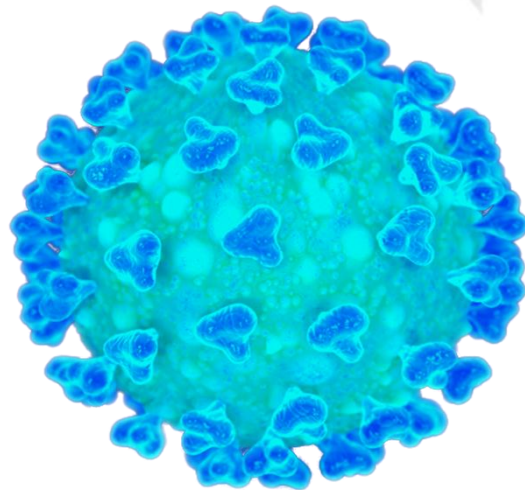


COVID19 ARDS (CARDS)



Dr Ameera Al-Sumat, MD

Consultant Internal Medicine

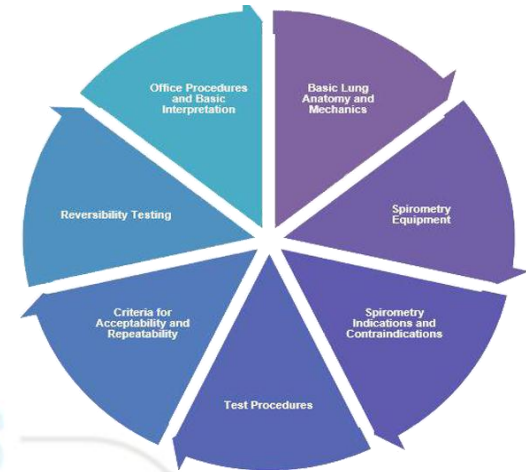
Asso. Prof. of internal Medicine

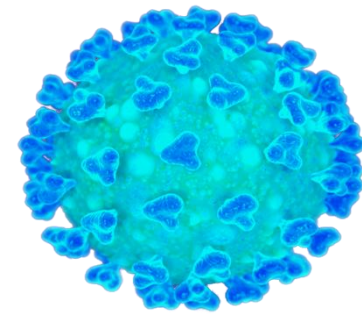
At 21 University of Applied Medical Sciences

Sana'a- Yemen

Outlines:

- Definition of COVID19 ?
- Definition of ARDS ?.





What is coronavirus disease 2019 (COVID-19)?

- **Coronavirus disease 2019 (COVID-19)** is a respiratory illness that can spread from person to person. The virus that causes **COVID-19** is a novel coronavirus that was first identified during an investigation into an outbreak in Wuhan, China in December 2019 .

Definition of ARDS :

?

Acute Respiratory Distress syndrome (ARDS) is a form of non-cardiogenic pulmonary edema attributed to the breakdown of alveolar membrane and capillaries leading to hypoxia.

Definition of ARDS :



