



STRATÉGIES D'OPTIMISATION CARDIO-CIRCULATOIRE.

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Faculté de Médecine Lyon Est

SESSION PARAMÉDICALE 2025



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DÉCLARATION D'INTÉRÊTS

2

- Aucun en rapport avec la présentation

OPTIMISATION CARDIO-CIRCULATOIRE POURQUOI ?

ÉTAT DE CHOC

Consensus on circulatory shock and hemodynamic monitoring. Task force of the European Society of Intensive Care Medicine

4

- 1 We define circulatory as a life-threatening, generalized form of acute circulatory failure associated with inadequate oxygen utilization by the cells
- 2 As a result, there is cellular dysoxia, associated with increased blood lactate levels
3. Shock can be associated with four underlying patterns: three associated with a low flow state (hypovolemic, cardiogenic, obstructive) and one associated with a hyperkinetic state (distributive)
4. Shock can be due to a combination of processes

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ÉTAT DE CHOC

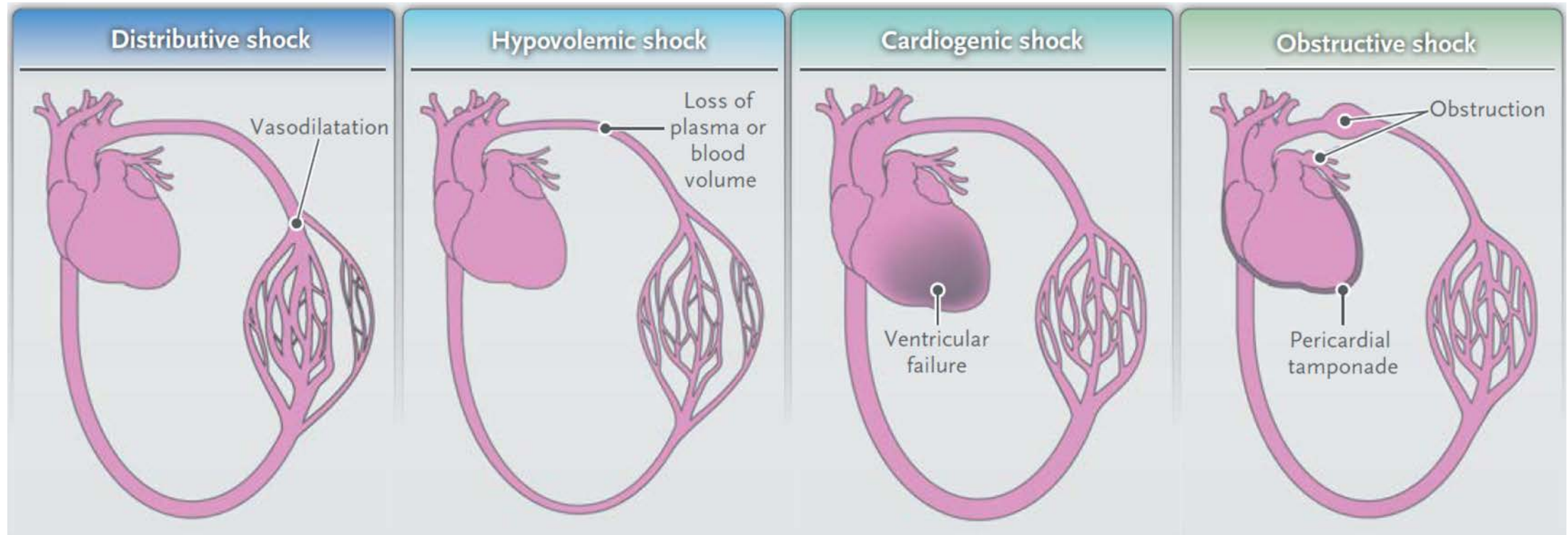
Consensus on circulatory shock and hemodynamic monitoring. Task force of the European Society of Intensive Care Medicine

6

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ÉTAT DE CHOC : PROFIL

7



ÉTAT DE CHOC

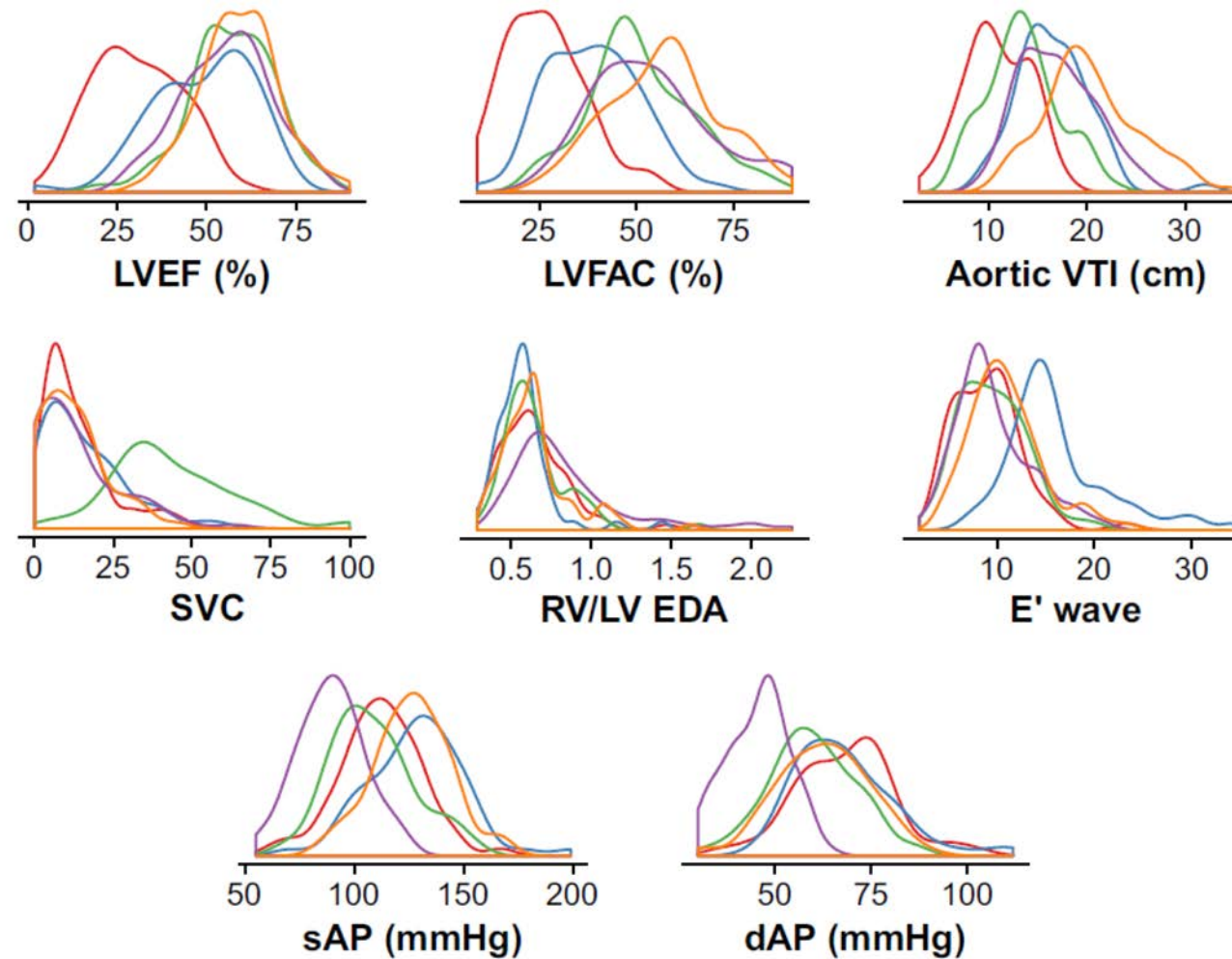
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8

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ÉTAT DE CHOC : PROFIL ?

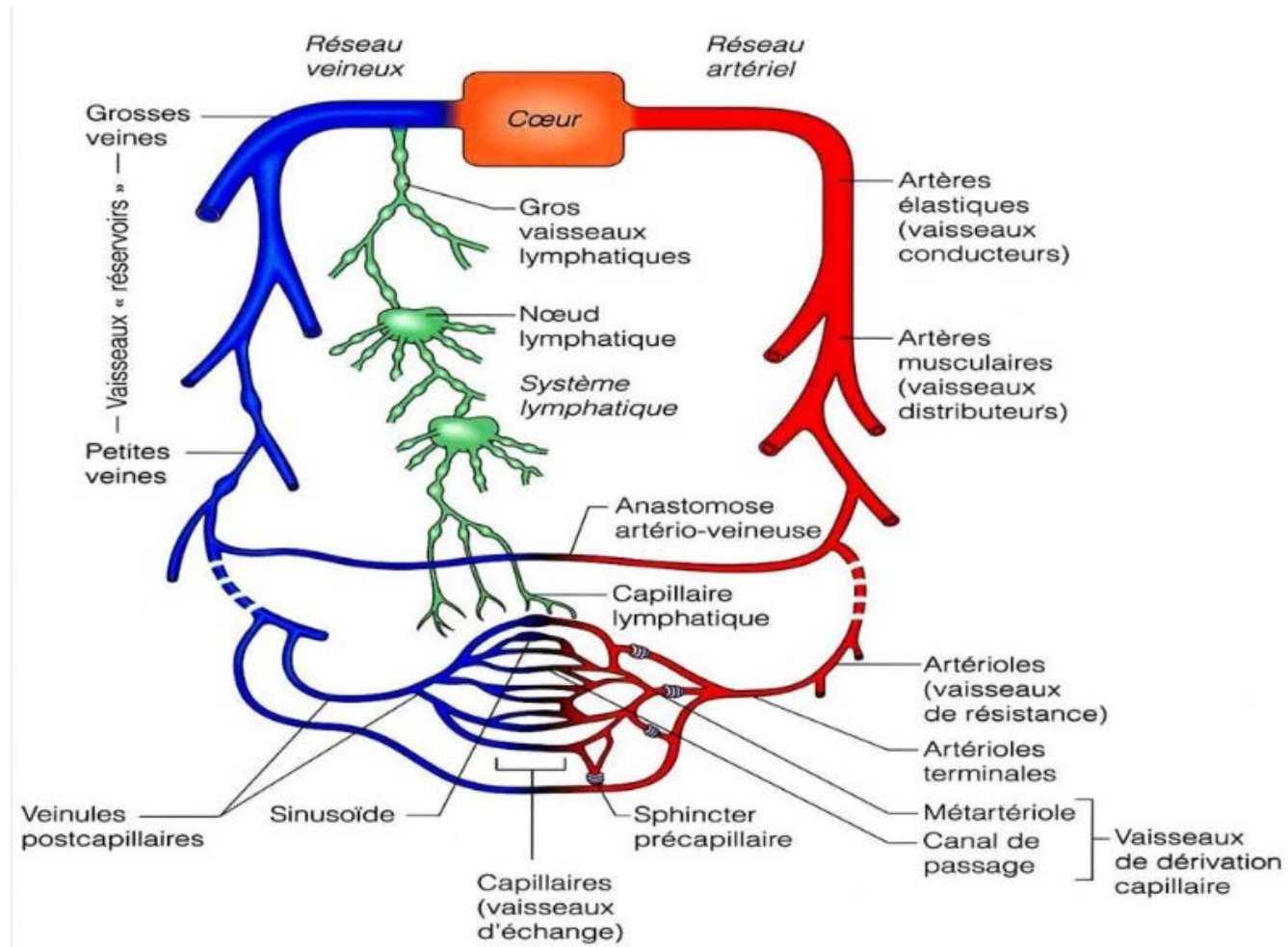
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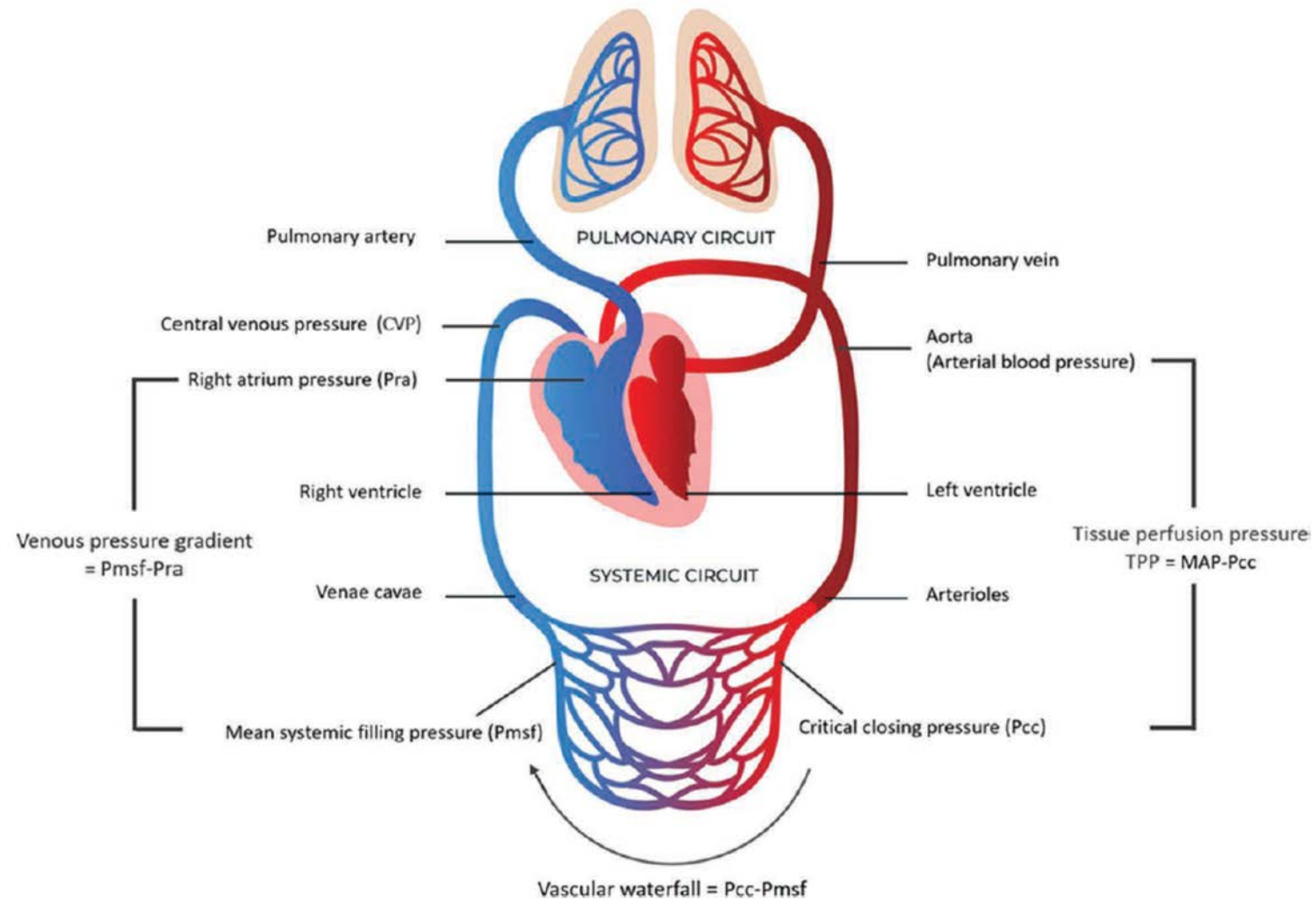
OPTIMISATION CARDIO-CIRCULATOIRE

PRINCIPES



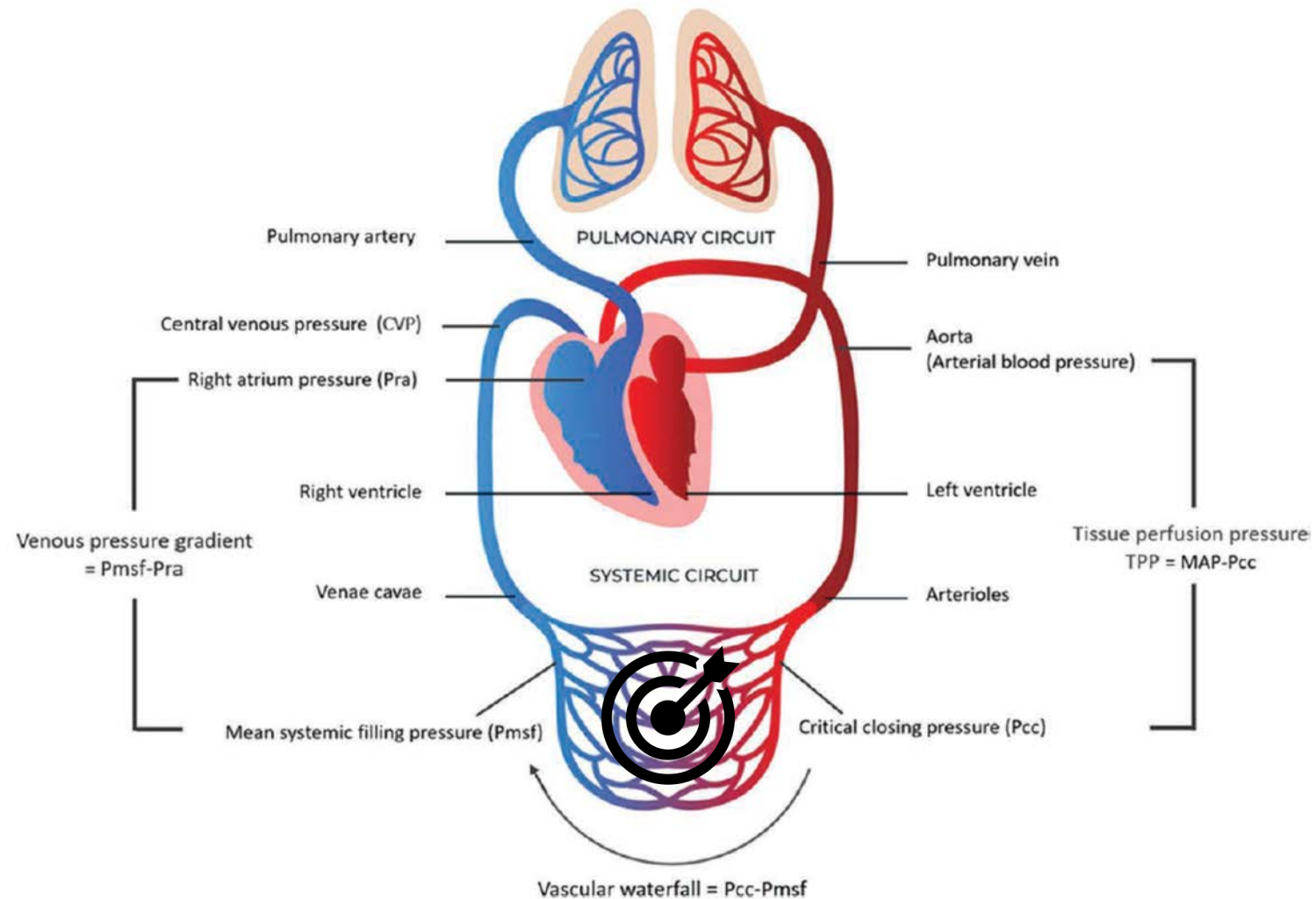
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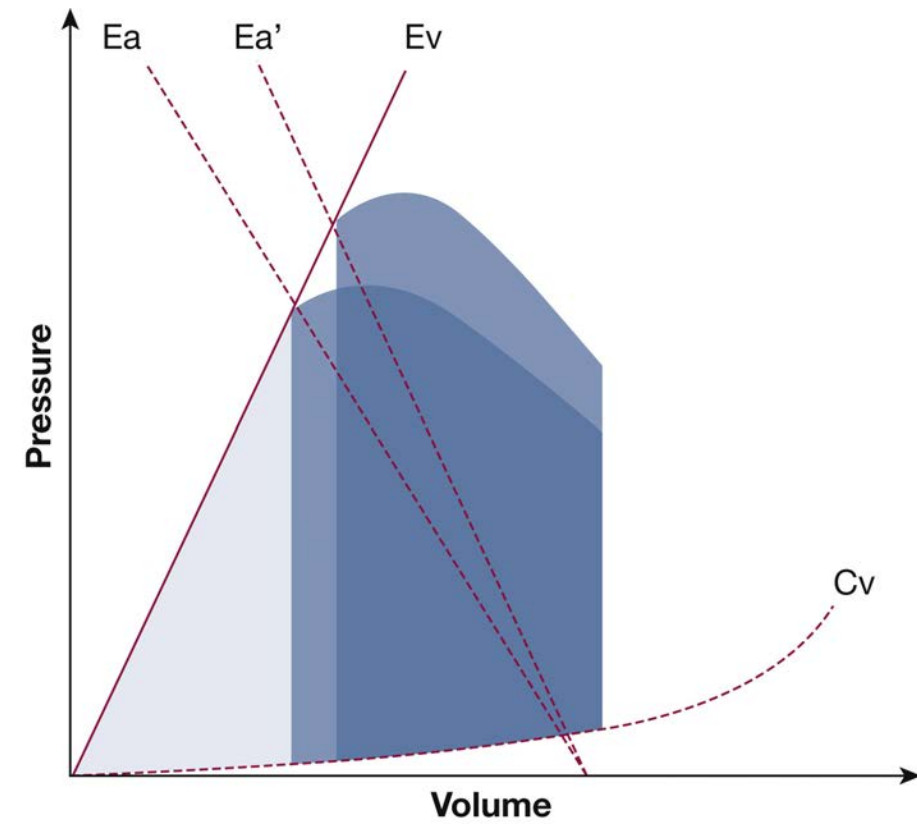
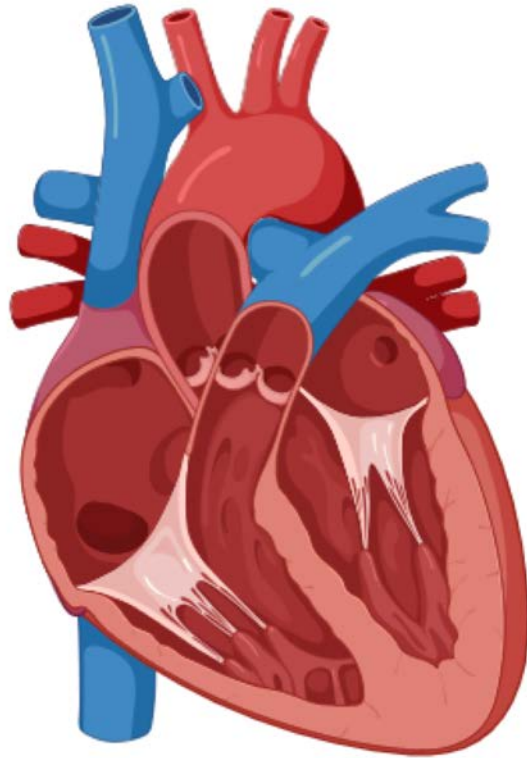
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PHYSIOLOGIE

