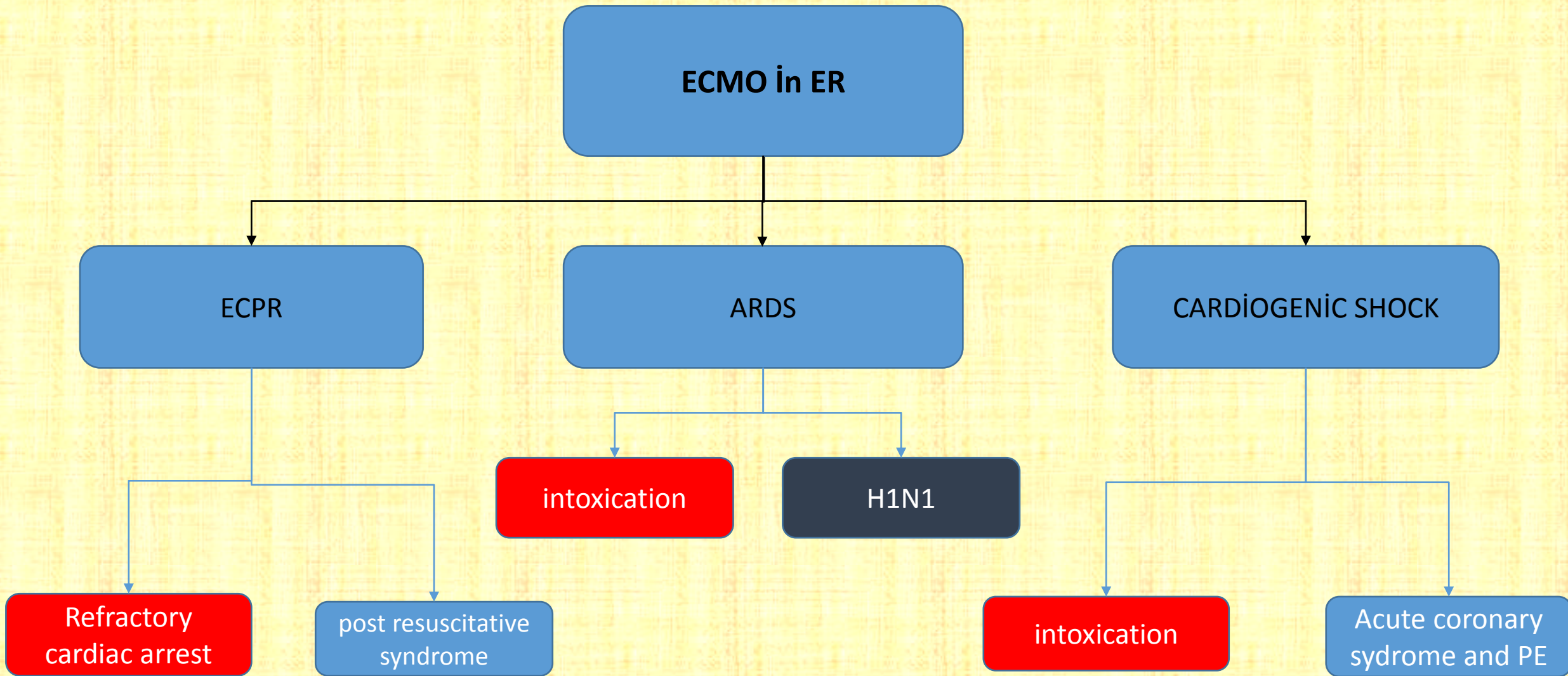


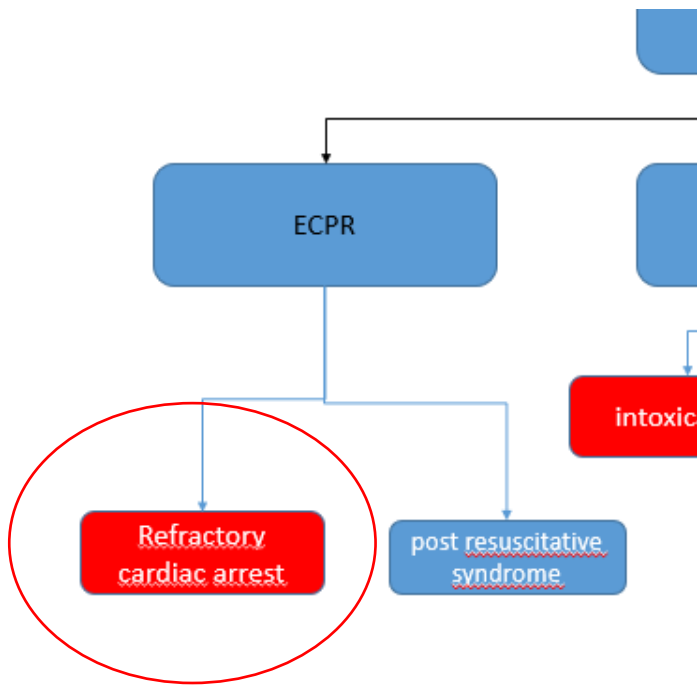


ECMO in ER

Mücahit Avcil MD.