ARDS – The Berlin Criteria

Symptom begin within 1 week of insult, or new/worsening symptoms in last 1 week

Bilateral opacities on chest imaging*

$\text{PaO}_2/\text{FiO}_2 \leq 300$ while on $\text{PEEP} \geq 5$ cm H₂O

Not fully attributed to cardiac failure and/or volume overload

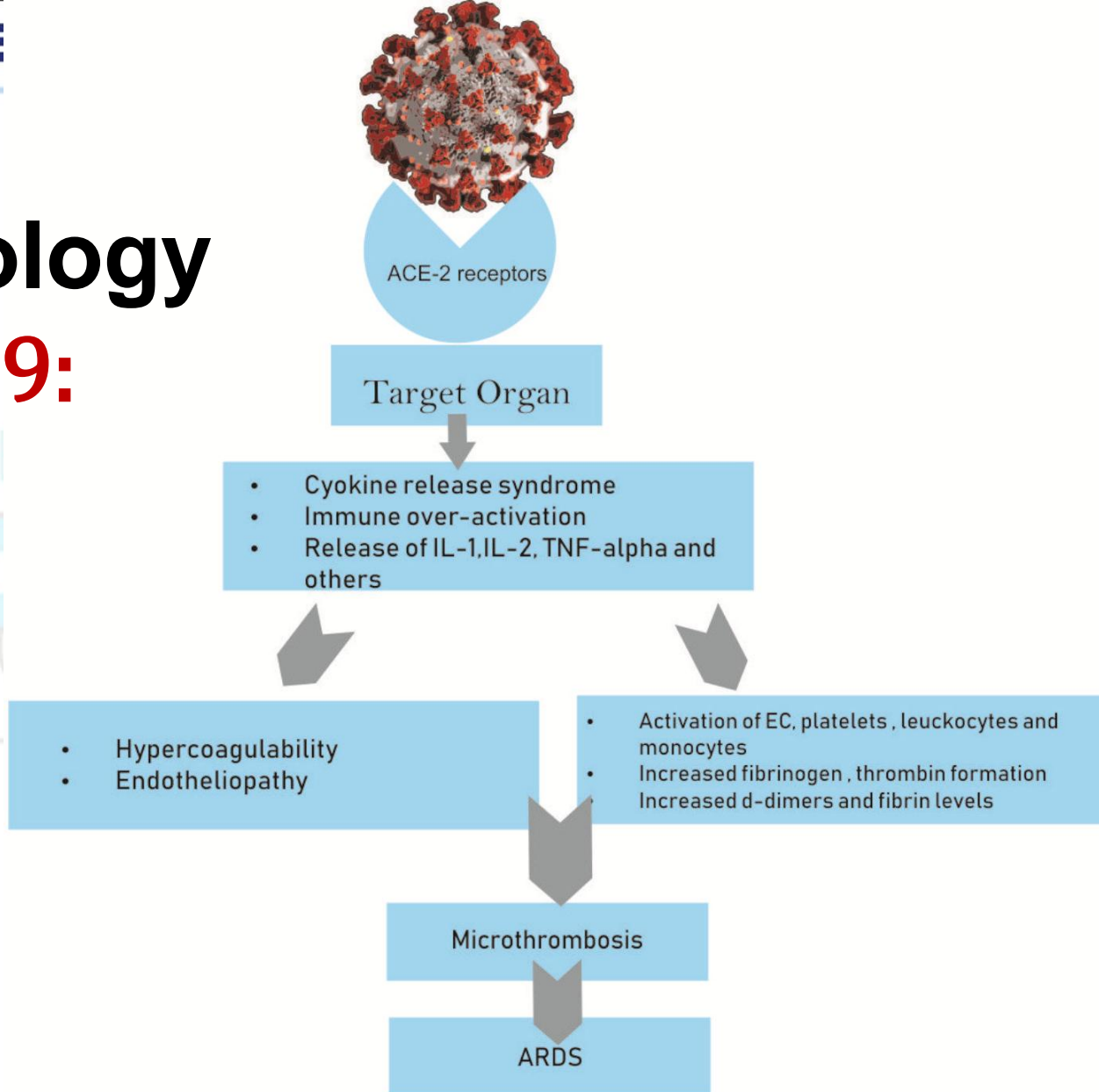
Classification of COVID19: ?

Several authors in a case report highlighted the non-uniformity of patients with COVID-19-associated ARDS and proposed the existence of two primary phenotypes:

- **Type L** : (low values of elastance, pulmonary ventilation/perfusion ratio, lung weight, and recruitability).

- **Type H**: (high values of elastance, right-to-left shunt, lung weight, and recruitability), more consistent with typical severe ARDS.

Pathophysiology of COVID19:



Clinical Features of COVID19:

- 81.4% of infected persons with COVID19 are asymptomatic.
- 13.9% of patients are symptomatic with or without seasonal flu-like symptoms, to severe pneumonia.
- Respiratory problems manifest as dyspnea that range from effort dyspnea to dyspnea occurring at rest.
- Patients with dyspnea can revert to an asymptomatic phase or progress to ARDS, requiring positive pressure oxygen therapy and intensive care therapy [18] in 17–19.6% of symptomatic patients.

Age more commonly observed patients aged ≥ 65 years old.

Gender men are more commonly affected by ARDS than women.

Race African Americans were at a higher risk of ARDS than white individuals

Risk factors of COVID19:

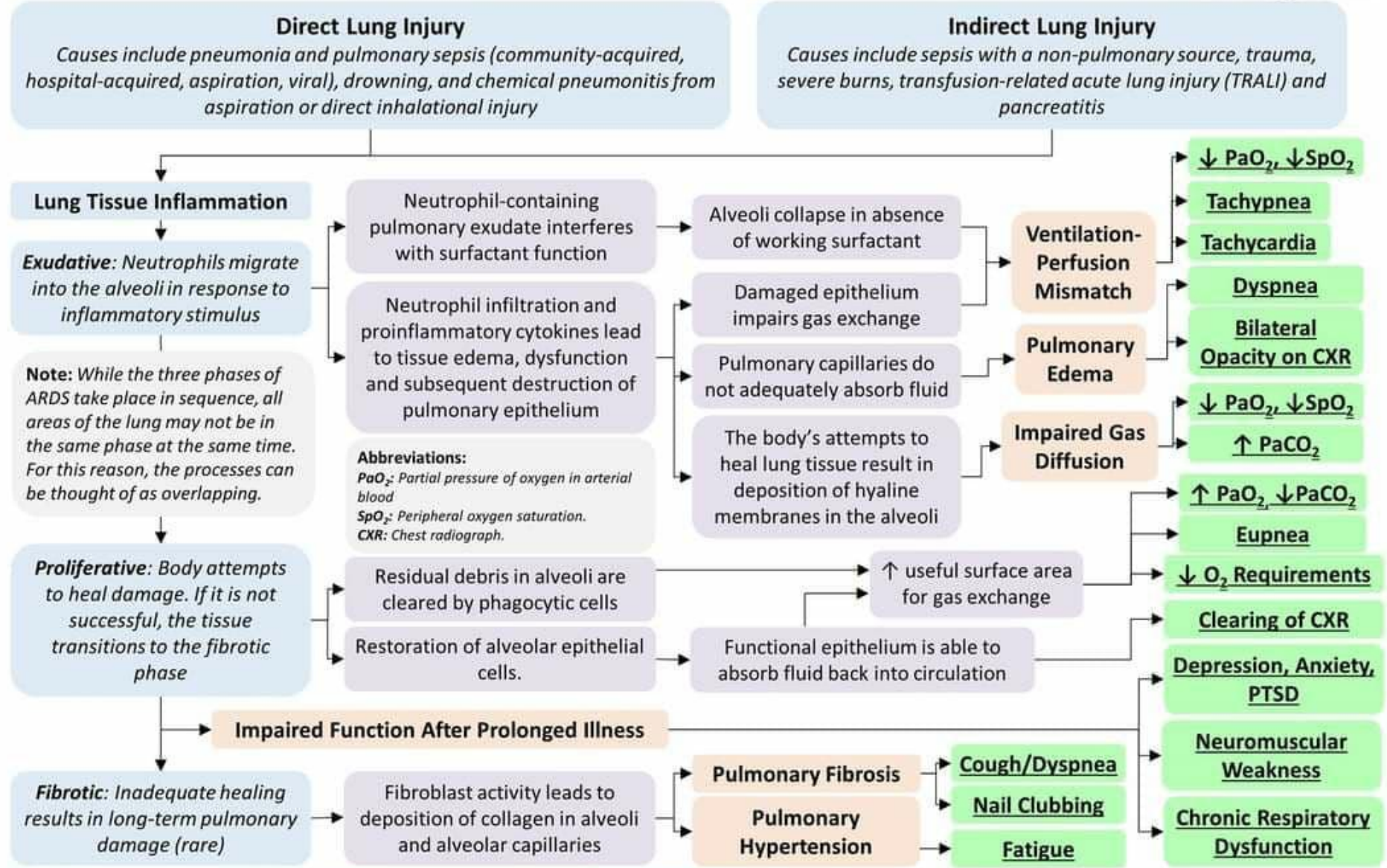
In a retrospective study conducted in China, following risk factors were the main predisposing factors for the development of ARDS:

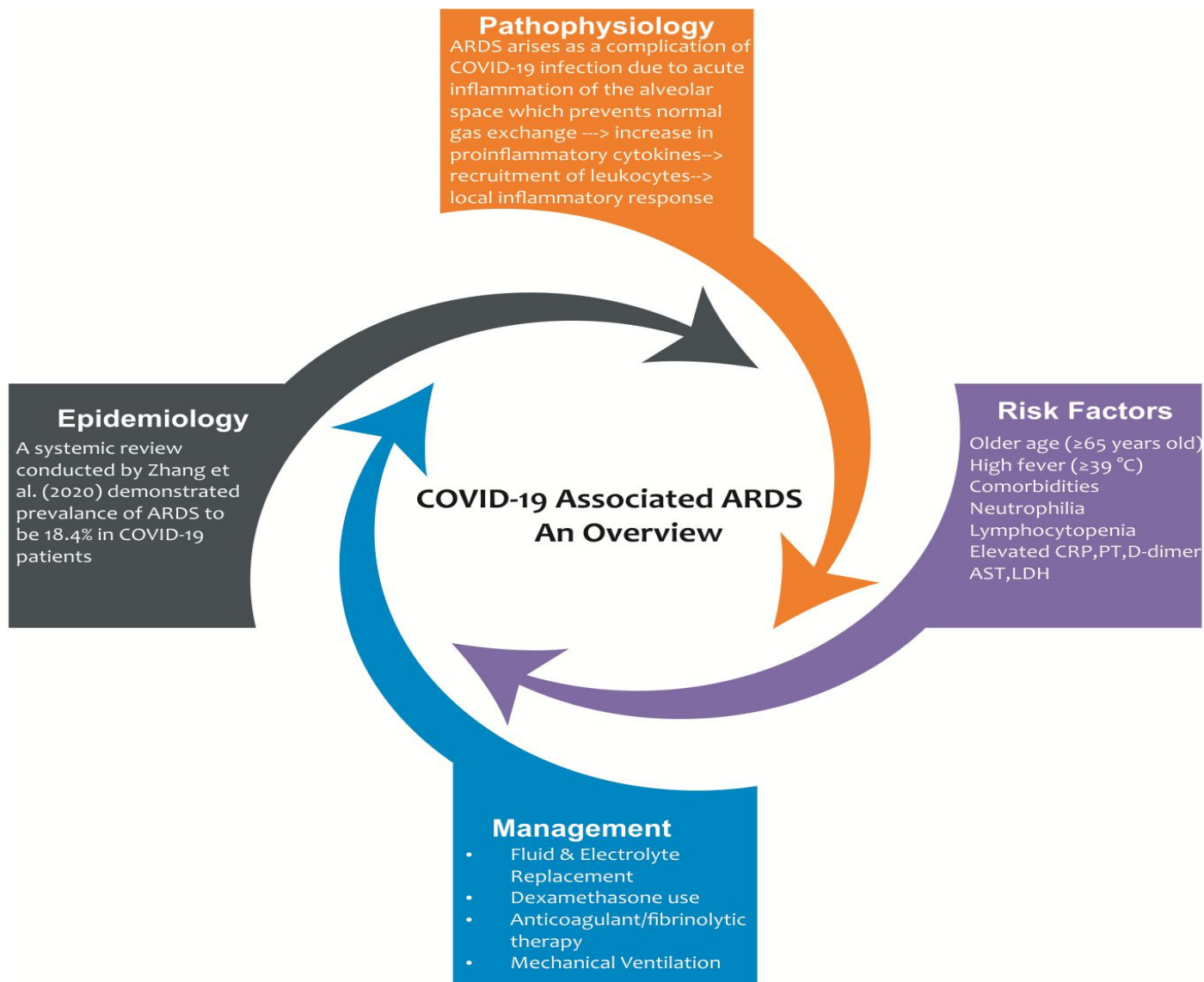
- Older age (≥ 65 years old)
- High fever (≥ 39 °C)
- Comorbidities (eg, hypertension, diabetes)
- Neutrophilia
- Lymphocytopenia (as well as lower CD3 and CD4 T-cell counts)
- Elevated end-organ related indices (eg, AST, urea, LDH)
- Elevated inflammation-related indices (high-sensitivity C-reactive protein and serum ferritin)
