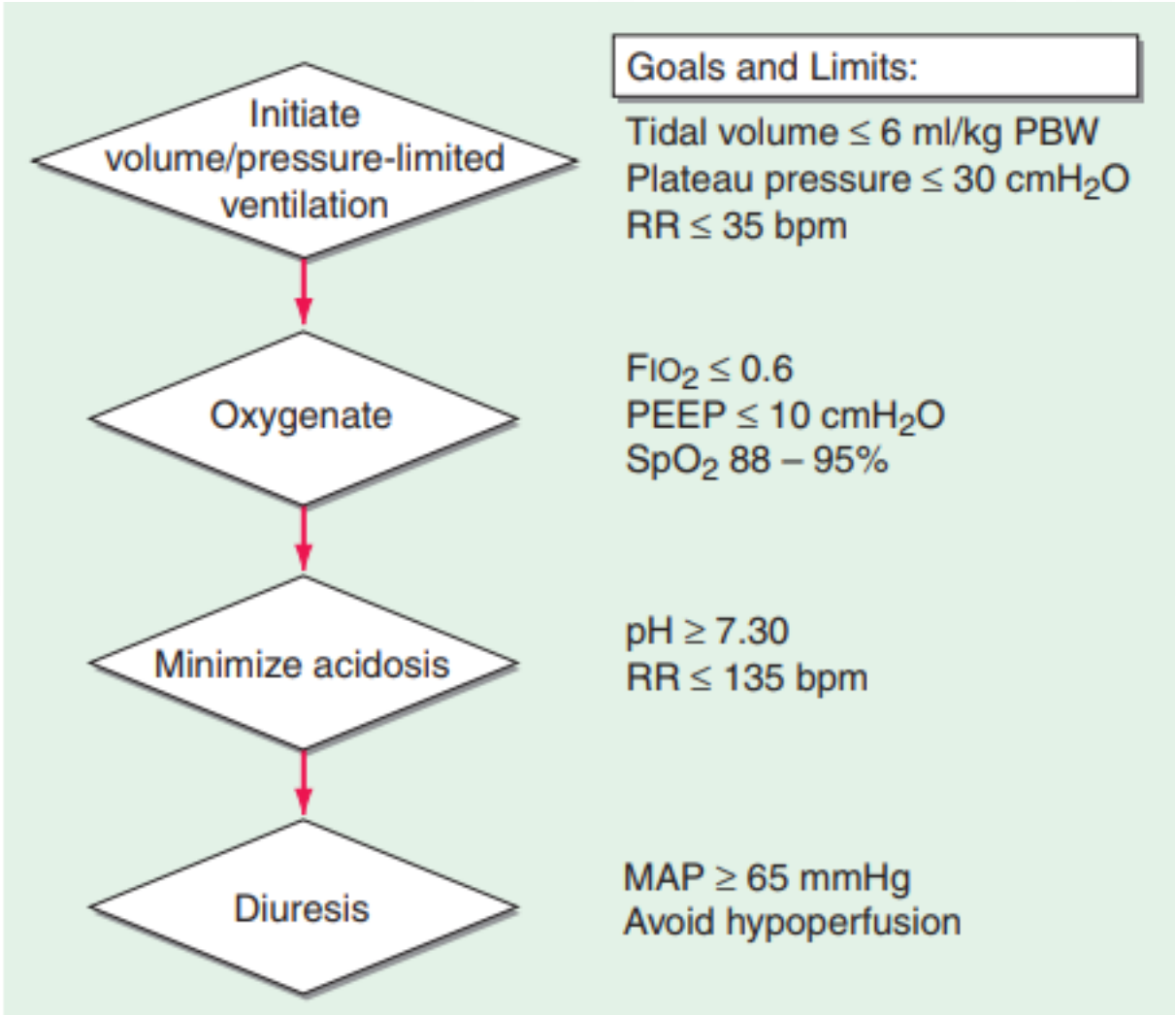
Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

Evidence- based recommendations for ARDS therapies

Treatment	Recommendation*
Mechanical ventilation:	
Low tidal volume	A
Minimize left atrial filling pressures	B
High-PEEP or "open lung"	C
Prone position	C
Recruitment maneuvers	C
ECMO	C
High-frequency ventilation	D
Glucocorticoids	D
Surfactant replacement, inhaled nitric oxide, and other anti-inflammatory therapy (e.g., ketoconazole, PGE_1, NSAIDs)	D

Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

Initial management of ARDS



Source: Levy BD, Choi A M K. Harrison's Principles of Internal Medicine, 2015, 19th ed, Mac Graw-Hill, p 1736-1740

Pham Nguyen Vinh

Acute Heart Failure

- Cardiogenic shock
- Acute pulmonary edema

Các yếu tố khởi kích suy tim cấp (1)

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).

