MODALITÉS DE L'ÉPURATION EXTRARÉNALE DANS LE CHOC SEPTIQUE

Pr Ag AYACHI JIHENE

Service de Réanimation Médicale

CHU Ibn El Jazzar Kairouan

ATR Novembre 2024

PHYSIOPATHOLOGIE

Pathogène

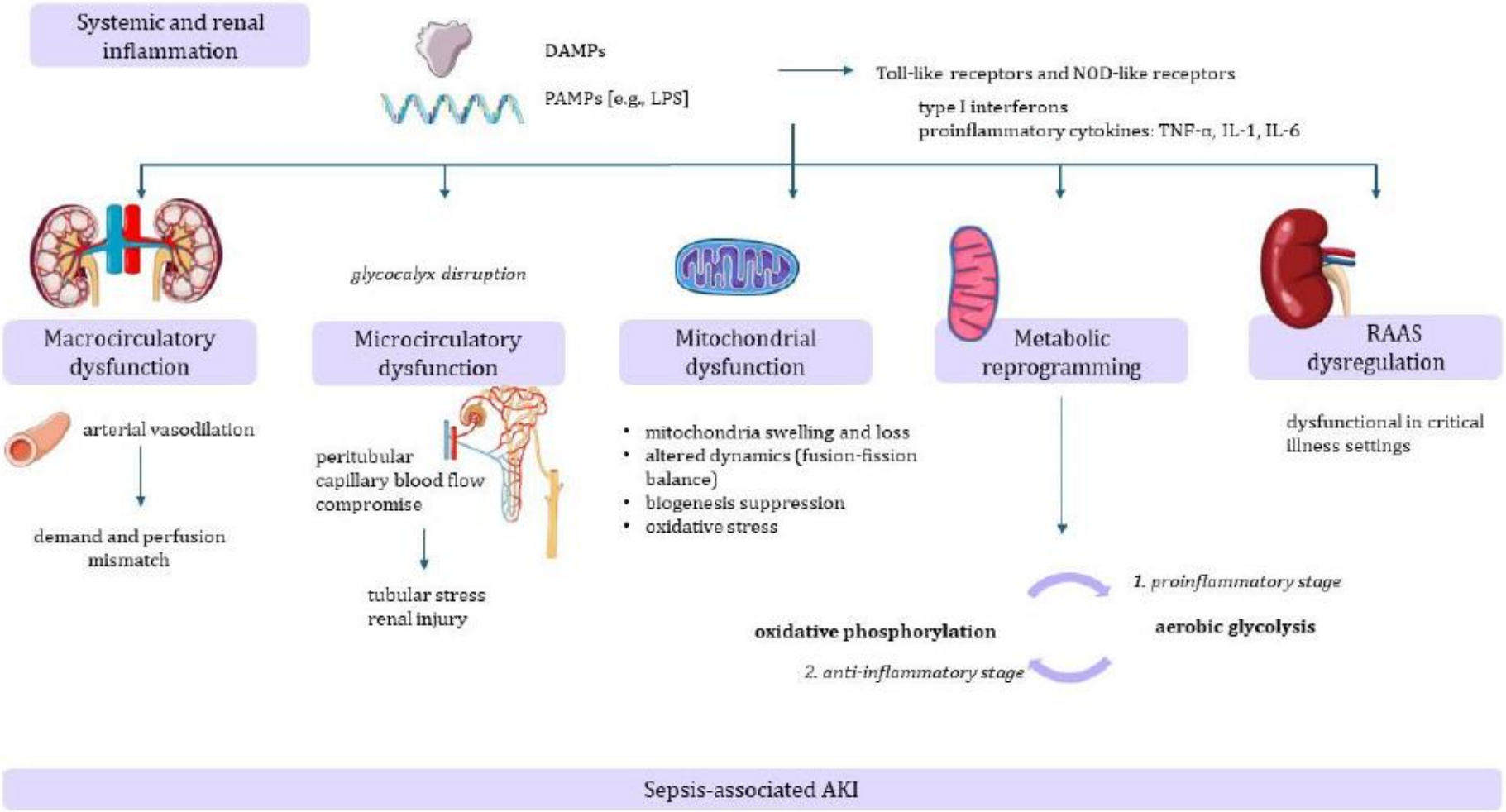
Infection

Orage cytokinique

Défaillance Multiviscérale

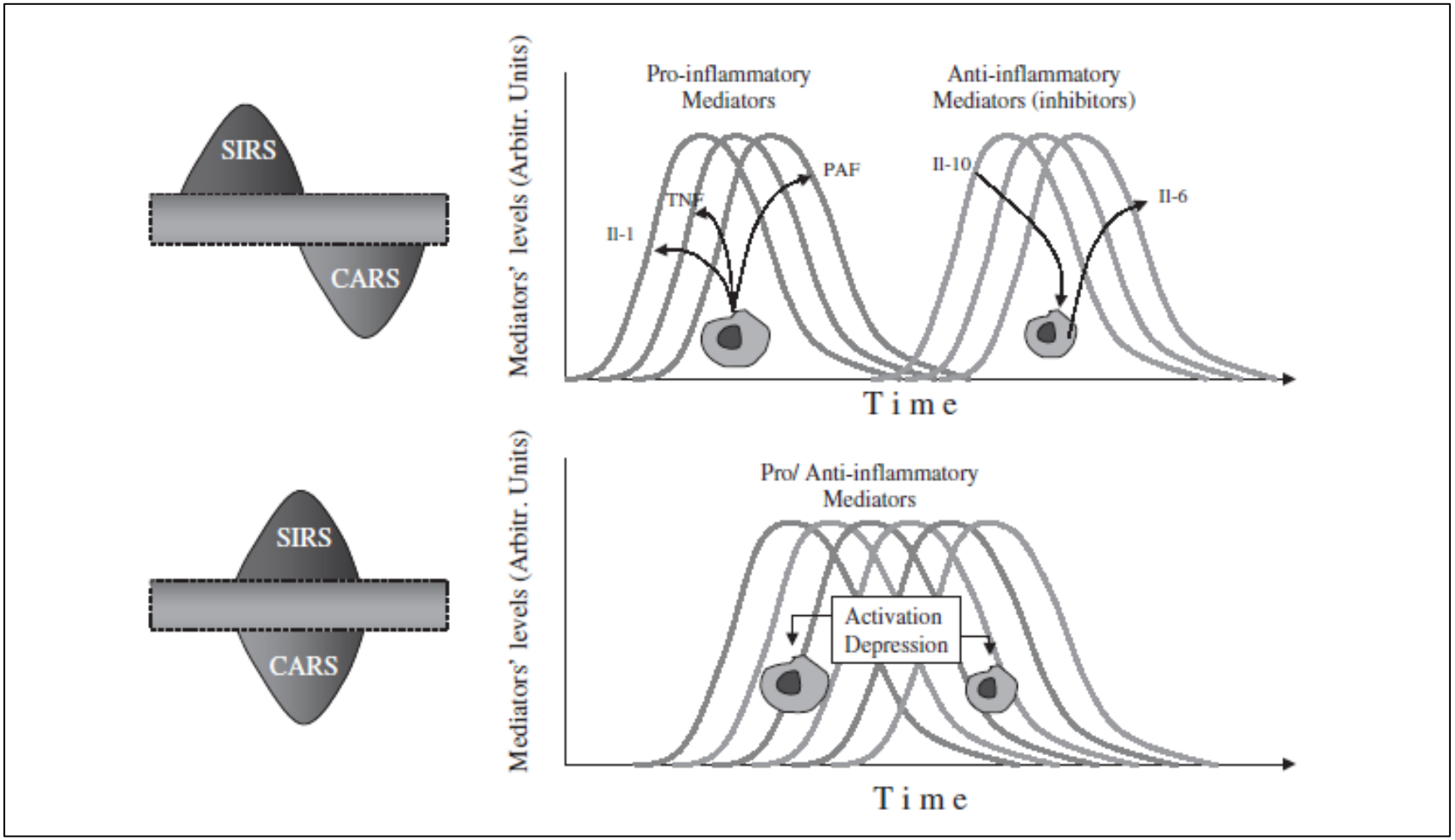
Décès

PHYSIOPATHOLOGIE SA-AKI