Department of Emergency Medicine, Adnan Menderes University, Faculty of Medicine, Associate Professor





- Survival of both in-hospital cardiac arrest (IHCA) and out-of-hospital cardiac arrest (OHCA) treated with conventional cardiopulmonary resuscitation (CCPR) is low, estimated at 20% and 10%, respectively

Conrad SA, Rycus PT. Extracorporeal membrane oxygenation for refractory cardiac arrest. *Ann Card Anaesth* 2017;20(Suppl):S4–10.

Original Article

Comparison of extracorporeal and conventional cardiopulmonary resuscitation: A meta-analysis of 2 260 patients with cardiac arrest

Gan-nan Wang, Xu-feng Chen, Li Qiao, Yong Mei, Jin-ru Lv, Xi-hua Huang, Bin Shen, Jin-song Zhang

Department of Emergency Medicine, the First Affiliated Hospital of Nanjing Medical University, Nanjing, China

Corresponding Author: Jin-song Zhang, Email: wanggnhua@163.com



Survival rates in the ECPR arms ranged from 14.5% to 34.9%



Survival rates in the conventional CPR arms 6.4% to 21.7%

Auther	Publicated in	Summary
Nast et al.	2018	<p>From ELSO registry; Two hundred seventeen patients, median age: 52 years were included. Percutaneous cannulation (71%) and femoral vessels (98%) were commonly used to initiate ECMO support. Sixty-three (29%) underwent coronary interventions. Median duration of ECMO was 47 (range 0–711) hours.</p> <p>Overall survival to hospital discharge was 27.6%, and male gender was associated with reduced survival.</p>
Bednarczyk et al	2014	<p>Canadian ECLS organizagion registry, showed survival of 29% among 2885 adults supported with ECMO during CPR</p>
Chung et al	2019	<p>Systematic reviev of adults with refractory out of hospital cardiac arrest, survival was 22% in the 833 patients who received ECMO duruing resuscitation.</p>

ECMO in ER

ARDS

intoxication

H1N1

excitatory
ome

into

Hypoxemia from ARDS results in multiple organ failure, which is (eventually) incompatible with life

ARDS is still a Severe lung disease with a high associated mortality rate. In The most severe forms of the disease, mortality rate may well Exceed 60%.

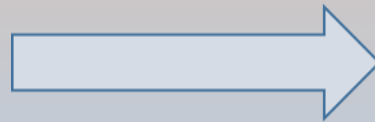
first successful clinical application of ECMO for acute respiratory distress syndrome (ARDS) was described in 1972



The NEW ENGLAND
JOURNAL of MEDICINE

Prolonged Extracorporeal Oxygenation for Acute Post-Traumatic Respiratory Failure (Shock-Lung Syndrome) — Use of the Bramson Membrane Lung

J. Donald Hill, M.D., Thomas G. O'Brien, M.D., James J. Murray, M.D., Leon Dontigny, M.D., M. L. Bramson, A.C.G.I., J. J. Osborn, M.D., and F. Gerbode, M.D.



Following the influenza A(H1N1) pandemic in 2009 there has been a significant increase in VV-ECMO utilization

In the last five years, more than 400 cases/year of VV-ECMO for adult respiratory failure have been reported in the ELSO Registry

Extracorporeal Membrane Oxygenation for Severe Acute Respiratory Distress Syndrome

A. Combes, D. Hajage, G. Capellier, A. Demoule, S. Lavoué, C. Guervilly, D. Da Silva, L. Zafrani, P. Tirot, B. Veber, E. Maury, B. Levy, Y. Cohen, C. Richard, P. Kalfon, L. Bouadma, H. Mehdaoui, G. Beduneau, G. Lebreton, L. Brochard, N.D. Ferguson, E. Fan, A.S. Slutsky, D. Brodie, and A. Mercat, for the EOLIA Trial Group, REVA, and ECMONet*

VV –ECMO studies

CESAR

2009, CONVENTIONAL vs ECMO

Randomly assigned 180 patient

ECMO significantly increased survival without disability at six months compared to conventional management. (63 versus 47 percent)