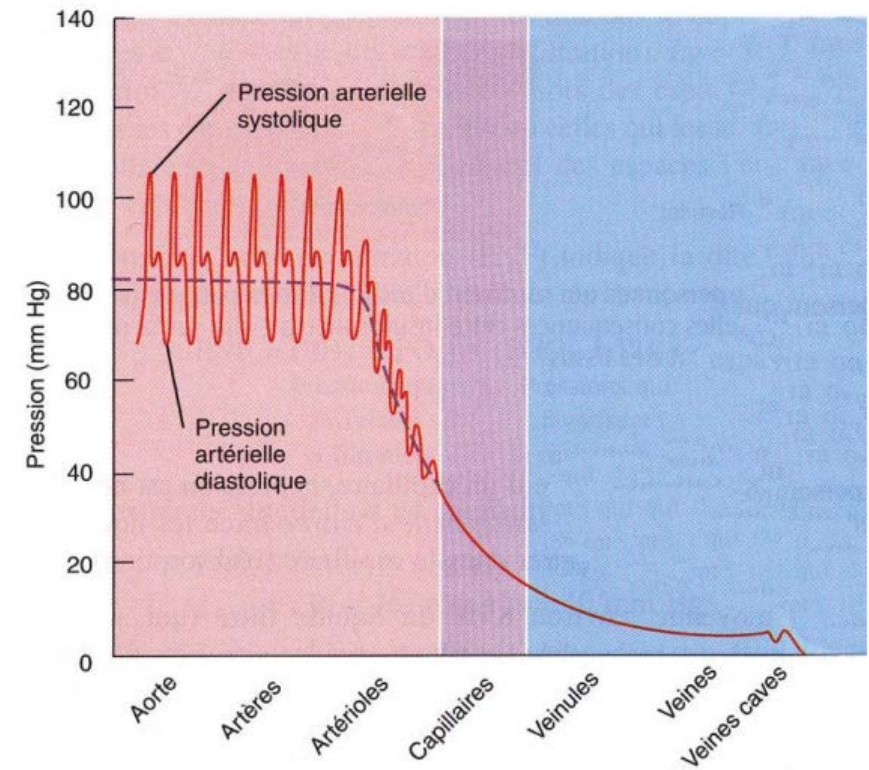
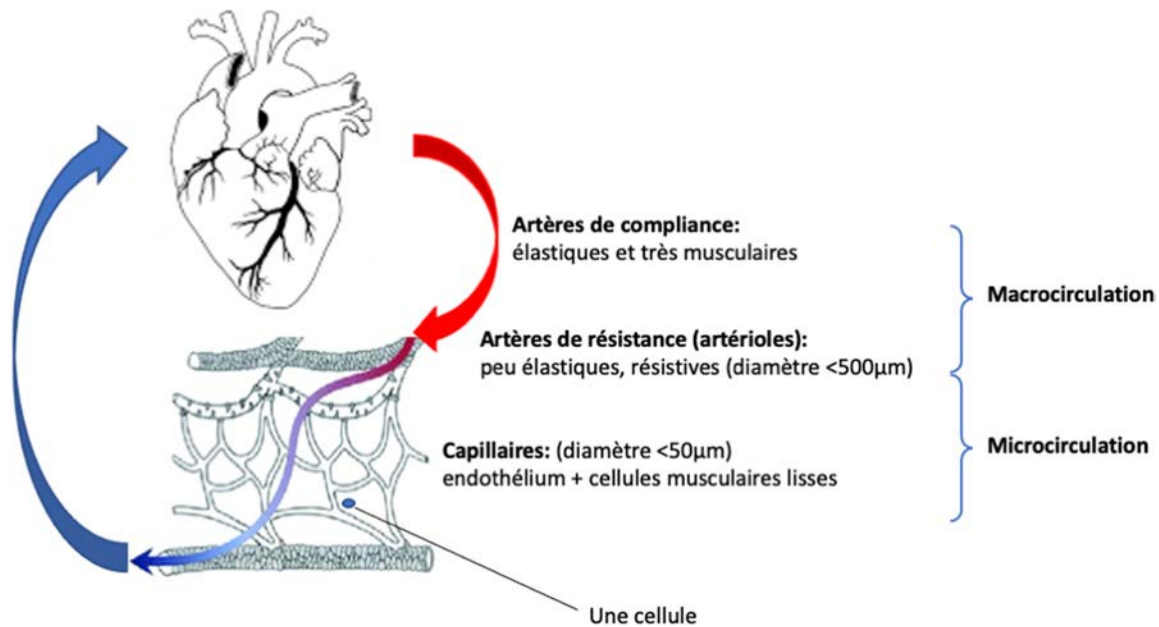
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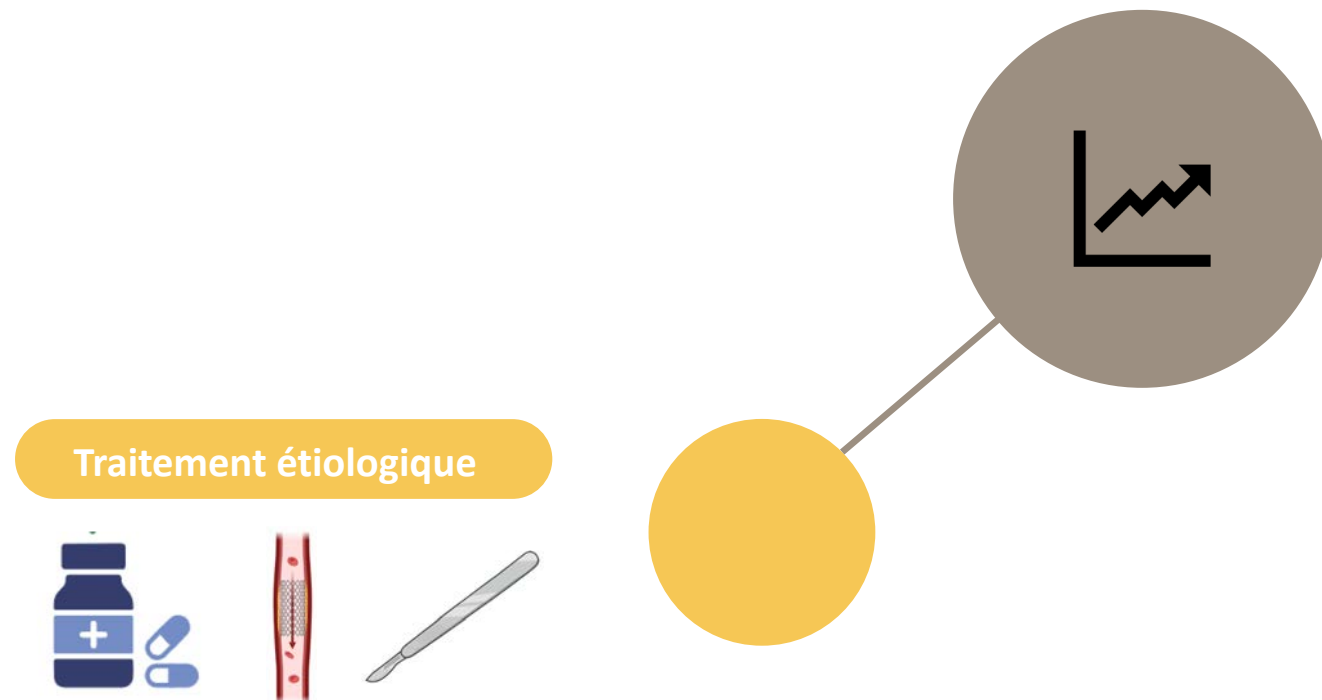
PHYSIOLOGIE

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COMMENT ?

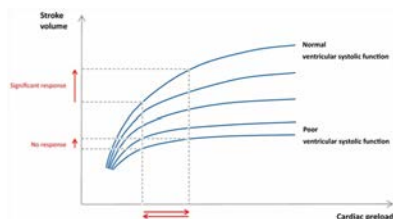
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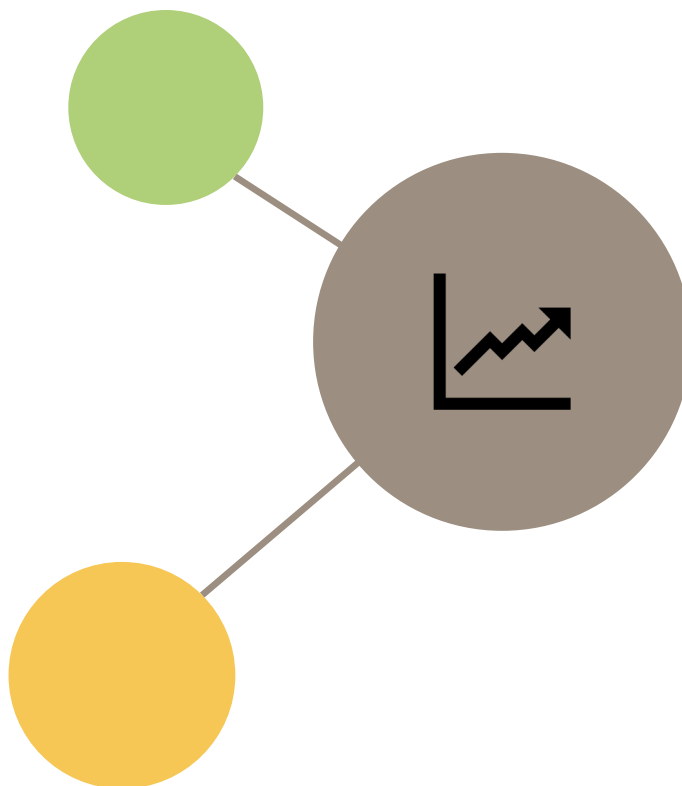
COMMENT ?

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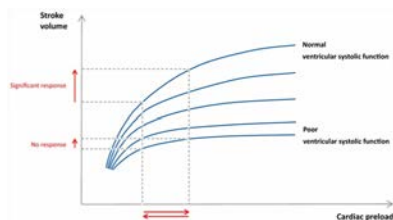


Traitement étiologique



COMMENT ?

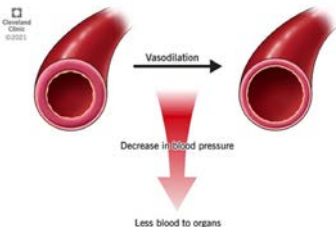
Précharge cardiaque



Traitement étiologique

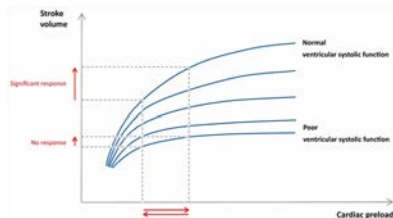


Tonus vasculaire



COMMENT ?

Précharge cardiaque



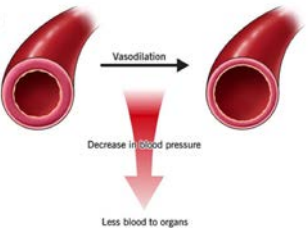
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Tonus vasculaire



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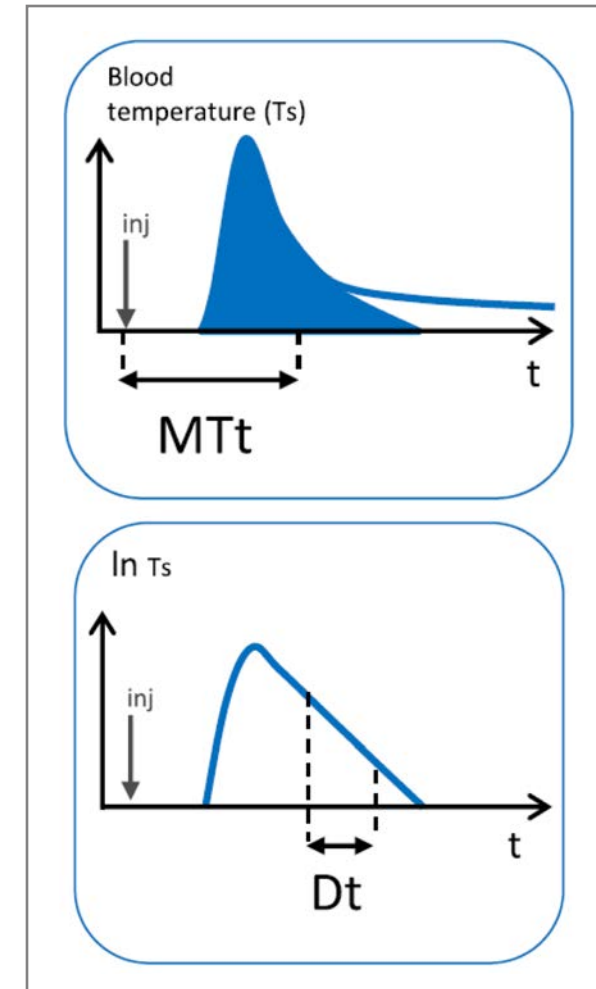
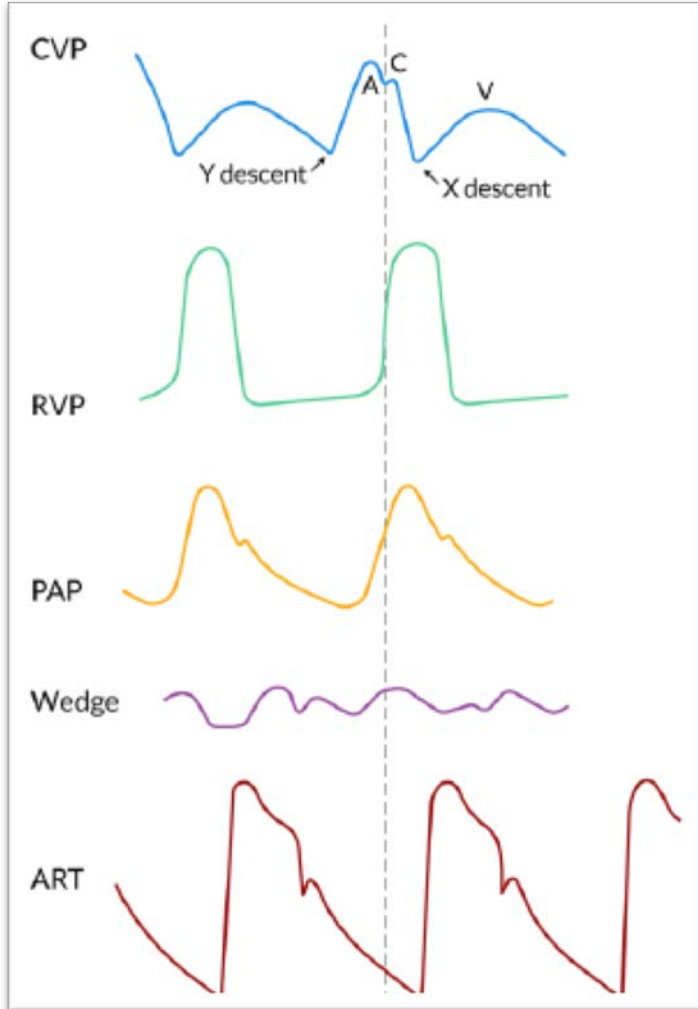


Inotropisme



QUELS OUTILS (MACRO CIRCULATION) ?

20



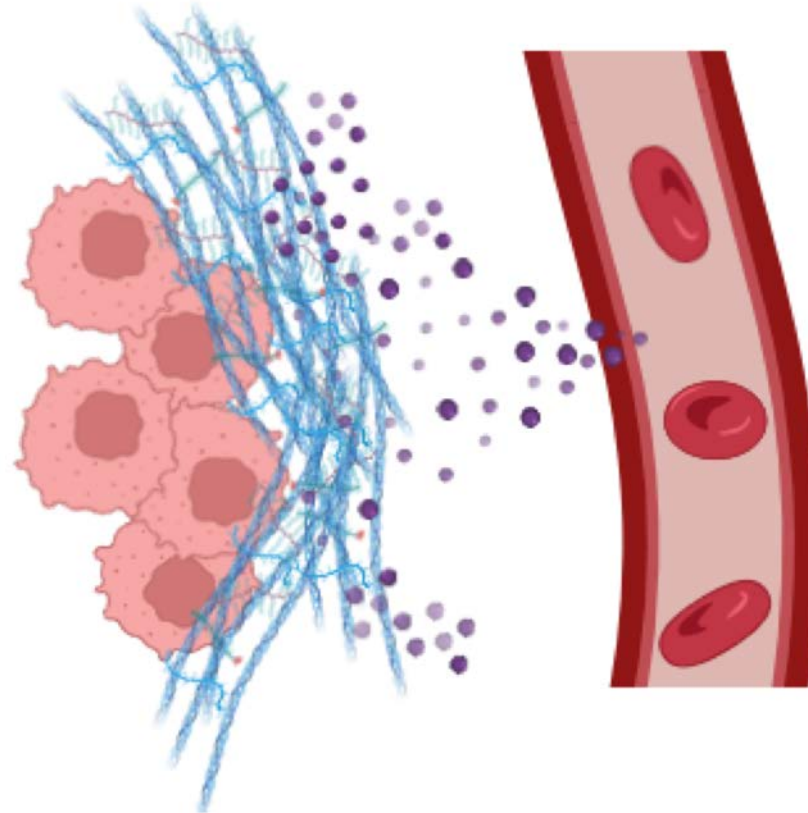
Monnet X, Teboul JL. Transpulmonary thermodilution: advantages and limits. Crit Care. 19 juin 2017;21(1):147.

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Bootsma IT, et al. The contemporary pulmonary artery catheter. Part 1: placement and waveform analysis. J Clin Monit Comput. févr 2022;36(1):5-15.