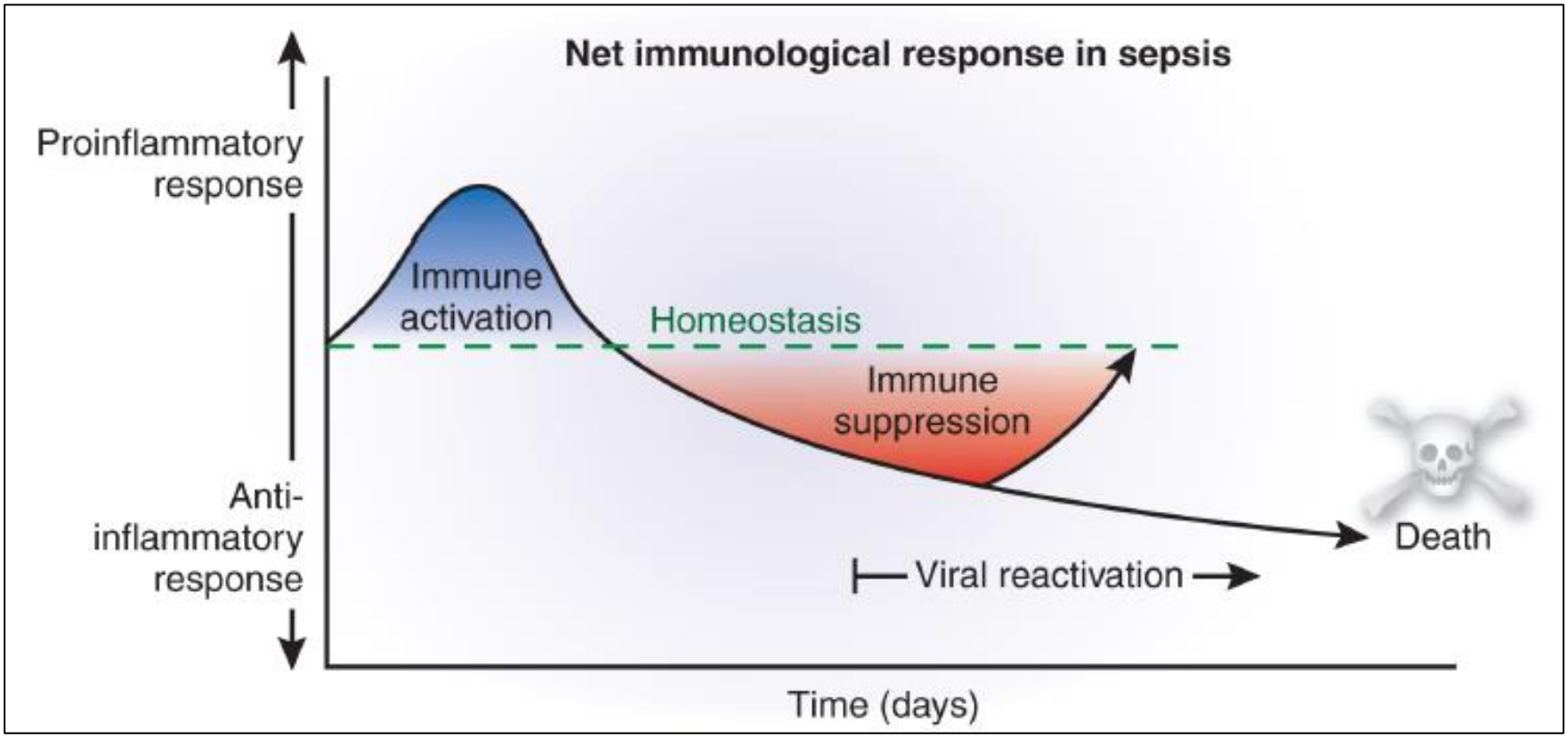
Telma Pais et al Int. J. Mol sci 2024

PHYSIOPATHOLOGIE CYTOKINE STORM



Ronco et al, Artif Organs, 2003

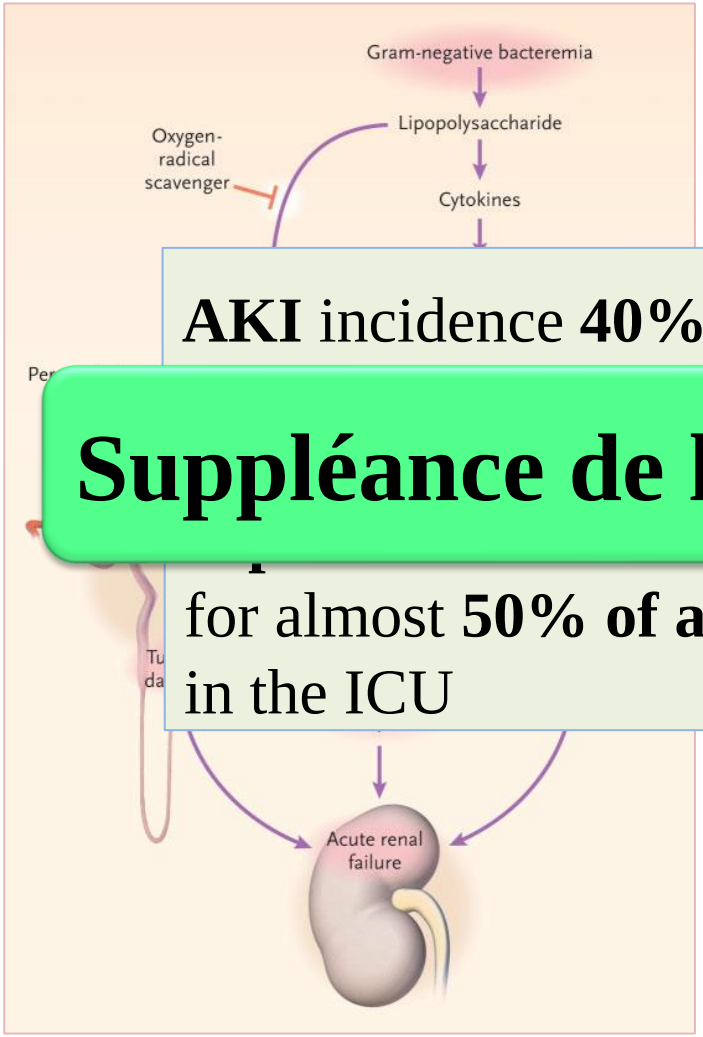