	DEATH or Disability	n
ECMO	%37	90 68(75)
Conventional	%53	90

EOLIA

Randomly assigned 249 severe ARDS patient,

Lung protective ventilation vs. Lung protective ventilation+Early VV ECMO

ECMO resulted in improved oxygenation, more days free of renal failure, fewer patient with ischemic stroke

11% lower mortality rate in ECMO group but not statistically significant

Trial was stopped after approximately 75% recruitment when the monitoring board determined the primary endpoint of a 20% decrease in mortality in the ECMO group was not going to be achieved

High cross-over rate to ECMO (28%) Survival of 43%



CASE from TURKEY

- MALE, 42 years old
 - He was found unconscious in the bathroom.
 - He was diagnosed with major depression and has a history of ativan (lorazepam) , lyrica (pregabalin), seroquel (quetiapine) and risperidone (risperidone) use.
 - He was suspected of having a large amount of medications from his own drugs.
 - The benzodiazepine was positive in the urine drug test.
 - GKS:10 , Stupor
 - No response to flumazenil



CASE from TURKEY

- IV lipid emulsion (ILE) therapy was started after the patient did not respond to Flumazenile.
- He was intubated and taken to emergency critical intensive care unit because of decreased GCS level.
- Hypoxia and tachypnea occurred on the second day of ILE therapy.
- Despite the low tidal volume protocol in the mechanical ventilator, PaO₂ / FiO₂ ratios were below 100.

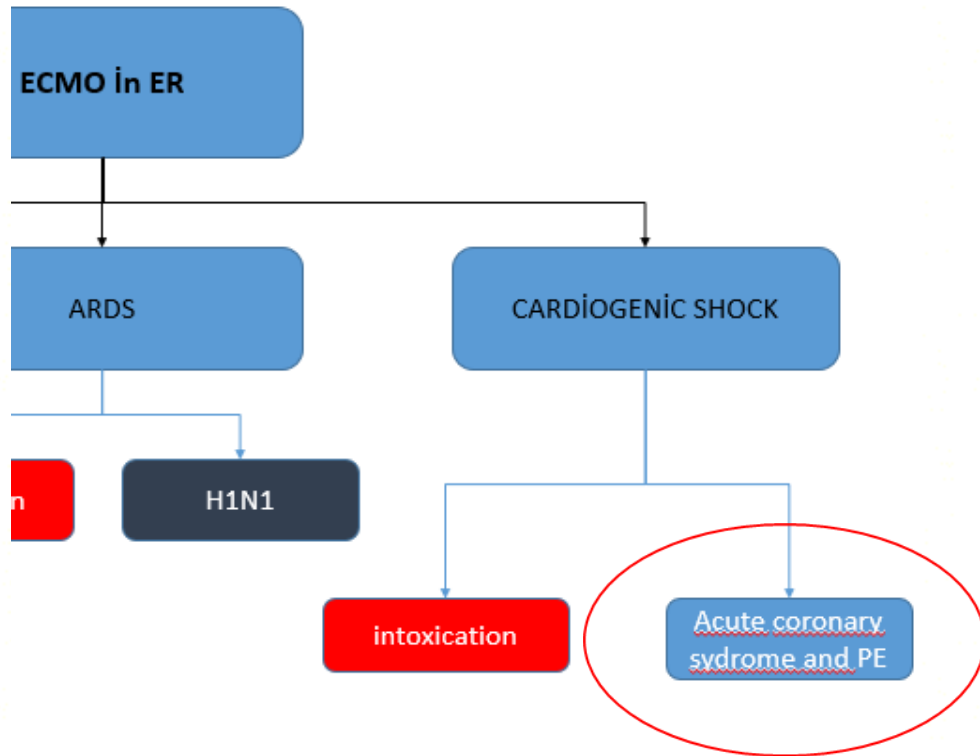


- On the 3rd day of his admission, the patient was diagnosed with ARDS due to severe hypoxemia and radiologic findings.
- Patient connected to ECMO.
- ARDS, may be occurred due to the drugs or it may be developed due to ILE therapy.

- AP X-ray








- Massive PE can cause acute right ventricular failure resulting in cardiogenic shock or cardiac arrest, and is associated with a high mortality.
- Conventional treatment includes systemic or catheter-directed thrombolysis or surgical embolectomy.

- ECMO can provide cardiopulmonary support for PE while allowing the clot to resolve with anticoagulation alone or may serve a bridge to a surgical or catheter-directed therapy.