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

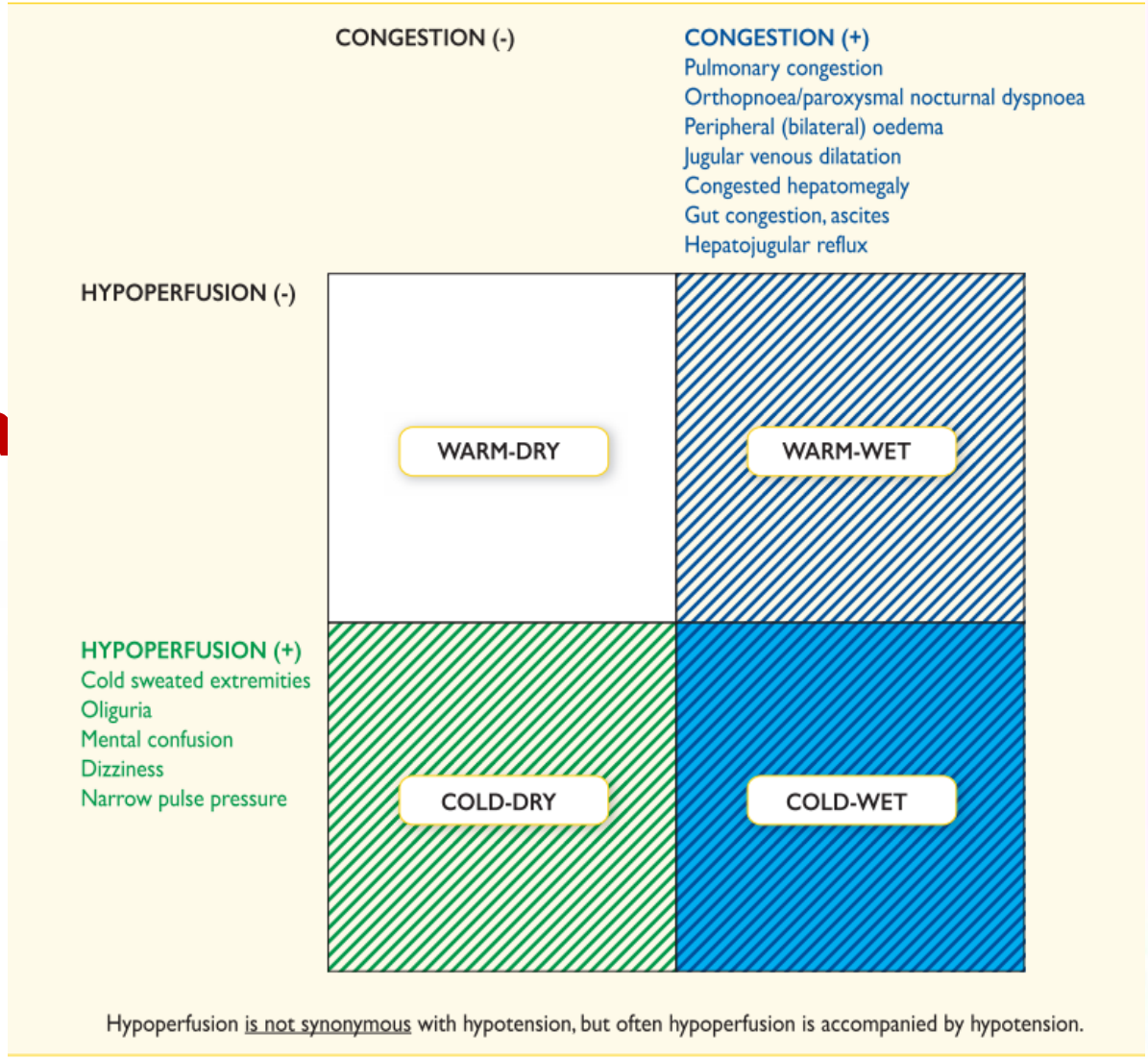
Các yếu tố khởi kích suy tim cấp (2)

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.