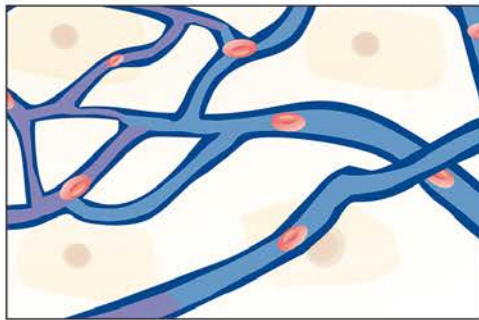
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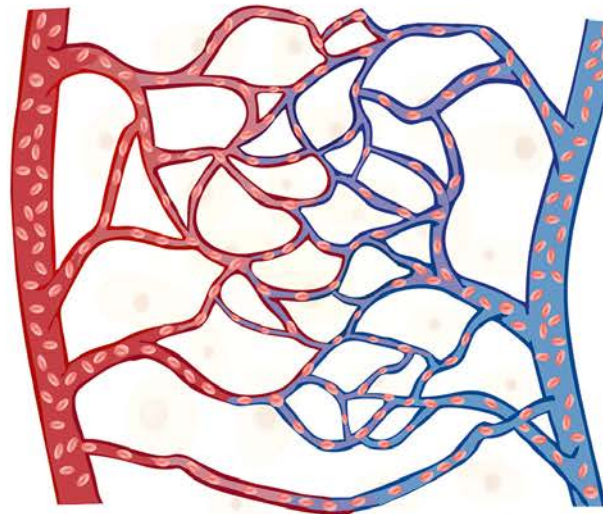


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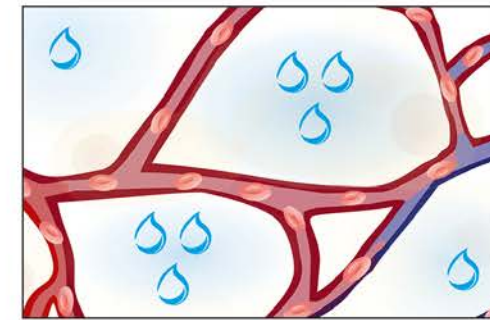
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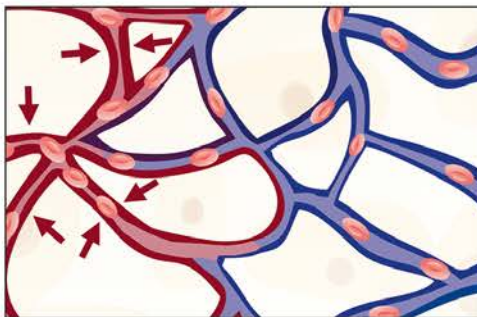
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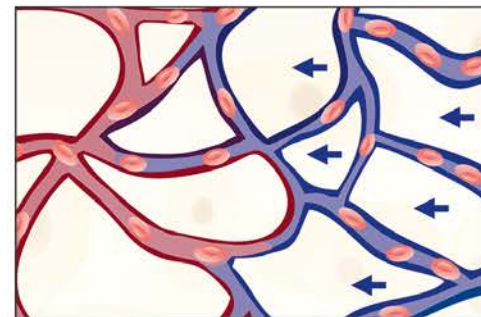
Intact microcirculation



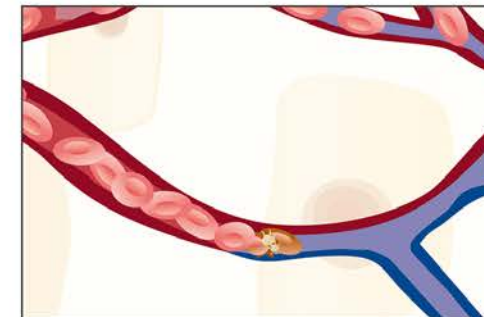
Oedema



Vasoconstriction

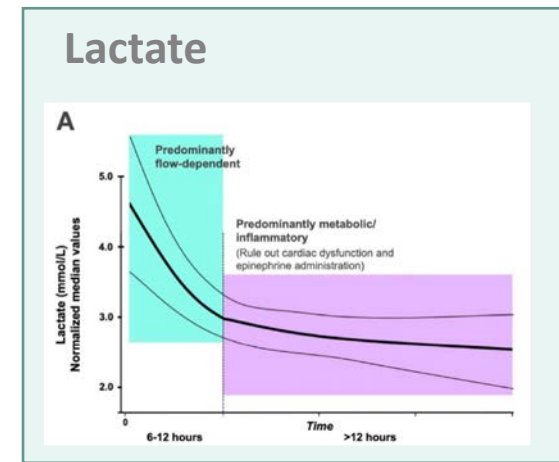
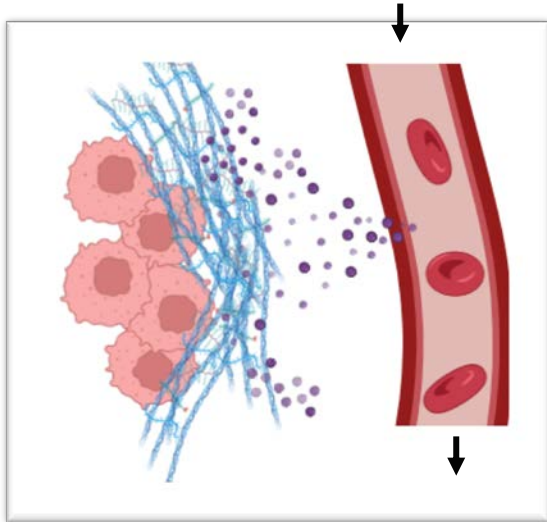


Venous congestion

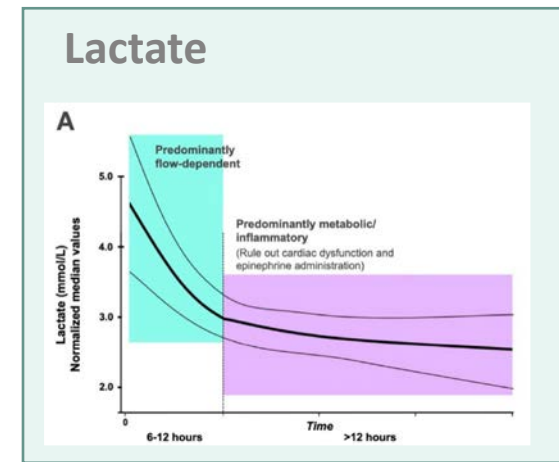
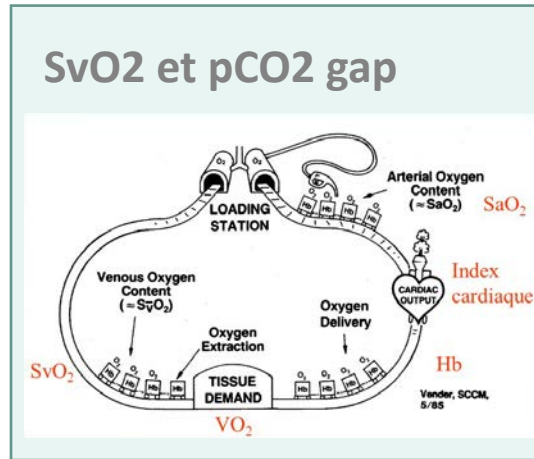
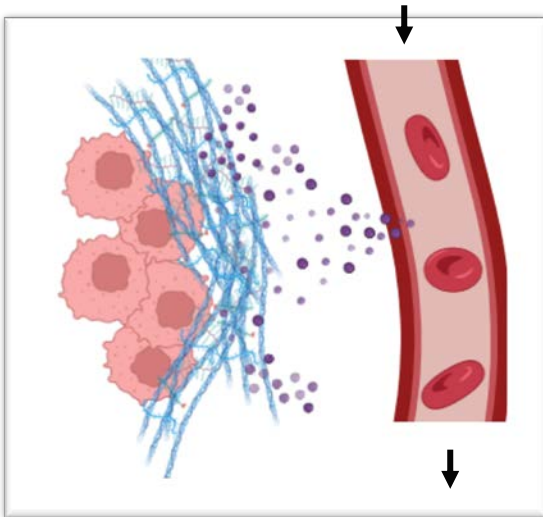


Obstruction

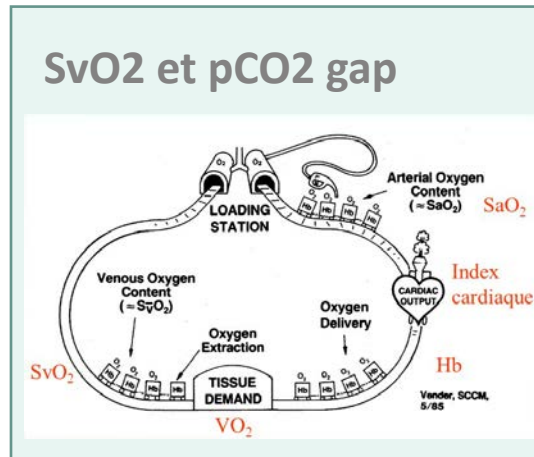
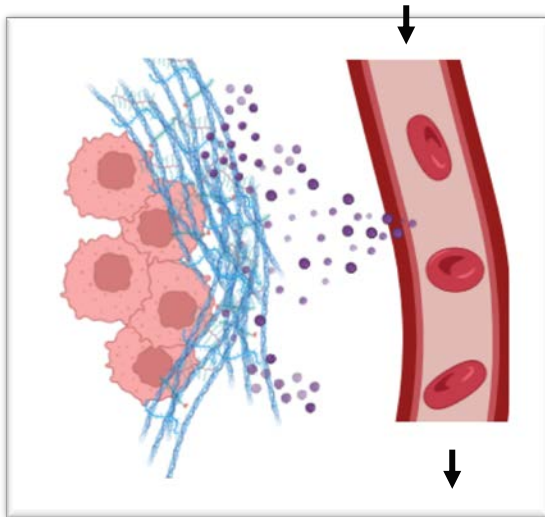
QUELS OUTILS (PERFUSION) ?



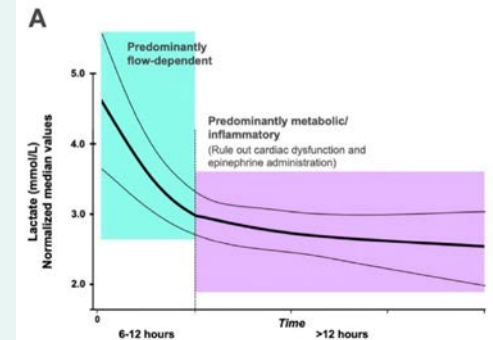
QUELS OUTILS (PERFUSION) ?



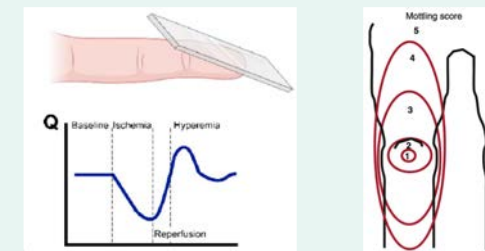
QUELS OUTILS (PERFUSION) ?



Lactate



Perfusion cutanée

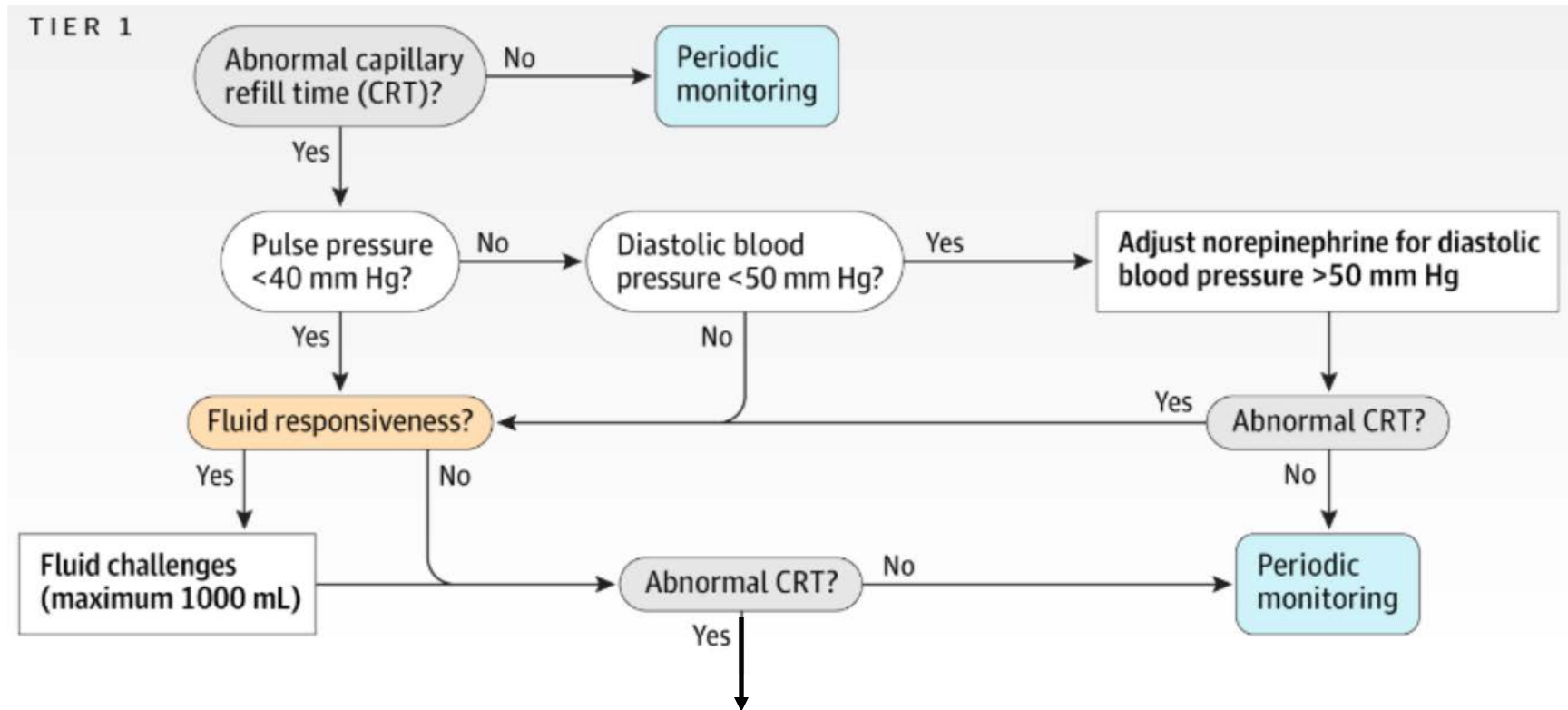


A decorative graphic consisting of several squares of varying sizes and shades of blue and grey, some with diagonal line patterns, arranged in a stepped, descending fashion from the top center towards the right side of the slide.

OPTIMISATION CARDIO-CIRCULATOIRE EST-CE QUE ÇA MARCHE ?

