

COVID – 19: training part II

Svetlana Plamadeala
MD, PhD, associate professor, Anesthesia and Intensive Care Department
Coordinator of training program in CUSIM
MEDPARK International Hospital, ICU and Anesthesia department
Member of examination subcommittee part I EDAIC, Republic of Moldova


sveta_plam@yahoo.com

Despre ce vorbim

- Criteriile de deteriorare a stării de bine a pacientului
- Oxigenoterapia: cui, când, cum și cu ce se asigură
- Pozitionarea pacientului în decubit ventral
- Pozitionarea pacientului critic în TI in vederea prevenirii escarelor

Despre ce vorbim

- Criteriile de deteriorare a stării de bine a pacientului
- Pozitionarea pacientului în decubit ventral
- Oxigenoterapia: cui, când, cum și cu ce se asigură
- Pozitionarea pacientului critic în TI in vederea prevenirii escarelor



**HE WHO IS NOT
GETTING BETTER IS
GETTING WORSE**

IGNATIUS OF LOYOLA

PICTUREQUOTES.COM

SANCTIONS

Close monitoring



Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected

Interim guidance
13 March 2020



- ✓ **Closely monitor patients with COVID-19 for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis and respond immediately with supportive care interventions.**

Patients hospitalized with COVID-19 require regular monitoring of vital signs and, where possible, utilization of medical early warning scores (e.g. NEWS2) that facilitate early recognition and escalation of treatment of the deteriorating patient

of timely, effective, and safe supportive therapies is the cornerstone of therapy for patients who develop severe manifestations of COVID-19.

Remarks 3: After resuscitation and stabilization of the pregnant patient, then fetal well-being should be monitored.

- ✓ **Understand the patient's co-morbid condition(s) to tailor the management of critical illness.**

Remark 1: Determine which chronic therapies should be continued and which therapies should be stopped temporarily. Monitor for drug-drug interactions.

Chart 1: The NEWS scoring system

Physiological parameter	Score			Score 0	Score		
	3	2	1		1	2	3
Respiration rate (per minute)	≤8		9–11	12–20		21–24	≥25
SpO ₂ Scale 1 (%)	≤91	92–93	94–95	≥96			
SpO ₂ Scale 2 (%)	≤83	84–85	86–87	88–92 ≥93 on air	93–94 on oxygen	95–96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91–100	101–110	111–219			≥220
Pulse (per minute)	≤40		41–50	51–90	91–110	111–130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	

Chart 1: The NEWS scoring system

Physiological parameter	Score						
	3	2	1	0	1	2	3
Respiration rate (per minute)	≤8		9–11	12–20		21–24	≥25
SpO ₂ Scale 1 (%)	≤91	92–93	94–95	≥96			
SpO ₂ Scale 2 (%)	≤83	84–85	86–87	88–92 ≥93 on air	93–94 on oxygen	95–96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)							≥220
Pulse (per minute)						–130	≥131
Consciousness							CVPU
Temperature (°C)						9.1	

COPD

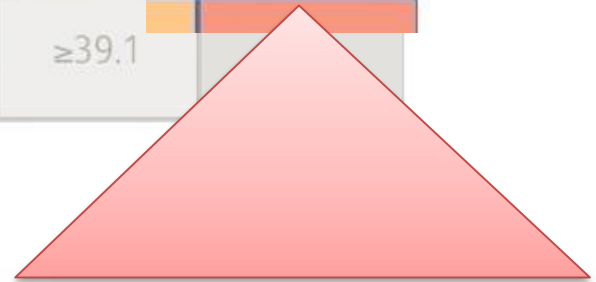


Chart 1: The NEWS scoring system

Physiological parameter	Score						
	3	2	1	0	1	2	3
Respiration rate (per minute)	≤8		9–11	12–20		21–24	≥25
SpO ₂ Scale 1 (%)	≤91	92–93	94–95	≥96			
SpO ₂ Scale 2 (%)	≤83	84–85	86–87	88–92 ≥93 on air	93–94 on oxygen	95–96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91–100	101–110	111–219			≥220
Pulse (per minute)	≤40		41–50	51–90	91–110	111–130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	

or oxygen?		Oxygen		Air			
olic blood ssure (mmHg)	≤90	91–100	101–110	111–219			≥220
e (per minute)	≤40		41–50	51–90	91–110	111–130	≥131
sciousness				Alert			
emperature (°C)	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	

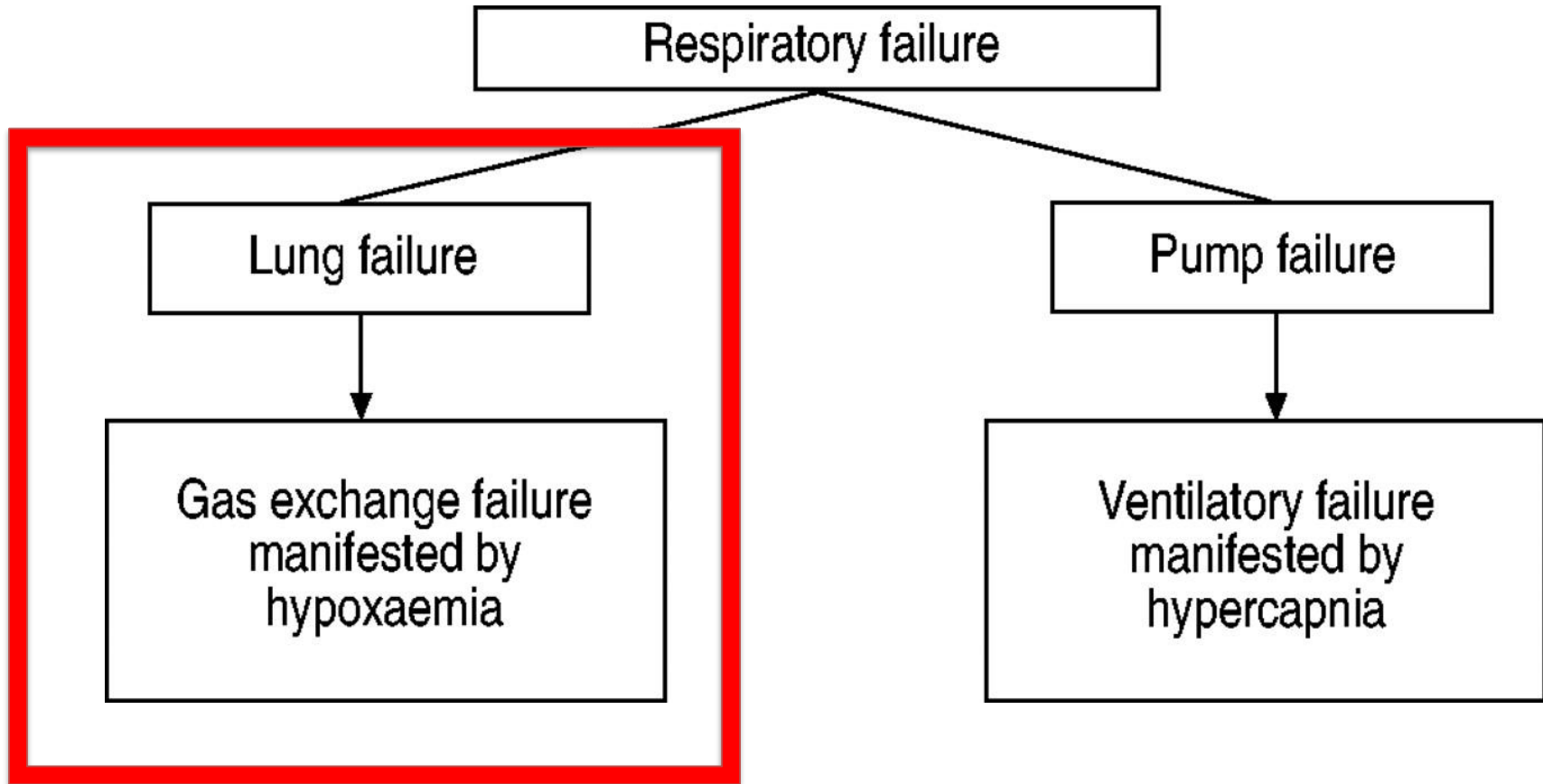
CVPU



ACVPU: LEVEL OF CONSCIOUSNESS

- ALERT**
- CONFUSION**
- VOICE**
- PAIN**
- UNRESPONSIVE**

Progresarea insuficienței respiratorii



Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected

Interim guidance
13 March 2020



SEVERE PNEUMONIA: fever or suspected respiratory infection, plus one of the following: respiratory rate > 30 breaths/min; severe respiratory distress; or SpO₂ ≤ 93% on room air

While the diagnosis is made on clinical grounds, chest imaging may identify or exclude some pulmonary complications.

Acute respiratory distress syndrome

Onset: within 1 week of a known clinical insult or new or worsening respiratory symptoms.