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

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Các thể lâm sàng suy tim cấp dựa trên sung huyết và giảm tưới máu



Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Định nghĩa các từ dùng trong suy tim cấp (1)

Term	Definition
Symptoms/signs of congestion (left-sided)	Orthopnoea, paroxysmal nocturnal dyspnoea, pulmonary rales (bilateral), peripheral oedema (bilateral).
Symptoms/signs of congestion (right-sided)	Jugular venous dilatation, peripheral oedema (bilateral), congested hepatomegaly, hepatojugular reflux, ascites, symptoms of gut congestion.
Symptoms/signs of hypoperfusion	Clinical: cold sweated extremities, oliguria, mental confusion, dizziness, narrow pulse pressure. Laboratory measures: metabolic acidosis, elevated serum lactate, elevated serum creatinine. Hypoperfusion is not synonymous with hypotension, but often hypoperfusion is accompanied by hypotension.
Hypotension	Systolic BP <90 mmHg
Bradycardia	Heart rate <40 bpm
Tachycardia	Heart rate >120 bpm

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Định nghĩa các từ dùng trong suy tim cấp (2)

Abnormal respiratory effort	Respiratory rate >25 breaths/min with use of accessory muscles for breathing, or respiratory rate <8 breaths/min despite dyspnoea.
Low O_2 saturation	O_2 saturation (SaO_2) <90% in pulse oximetry Normal SaO_2 neither excludes hypoxaemia (low PaO_2) nor tissue hypoxia.
Hypoxaemia	O_2 partial pressure (PaO_2) in arterial blood <80 mmHg (<10,67 kPa) (blood gas analysis).
Hypoxaemic respiratory failure (type I)	PaO_2 <60 mmHg (<8 kPa)
Hypercapnia	CO_2 partial pressure ($PaCO_2$) in arterial blood >45 mmHg (>6 kPa) (blood gas analysis).
Hypercapnic respiratory failure (type II)	$PaCO_2$ >50 mmHg (>6,65 kPa).
Acidosis	pH <7.35
Elevated blood lactate	>2 mmol/L
Oliguria	Urine output <0.5 mL/kg/h

BP = blood pressure; bpm = beats per minute; $PaCO_2$ = partial pressure of carbon dioxide in arterial blood; PaO_2 = partial pressure of oxygen in arterial blood; SaO_2 = oxygen saturation.