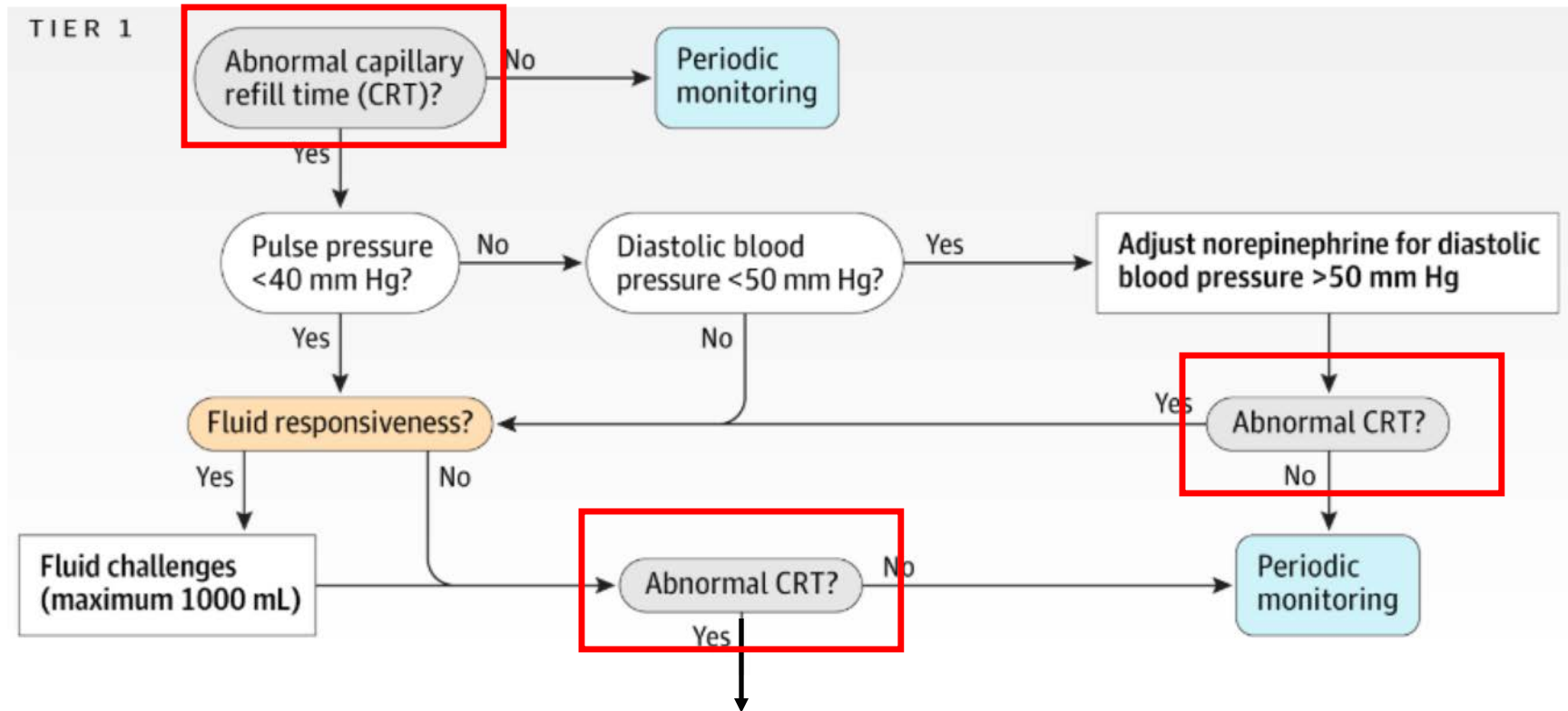
ALGORITHME ANDROMEDA SHOCK 2

27



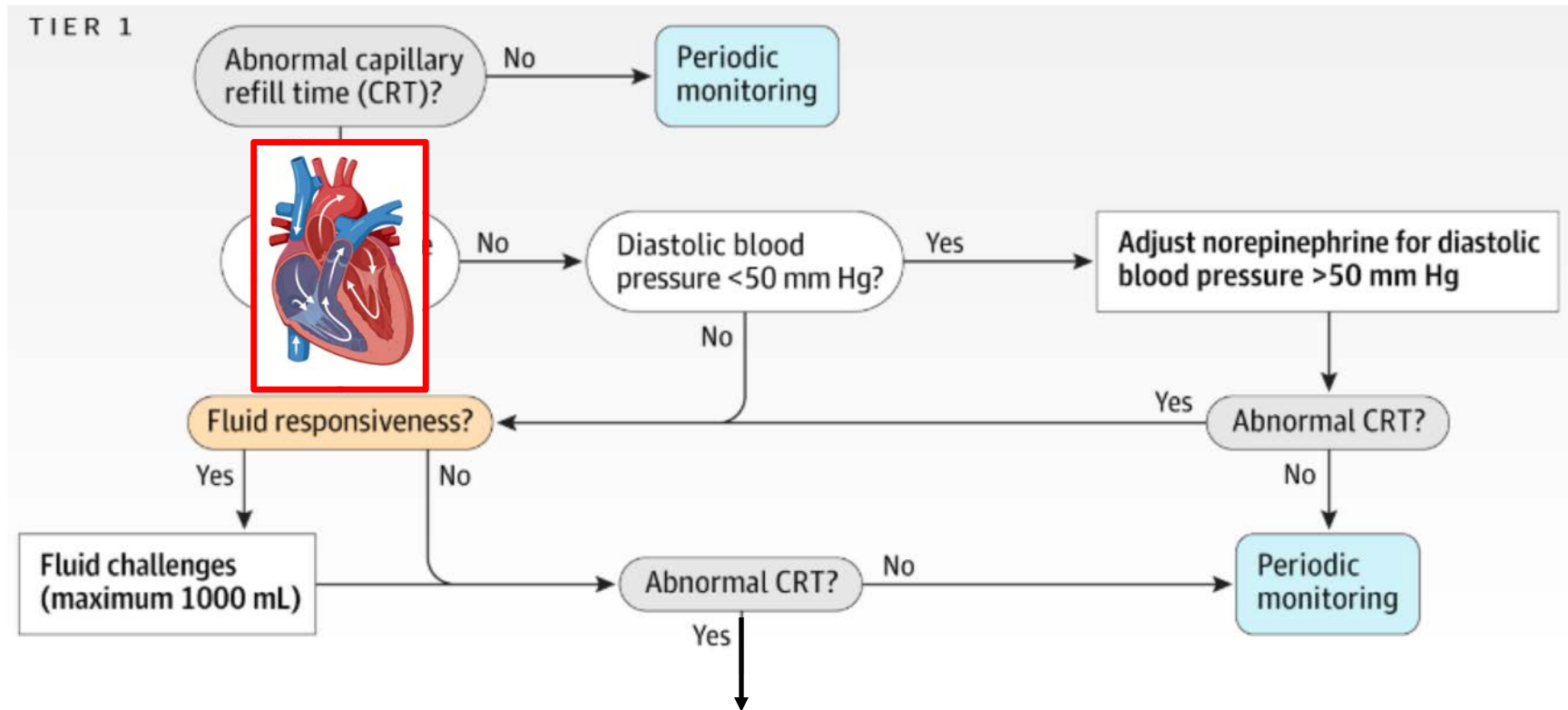
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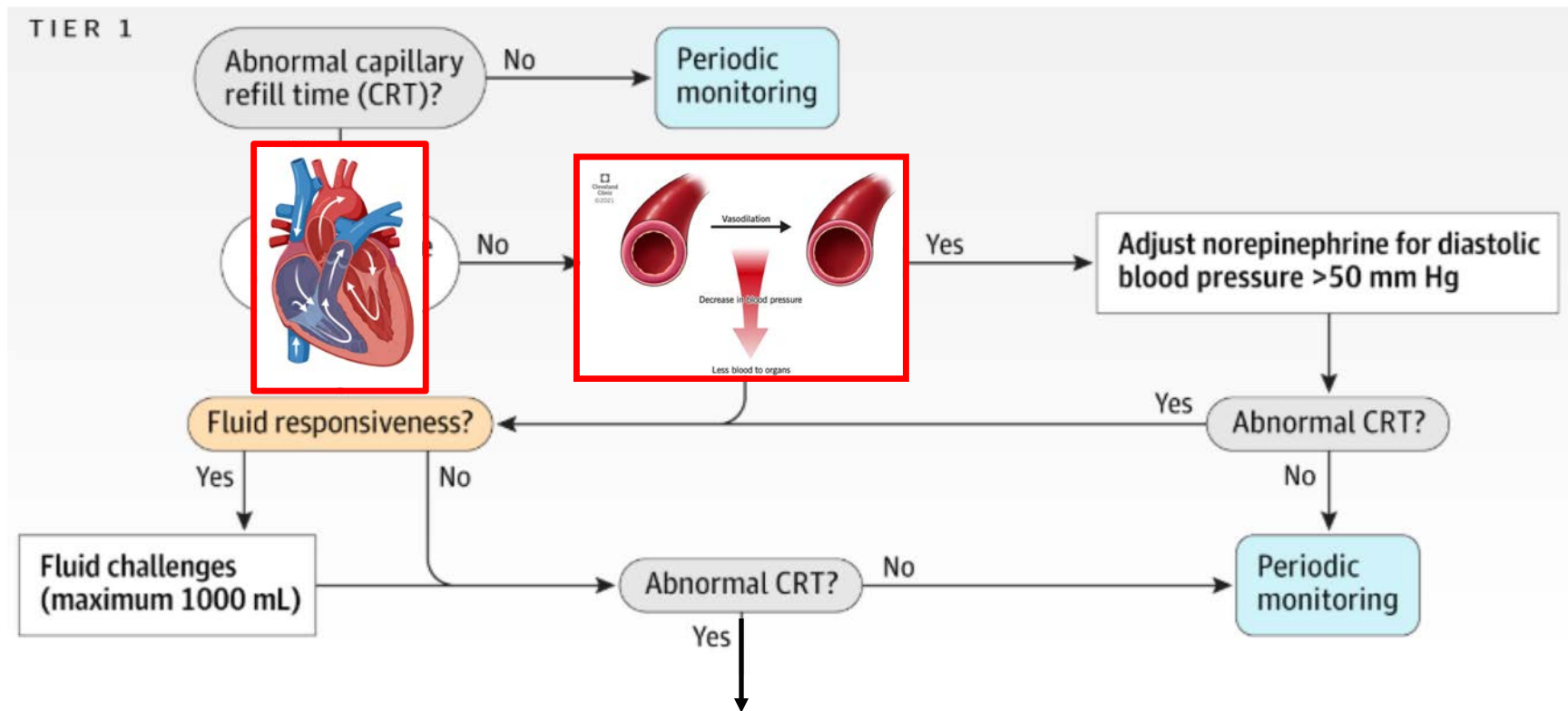
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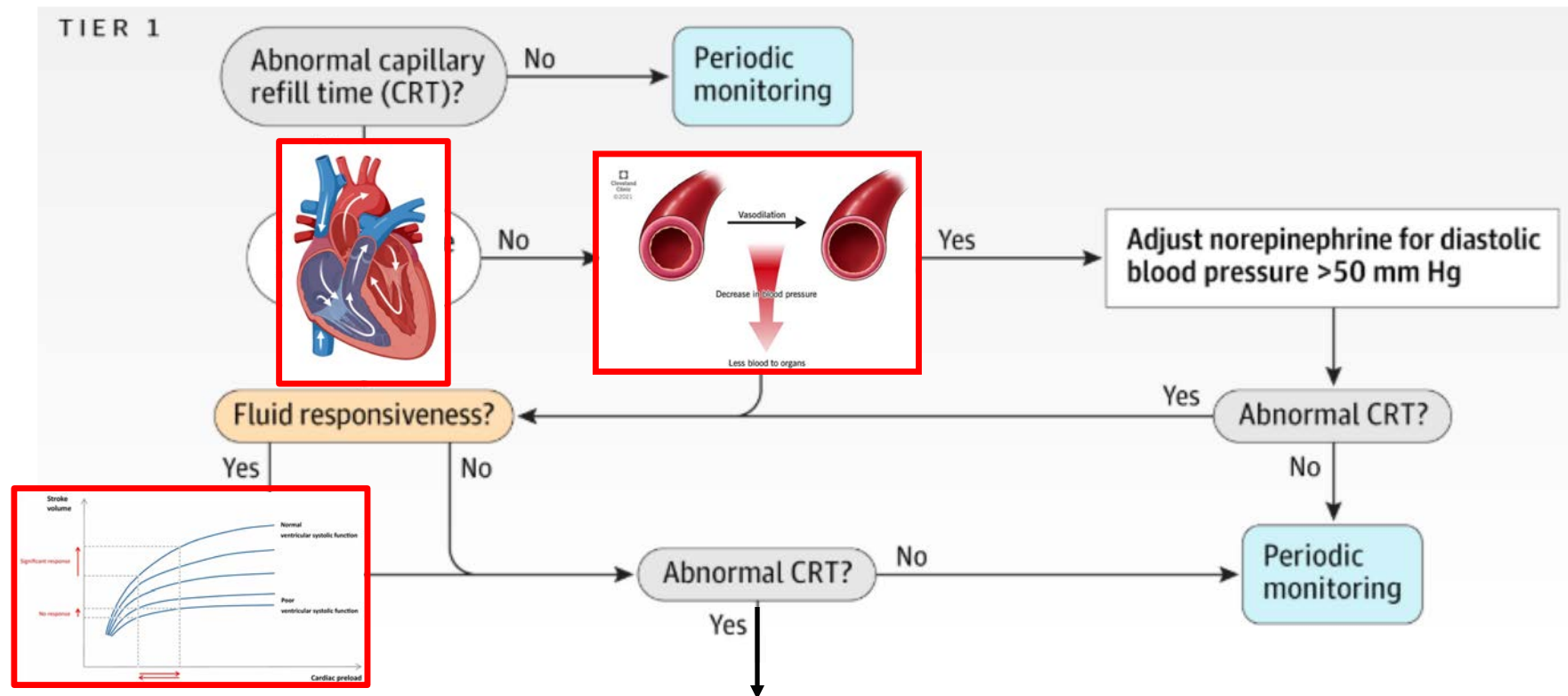
ALGORITHME ANDROMEDA SHOCK 2

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ALGORITHME ANDROMEDA SHOCK 2

31



UTILISATION DE LA PRÉCHARGE DÉPENDANCE

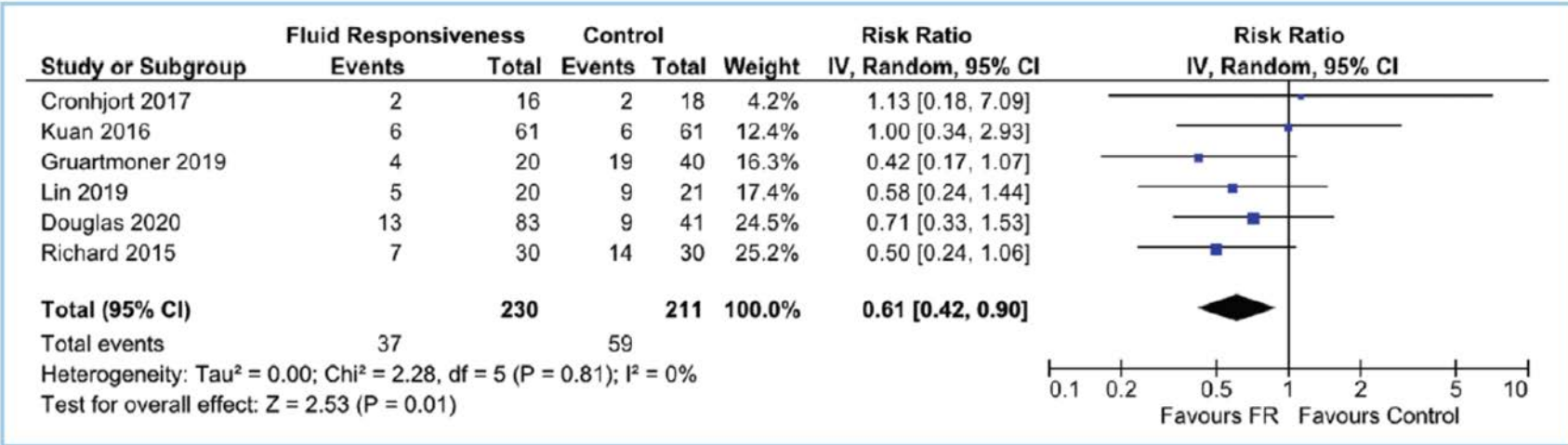


Figure 1. Forest plot of 28-day mortality. FR = fluid responsiveness.

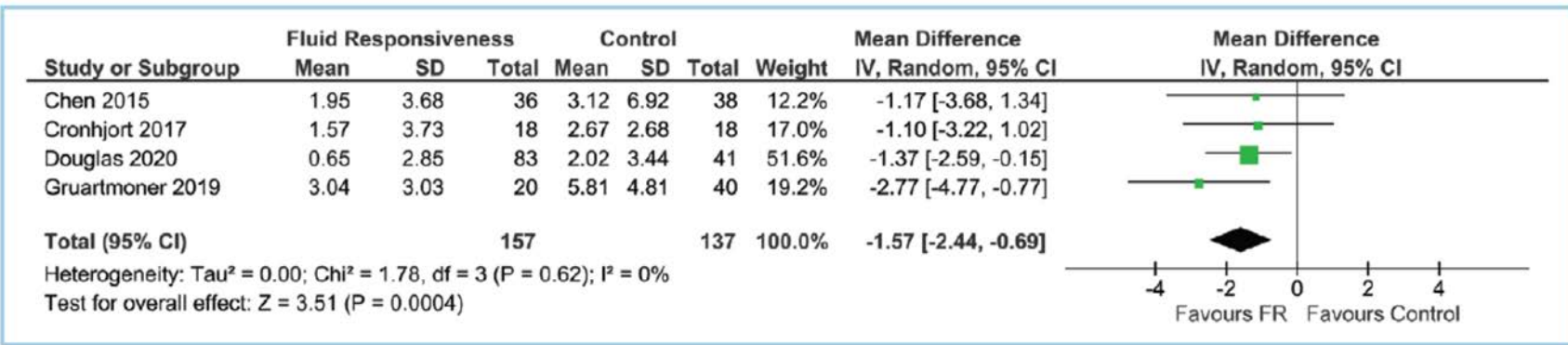
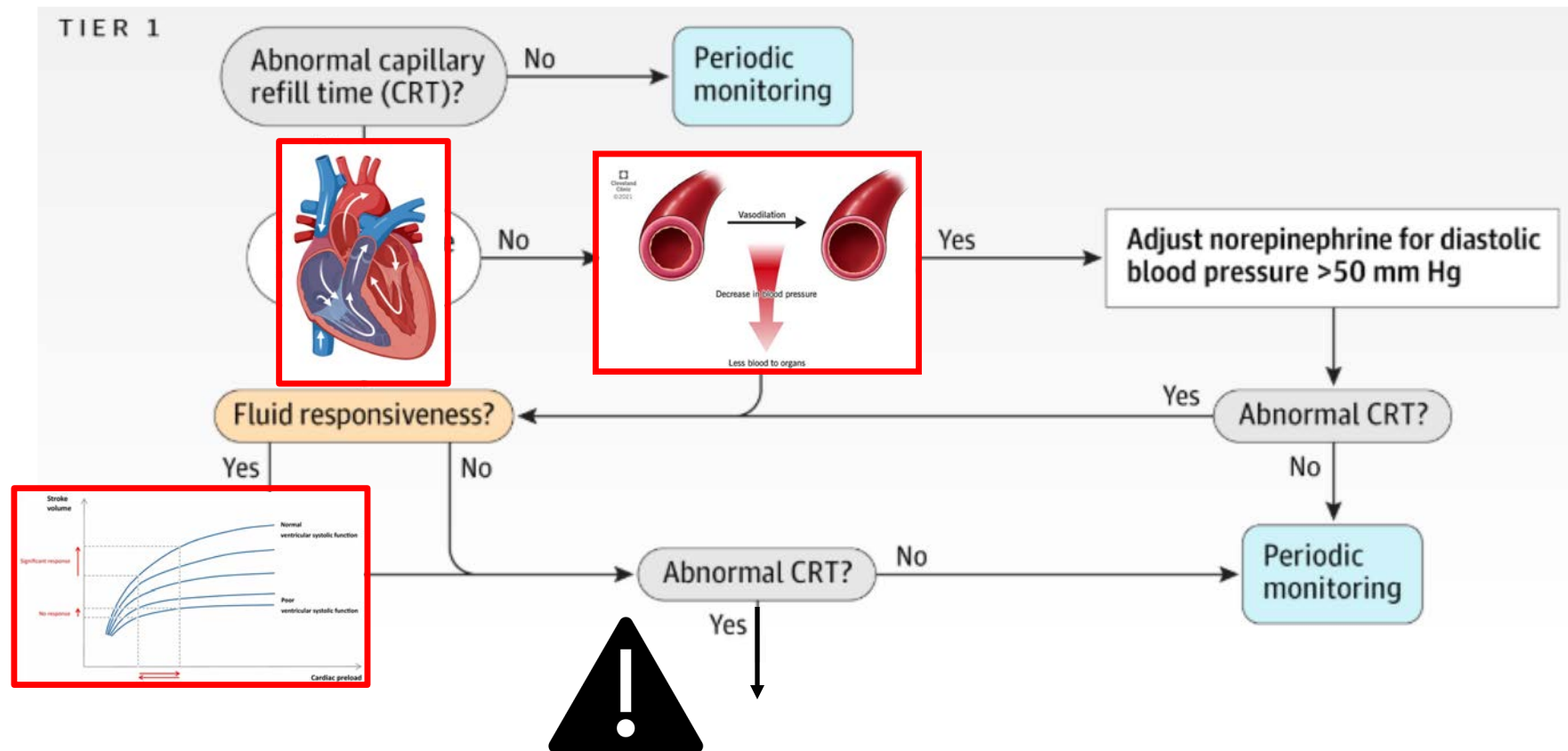


Figure 2. Forest plot of cumulative fluid balance on day 3. FR = fluid responsiveness.

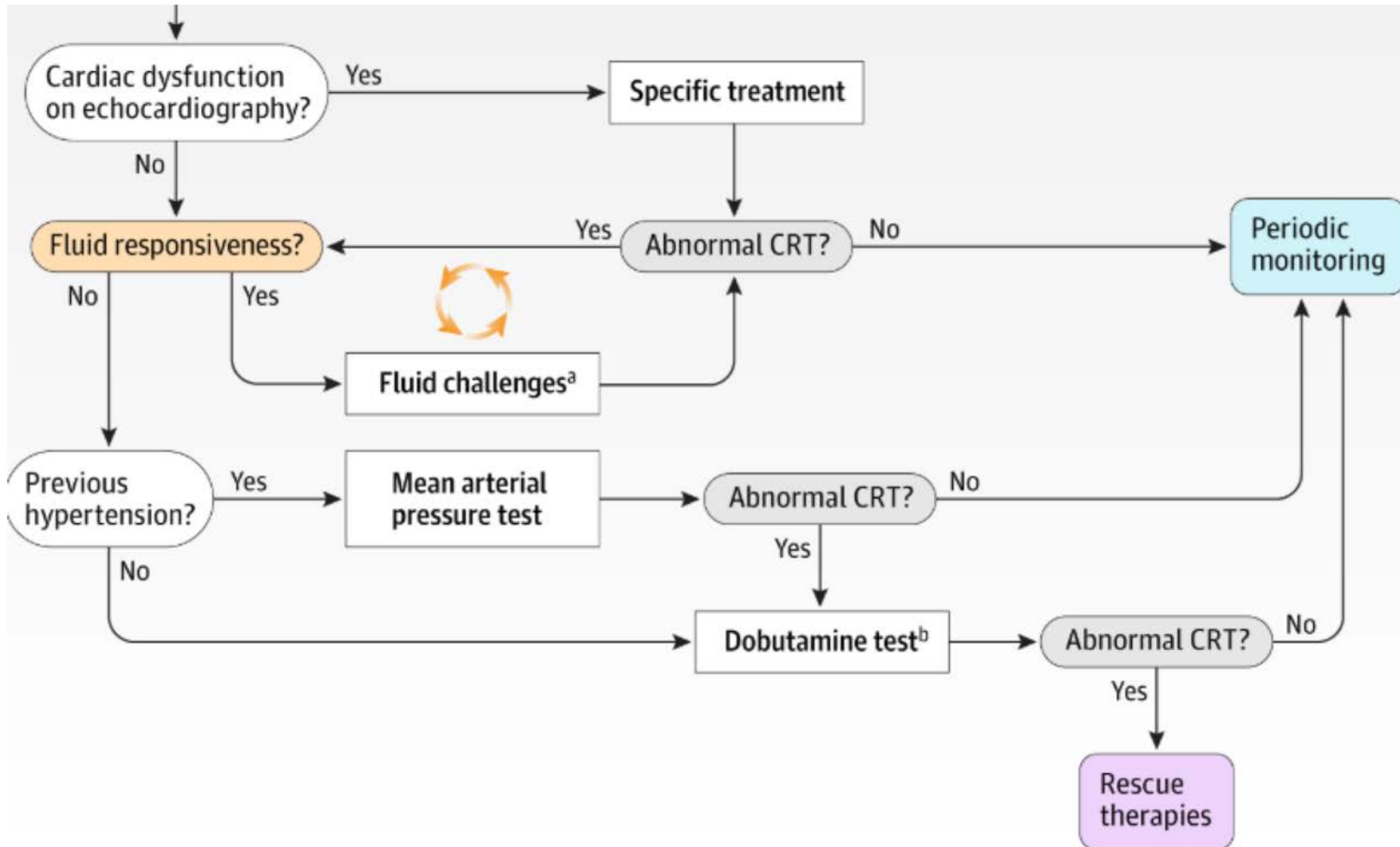
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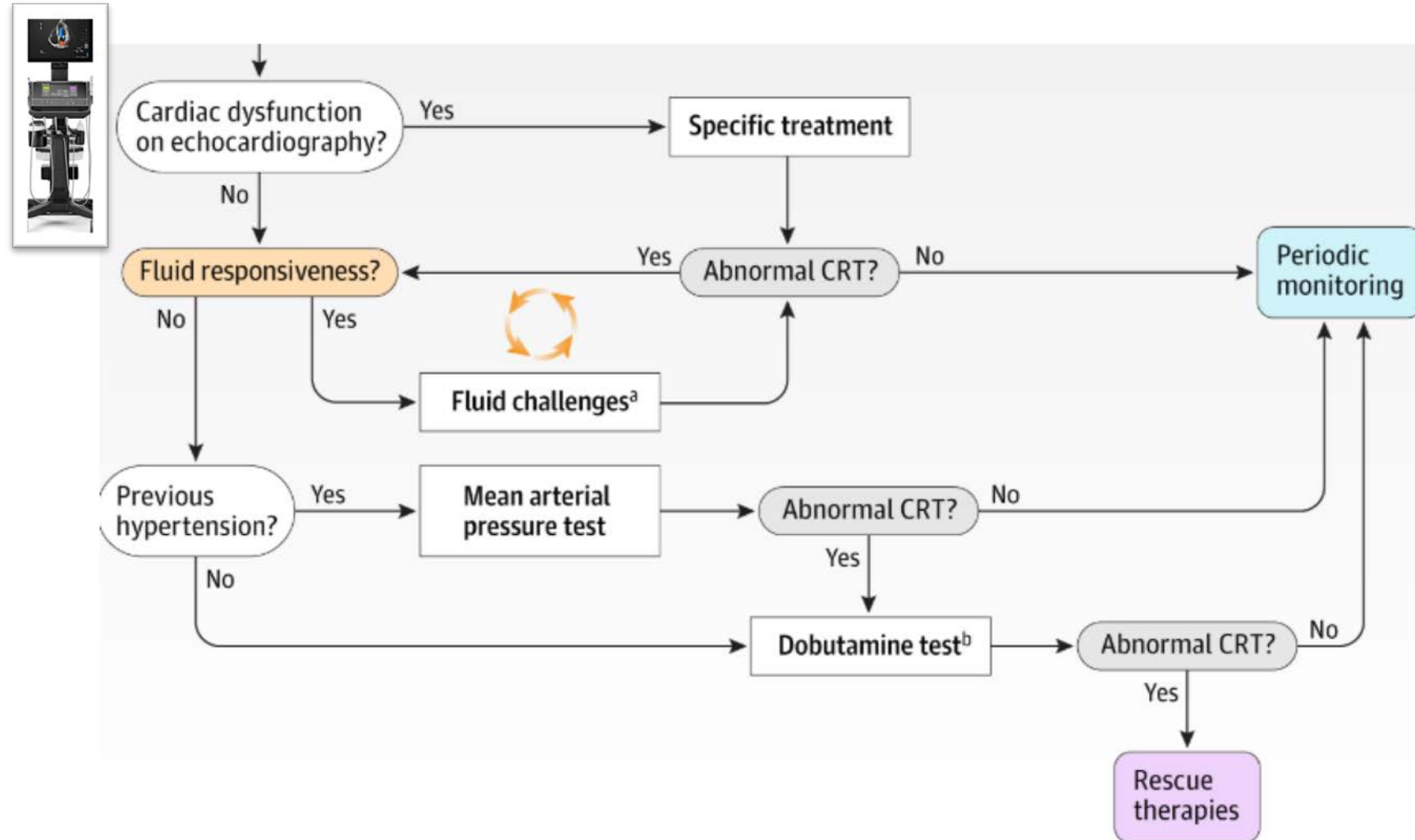
ALGORITHME ANDROMEDA SHOCK 2