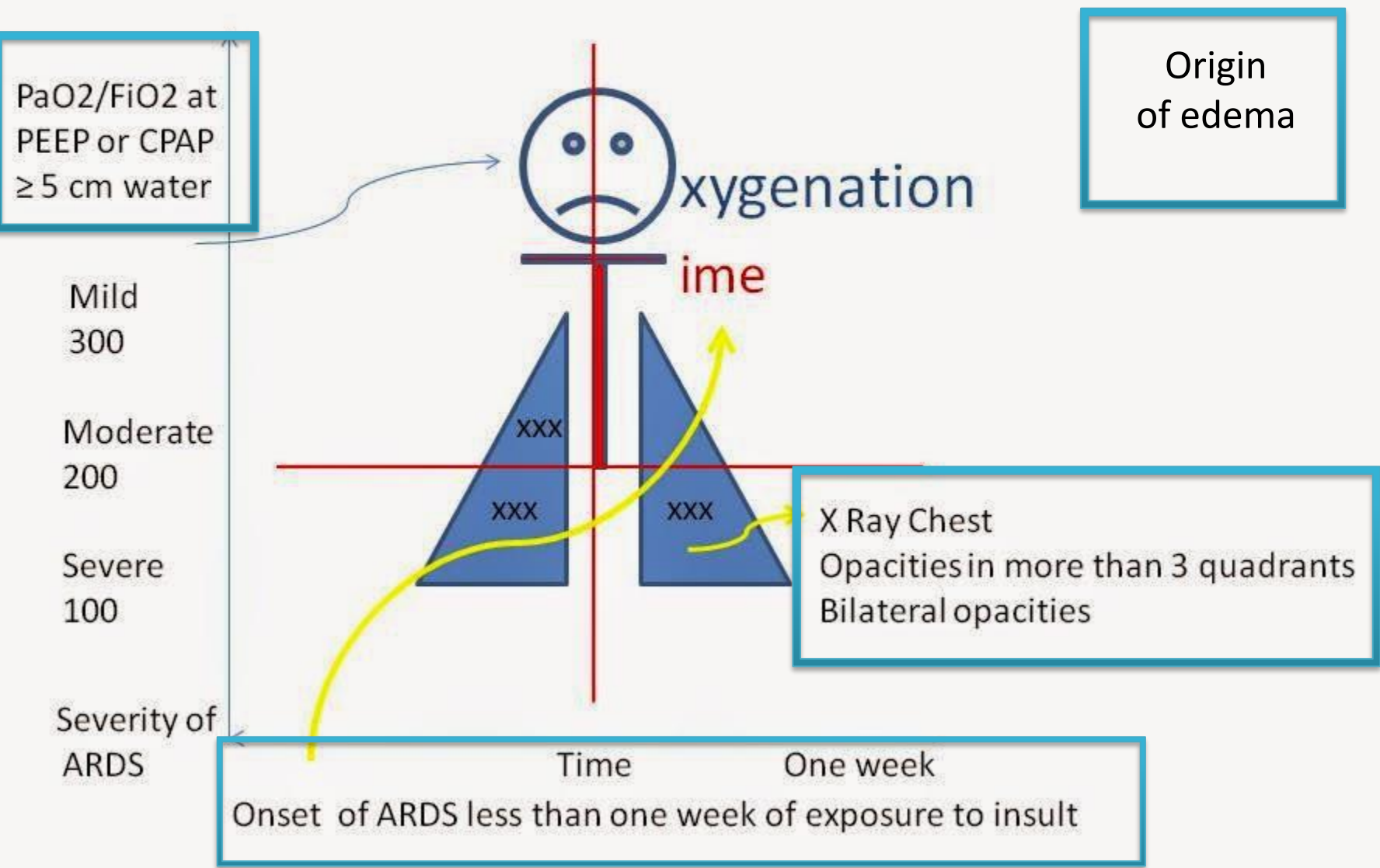
Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by volume overload, lobar or lung collapse, or nodules.

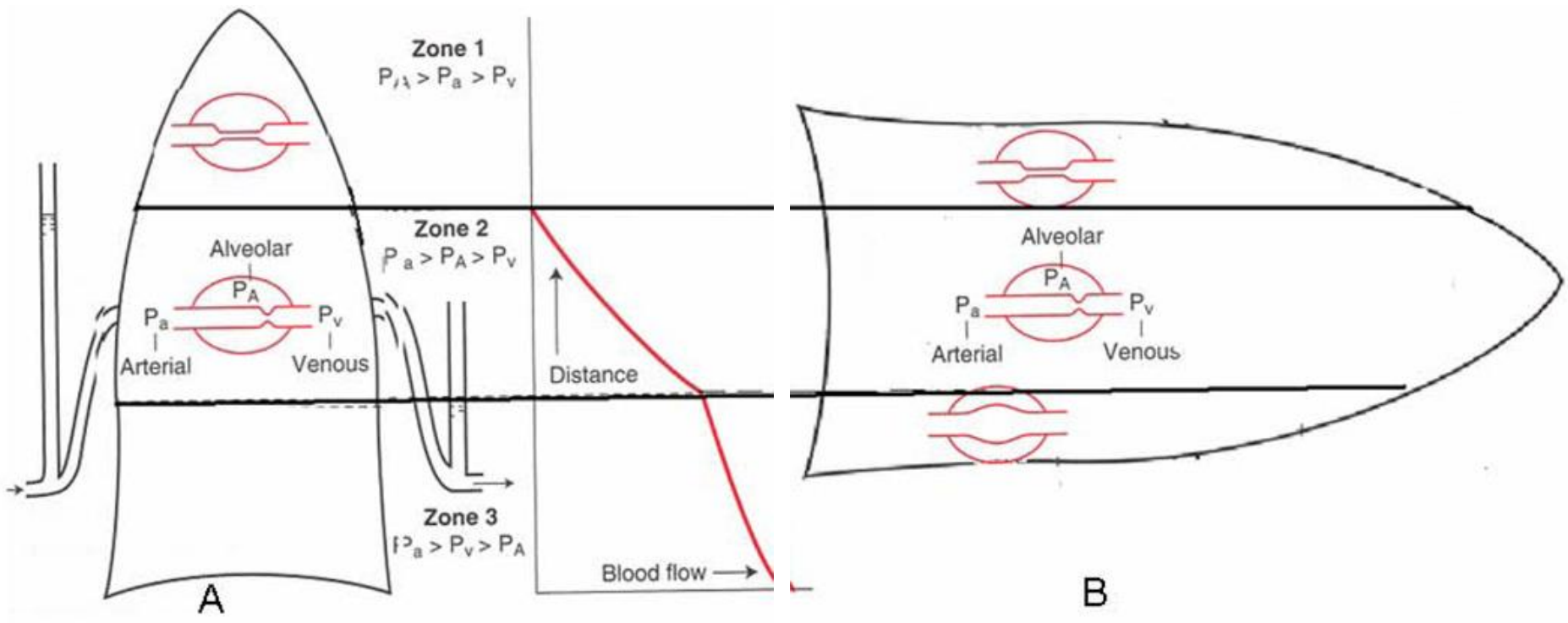
Origin of pulmonary infiltrates: respiratory failure not fully explained by cardiac failure or fluid overload. Need

ARDS

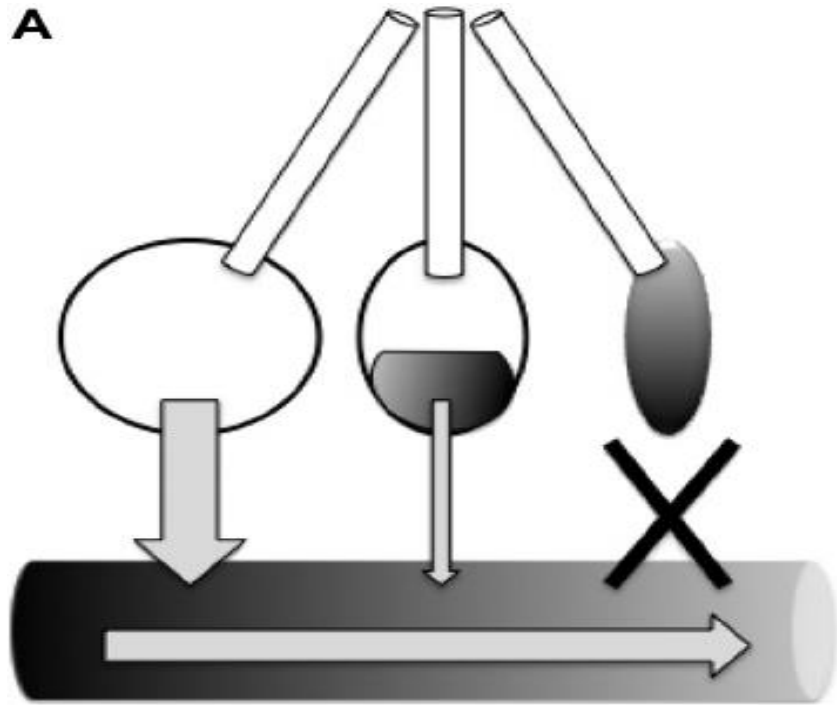
- When PaO₂ is not available, SpO₂/FiO₂ ≤ 315 suggests ARDS (including in non-ventilated patients).
- **Oxygenation impairment in children:** note OI = Oxygenation Index and OSI = Oxygenation Index using SpO₂. Use PaO₂-based metric when available. If PaO₂ not available, wean FiO₂ to maintain SpO₂ ≤ 97% to calculate OSI or SpO₂/FiO₂ ratio:
 - Bilevel (NIV or CPAP) ≥ 5 cmH₂O via full face mask: PaO₂/FiO₂ ≤ 300 mmHg or SpO₂/FiO₂ ≤ 264
 - Mild ARDS (invasively ventilated): 4 ≤ OI < 8 or 5 ≤ OSI < 7.5
 - Moderate ARDS (invasively ventilated): 8 ≤ OI < 16 or 7.5 ≤ OSI < 12.3
 - Severe ARDS (invasively ventilated): OI ≥ 16 or OSI ≥ 12.3