**Extracorporeal membrane oxygenation
in acute massive pulmonary embolism:
a systematic review**

HO Yusuff¹, V Zochios² and A Vuylsteke³

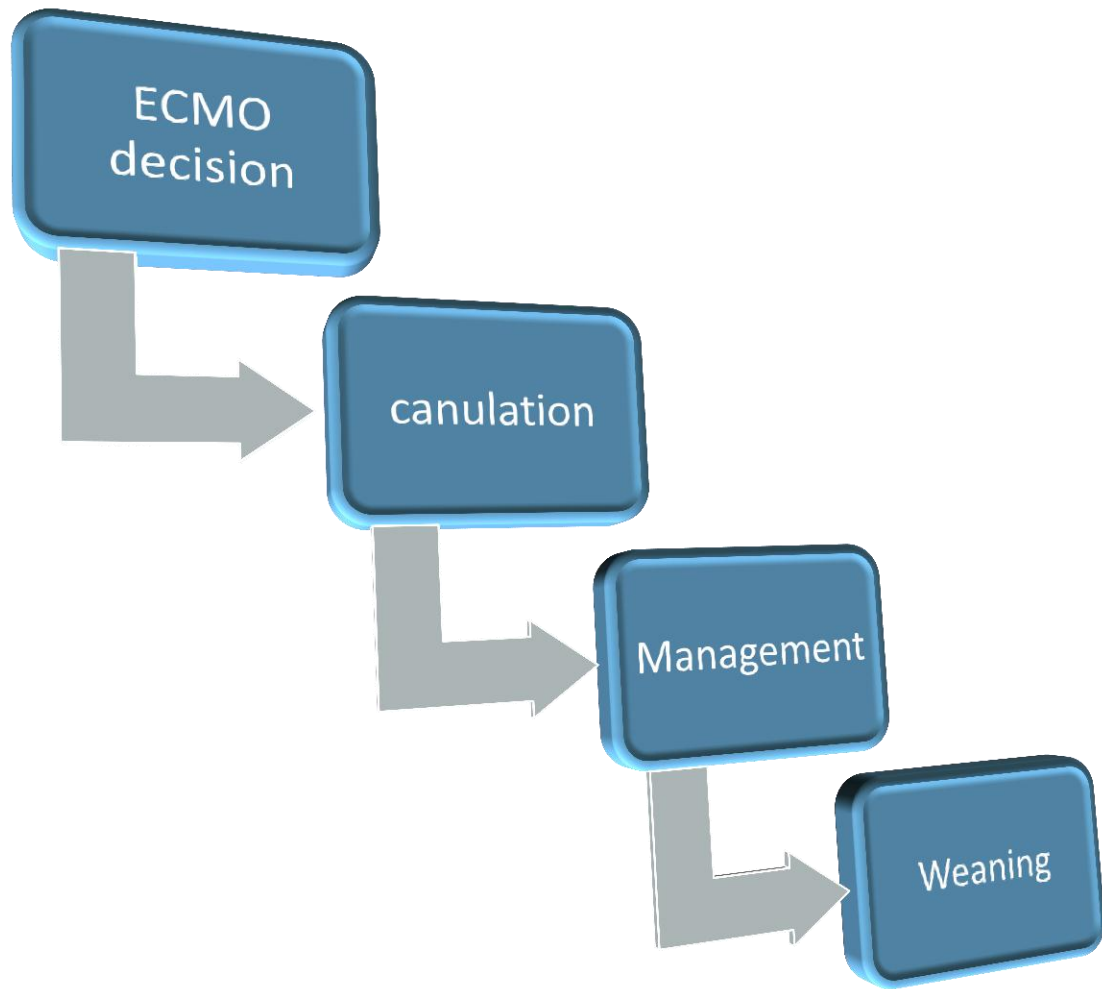
Perfusion
2015, Vol. 30(8) 611–616
© The Author(s) 2015
Reprints and permissions:
sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/0267659115583377
prf.sagepub.com


In 2015, Yusuff and colleagues published a review of the reported cases of PE managed with VA ECMO to date.

A total of 78 patients (11 case reports and 8 case series) were reported on, 43 (55%) of whom had a cardiac arrest.

Overall survival of the cohort was 70.1%. For patients who presented with cardiac arrest there was a survival of 49%, compared with a historical rate as high as 75%.