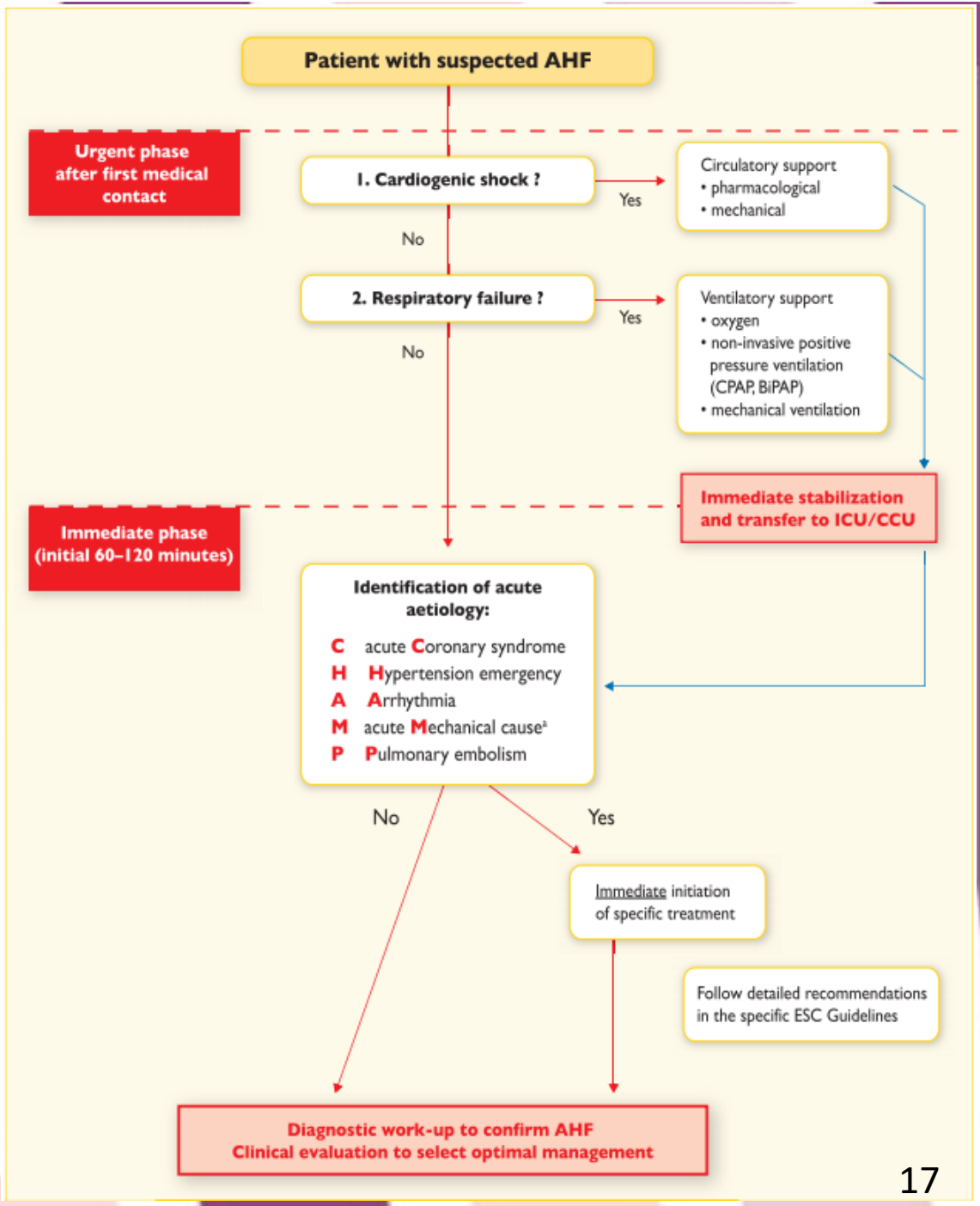
Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Quy trình xử trí ban đầu suy tim cấp

- BNP < 100pg/ml
- NT-proBNP < 300 pg/ml

→ Ít khả năng suy tim cấp



TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Pham Nguyen Vinh

Các nguyên nhân gia tăng peptides bài natri (1)

Cardiac	Heart failure Acute coronary syndromes Pulmonary embolism Myocarditis Left ventricular hypertrophy Hypertrophic or restrictive cardiomyopathy Valvular heart disease Congenital heart disease Atrial and ventricular tachyarrhythmias Heart contusion Cardioversion, ICD shock Surgical procedures involving the heart Pulmonary hypertension

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Các nguyên nhân gia tăng peptides bài natri (2)

Non-cardiac	Advanced age Ischaemic stroke Subarachnoid haemorrhage Renal dysfunction Liver dysfunction (mainly liver cirrhosis with ascites) Paraneoplastic syndrome Chronic obstructive pulmonary disease Severe infections (including pneumonia and sepsis) Severe burns Anaemia Severe metabolic and hormone abnormalities (e.g. thyrotoxicosis, diabetic ketosis)

HFpEF = heart failure with preserved ejection fraction; HFrEF = heart failure with reduced ejection fraction; ICD = implantable cardioverter defibrillator.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Khuyến cáo sử dụng các biện pháp chẩn đoán suy tim cấp

Recommendations	Class [a]	Level [b]	Ref [c]
Upon presentation a measurement of plasma natriuretic peptide level (BNP, NT-proBNP or MR-proANP) is recommended in all patients with acute dyspnoea and suspected AHF to help in the differentiation of AHF from non-cardiac causes of acute dyspnoea.	I	A	531–534
At admission in all patients presenting with suspected AHF, the following diagnostic tests are recommended:			
a. 12-lead ECG;	I	C	
b. chest X-ray to assess signs of pulmonary congestion and detect other cardiac or non-cardiac diseases that may cause or contribute to the patient's symptoms;	I	C	
c. the following laboratory assessments in the blood: cardiac troponins, BUN (or urea), creatinine, electrolytes (sodium, potassium), glucose, complete blood count, liver function tests and TSH.	I	C	
Echocardiography is recommended immediately in haemodynamically unstable AHF patients and within 48 hours when cardiac structure and function are either not known or may have changed since previous studies.	I	C	

AHF = acute heart failure; BNP = B-type natriuretic peptide; BUN = blood urea nitrogen; ECG = electrocardiogram; MR-proANP = mid-regional pro A-type natriuretic peptide; NT-proBNP = N-terminal pro-B type natriuretic peptide; TSH = thyroid-stimulating hormone

[a]Class of recommendation.