The Berlin Definition of ARDS



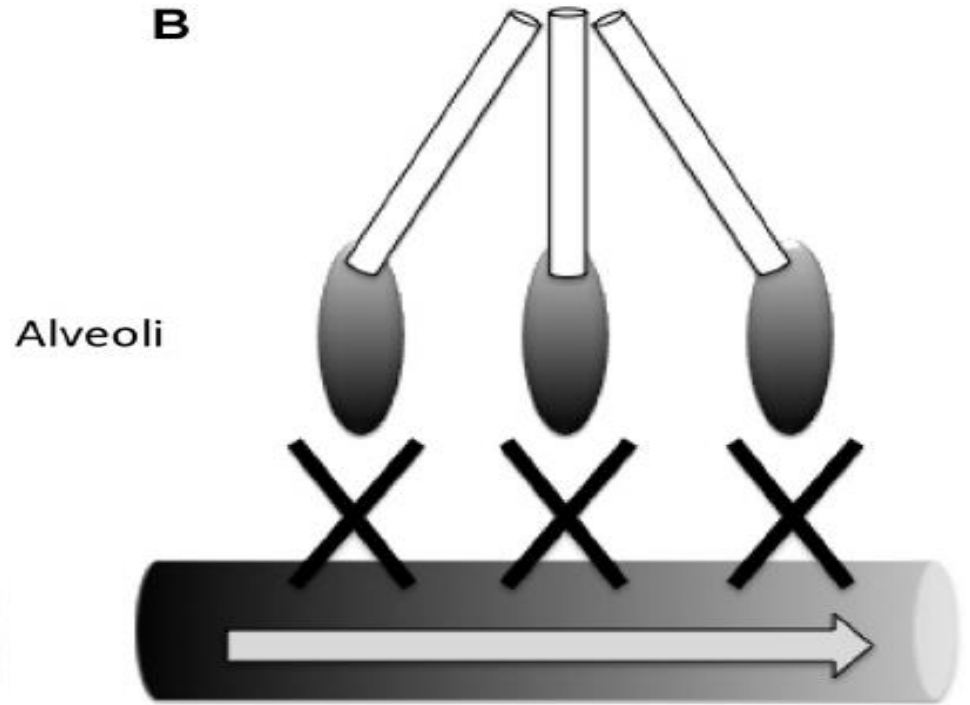


A



VQ mismatch

B

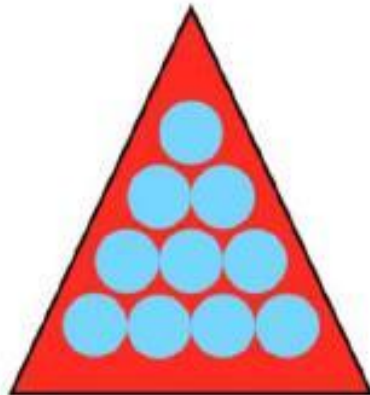


Capillary

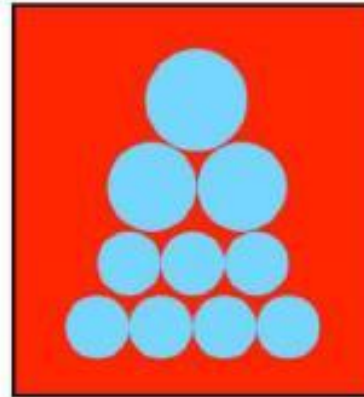
Shunt Physiology

SUPINE POSITION

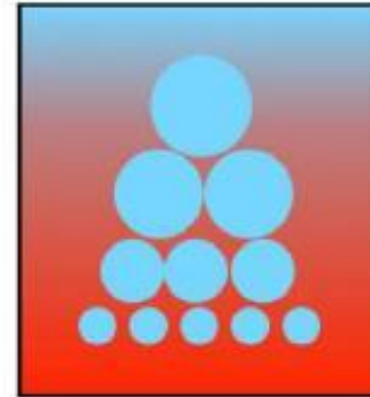
Ventral



Isolated lung



Shape matching



No gravity

Gravity



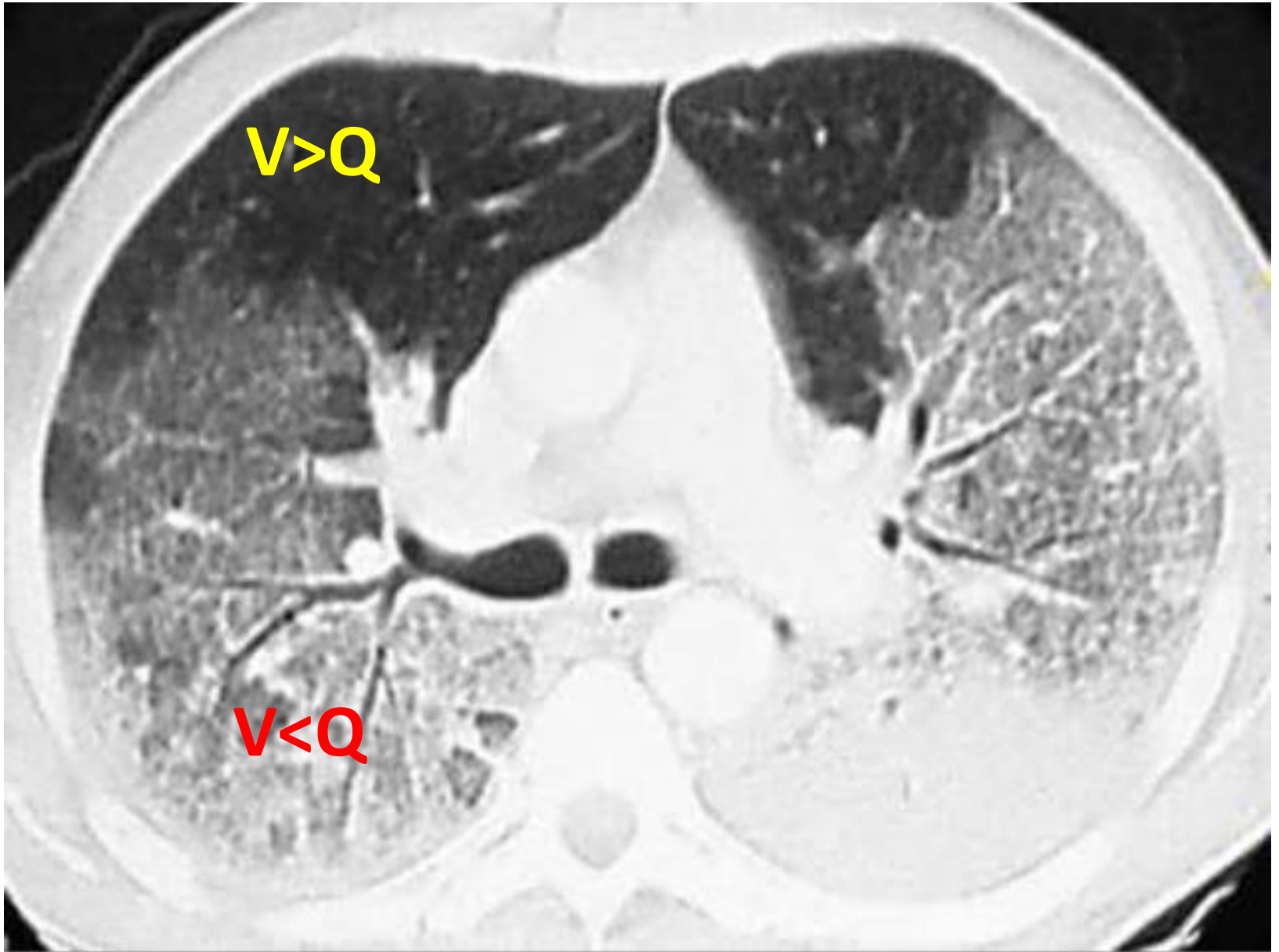
A



B



C



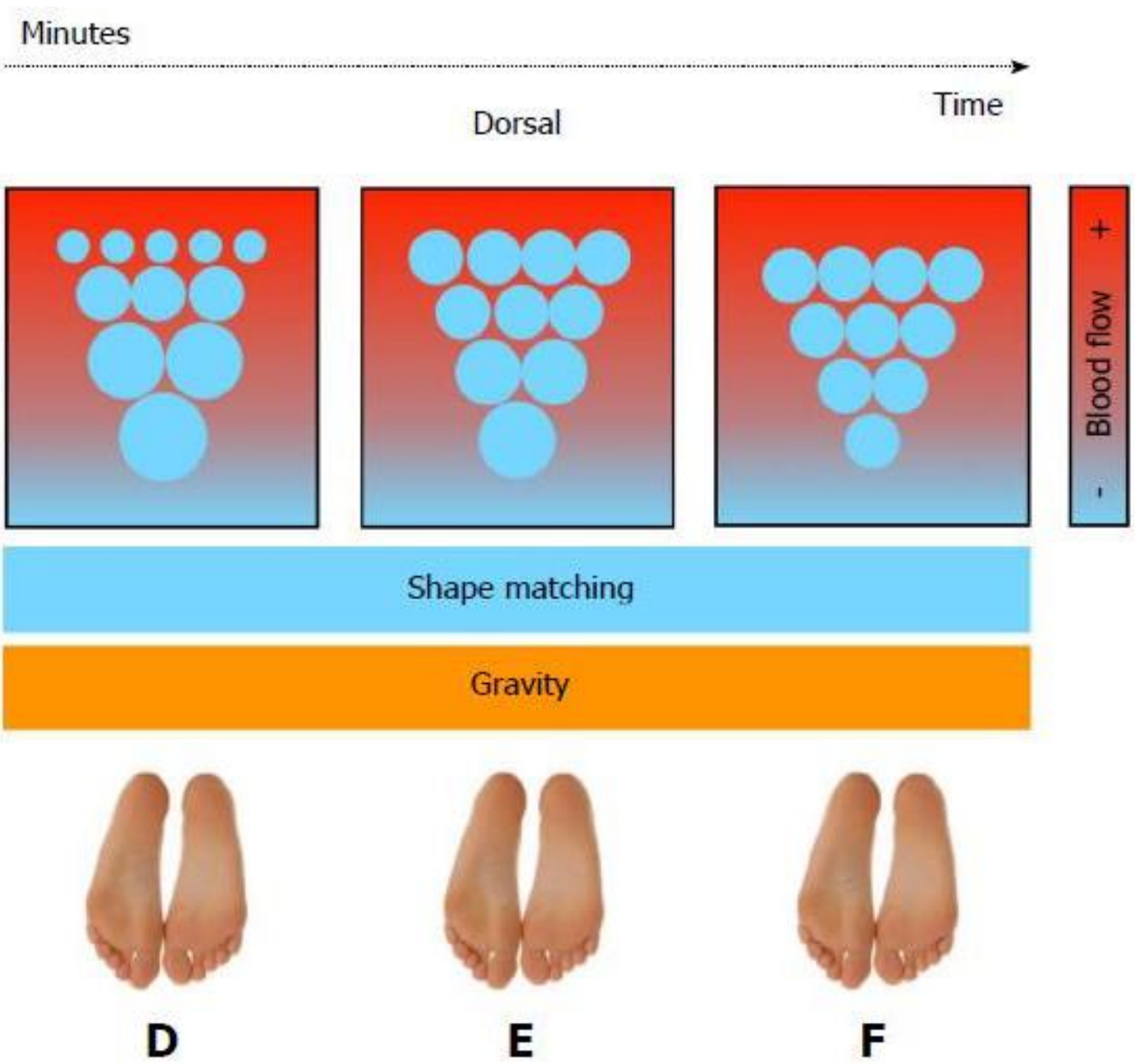
$V > Q$

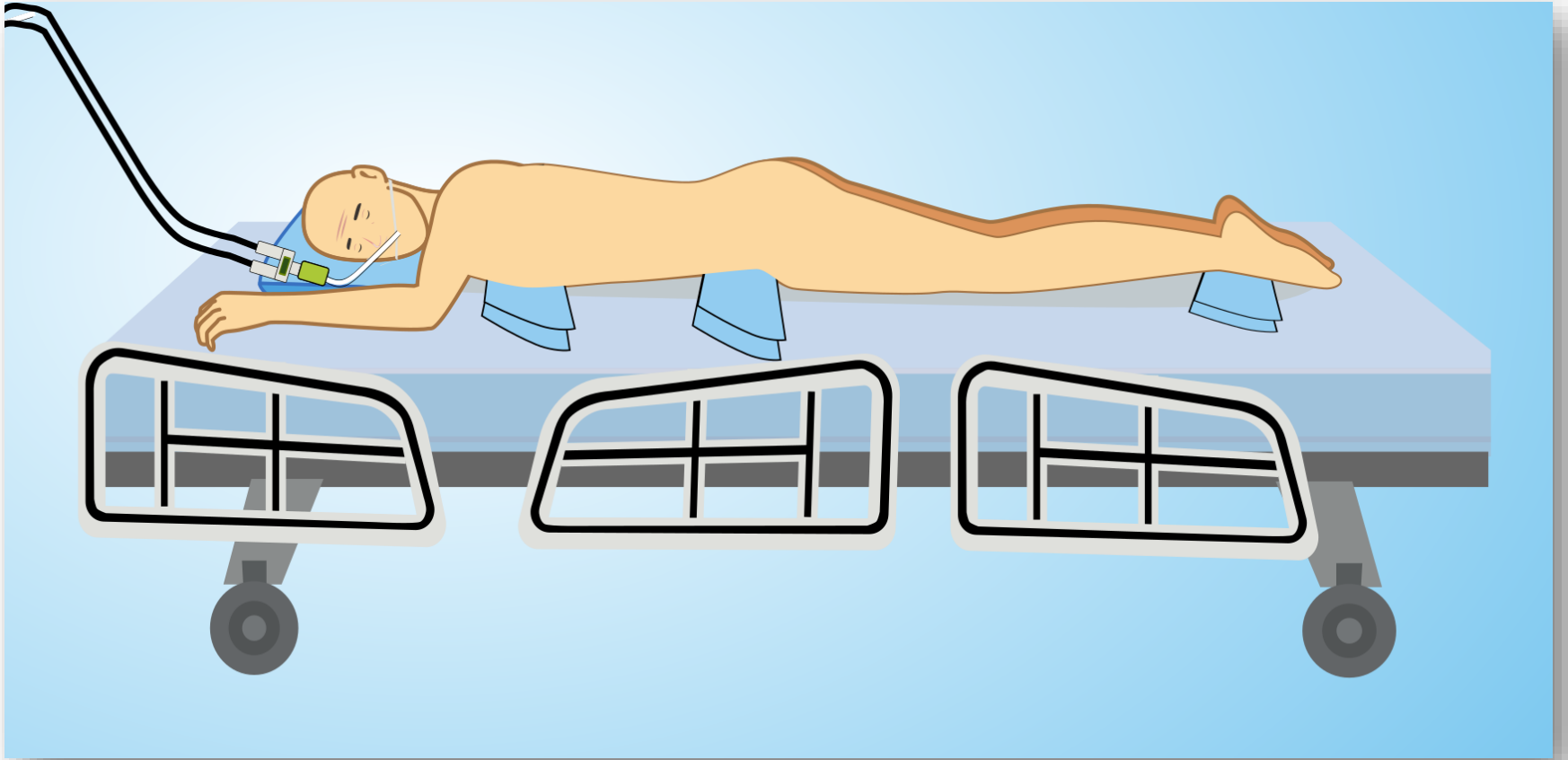
$V < Q$

$$V/Q = 1$$