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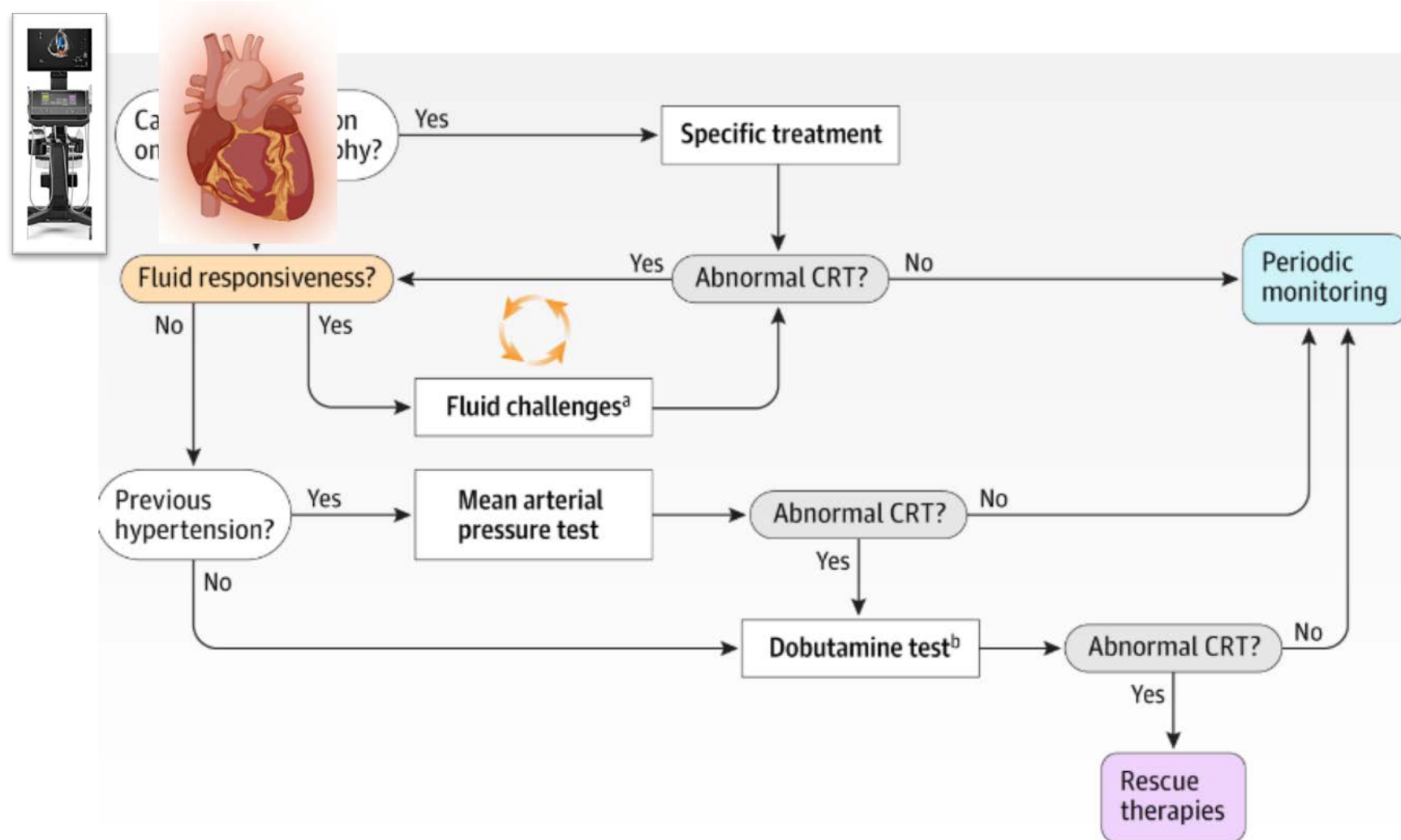
ALGORITHME ANDROMEDA SHOCK 2

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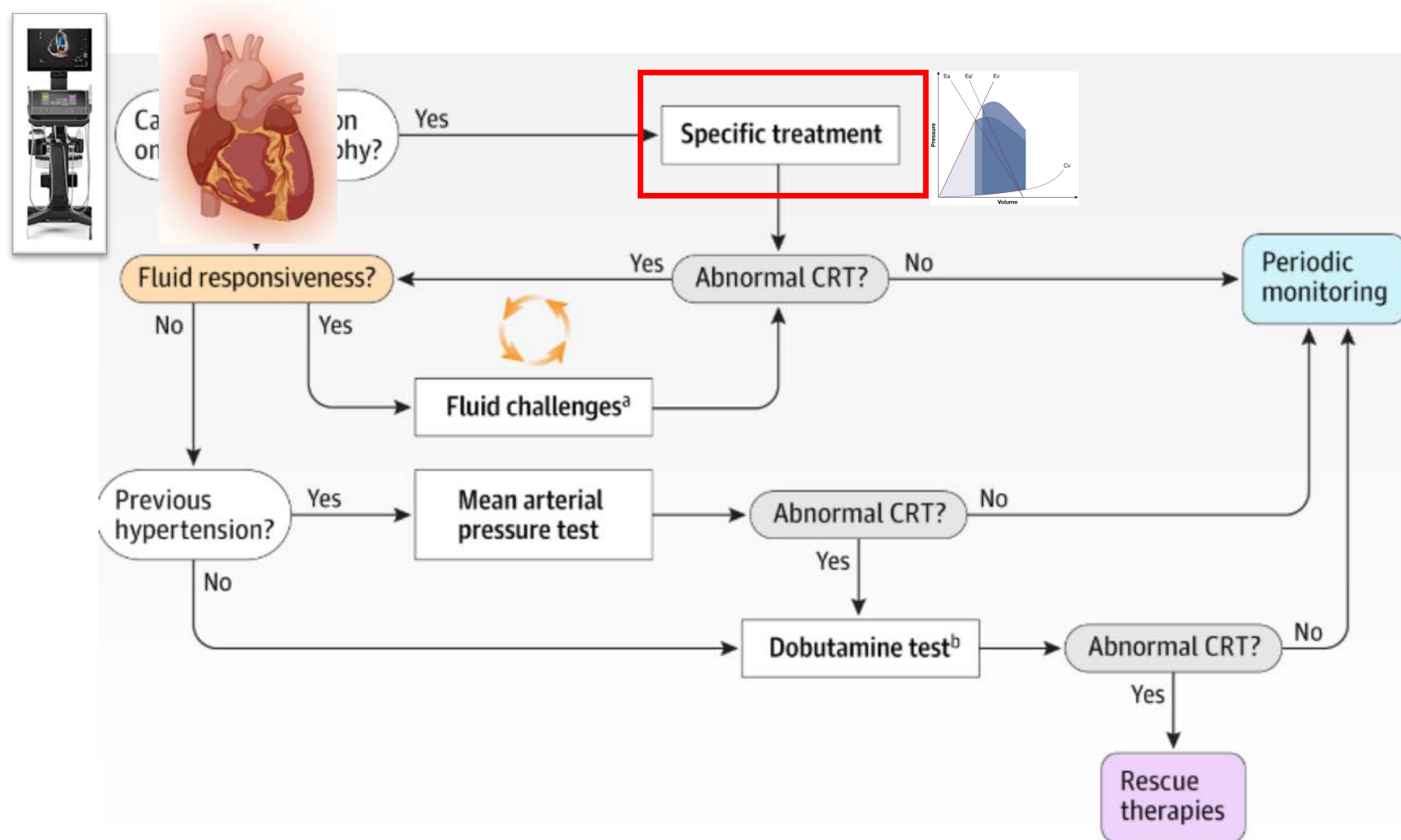
ALGORITHME ANDROMEDA SHOCK 2

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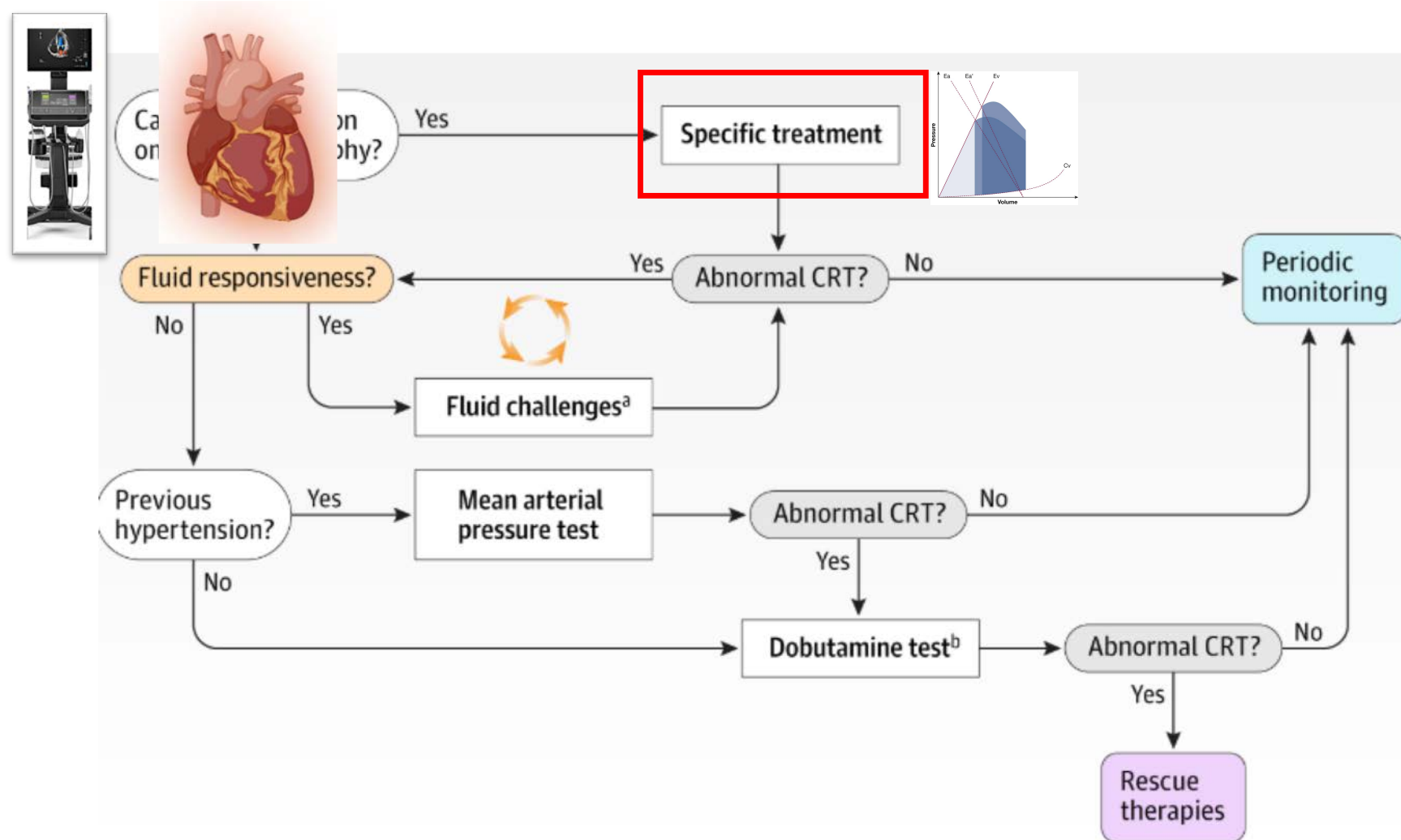
ALGORITHME ANDROMEDA SHOCK 2

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ALGORITHME ANDROMEDA SHOCK 2

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UTILISATION DE L'ÉCHOGRAPHIE

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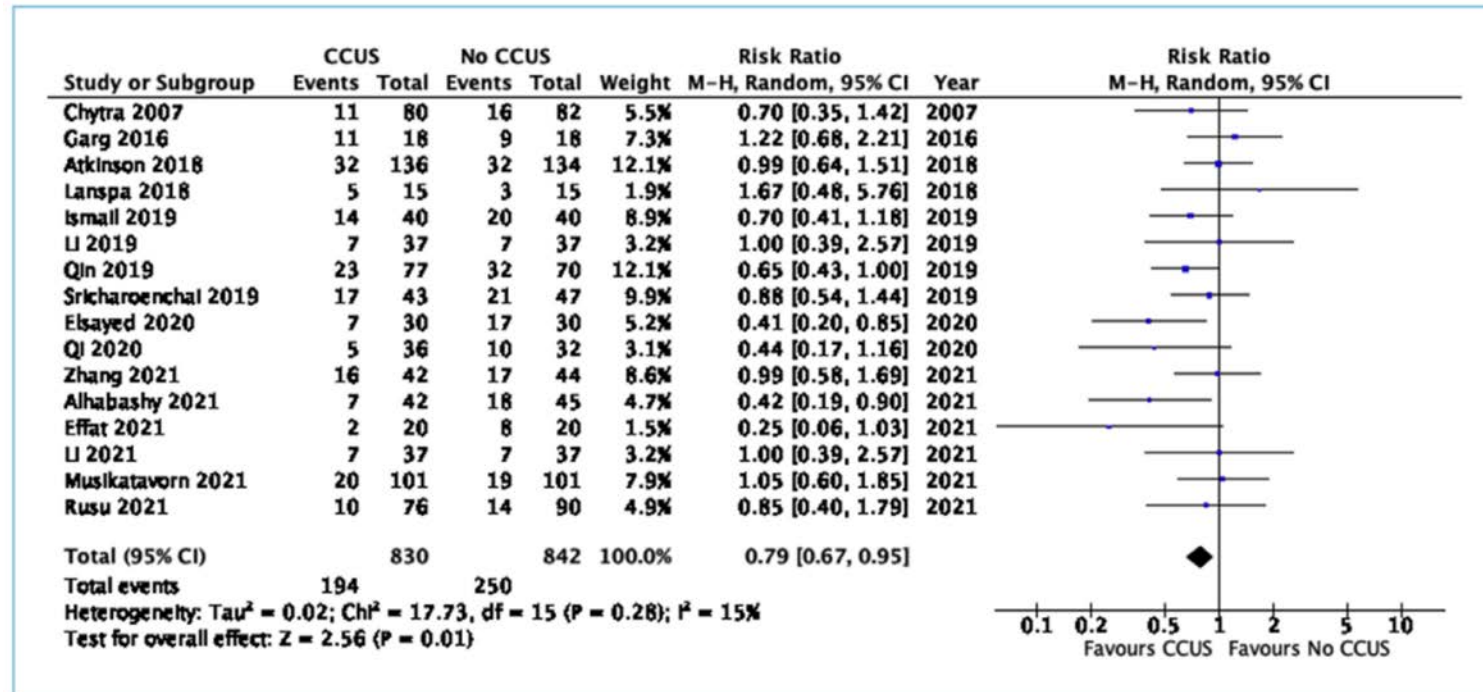


Figure 1. Forest plot comparing critical care ultrasonography (CCUS) and no CCUS for the outcome of mortality. df = degrees of freedom, M-H = Mantel-Haenszel.



KEY POINTS

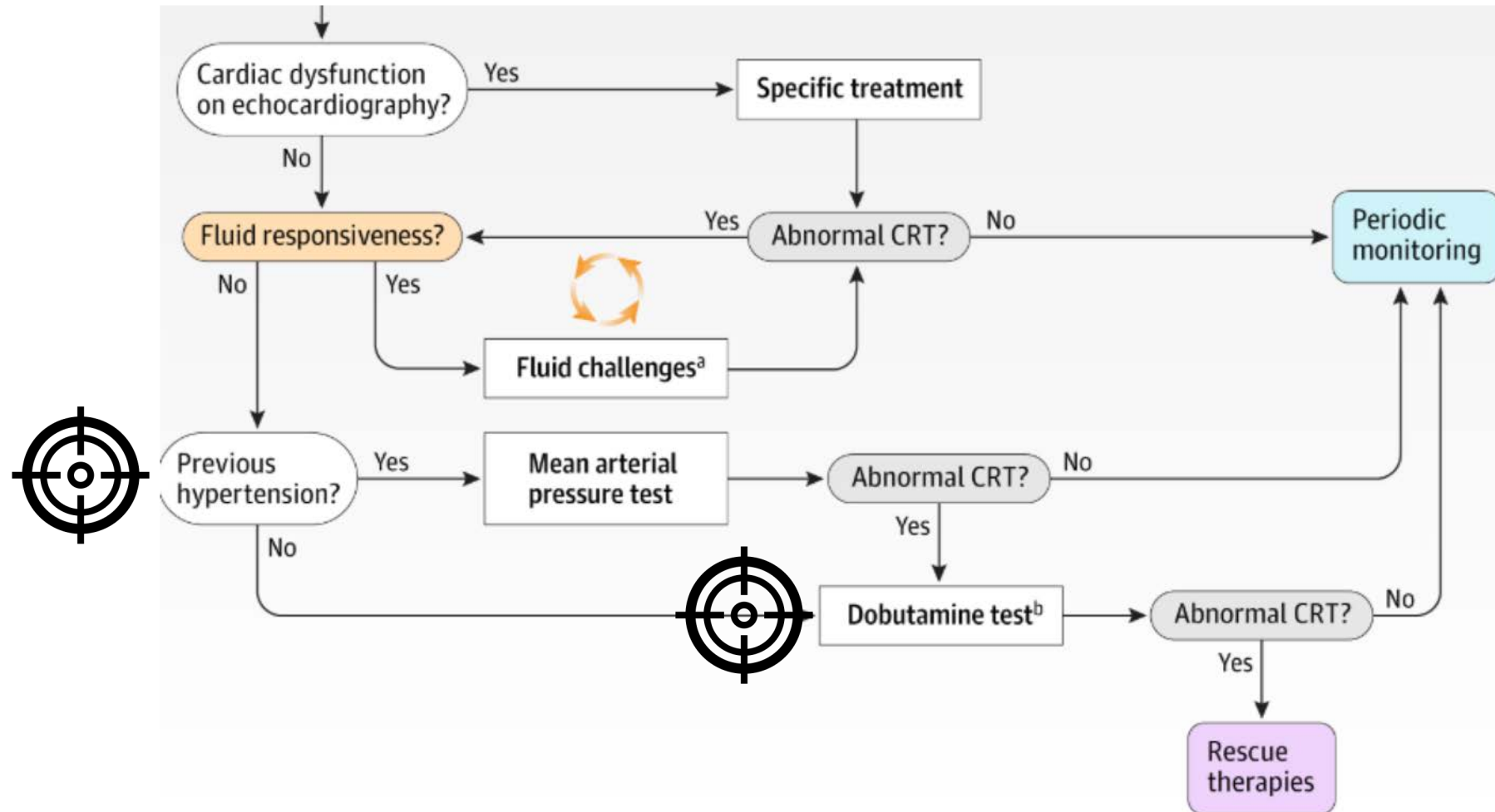
Question: Does the use of critical care ultrasonography (CCUS) to guide volume management in acutely ill patients improve patient outcomes?

Findings: Seventeen randomized trials were included. Compared with no CCUS for targeted volume management, patients who received CCUS may have a reduction in mortality and may have a decreased fluid balance up to 72 hours after admission.

Meaning: In acutely ill adult patients, CCUS for the use of targeted volume management may reduce mortality and fluid balance up to 72 hours after admission.