- Elevated coagulation function–related indicators (PT and D-dimer).

Acute Respiratory Distress Syndrome: Pathogenesis and clinical findings

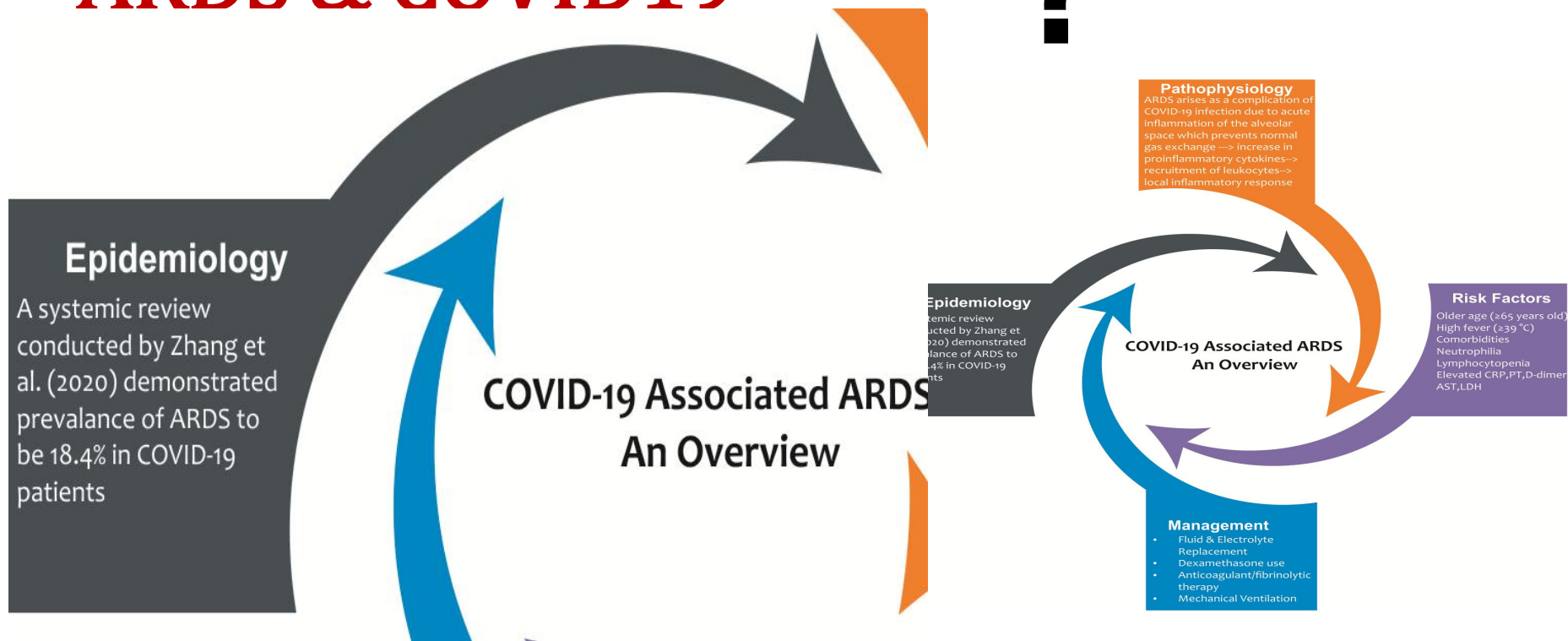
Note: Acute respiratory distress syndrome is a clinical syndrome involving acute lung injury. It results in severe hypoxemia and bilateral airspace disease in the absence of elevated left-heart pressures.