$$V = Q$$

Prone position





Insuficienta cardiaca

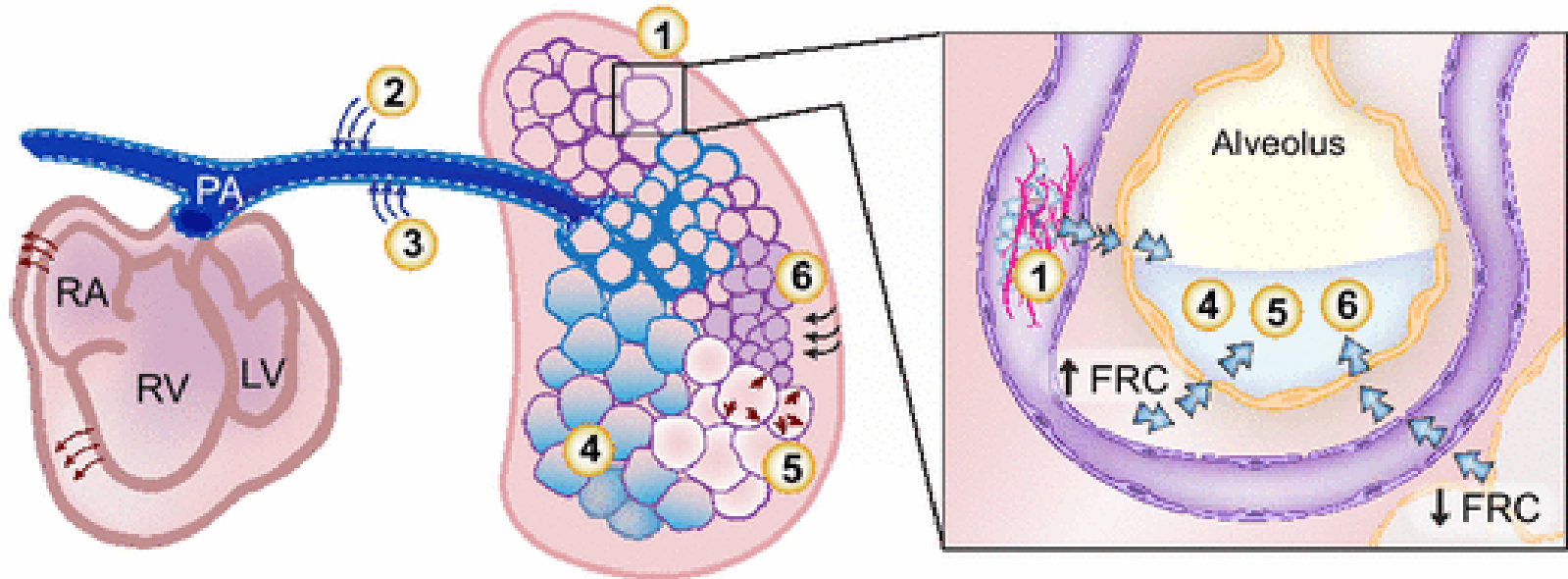
DC ???



Breathing Near ImPossible

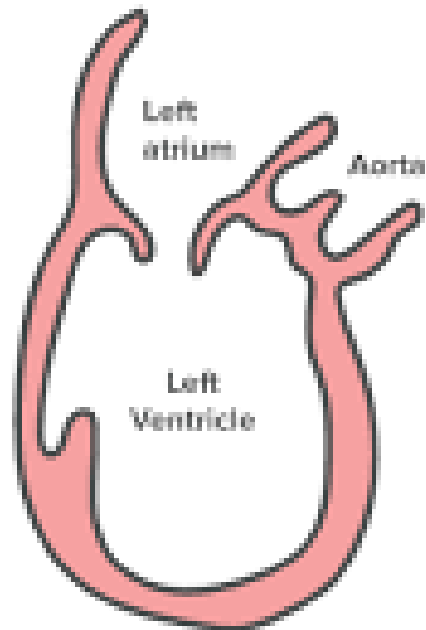
Acute Cor Pulmonale

ARDS Lung

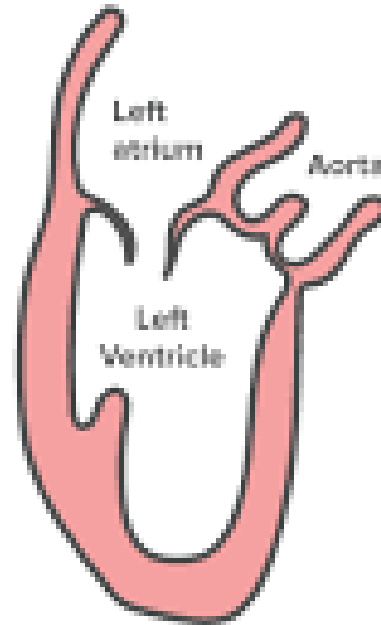


Elevated Pulmonary Vascular Resistance (PVR) ⇒ Pulmonary Hypertension

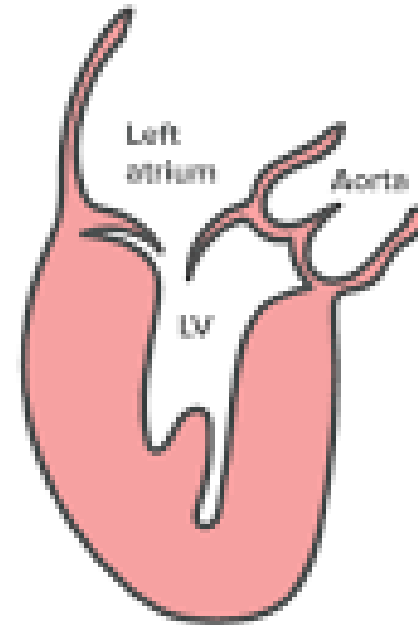
- 1 Microthrombi
- 2 Hypoxemia
- 3 Hypercapnia
- 4 Edema
- 5 Overdistention (increased regional FRC)
- 6 Loss of lung volume (decreased regional FRC)