ECMO process



Cannulation

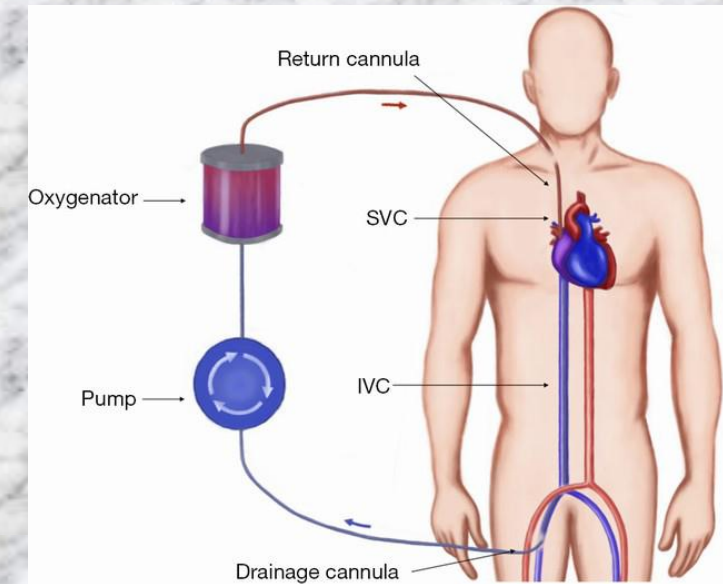
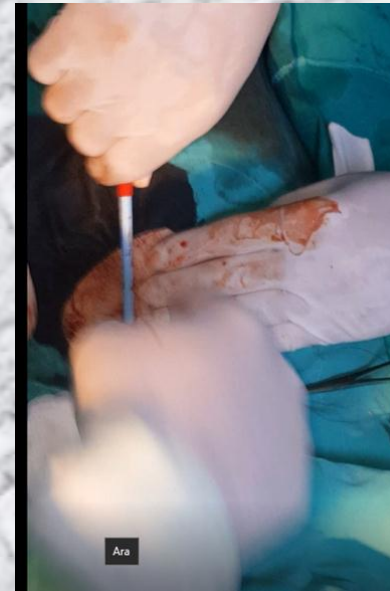
Peripheral cannulation is performed either percutaneously or by vascular cutdown

Ultrasonography evaluation is useful in both accessing the vessels and in evaluating the size of vessels before cannulation

Advantages of percutaneous cannulation include decreased bleeding and infection risk

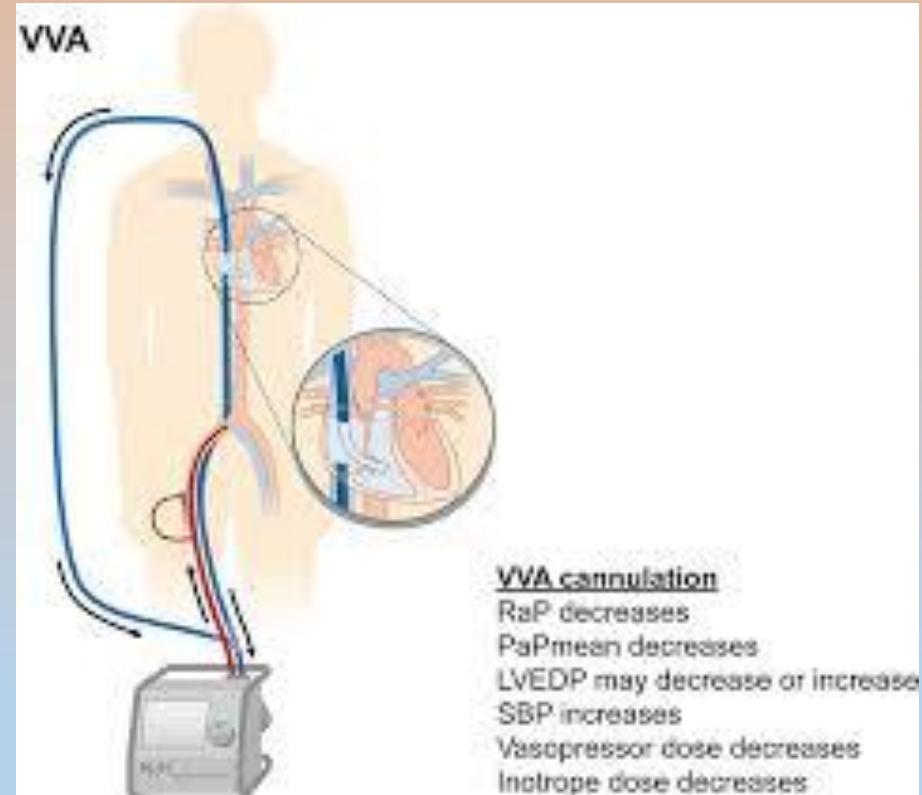
For VA-ECMO Right common femoral artery and right femoral vein preferred