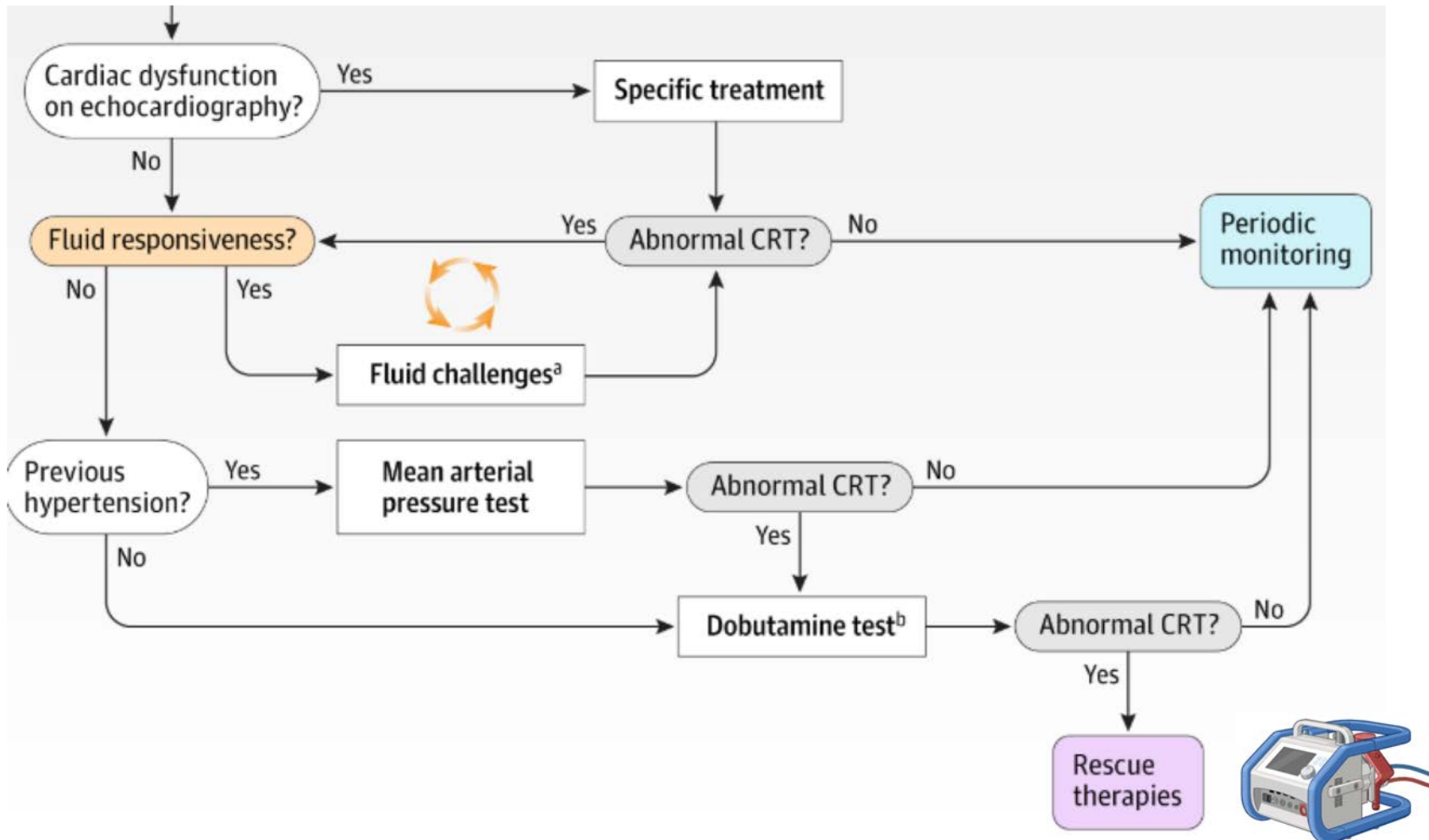
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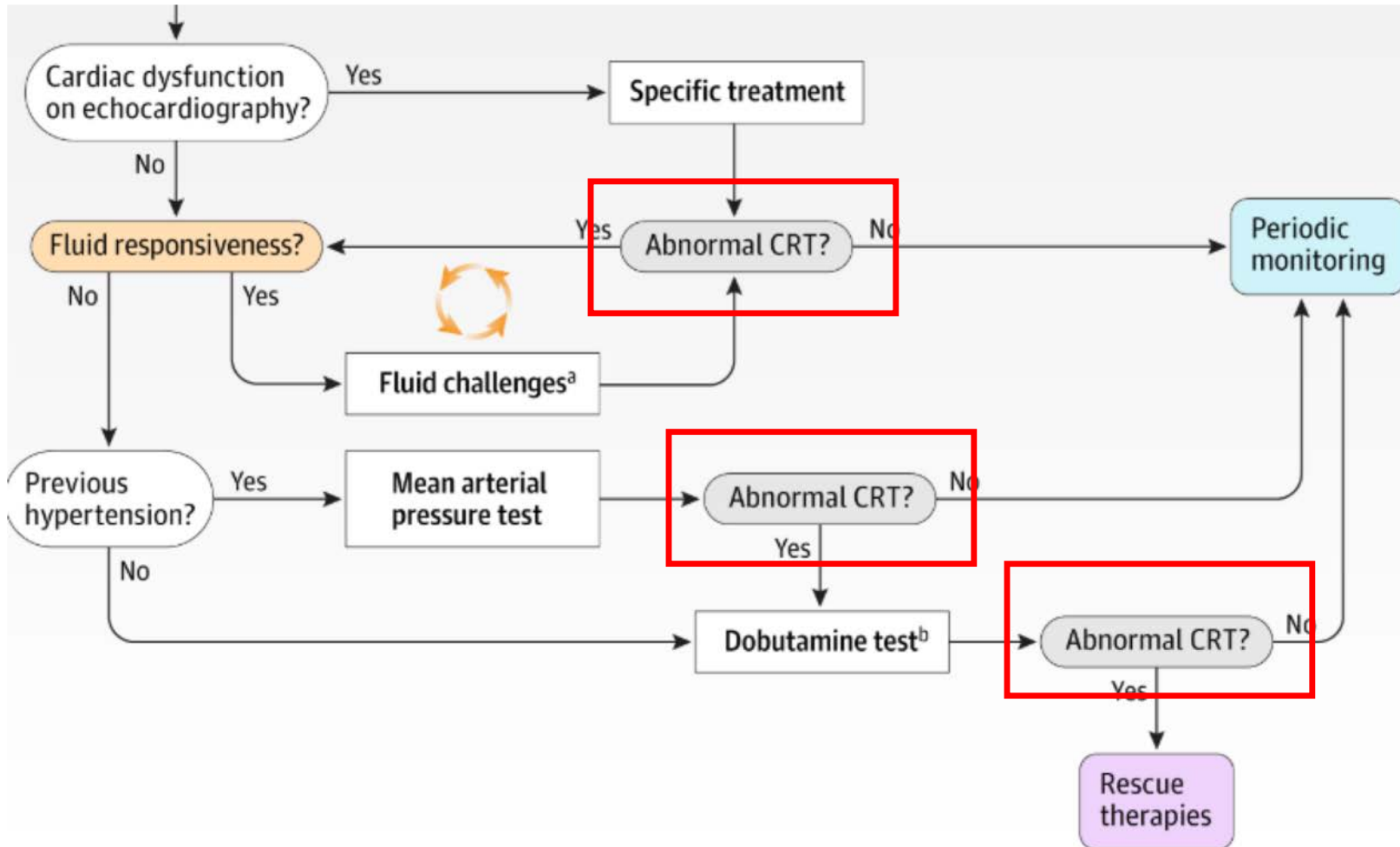
ALGORITHME ANDROMEDA SHOCK 2

41



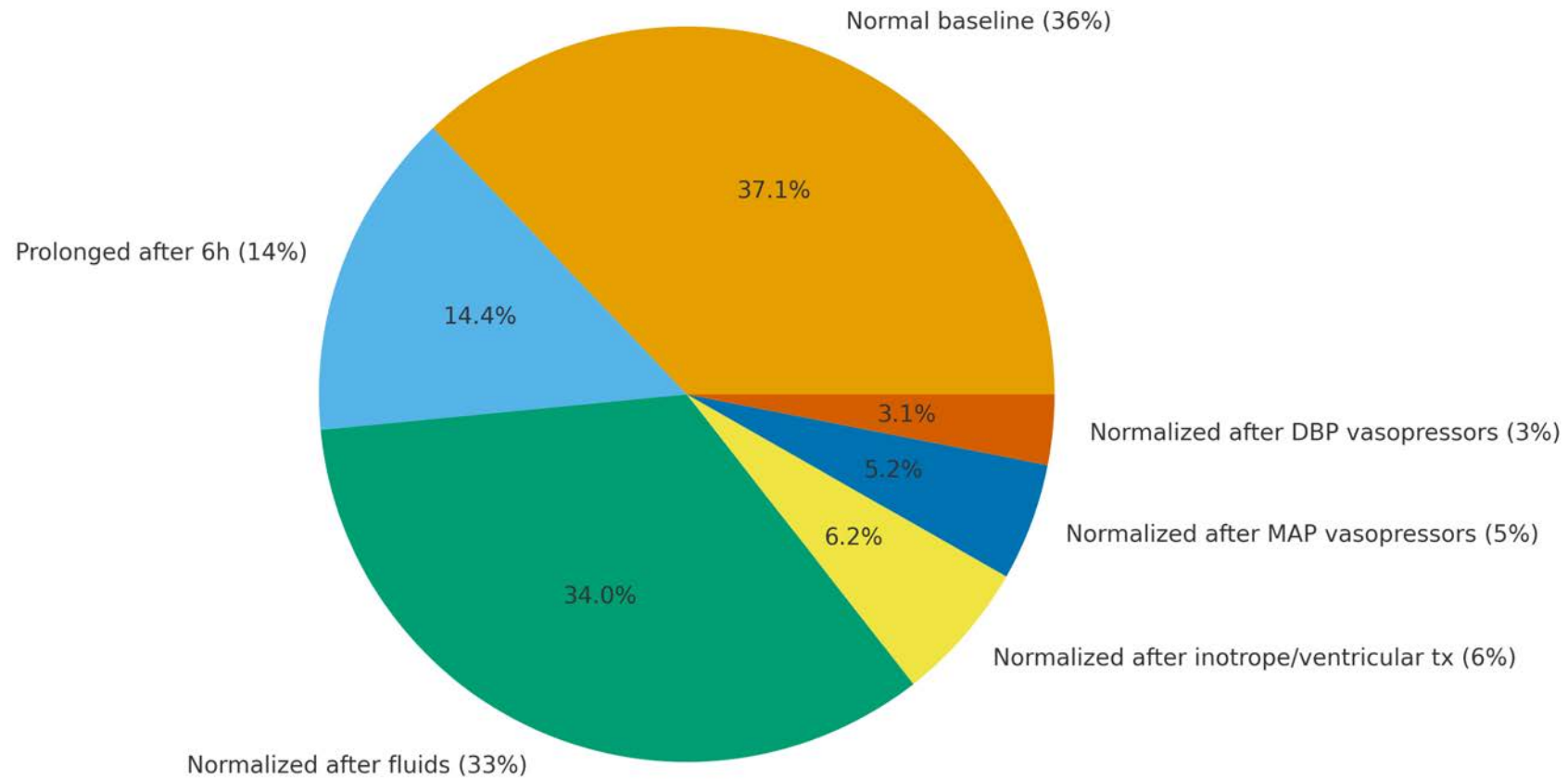
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42



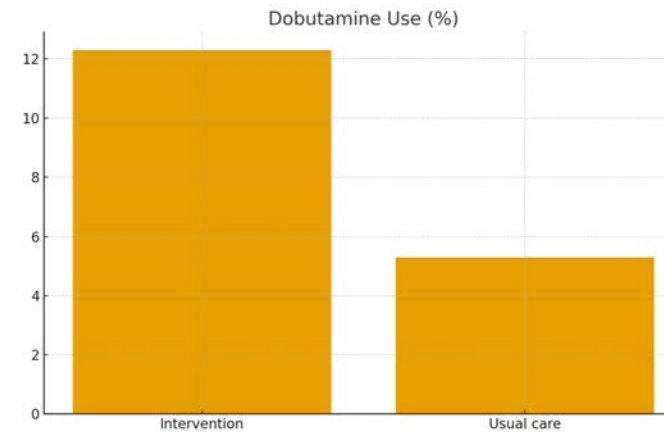
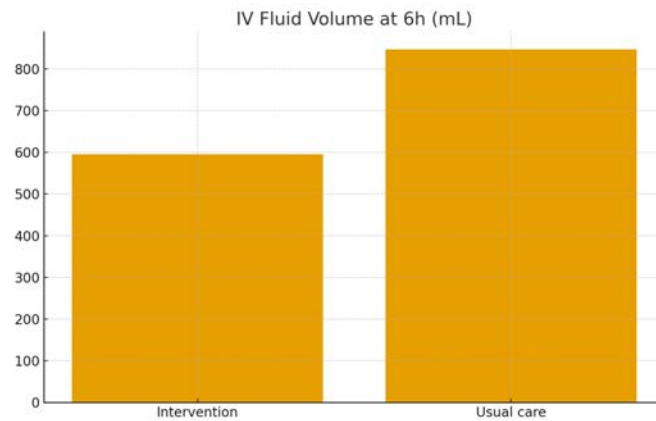
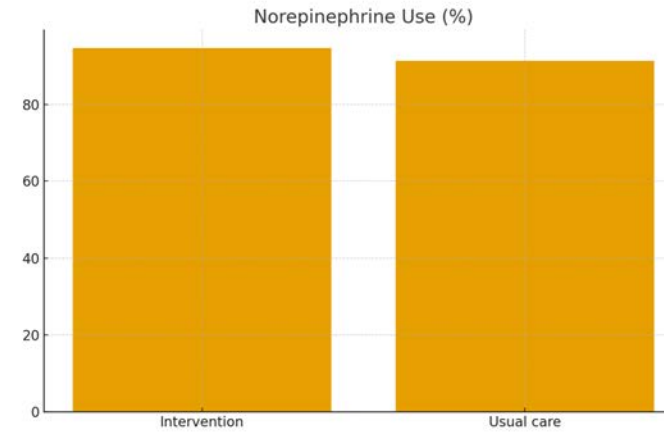
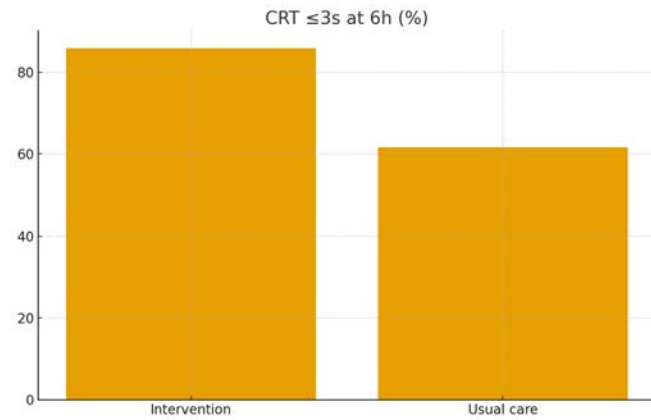
ALGORITHME ANDROMEDA SHOCK 2

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ALGORITHME ANDROMEDA SHOCK 2

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QUESTION Does a personalized hemodynamic resuscitation strategy targeting capillary refill time improve outcomes in patients with early septic shock vs usual care?

CONCLUSION In patients with early septic shock, a personalized hemodynamic resuscitation protocol targeting capillary refill time (CRT-PHR) was superior to usual care.

POPULATION



831 Men 636 Women

Adults 18 years or older
with septic shock

Mean age: 66 years

LOCATIONS

86
Sites in
19 countries



INTERVENTION

1501 Patients randomized
1467 Patients analyzed

720

CRT-PHR

Underwent PHR targeted
at normalizing CRT over
a 6-hour period

747

Usual care

Treated according to local
protocols or international
guidelines over a 6-hour period

PRIMARY OUTCOME

Hierarchical composite outcome: all-cause mortality,
duration of vital support, and length of hospital stay
at 28 days as an overall win ratio

FINDINGS

Total No. of wins

CRT-PHR

131 131
(48.9%)

Usual care

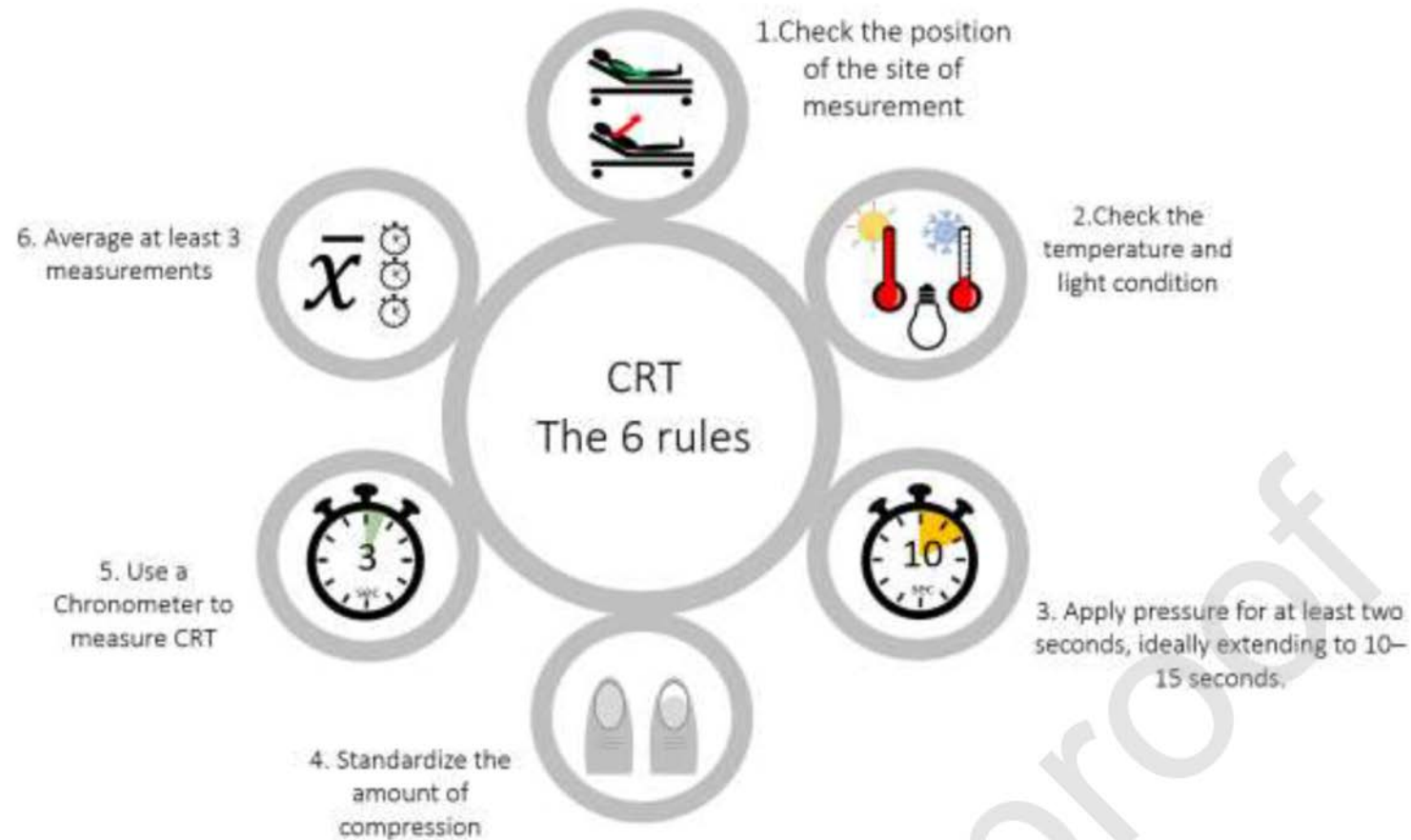
112 787
(42.1%)

CRT-PHR was superior to usual care:

Win ratio, **1.16**
(95% CI, 1.02 to 1.33; $P = .04$)

TRC : COMMENT ?

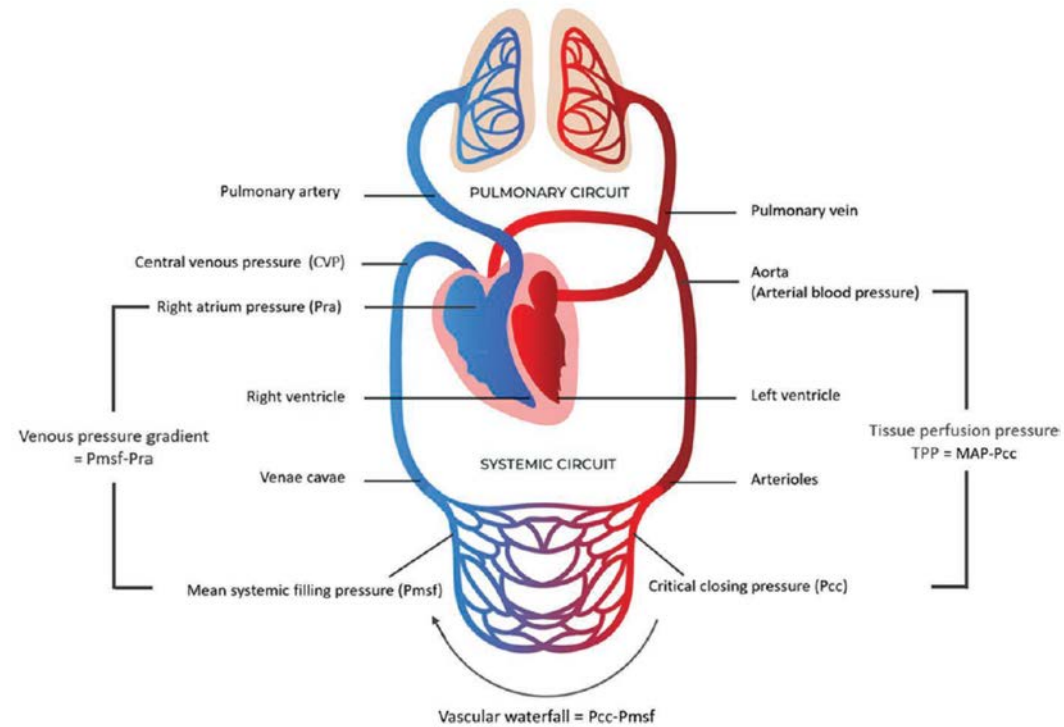
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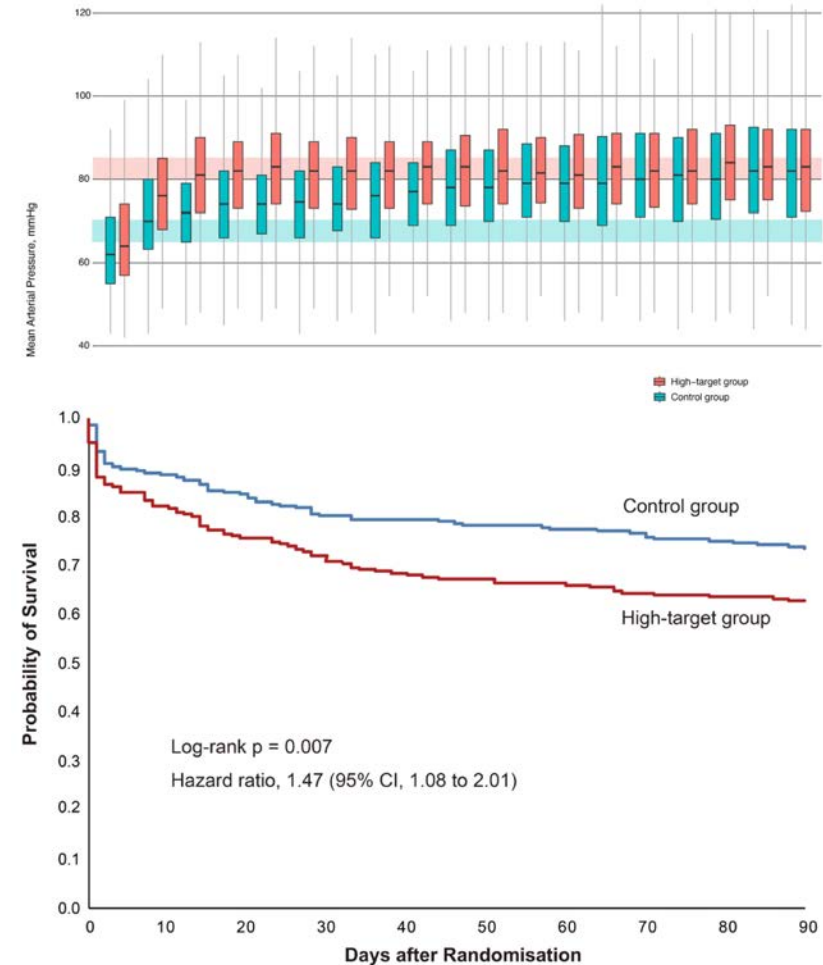
OPTIMISATION CARDIO-CIRCULATOIRE LE FUTUR ?