Systolic Heart Failure



Normal Heart



Diastolic Heart Failure

[News](#) > [Medscape Medical News](#)

Wuhan Data Link COVID-19 With Myocardial Damage

Mitchel L. Zoler

March 27, 2020

"A consistent picture emerges" from two reports on a total of 603 COVID-19 patients treated at two academic hospitals in Wuhan, which described "remarkably similar characteristics of patients who develop myocardial injury" associated with their infection.

"Patients who develop myocardial injury with COVID-19 have clinical evidence of higher acuity, with a higher incidence of [acute respiratory distress syndrome](#) and more frequent need for assisted ventilation than those without myocardial injury, and the patients who are more prone to have myocardial injury are "older patients with preexisting cardiovascular complications and diabetes," [Robert O. Bonow, MD](#), and coauthors wrote in an editorial published online ([JAMA Cardiol. 2020 Mar 27](#)).

These new findings have special relevance to the United States and other Western countries because of their substantial numbers of elderly patients with cardiovascular diseases, said Dr. Bonow, professor of medicine at Northwestern University, Chicago, and coauthors.

[News](#) > [Medscape Medical News](#)

Wuhan Data Link COVID-19 With Myocardial Damage

...found that 20% of the cohort had evidence of cardiac injury, defined as blood levels of the high-sensitivity troponin I cardiac biomarker above the 99th-percentile upper reference limit

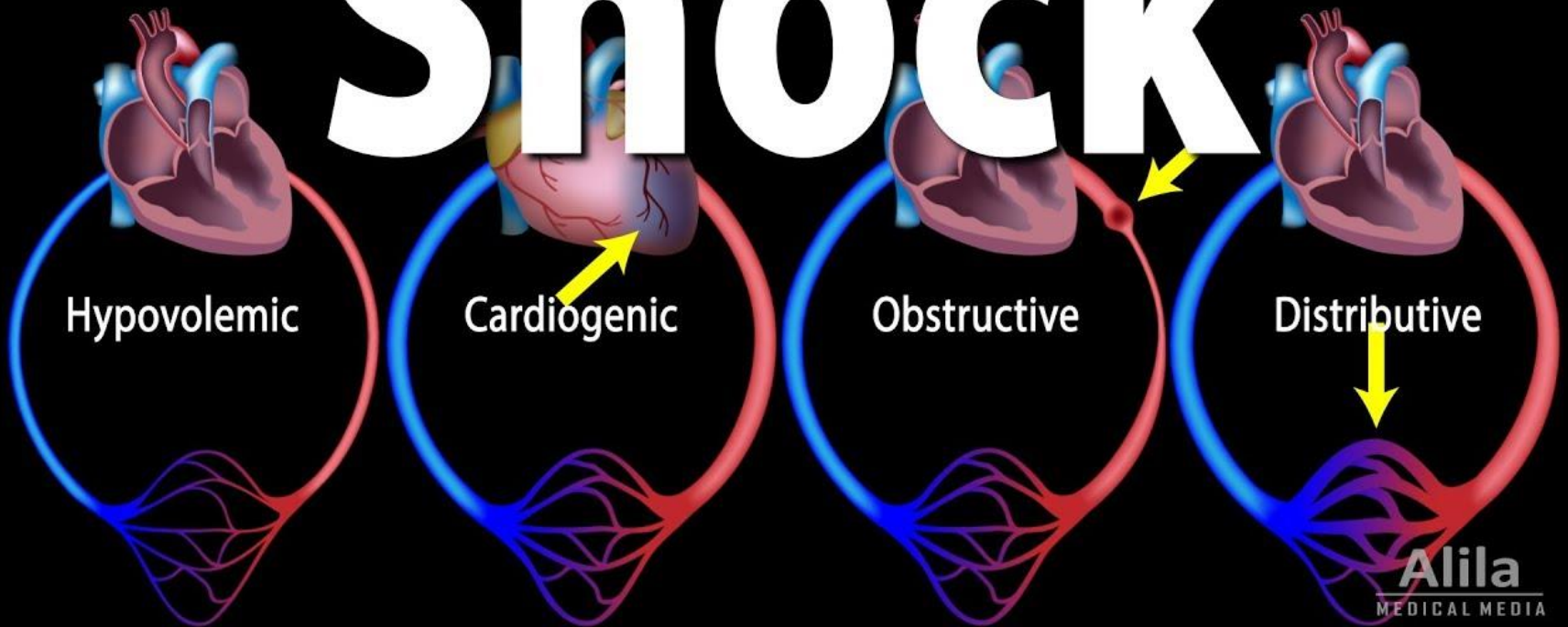
higher mortality rate (*JAMA Cardiol.* 2020 Mar 25).

... higher in-hospital mortality rate, 51%, compared with a 5% mortality rate among patients without myocardial injury

TnT levels and CVD at entry each linked with substantially increased mortality.

The incidence of death among patients with elevated TnT and no underlying CVD was 38% compared with 8% among patients without elevated TnT or underlying CVD. Among patients admitted with underlying CVD those who also had an elevated TnT had a 69% death rate during hospitalization

Shock



Shock

reduction in -cardiac output or
-effective circulating
blood volume

Systemic
hypoperfusion

= elevated
lactate

Hypotension

Impaired tissue
perfusion

Cellular hypoxia

Persistence causes

Initially

Irreversible tissue injury

Death

Reversible cellular
injury

Shock

reduction in -cardiac output or
-effective circulating
blood volume

Systemic
hypoperfusion

Hypotension

Impaired tissue
perfusion

Cellular hypoxia

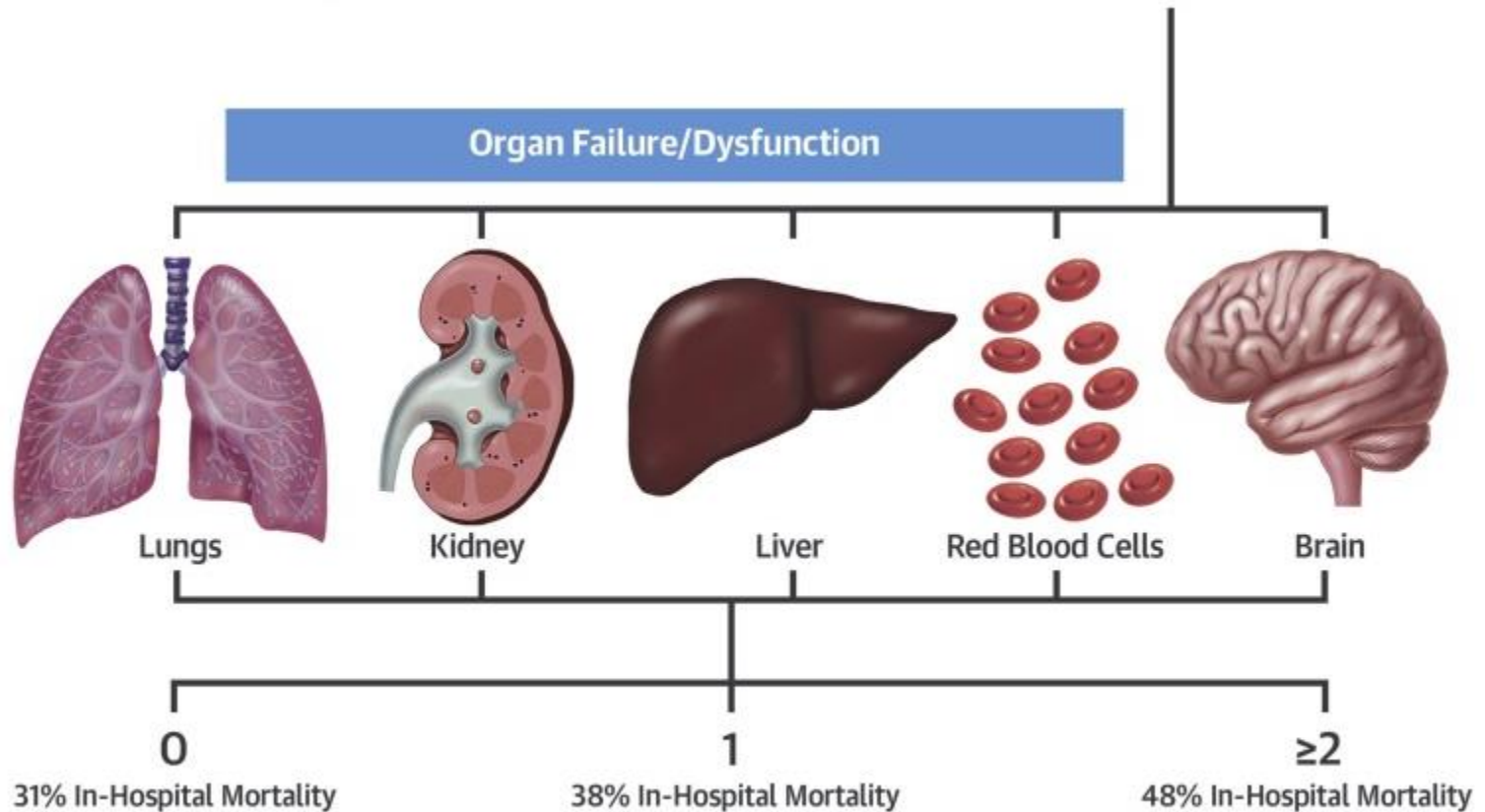
Perfusion decreases

Initially

MODS

Reversible cellular
injury

MODS



Vallabhajosyula, S. et al. J Am Coll Cardiol. 2019;73(14):1781-91.