[b]Level of evidence.

[c]Reference(s) supporting recommendations.

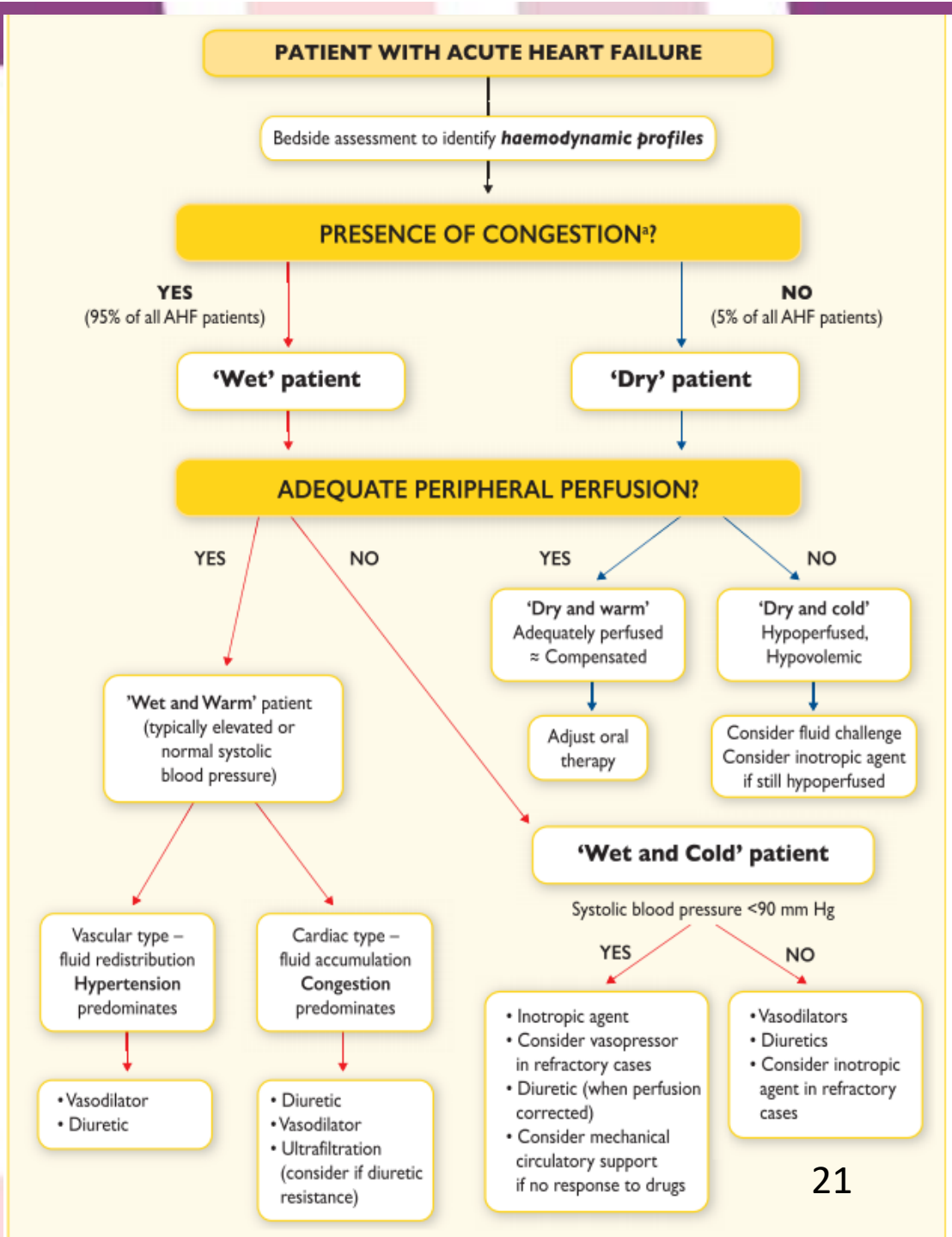
Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Điều trị suy tim cấp