Authors: David Olmstead
Reviewers: Midas (Kening) Kang, Usama Malik, Kevin Solverson*
* MD at time of publication





ARDS & COVID19



ARDS & COVID19

?

Pathophysiology

ARDS arises as a complication of COVID-19 infection due to acute inflammation of the alveolar space which prevents normal gas exchange ---> increase in proinflammatory cytokines--> recruitment of leukocytes--> local inflammatory response

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Epidemiology

A systemic review conducted by Zhang et al. (2020) demonstrated prevalence of ARDS to be 18.4% in COVID-19 patients

COVID-19 Associated ARDS An Overview

Risk Factors

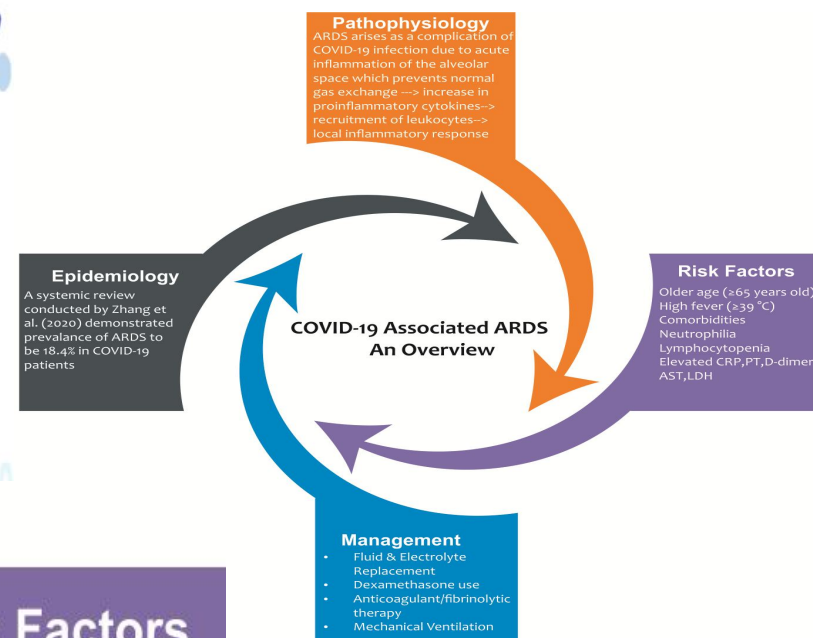
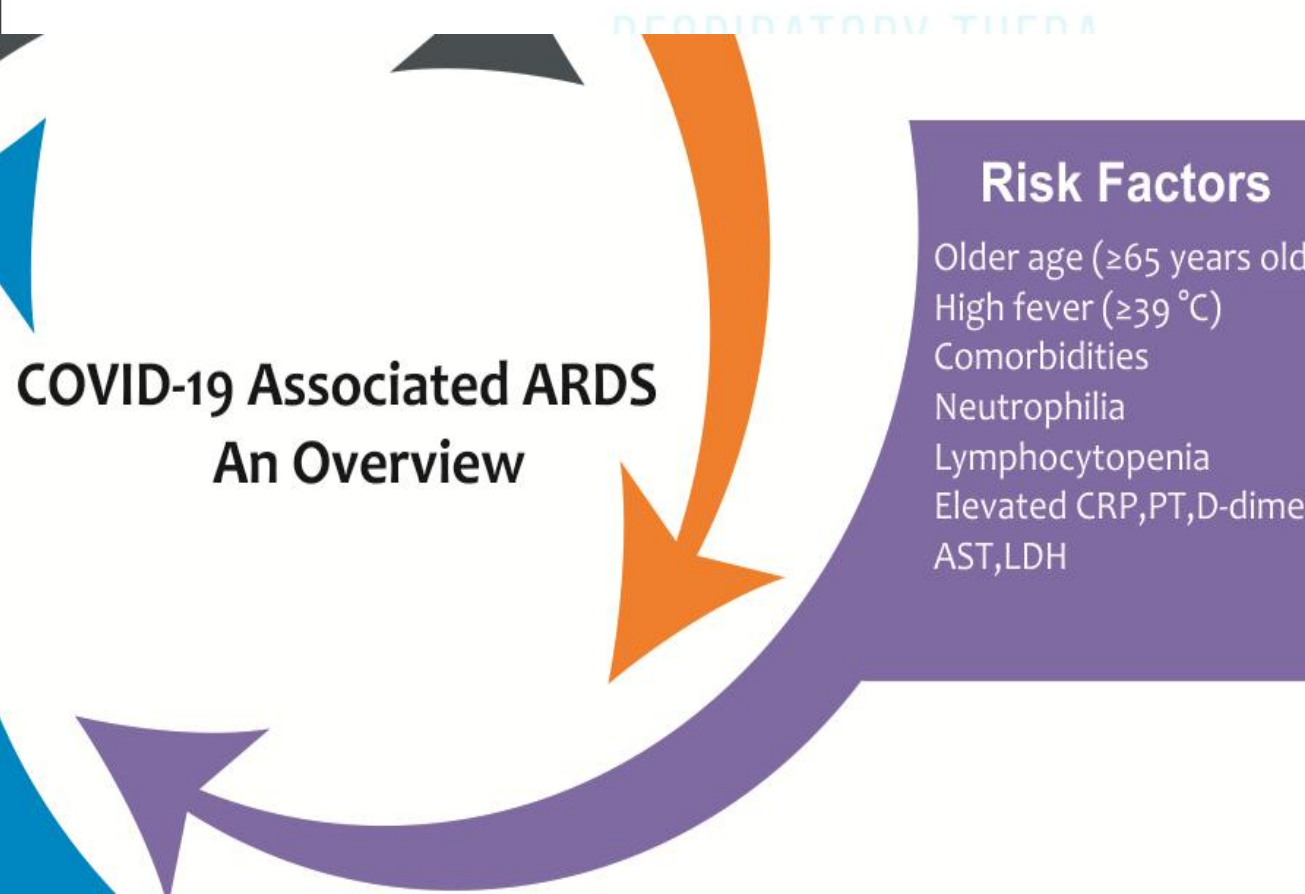
Older age (≥ 65 years old)
High fever ($\geq 39^{\circ}\text{C}$)
Comorbidities
Neutrophilia
Lymphocytopenia
Elevated CRP, PT, D-dimer
AST, LDH

Management

- Fluid & Electrolyte Replacement
- Dexamethasone use
- Anticoagulant/fibrinolytic therapy
- Mechanical Ventilation

COVID-19 Associated ARDS An Overview

ARDS & COVID19



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ARDS & COVID19

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We Save Lives

Management:

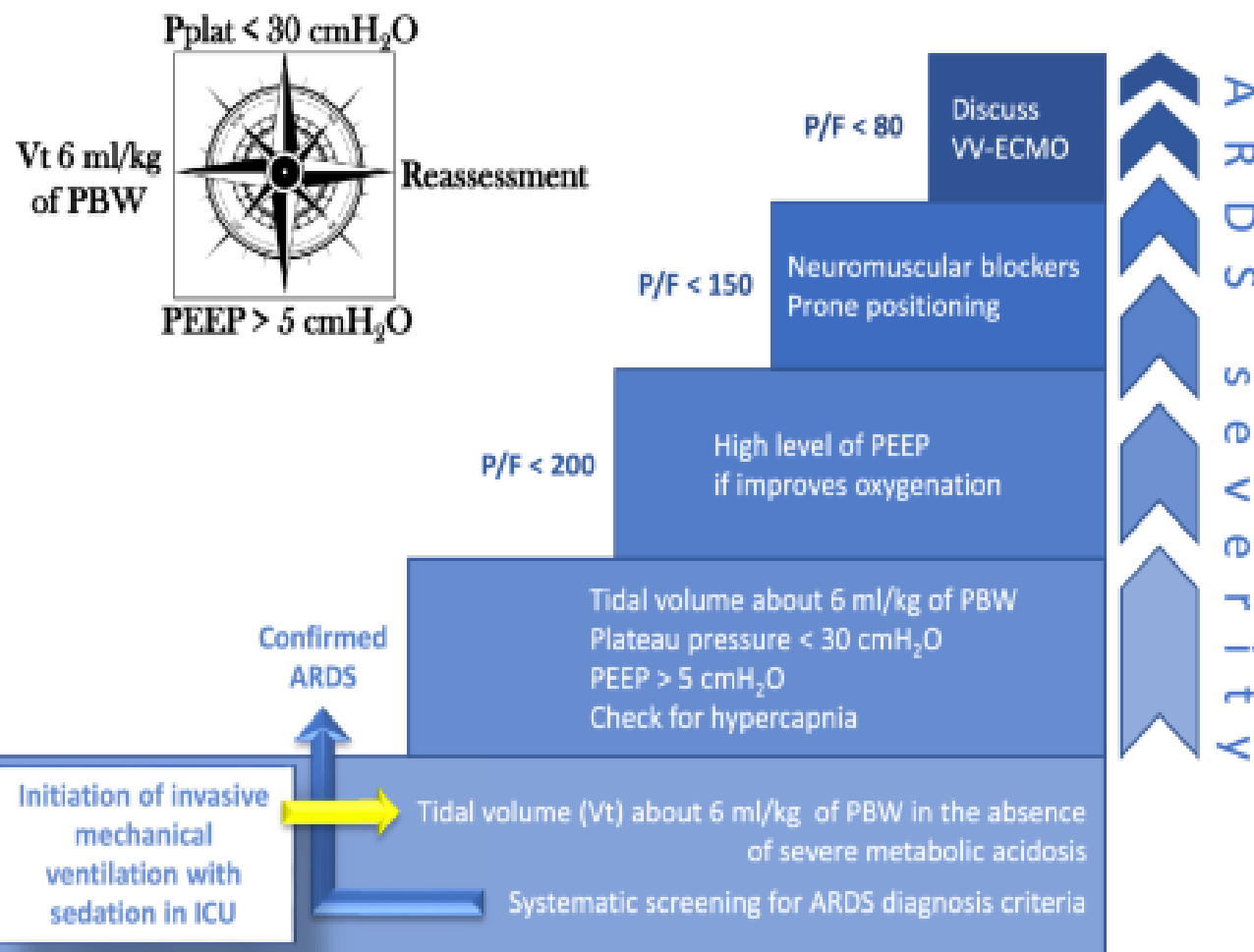
Therapy	Implementation
High-flow nasal oxygen	Might prevent or delay the need for intubation
Tidal volume	Use 6 mL/kg per predicted bodyweight (can reduce to 4 mL/kg per predicted bodyweight)
Plateau airway pressure	Maintain at <30 cm H ₂ O if possible
Positive end-expiratory pressure	Consider moderate to high levels if needed
Recruitment manoeuvres	Little value
Neuromuscular blockade	For ventilator dyssynchrony, increased airway pressure, hypoxaemia
Prone positioning	For worsening hypoxaemia, PaO ₂ :FiO ₂ <100–150 mm Hg
Inhaled NO	Use 5–20 ppm
Fluid management	Aim for negative fluid balance of 0.5–1.0 L per day
Renal replacement therapy	For oliguric renal failure, acid-base management, negative fluid balance
Antibiotics	For secondary bacterial infections
Glucocorticoids	Not recommended
Extracorporeal membrane oxygenation	Use EOLIA trial criteria ³

Consider Reasonable Steps to Support Patient Status, Avoid Intubation (unless severe ARDS):

- NRB mask.
- Strongly consider self-guided treatments , including Lung Expansion (IS) and Bronchial Hygiene (Acapella, for example) .
- Consider Noninvasive Support (HFNC with mask, perhaps CPAP/NPPV) as a trial
- Consider self-pronning .
- Keep head of bed elevated if not pronning, sit out of bed, and mobilize as able..
- Consider a trial of inhaled pulmonary vasodilators



Early management of ARDS



Reassessment of ventilator settings and of the management strategy at least every 24h

Veno-venous ECMO

- ☐ In case of refractory hypoxemia or when protective ventilation can not be applied
- ☐ To be discussed with experienced ECMO centres

Neuromuscular blockers: continuous intravenous infusion

- ☐ Early initiation (within the first 48h of ARDS diagnosis)

Prone positioning methods :

- ☐ Applied for >16h a day, for several consecutive days

Moderate or severe ARDS -> High PEEP test (> 12 cmH₂O)

Use high levels if:

- ☐ Oxygenation improvement
- ☐ Without hemodynamic impairment or significant decrease in lung compliance
- ☐ Maintain Pplat < 30 cmH₂O, continuous monitoring