Despre ce vorbim

- Criteriile de deteriorare a stării de bine a pacientului
- Pozitionarea pacientului în decubit ventral
- **Oxigenoterapia: cui, când, cum și cu ce se asigură**
- Pozitionarea pacientului critic în TI in vederea prevenirii escarelor

British Thoracic Society Guideline for oxygen use in adults in healthcare and emergency settings

B R O'Driscoll, L S Howard, J Earis, V Mak, on behalf of the BTS Emergency Oxygen Guideline Development Group

Oxygen saturation, **'the fifth vital sign'**, should be checked by trained staff using pulse oximetry

5 years from publication.

blood gases when necessary) and the inspired oxygen device and flow rate should be recorded on the observation chart with the oximetry result (grade D)

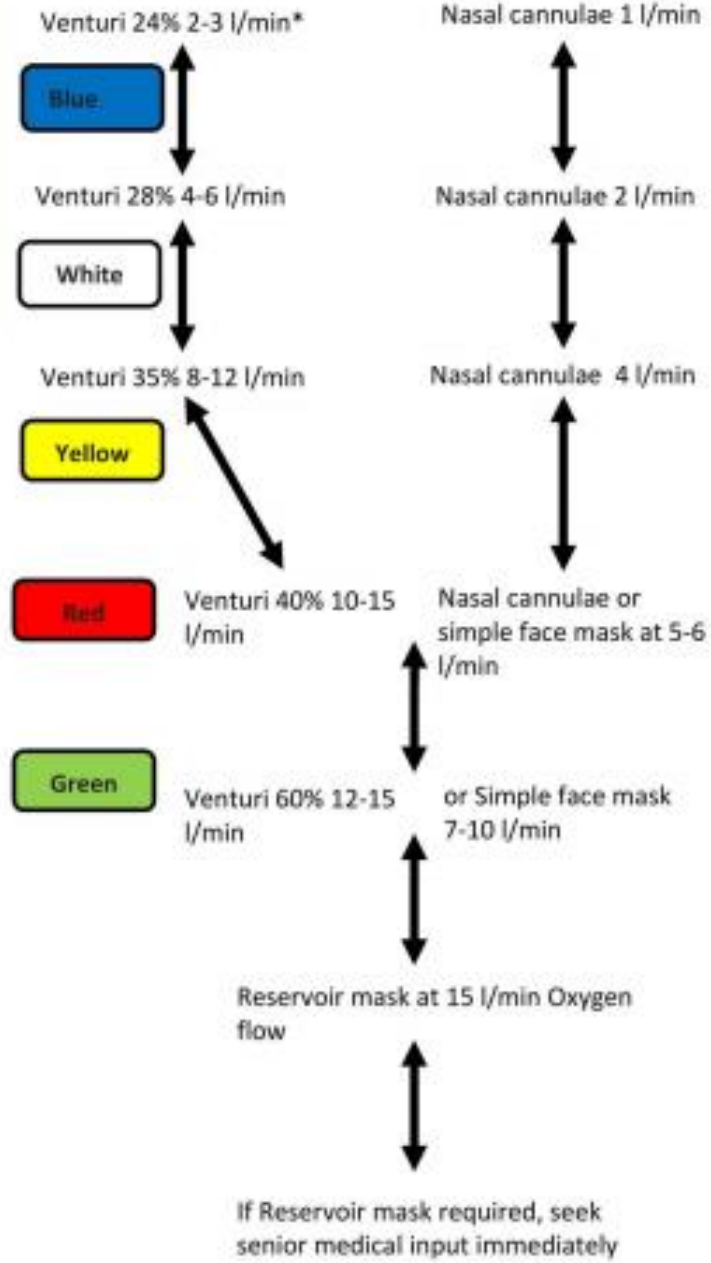
Clinical assessment is recommended if the saturation falls by $\geq 3\%$ or below the target range for the patient.

Indicatii

- Hipoxemie/hipoxie
- Lucru respirator excesiv
- Lucru la nivelul cordului sporit
- Cerinta oxigenica sistemica sporita
- Capacitate de transport oxigenic redusa (anemie)
-

Seek medical advice if patient appears to need increasing oxygen therapy or if there is a rising NEWS or Track and Trigger score.

All Patients **must** have ABG or Earlobe Blood Gases (ELBG) within **1** hour of requiring increased oxygen dose.



Signs of Respiratory Deterioration

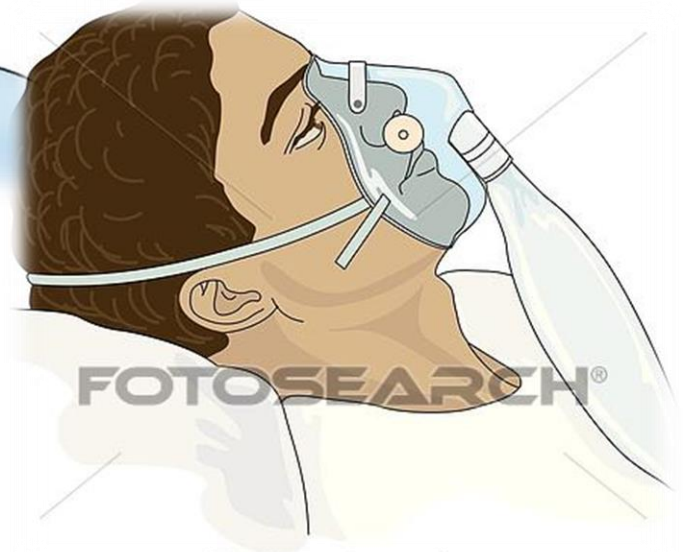
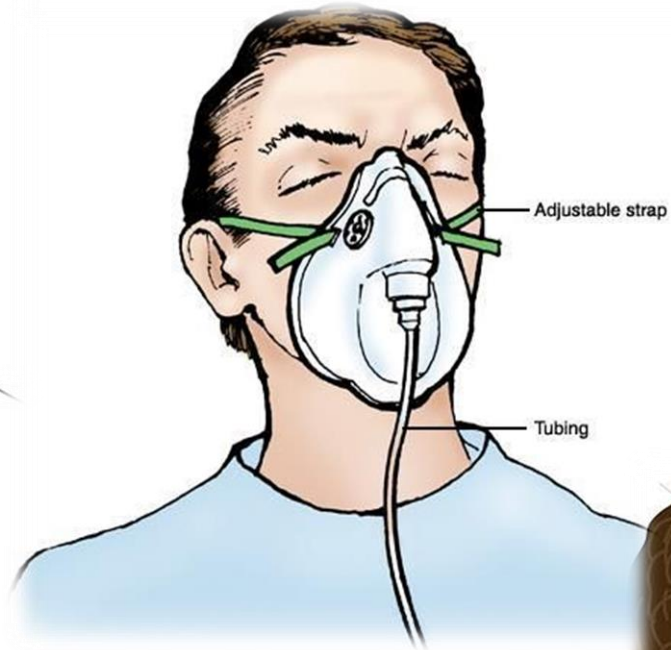
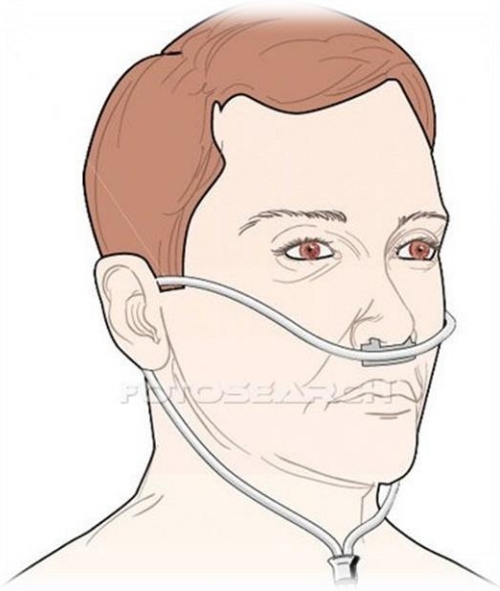
- ↑ Resp Rate (especially if >30)
- ↓ SpO₂
- ↑ oxygen dose needed to keep SpO₂ in target range
- ↑ EWS/Trigger score

CO₂ Retention

- Drowsiness
- Headache
- Flushed face
- Flapping Tremor

Seek Medical Advice

* For Venturi masks, the higher flow rate is required if the respiratory rate is >30



HFNO/NIV & COVID 19



Non-invasive ventilation (NIV) and High Flow Nasal Oxygen (HFNO) Therapy

Experience with the COVID-19 patient group in Wuhan showed a similar failure rate of NIV (76%)

require invasive mechanical ventilation. The mortality rates for patients receiving NIV and invasive ventilation were strikingly similar (79% and 86% respectively) (7). Generally, it has