For VV-ECMO Right or left femoral vein and right jugular vein preferred

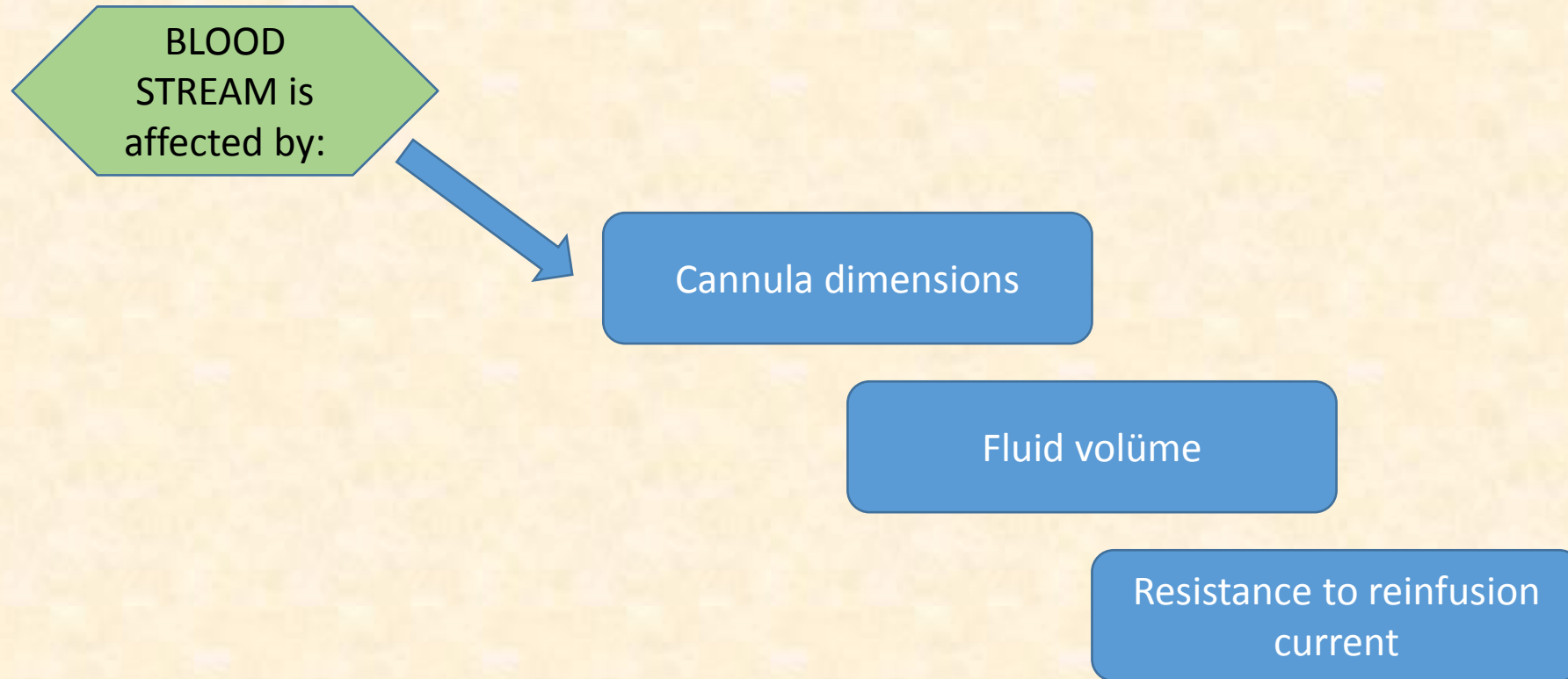


Hybrid cannulation

- Sometimes an extra second venous drainage may be required to increase the amount of blood in severely hypoxemic patients



Management - Circuit effective factors



If you increase RPM, the blood flow (blood pressure) increases but the pressure in the venous drainage should be monitored.

Causes negative pressure at the venous tip.