ARDS diagnosis criteria

- ☐ PaO₂/FIO₂ ≤ 300 mmHg
- ☐ PEEP ≥ 5 cmH₂O
- ☐ Bilateral opacities on chest imaging
- ☐ Not fully explained by cardiac failure or fluid overload
- ☐ Within a week of a known clinical insult

Might be applied

- Inhaled Nitric Oxide (iNO), when severe hypoxemia remains despite prone positioning and before considering VV-ECMO
- Partial ventilation support after early phase to generate tidal volume about 6 ml/kg and less than 8 ml/kg

No recommendation could be made

- ECCO₂R
- Driving pressure
- Partial ventilation support at the early phase

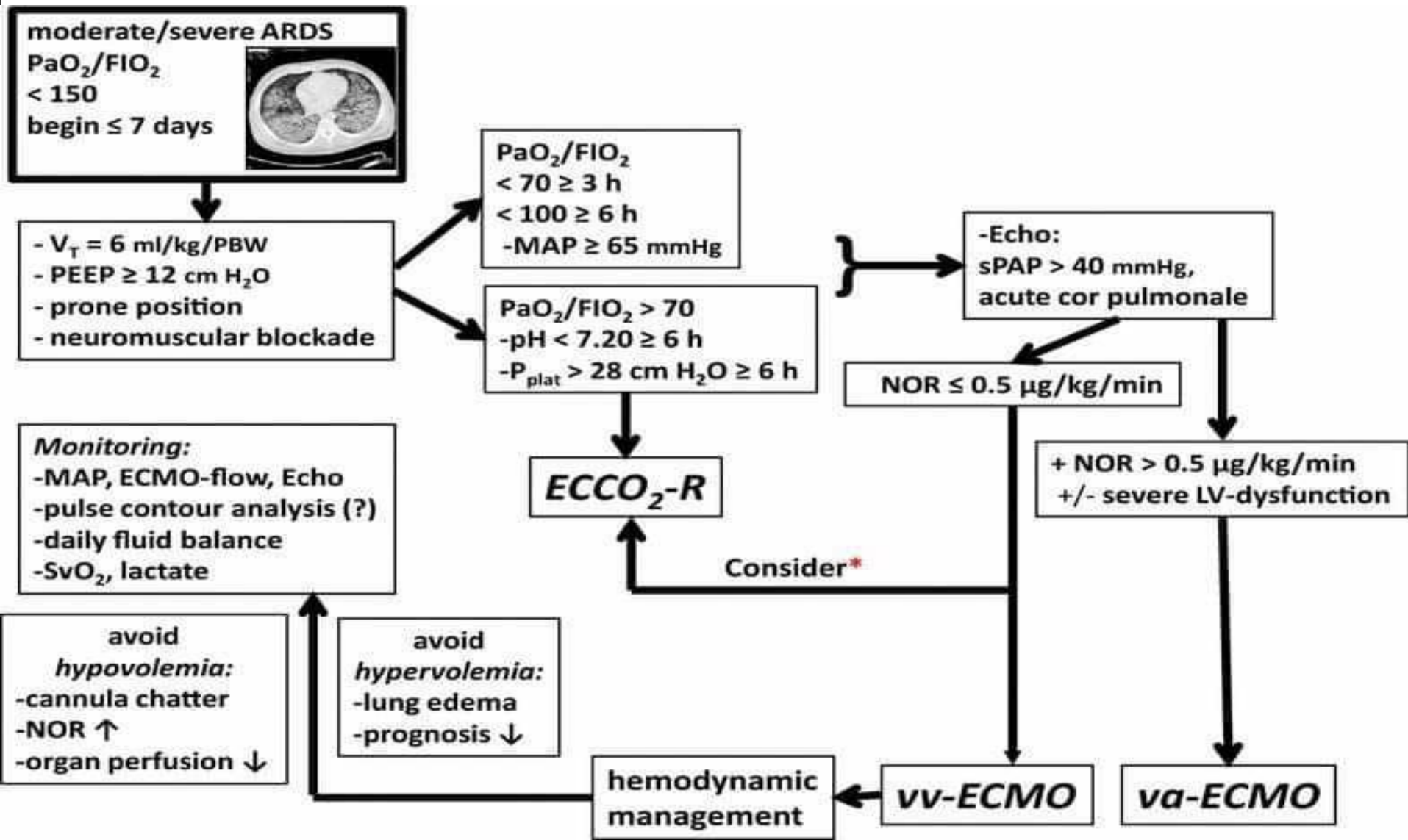
Should probably not be done

- Systematic recruitment maneuvers

Should not be done

- HFOV

Management of ARDS :



References :

https://www.wikidoc.org/index.php/COVID-19-associated_acute_respiratory_distress_syndrome



Thank you for your attention