The mortality rates for patients receiving NIV and invasive ventilation were strikingly similar (79% and 86% respectively)

In general ICU patients, HFNO has been found to decrease the need for tracheal intubation

..... there were reports of significant transmission secondary to NIV

ventilation. (10) Reports in the online media suggest that NIV and HFNO are being used extensively in the COVID-19 patient group. This is likely in patients with milder disease, though

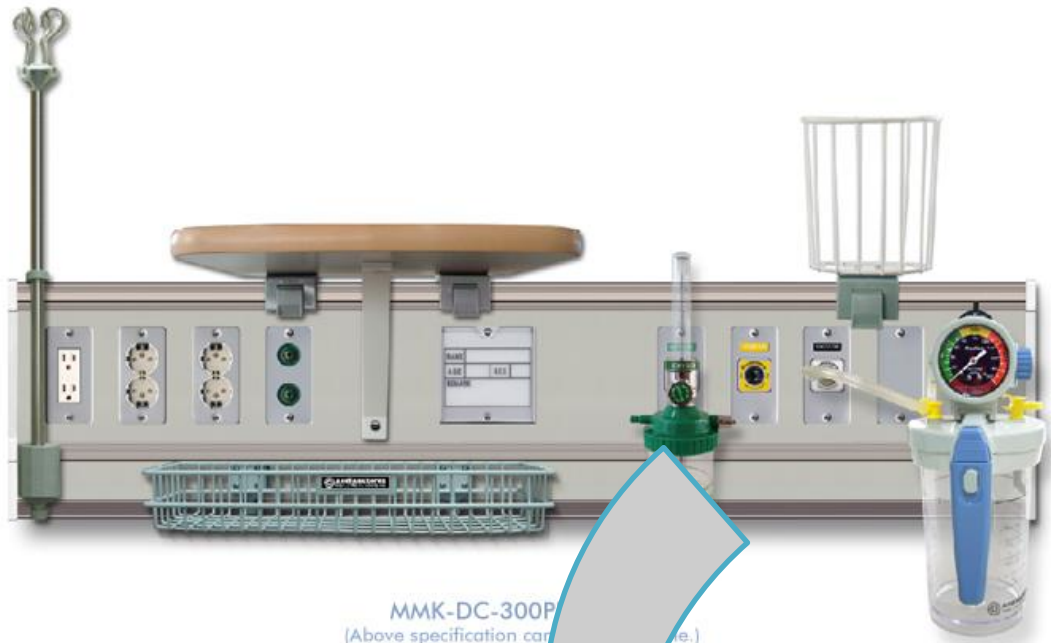
The **potential advantages** of using HFNO and NIV in these circumstances, however, need to be balanced **against the risk of virus aerosolization...**

Securitatea & O2



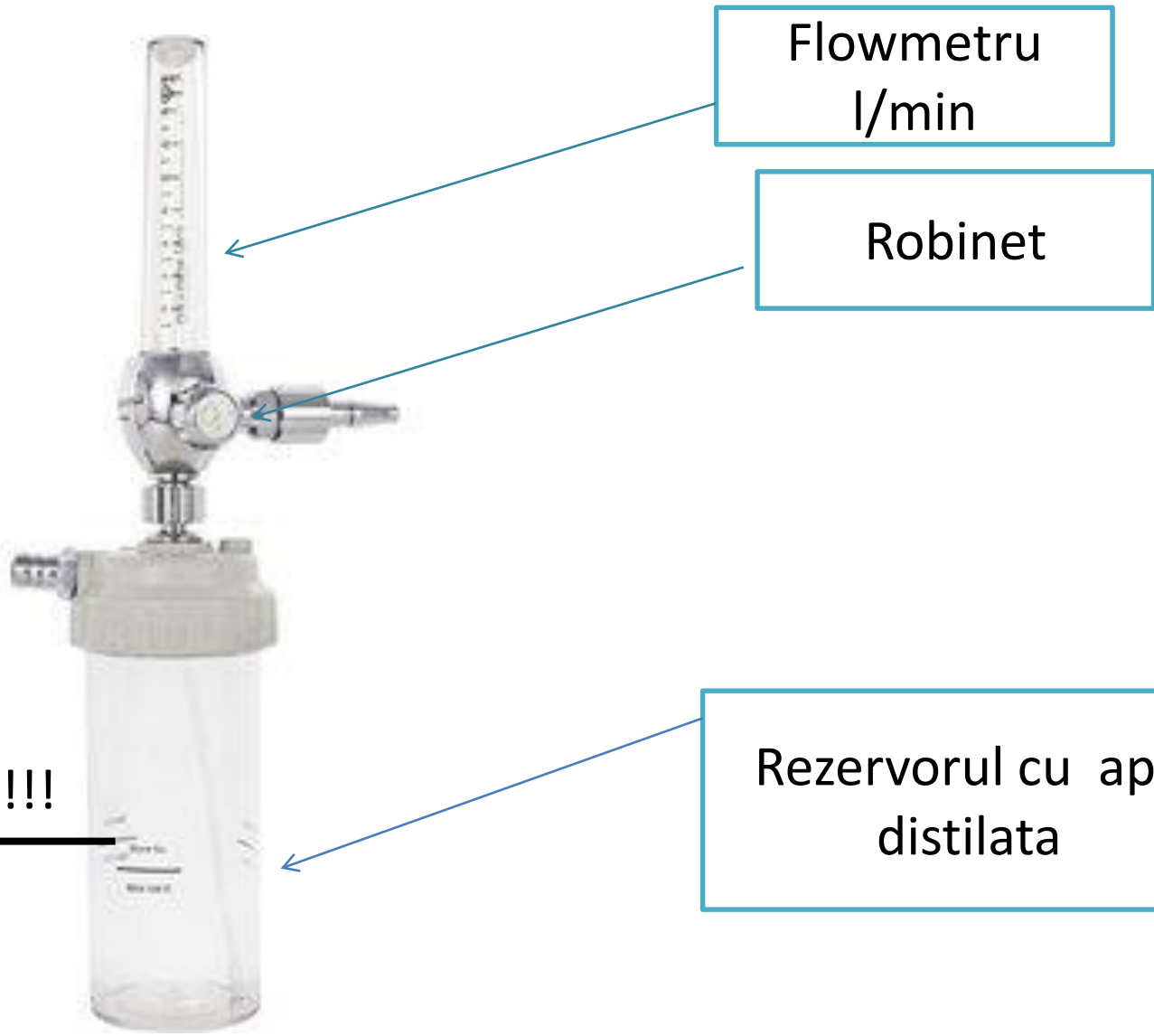
MMK-DC-300PU3-1300
(Above specification can be changeable.)





MMK-DC-300P
(Above specification cart... e.)



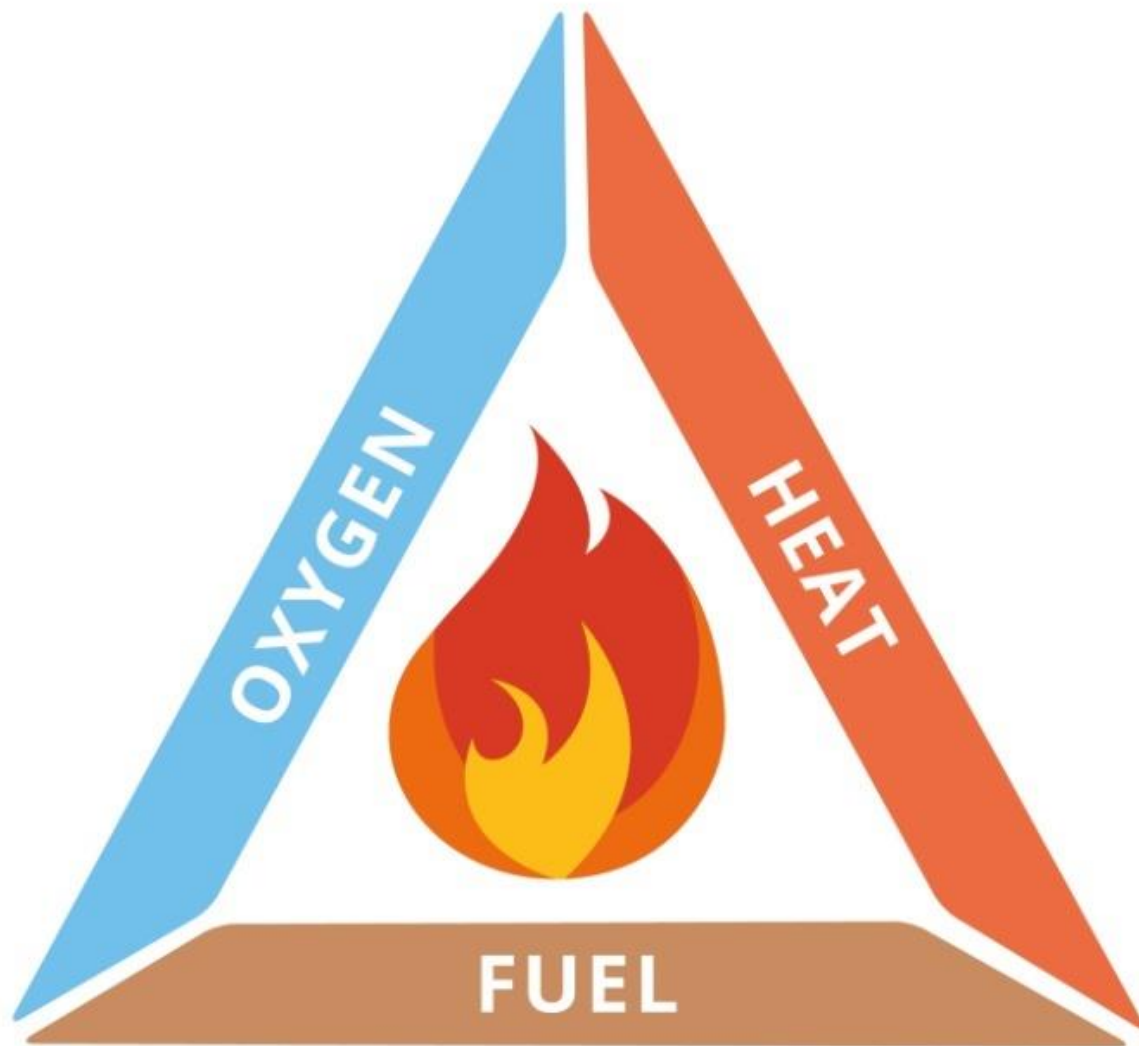


Flowmetru
l/min

Robinet

Rezervorul cu apa
distilata

Nivel limita!!!