50-100 mm Hg pressure causes erythrocyte trauma

Management - Circuit effective factors

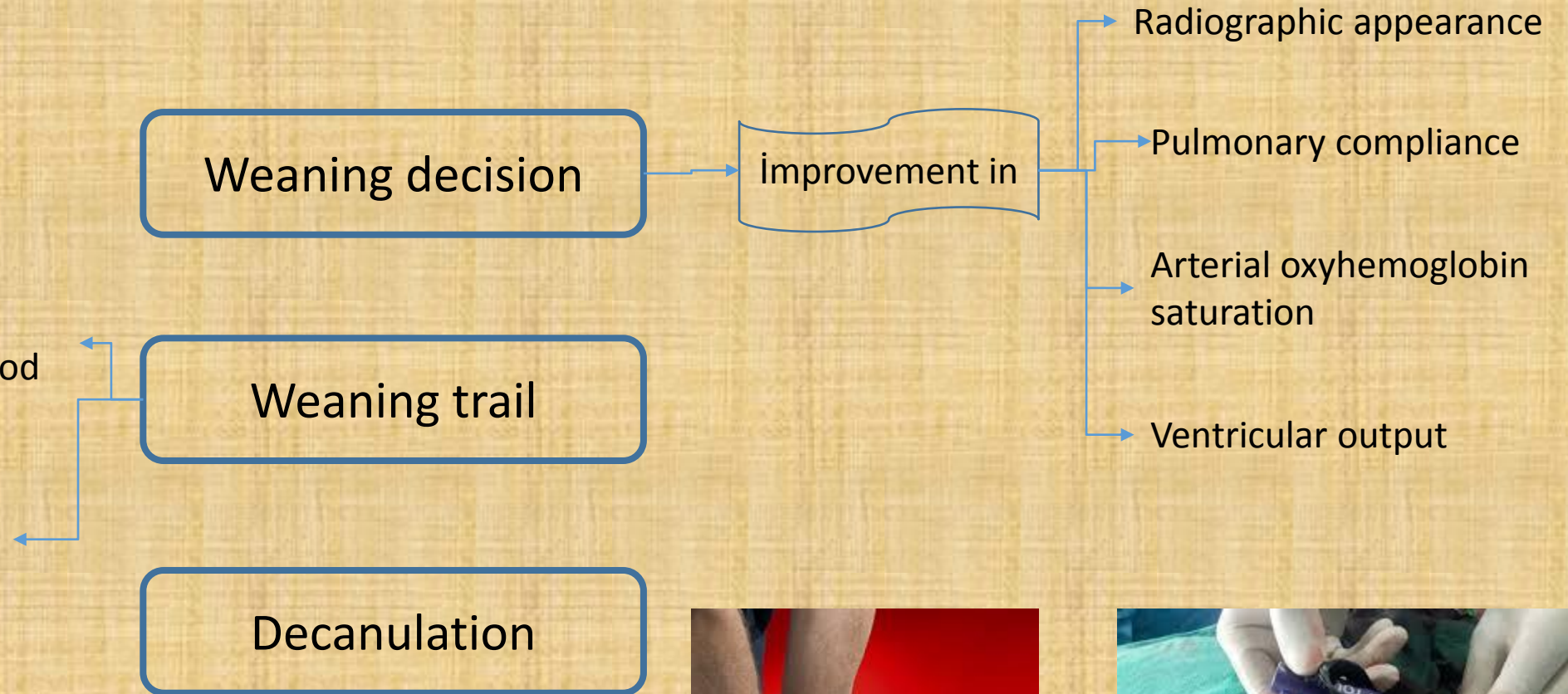


- ANTICOAGULATION
- Bolus heparin is given pre-cannulation and then the infusion continues.
- Direct thrombin inhibitors are used if contraindicated
- Platelet count tends to decrease, should be followed
- The circuit should be observed for thrombus.

ECMO weaning

VV-ECMO: Performed by eliminating gas transfer, while maintaining the blood flow

VA-ECMO Performed by clamping of both the drainage and infusion lines



Emergency physicians should also know about ..



managing serious
arterial bleedings

Cutt down and
vessel repairment



being able to
bypass the leg to
ensure blood
supply

various special
circumstances during
ECMO such as left
ventricle
decompressing, .

Coronary and
cerebral hypoxia

HIT

local laws

.....

.....

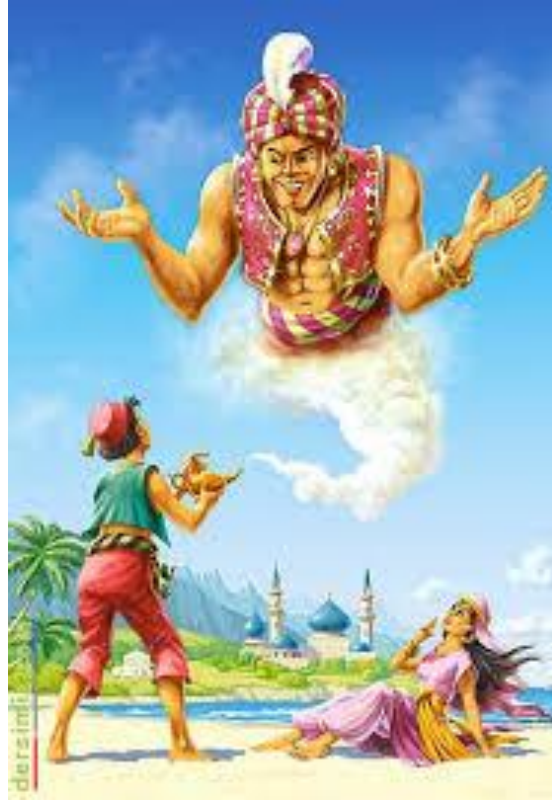
SUMMARY

The priority of ECMO is ECPR in emergency practise. ECMO can also be used in ARDS and cardiogenic shock particularly which caused by intoxication, postresuscitative syndrome, acute coronary syndrome and PE.