PERSONNALISATION DE LA PRESSION ARTÉRIELLE

48

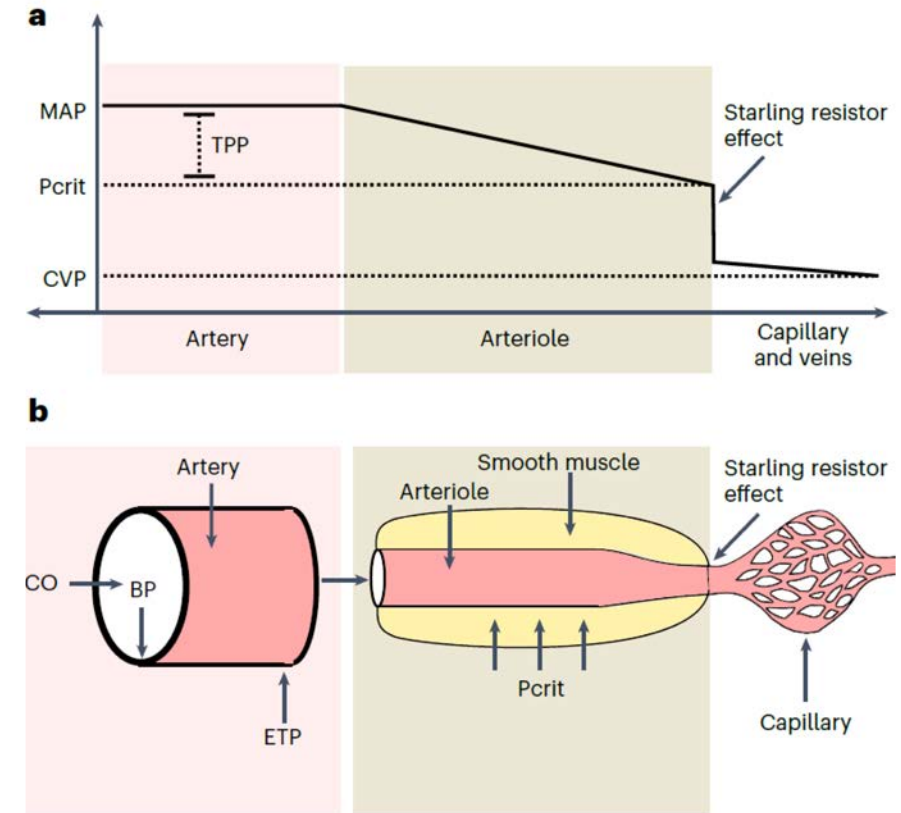
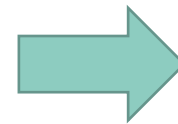
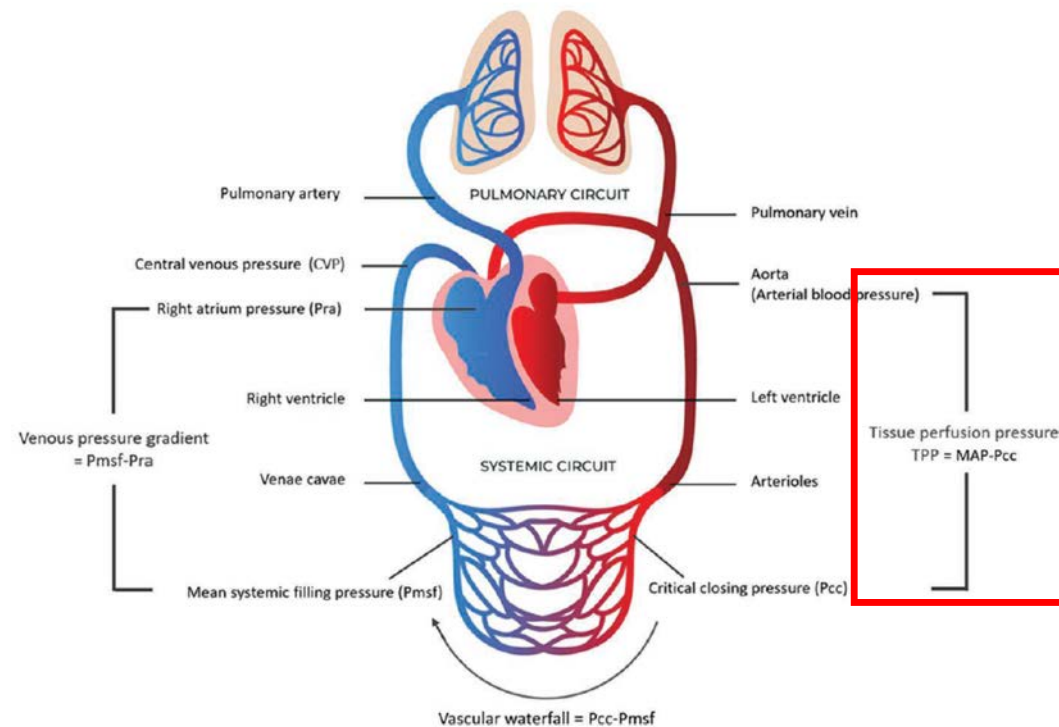


OPTRESS trial (2025)



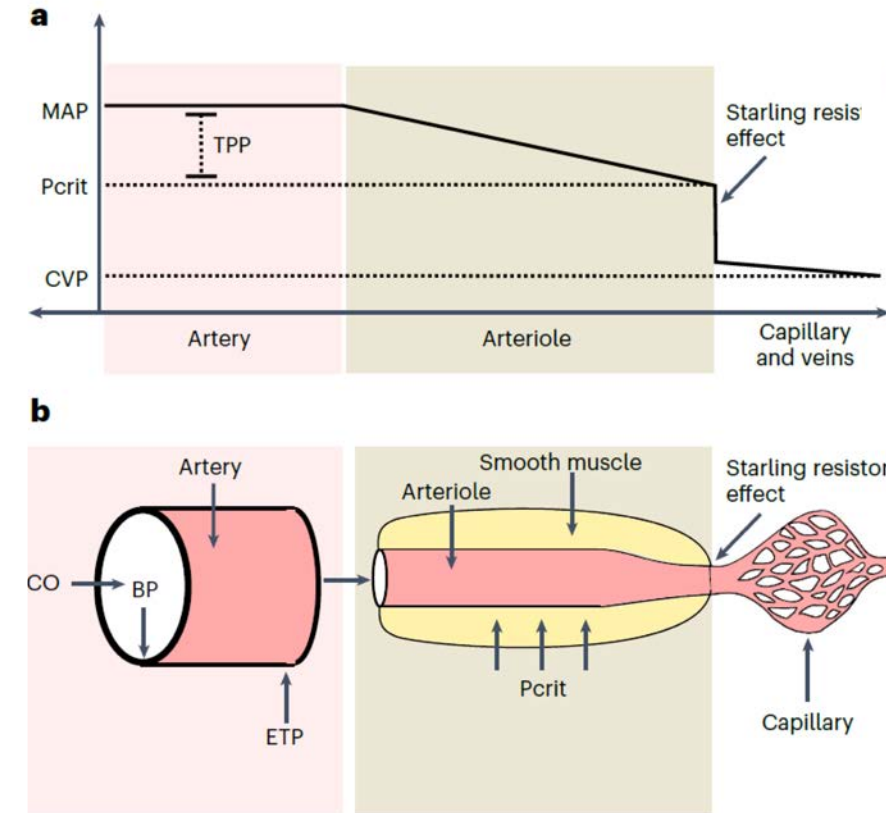
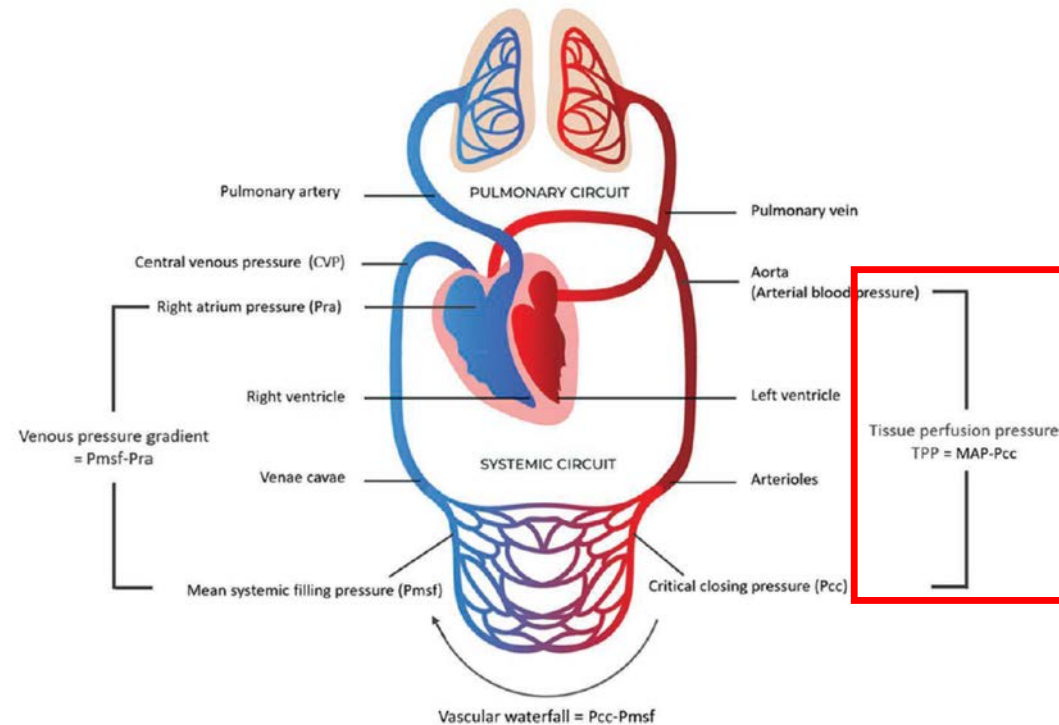
PERSONNALISATION DE LA PRESSION ARTÉRIELLE

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PERSONNALISATION DE LA PRESSION ARTÉRIELLE

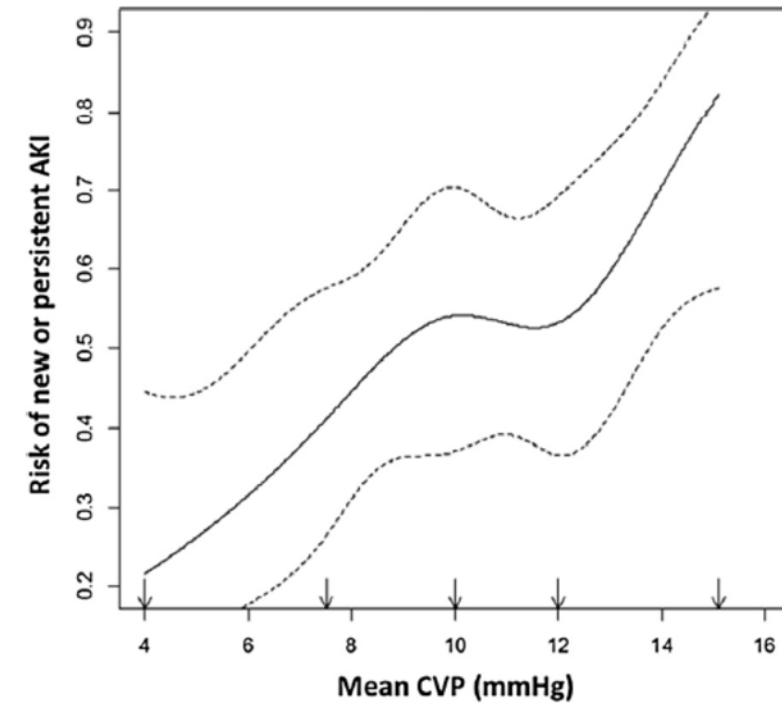
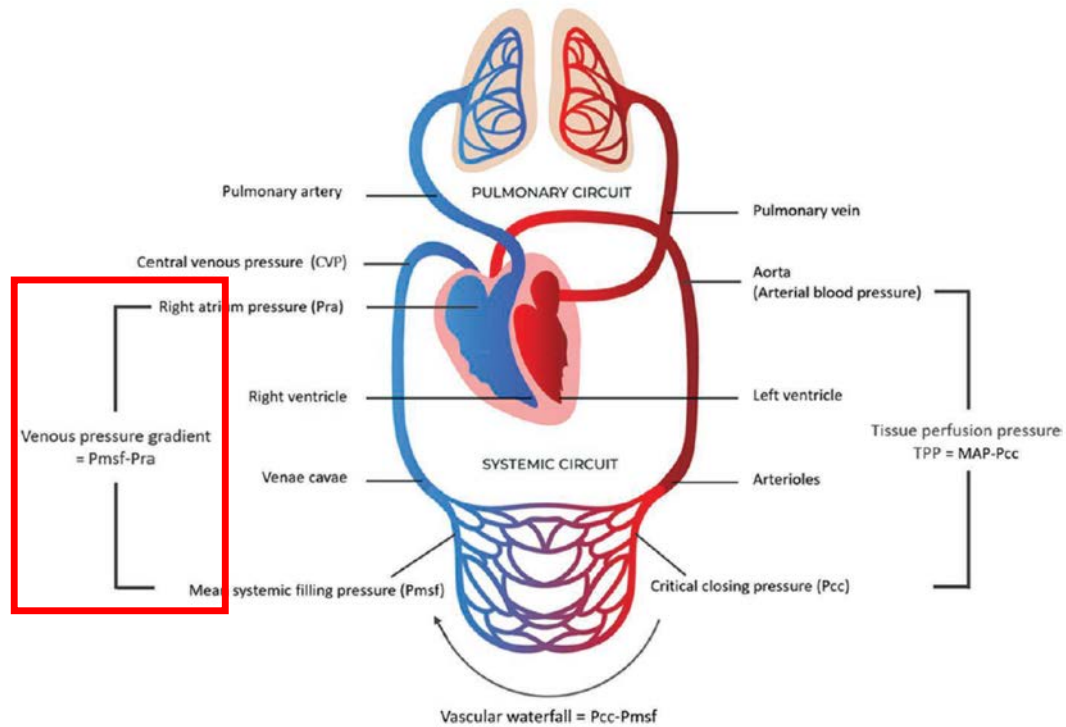
50



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OPTIMISATION DU RETOUR VEINEUX

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Legrand M, et al. Association between systemic hemodynamics and septic acute kidney injury in critically ill patients: a retrospective observational study. *Crit Care*. 29 nov 2013;17(6):R278.

Taha, A, et al. "Assessment of Tissue Perfusion Pressure in Patients With Septic Shock: Beyond Mean Arterial Pressure." *Critical Care Medicine* (2025). November. 2025.

OPTIMISATION DU RETOUR VEINEUX

52

Muñoz et al. *Critical Care* (2024) 28:52
<https://doi.org/10.1186/s13054-024-04834-1>

Critical Care

RESEARCH

Open Access

Coexistence of a fluid responsive state and venous congestion signals in critically ill patients: a multicenter observational proof-of-concept study



Felipe Muñoz^{1†}, Pablo Born^{1†}, Mario Bruna², Rodrigo Ulloa³, Cecilia González¹, Valerie Philp³, Roberto Mondaca¹, Juan Pablo Blanco³, Emilio Daniel Valenzuela¹, Jaime Retamal¹, Francisco Miralles⁴, Pedro D. Wendel-García⁵, Gustavo A. Ospina-Tascón^{6,7}, Ricardo Castro¹, Philippe Rola⁸, Jan Bakker^{1,9,10}, Glenn Hernández¹ and Eduardo Kattan^{1*}



OPTIMISATION DU RETOUR VEINEUX

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Muñoz et al. *Critical Care* (2024) 28:52
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Critical Care

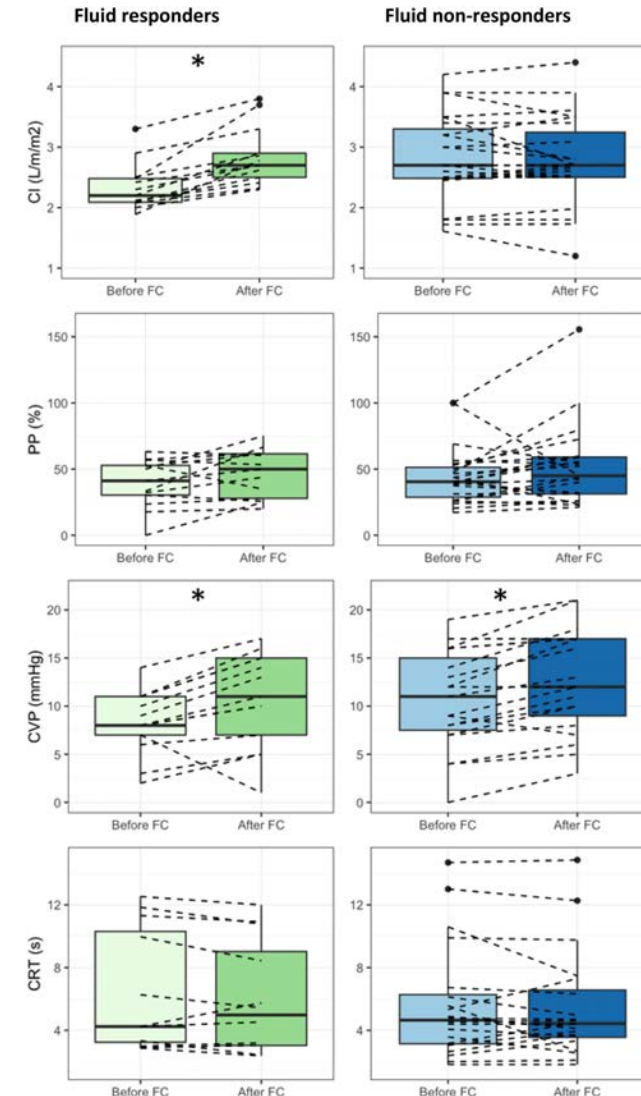
RESEARCH

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Coexistence of a fluid responsive state and venous congestion signals in critically ill patients: a multicenter observational proof-of-concept study

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Muñoz F, et al. Coexistence of a fluid responsive state and venous congestion signals in critically ill patients: a multicenter observational proof-of-concept study. *Crit Care*. 19 févr 2024;28(1):52.

Ruste M, et al. Changes in portal pulsatility index induced by a fluid challenge in patients with haemodynamic instability and systemic venous congestion: a prospective cohort study. *Ann Intensive Care*. 1 nov 2024;14(1):167.

STRATÉGIE PRÉEMPTIVE ?