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Pham Nguyen Vinh



Khuyến cáo xử trí suy tim cấp bằng oxy và trợ giúp thông khí

Recommendations	Class [a]	Level [b]	Ref [c]
Monitoring of transcutaneous arterial oxygen saturation (SpO_2) is recommended.	I	C	
Measurement of blood pH and carbon dioxide tension (possibly including lactate) should be considered, especially in patients with acute pulmonary oedema or previous history of COPD using venous blood. In patients with cardiogenic shock arterial blood is preferable.	IIa	C	
Oxygen therapy is recommended in patients with AHF and SpO_2 <90% or PaO_2 <60 mmHg (8.0 kPa) to correct hypoxaemia.	I	C	
Non-invasive positive pressure ventilation (CPAP, BiPAP) should be considered in patients with respiratory distress (respiratory rate >25 breaths/min, SpO_2 <90%) and started as soon as possible in order to decrease respiratory distress and reduce the rate of mechanical endotracheal intubation. Non-invasive positive pressure ventilation can reduce blood pressure and should be used with caution in hypotensive patients. Blood pressure should be monitored regularly when this treatment is used.	IIa	B	541–545
Intubation is recommended, if respiratory failure, leading to hypoxaemia (PaO_2 <60 mmHg (8.0 kPa)), hypercapnia ($PaCO_2$ >50 mmHg (6.65 kPa)) and acidosis (pH <7.35), cannot be managed non-invasively.	I	C	

AHF = acute heart failure; BiPAP = bilevel positive airway pressure; COPD = chronic obstructive pulmonary disease; CPAP = continuous positive airway pressure; $PaCO_2$ = partial pressure of carbon dioxide in arterial blood; PaO_2 = partial pressure of oxygen in arterial blood; SpO_2 = transcutaneous oxygen saturation.

[a]Class of recommendation.

[b]Level of evidence.

[c]Reference(s) supporting recommendations.

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Điều trị suy tim cấp bằng thuốc (1)

Recommendations	Class [a]	Level [b]	Ref [c]
Diuretics			
Intravenous loop diuretics are recommended for all patients with AHF admitted with signs/symptoms of fluid overload to improve symptoms. It is recommended to regularly monitor symptoms, urine output, renal function and electrolytes during use of i.v. diuretics.	I	C	
In patients with new-onset AHF or those with chronic, decompensated HF not receiving oral diuretics the initial recommended dose should be 20–40 mg i.v. furosemide (or equivalent); for those on chronic diuretic therapy, initial i.v. dose should be at least equivalent to oral dose.	I	B	540, 548
It is recommended to give diuretics either as intermittent boluses or as a continuous infusion, and the dose and duration should be adjusted according to patients' symptoms and clinical status.	I	B	548
Combination of loop diuretic with either thiazide-type diuretic or spironolactone may be considered in patients with resistant oedema or insufficient symptomatic response.	IIb	C	549

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Điều trị suy tim cấp bằng thuốc (2)

Vasodilators			
i.v. vasodilators should be considered for symptomatic relief in AHF with SBP >90 mmHg (and without symptomatic hypotension). Symptoms and blood pressure should be monitored frequently during administration of i.v. vasodilators.	IIa	B	537, 550–555
In patients with hypertensive AHF, i.v. vasodilators should be considered as initial therapy to improve symptoms and reduce congestion.	IIa	B	537, 551–554
Inotropic agents – dobutamine, dopamine, levosimendan, phosphodiesterase III (PDE III) inhibitors			
Short-term, i.v. infusion of inotropic agents may be considered in patients with hypotension (SBP <90 mmHg) and/or signs/symptoms of hypoperfusion despite adequate filling status, to increase cardiac output, increase blood pressure, improve peripheral perfusion and maintain end-organ function.	IIb	C	
An intravenous infusion of levosimendan or a PDE III inhibitor may be considered to reverse the effect of beta-blockade if beta-blockade is thought to be contributing to hypotension with subsequent hypoperfusion.	IIb	C	
Inotropic agents are not recommended unless the patient is symptomatically hypotensive or hypoperfused because of safety concern.	III	A	556, 557

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Điều trị suy tim cấp bằng thuốc (3)