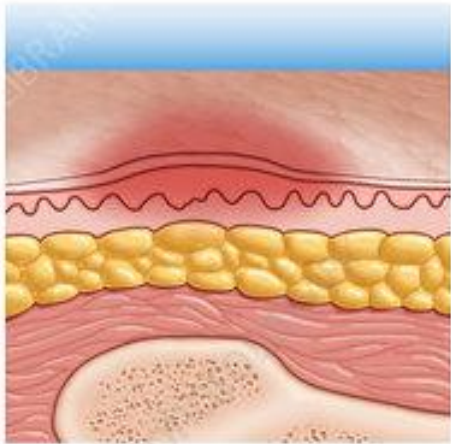


Despre ce vorbim

- Criteriile de deteriorare a stării de bine a pacientului
- Pozitionarea pacientului în decubit ventral
- Oxigenoterapia: cui, când, cum și cu ce se asigură
- Pozitionarea pacientului critic în TI in vederea prevenirii escarelor

Decubitus in ICU

STAGE 1



STAGE 2



STAGE 3



STAGE 4



Waterlow pressure ulcer prevention/treatment policy

OBSERVATION	BUILD /WEIGHT FOR HEIGHT (BMI)	Average BMI (20 – 24.9)	0	
		Above average BMI =25 – 29.9	1	
		Obese BMI >30	2	
		Below average BMI <20	3	
	SKIN TYPE	Healthy	0	
	VISUAL RISK AREAS	Tissue paper	1	
		Dry	1	
		Oedematous	1	
		Clammy, pyrexia	1	
		Discoloured grade 1	2	
	Broken / spots grade 2 – 4	3		
	GENDER	Male	1	
		Female	2	
	AGE	14 – 49	1	
		50 – 64	2	
		65 – 74	3	
		75 – 80	4	
		81+	5	
	MALNUTRITION SCREENING TOOL (MST)† □	A Has patient lost weight recently?	Yes go to B – No go to C – Unsure go to C & score 2	
		B Weight loss score	0.5 – 5 kg 1 5 – 10 kg 2 10 – 15 kg 3 > 15 kg 4 Unsure 2	
		C Patient eating poorly or lack of appetite	No 0 Yes 1	
	CONTINENCE	Complete / catheterised	0	
		Urine incontinent	1	
		Faecal incontinent	2	
		Urine & faecal incontinent	3	
	MOBILITY	Fully Mobile	0	
		Restless / fidgety	1	
		Apathetic	2	
		Restricted	3	
		Bedbound e.g. Traction	4	
		Chairbound e.g. Wheelchair	5	
SPECIAL RISKS	TISSUE MALNUTRITION	Terminal cachexia	8	
		Multiple organ failure	8	
		Single organ failure (resp, renal, cardiac)	5	
		Peripheral vascular disease	5	
		Anaemia (HB < 8)	2	
		Smoking	1	
		NEUROLOGICAL DEFICIT	Diabetes, MS, CVA	4 – 6
			Motor/sensory	4 – 6
			Paraplegia (max of 6)	4 – 6
		MAJOR SURGERY OR TRAUMA	Orthopaedic / spinal	5
		On table > 2 hours	5	
		On table > 6 hours *	8	
	MEDICATION (MAX OF 4)	cytotoxics	1	
		long term / high dose steroids, anti-inflammatory	1	
SCORE TOTAL				

Ring scores in table, add and total.

More than 1 score per category can be used.

SCORE

10+ AT RISK

15+ HIGH RISK

20+ VERY HIGH RISK

BMI = $\text{weight (kg)} \div (\text{height (m)})^2$

† Nutrition Vol 15, No.6 1999 - Australia

□ if Nutrition score is less than 2, refer for nutrition assessment / intervention

* Scores can be reduced after 48 hours, provided patient is recovering normally

© J. Waterlow 1985, revised 2005 (the 2005 revision incorporates the research undertaken by Queensland Health).

www.judy-watertaw.co.uk

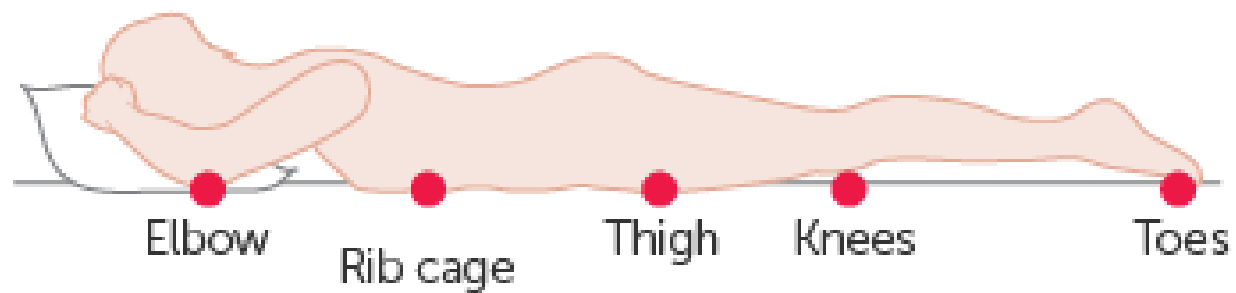
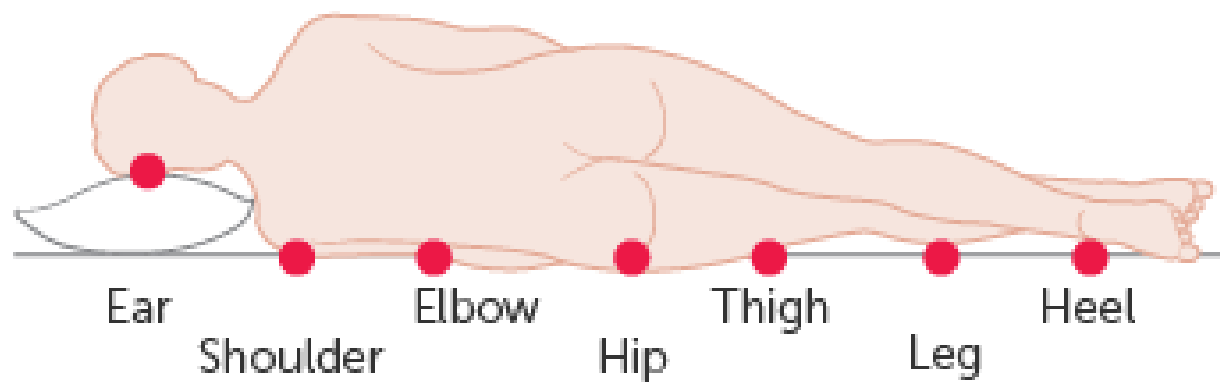
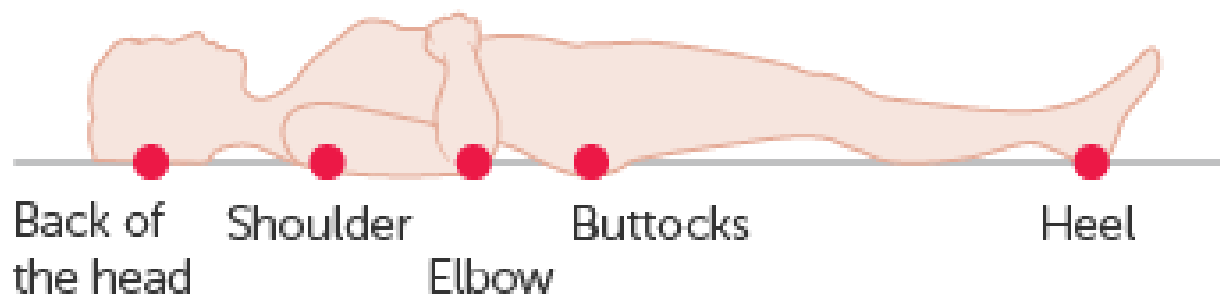
The waterlow score card is reproduced with the permission of Judy Waterlow 2010. Original card is obtainable from the Nook: Stoke Road, Henlade Taurton TA3 5LX

Norton Scale

Physical Condition	Good	4
	Fair	3
	Poor	2
	Very Bad	1
Mental Condition	Alert	4
	Apathetic	3
	Confused	2
	Stuporous	1
Activity	Ambulant	4
	Walks with help	3
	Chairbound	2
	Bedfast	1
Mobility	Full	4
	Slightly Impaired	3
	Very Limited	2
	Immobile	1
Incontinence	None	4
	Occasional	3
	Usually Urinary	2
	Urinary and Fecal	1

Generally, the risk factor is coded this way:

Greater than 18	Low Risk
Between 18 and 14	Medium risk
Between 14 and 10	High Risk
Lesser than 10	Very High Risk







Take home messages



Tight monitoring

Take home messages

- IRA este cea mai frecventa forma de decompensare in COVID 19
- ARDS este cea mai grava
- Prone position are drept la existenta
- ... dar nu se exclud si alte suferinte
- Oxigenoterapia - cartea de vizita a TI
- Nursingul – cheia succesului