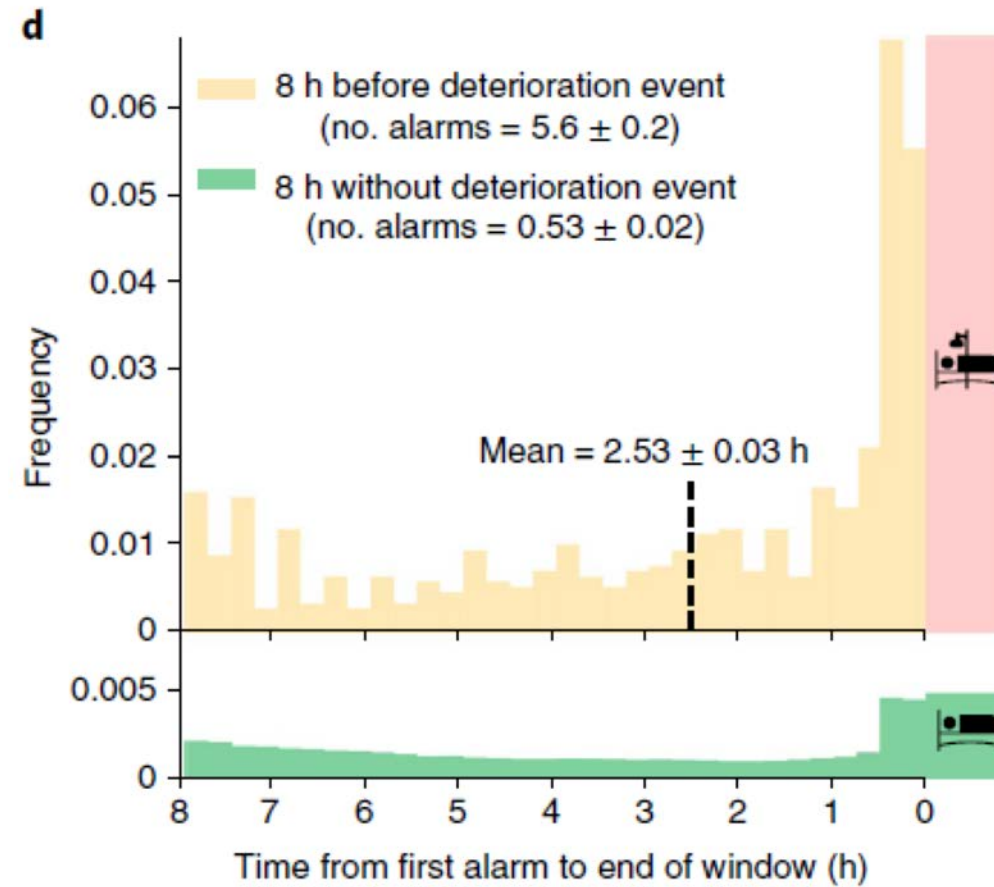
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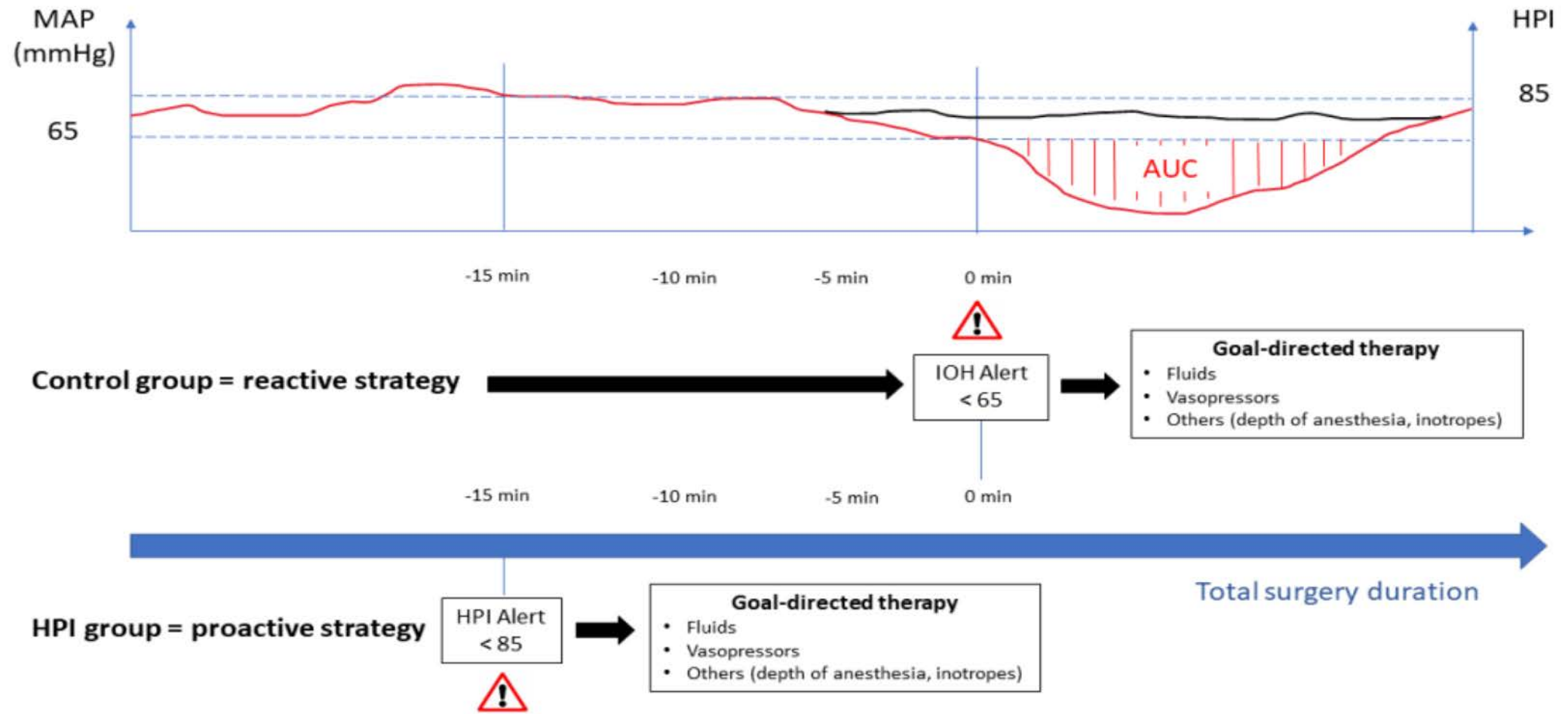
STRATÉGIE PRÉEMPTIVE ?

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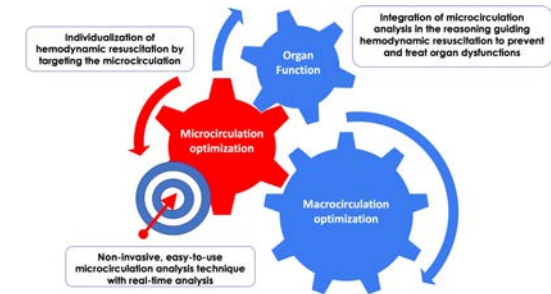
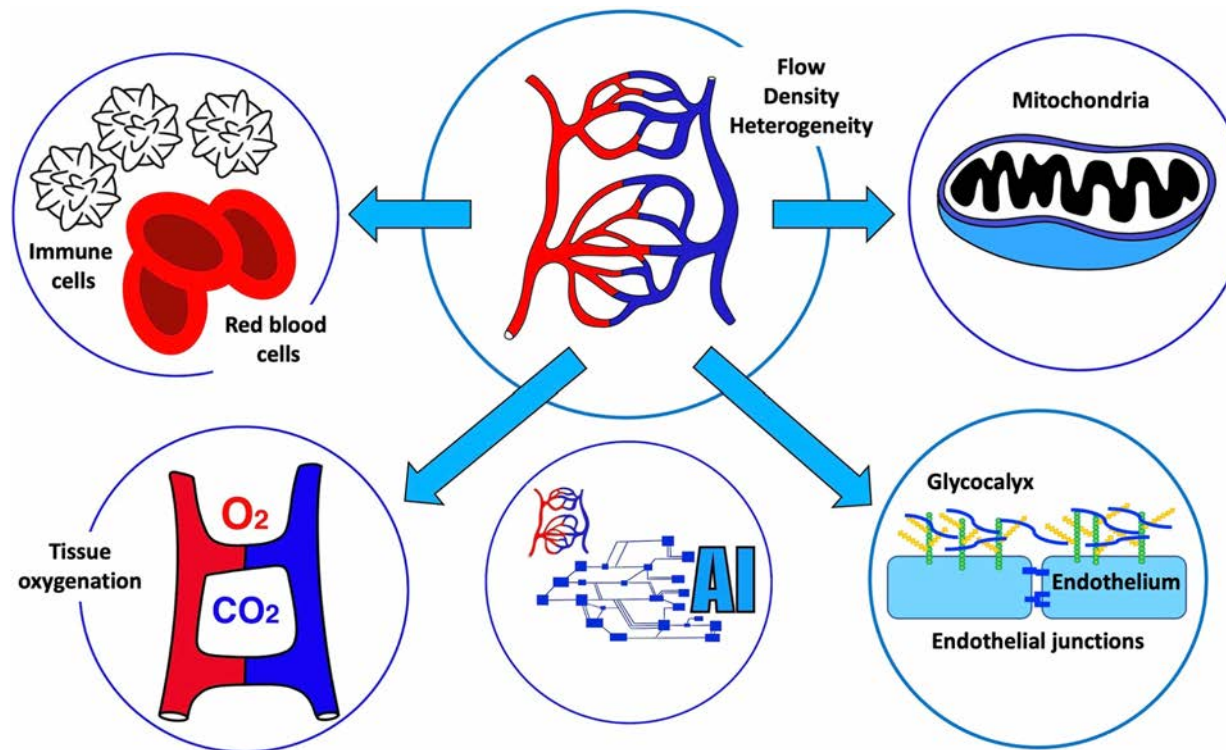
STRATÉGIE PRÉEMPTIVE ?

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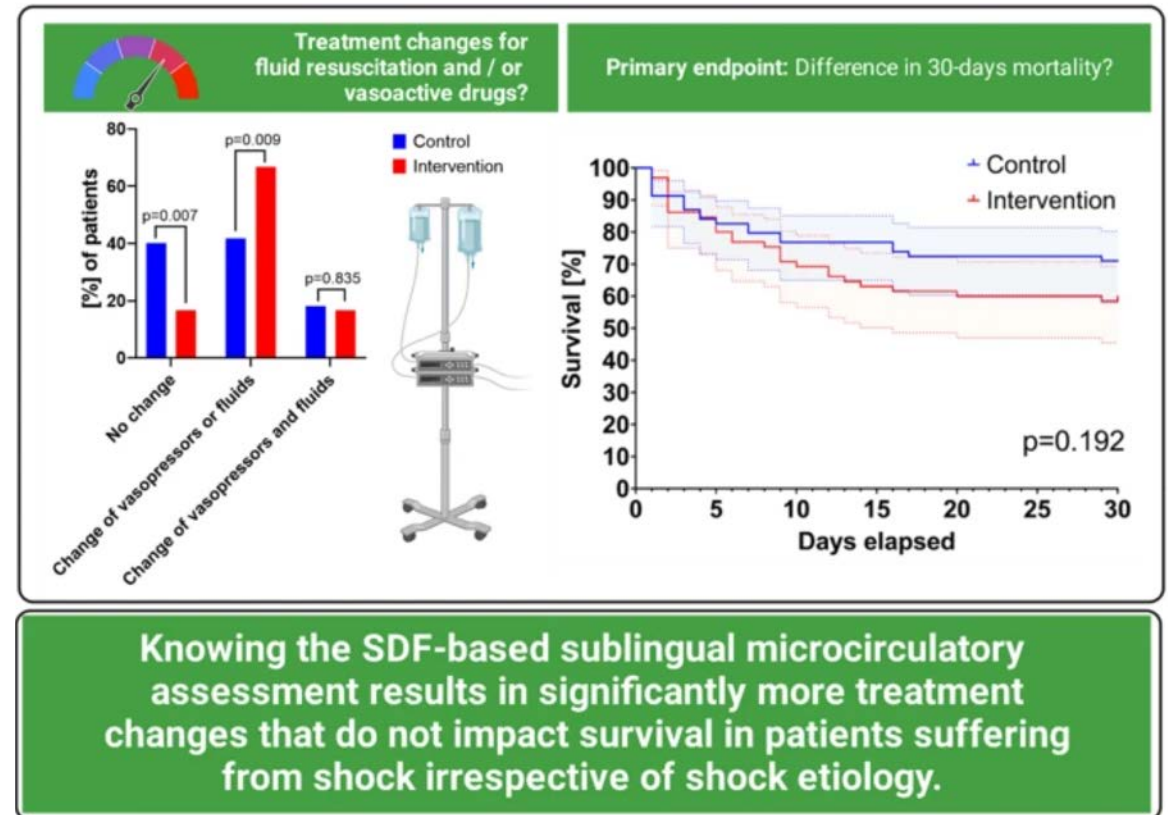
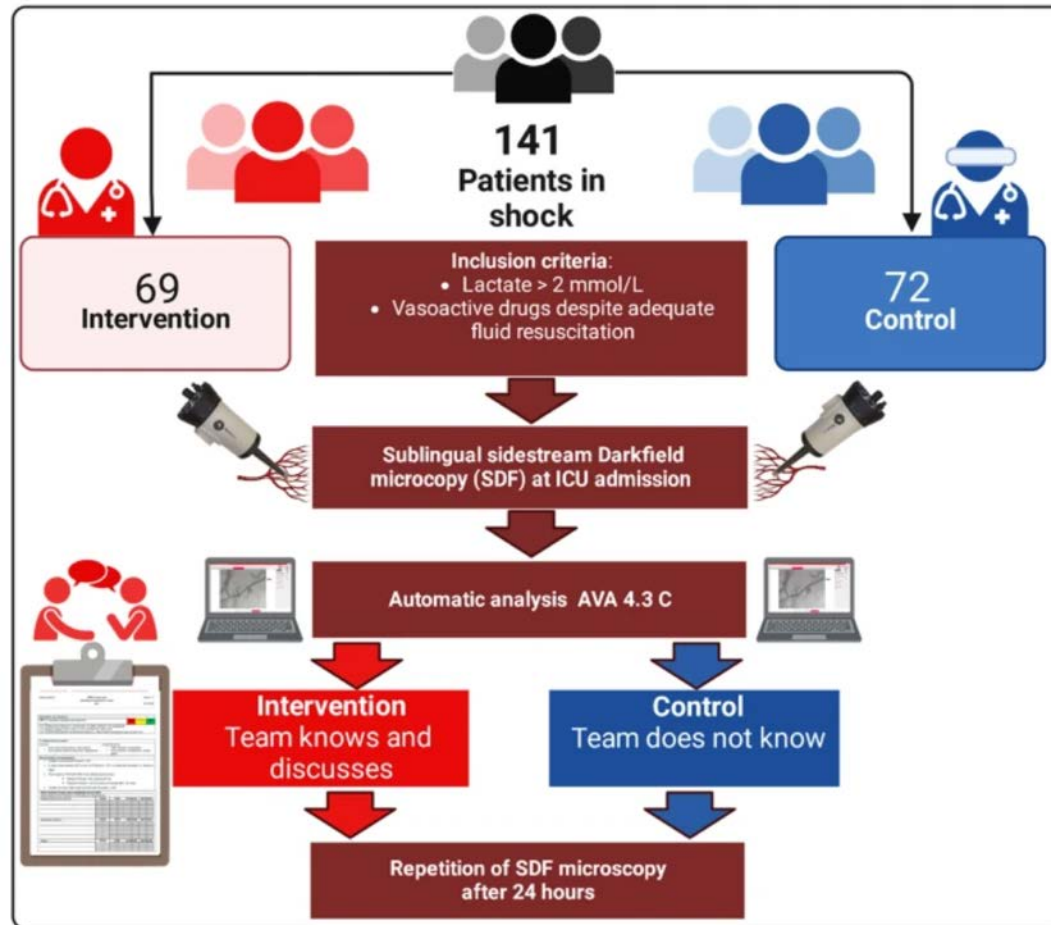
OPTIMISATION MICROCIRCULATOIRE

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OPTIMISATION MICROCIRCULATOIRE

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OPTIMISATION MICROCIRCULATOIRE

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Clinical Trial > Am J Respir Crit Care Med. 2025 Jul;211(7):1211-1219.

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Iloprost for the Treatment of Severe Septic Shock with Persistent Hypoperfusion: A Double-Blind, Randomized Controlled Trial

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Julien Pottecher¹², Matthieu Jamme¹³, Yves Poncelin de Raucourt¹⁴, Damien Barraud¹⁵,
Jean-Michel Constantin¹⁶, William Juguet¹⁷, Sigismond Lasocki¹⁸, Romain Sonnevill^{19,20},
Juliette Audibert²¹, Gaëtan Plantefève²², Olivier Ellrodt²³, Anne-Laure Fedou²⁴, Marc Leone²⁵,
Laurent Lefebvre²⁶, Adrien Auvet²⁷, David Chen¹, Eric Vicaud^{2,28}, François Dépret^{2,29};
I-MICRO Trial Investigators

Clinical Trial > JAMA Netw Open. 2024 Sep 3;7(9):e2432444.

doi: 10.1001/jamanetworkopen.2024.32444.

Iloprost and Organ Dysfunction in Adults With Septic Shock and Endotheliopathy: A Randomized Clinical Trial

Morten H Bestle^{1,2}, Jakob Stensballe^{3,4}, Theis Lange⁵, Niels E Clausen⁶, Peter Sørensen⁷,
Kristine Holst Pedersen³, Mikkel Gybel-Brask³, Maj-Brit N Kjær⁸, Christian Overgaard Steensen⁸,
Diana Bertelsen Jensen⁶, Rune Gärtner⁶, Martin Schønemann-Lund¹, Klaus T Kristiansen⁹,
Anne Lindhardt¹⁰, Pär I Johansson³, Anders Perner^{2,8}

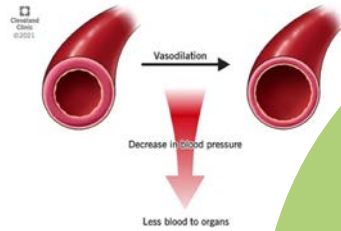
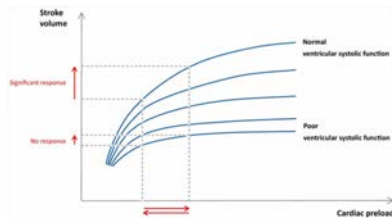
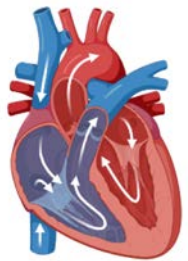
ILOMEDINE : PAS DE BENEFICE DEMONTRE

OPTIMISATION CARDIO-CIRCULATOIRE

CONCLUSION

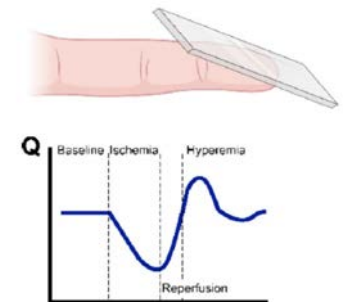
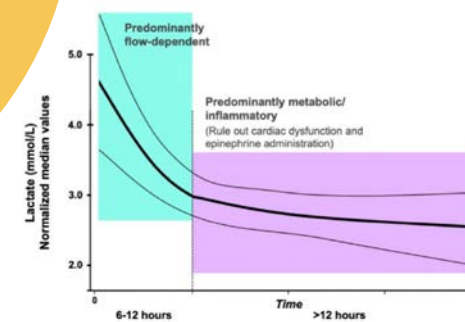
CONCLUSION

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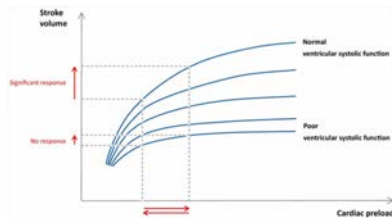
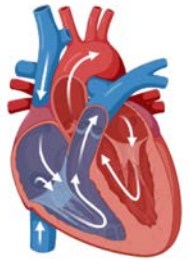


MACRO CIRCULATION

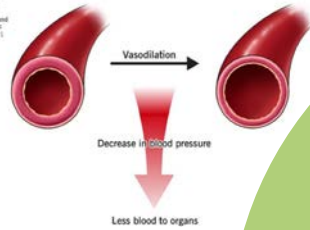
PERFUSION



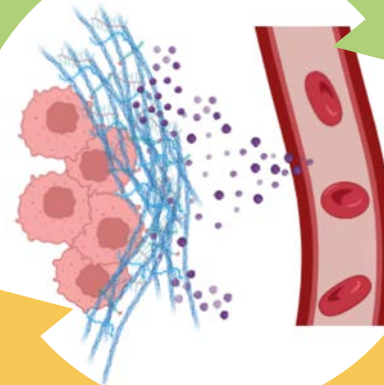
CONCLUSION



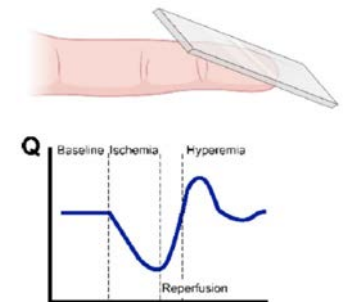
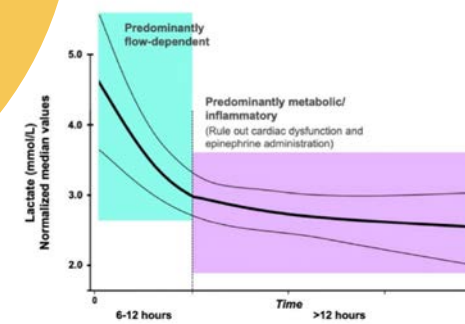
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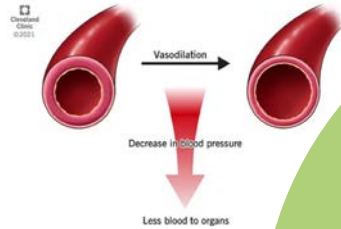
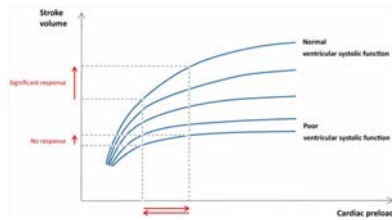
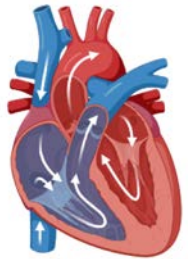
MACRO CIRCULATION



PERFUSION



CONCLUSION



MACRO CIRCULATION

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PERFUSION