Emergency medicine professionals should know which patients can benefit from ECMO

ECMO management requires a trained and experienced team

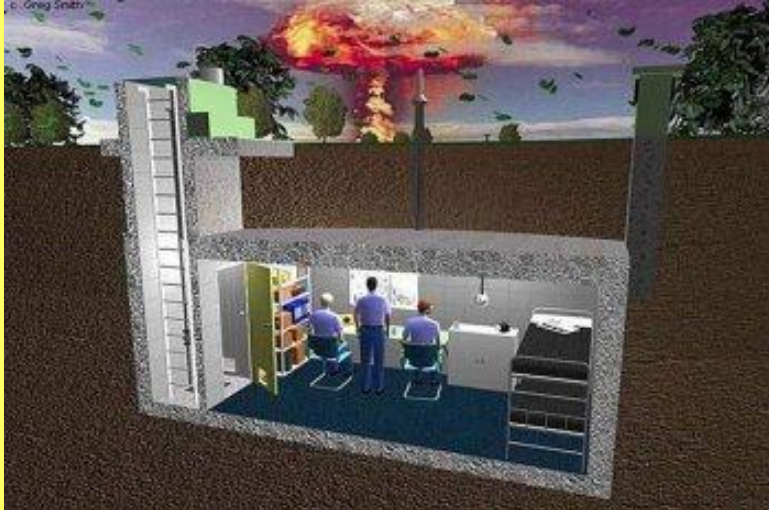
WHICH ONE WOULD YOU LIKE TO HAVE



Last words

- In many diseases, the patient should be kept in life until the treatment (etc. Antibiotherapy for sepsis) heals the patient or until the body (detoxification of poison) overcomes it..
- Many patients die because they cannot exceed this critical threshold.
- We must help the patient to overcome this threshold, and ECMO can do so.

- Of course the secret of immortality has not been found..

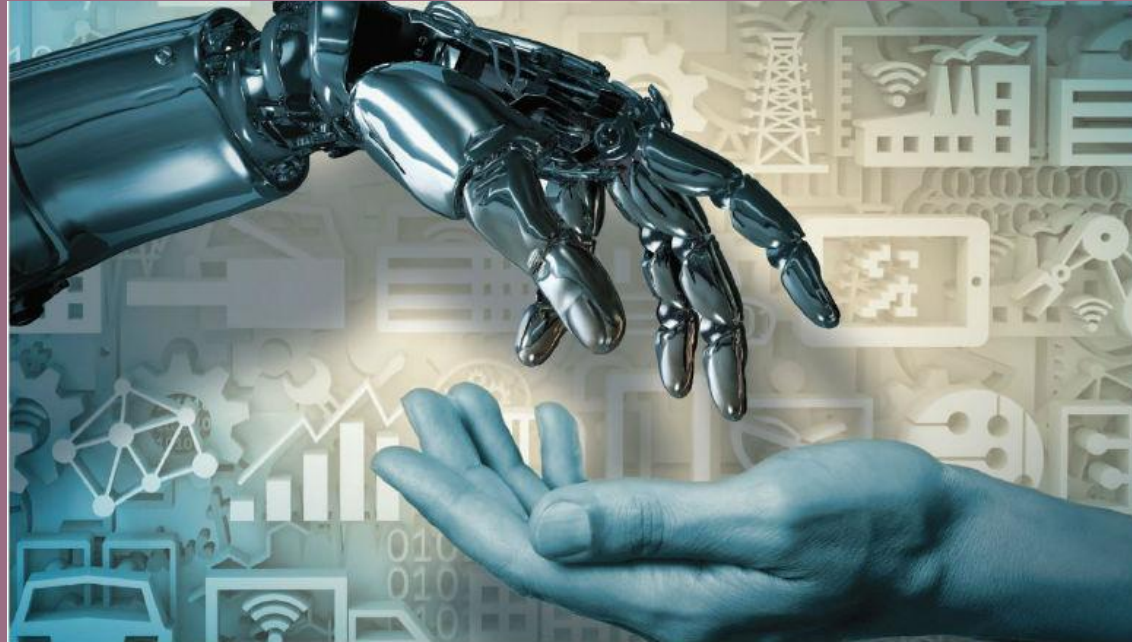


We had a new bunker to survive until attack ended

TODAY



the first thing we need today is to
reduce the costs of ECMO



FUTURE



In the future we need a device , that is smaller,
more practical and easier to manage.



THANKS



QUESTION?



CONTRIBUTION?