Recommendations	Class [a]	Level [b]	Ref [c]
Vasopressors			
A vasopressor (norepinephrine preferably) may be considered in patients who have cardiogenic shock, despite treatment with another inotrope, to increase blood pressure and vital organ perfusion.	IIb	B	558
It is recommended to monitor ECG and blood pressure when using inotropic agents and vasopressors, as they can cause arrhythmia, myocardial ischaemia, and in the case of levosimendan and PDE III inhibitors also hypotension.	I	C	540, 559–563
In such cases intra-arterial blood pressure measurement may be considered.	IIb	C	
Thrombo-embolism prophylaxis			
Thrombo-embolism prophylaxis (e.g. with LMWH) is recommended in patients not already anticoagulated and with no contra-indication to anticoagulation, to reduce the risk of deep venous thrombosis and pulmonary embolism.	I	B	564
Other drugs			
For acute control of the ventricular rate In patients with atrial fibrillation:			
a. digoxin and/or beta-blockers should be considered as the first-line therapy.[d]	IIa	C	
b. amiodarone may be considered.	IIb	B	565–567
Opiates may be considered for cautious use to relieve dyspnoea and anxiety in patients with severe dyspnoea but nausea and hypopnea may occur.	IIb	B	568, 569

AHF = acute heart failure; ECG = electrocardiogram; HF = heart failure; i.v. = intravenous; LMWH = low molecular weight heparin; SBP = systolic blood pressure.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.
[d]Beta-blockers should be used cautiously, if the patient is hypotensive.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Các thuốc tăng co cơ tim, điều trị suy tim cấp

Vasodilator	Bolus	Infusion rate
Dobutamine[a]	No	2–20 μg/kg/min (beta+)
Dopamine	No	3–5 μg/kg/min; inotropic (beta+)
		>5 μg/kg/min: (beta+), vasopressor (alpha+)
Milrinone[a,b]	25–75 μg/kg over 10–20 min	0.375–0.75 μg/kg/min
Enoximone[a]	0.5–1.0 mg/kg over 5–10 min	5–20 μg/kg/min
Levosimendan[a]	12 μg/kg over 10 min (optional) [c]	0.1 μg/kg/min, which can be decreased to 0.05 or increased to 0.2 μg/kg/min
Norepinephrine	No	0.2–1.0 μg/kg/min
Epinephrine	Bolus: 1 mg can be given i.v. during resuscitation, repeated every 3–5 min	0.05–0.5 μg/kg/min

i.v. = intravenous.
[a]Also a vasodilator.
[b]Not recommended in acutely worsened ischaemic heart failure.
[c]Bolus not recommended in hypotensive patients.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Pham Nguyen Vinh

Thuốc dãn mạch TTM/điều trị suy tim cấp

Vasodilator	Dosing	Main side effects	Other
Nitroglycerine	Start with10–20 µg/min, increase up to 200 µg/min	Hypotension, headache	Tolerance on continuous use
Isosorbide dinitrate	Start with 1 mg/h, increase up to 10 mg/h	Hypotension, headache	Tolerance on continuous use
Nitroprusside	Start with 0.3 µg/kg/min and increase up to 5 µg/kg/min	Hypotension, isocyanate toxicity	Light sensitive
Nesiritide[a]	Bolus 2 µg/kg + infusion 0.01 µg/kg/min	Hypotension	

[a]Not available in many European countries.

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Khuyến cáo điều trị thay thế thận/suy tim cấp

Recommendations	Class [a]	Level [b]	Ref [c]
Ultrafiltration may be considered for patients with refractory congestion, who failed to respond to diuretic-based strategies.	IIb	B	578–580
Renal replacement therapy should be considered in patients with refractory volume overload and acute kidney injury.	IIa	C	

[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Khuyến cáo cách theo dõi b/n nhập viện điều trị suy tim cấp (1)

Recommendations	Class [a]	Level [b]
Standard non-invasive monitoring of heart rate, rhythm, respiratory rate, oxygen saturation and blood pressure is recommended.	I	C
It is recommended that patients should be weighed daily and have an accurate fluid balance chart completed.	I	C
It is recommended to evaluate signs and symptoms relevant to HF (e.g. dyspnoea, pulmonary rales, peripheral oedema, weight) daily to assess correction of fluid overload.	I	C
Frequent, often daily, measurement of renal function (blood urea, creatinine) and electrolytes (potassium, sodium) during i.v. therapy and when renin-angiotensin-aldosterone system antagonists are initiated is recommended.	I	C

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Khuyến cáo cách theo dõi b/n nhập viện điều trị suy tim cấp (2)

Intra-arterial line should be considered in patients with hypotension and persistent symptoms despite treatment.	IIa	C
Pulmonary artery catheter may be considered in patients who, despite pharmacological treatment present refractory symptoms (particularly with hypotension and hypoperfusion).	IIb	C

HF = heart failure; i.v. = intravenous.
[a]Class of recommendation.
[b]Level of evidence.

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Mục tiêu điều trị suy tim cấp (1)

Immediate (ED/ICU/CCU)
Improve haemodynamics and organ perfusion.
Restore oxygenation.
Alleviate symptoms.
Limit cardiac and renal damage.
Prevent thrombo-embolism.
Minimize ICU length of stay.

Pham Nguyen Vinh

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Mục tiêu điều trị suy tim cấp (2)

Intermediate (in hospital)
Identify aetiology and relevant co-morbidities.
Titrate therapy to control symptoms and congestion and optimize blood pressure.
Initiate and up-titrate disease-modifying pharmacological therapy.
Consider device therapy in appropriate patients.
Pre-discharge and long-term management
Develop a careplan that provides: o A schedule for up-titration and monitoring of pharmacological therapy. o Need and timing for review for device therapy. o Who will see the patient for follow-up and when.
Enrol in disease management programme, educate, and initiate appropriate lifestyle adjustments.
Prevent early readmission.
Improve symptoms, quality of life, and survival.

CCU = coronary care unit; ED = emergency department; ICU = intensive care unit.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Pham Nguyen Vinh

Các bệnh nhân có đủ điều kiện đặt dụng cụ trợ giúp thất trái (LV assist device)

Patients with >2 months of severe symptoms despite optimal medical and device therapy and more than one of the following:
LVEF <25% and, if measured, peak VO_2 <12 mL/kg/min.
≥3 HF hospitalizations in previous 12 months without an obvious precipitating cause.
Dependence on i.v. inotropic therapy.
Progressive end-organ dysfunction (worsening renal and/or hepatic function) due to reduced perfusion and not to inadequate ventricular filling pressure (PCWP ≥20 mmHg and SBP ≤80–90 mmHg or CI ≤2 L/min/m^2).
Absence of severe right ventricular dysfunction together with severe tricuspid regurgitation.

CI = cardiac index; HF = heart failure; i.v. = intravenous; LVEF = left ventricular ejection fraction; PCWP = pulmonary capillary wedge pressure; SBP = systolic blood pressure; VO_2 = oxygen consumption.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Khuyến cáo đặt trợ giúp tuần hoàn cơ học/ bệnh nhân suy tim kháng trị

Recommendations	Class [a]	Level [b]	Ref [c]
An LVAD should be considered in patients who have end- stage HFrEF despite optimal medical and device therapy and who are eligible for heart transplantation in order to improve symptoms, reduce the risk of HF hospitalization and the risk of premature death (Bridge to transplant indication).	IIa	C	
An LVAD should be considered in patients who have end-stage HFrEF despite optimal medical and device therapy and who are not eligible for heart transplantation to, reduce the risk of premature death.	IIa	B	605, 612, 613

HF = heart failure; HFrEF = heart failure with reduced ejection fraction; LVAD = left ventricular assist device.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting levels of evidence.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Pham Nguyen Vinh

Chỉ định và chống chỉ định ghép tim

Patients to consider	End-stage HF with severe symptoms, a poor prognosis, and no remaining alternative treatment options. Motivated, well informed, and emotionally stable. Capable of complying with the intensive treatment required postoperatively.
Contra-indications	Active infection. Severe peripheral arterial or cerebrovascular disease. Pharmacologically irreversible pulmonary hypertension (LVAD should be considered with a subsequent re-evaluation to establish candidacy). Cancer (a collaboration with oncology specialists should occur to stratify each patient as to their risk of tumour recurrence). Irreversible renal dysfunction (e.g. creatinine clearance <30 mL/min). Systemic disease with multi-organ involvement. Other serious co-morbidity with poor prognosis. Pre-transplant BMI >35 kg/m^2 (weight loss is recommended to achieve a BMI <35 kg/m^2). Current alcohol or drug abuse. Any patient for whom social supports are deemed insufficient to achieve compliant care in the outpatient setting.

BMI = body mass index; HF = heart failure; LVAD = left ventricular assist device.

TL: Ponikowski P. 2016 ESC Guideline for the diagnosis and treatment of acute and chronic heart failure. Eur. H. J, May 20, 2016

Pham Nguyen Vinh