PHYSIOPATHOLOGIE CYTOKINE STORM

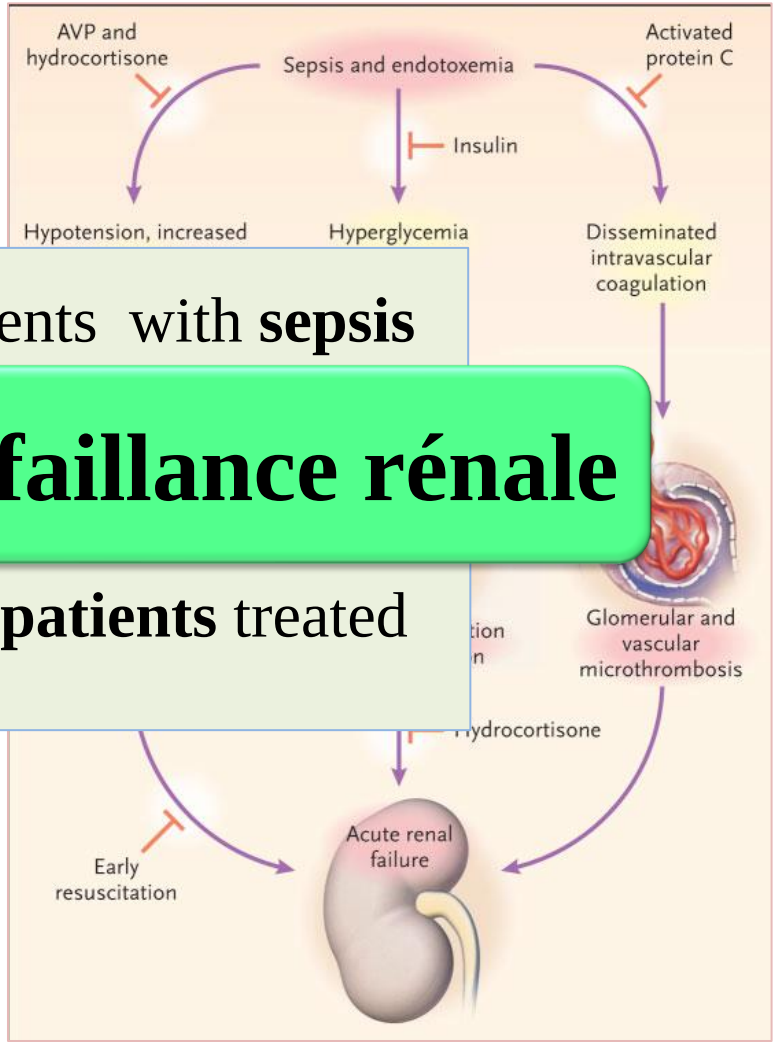


Hotchkiss et al.Nat Med 2009

INTÉRÊT DE L'ÉPURATION EXTRA-RÉNALE AU COURS DU CHOC SEPTIQUE ?

RRT FOR SA-AKI





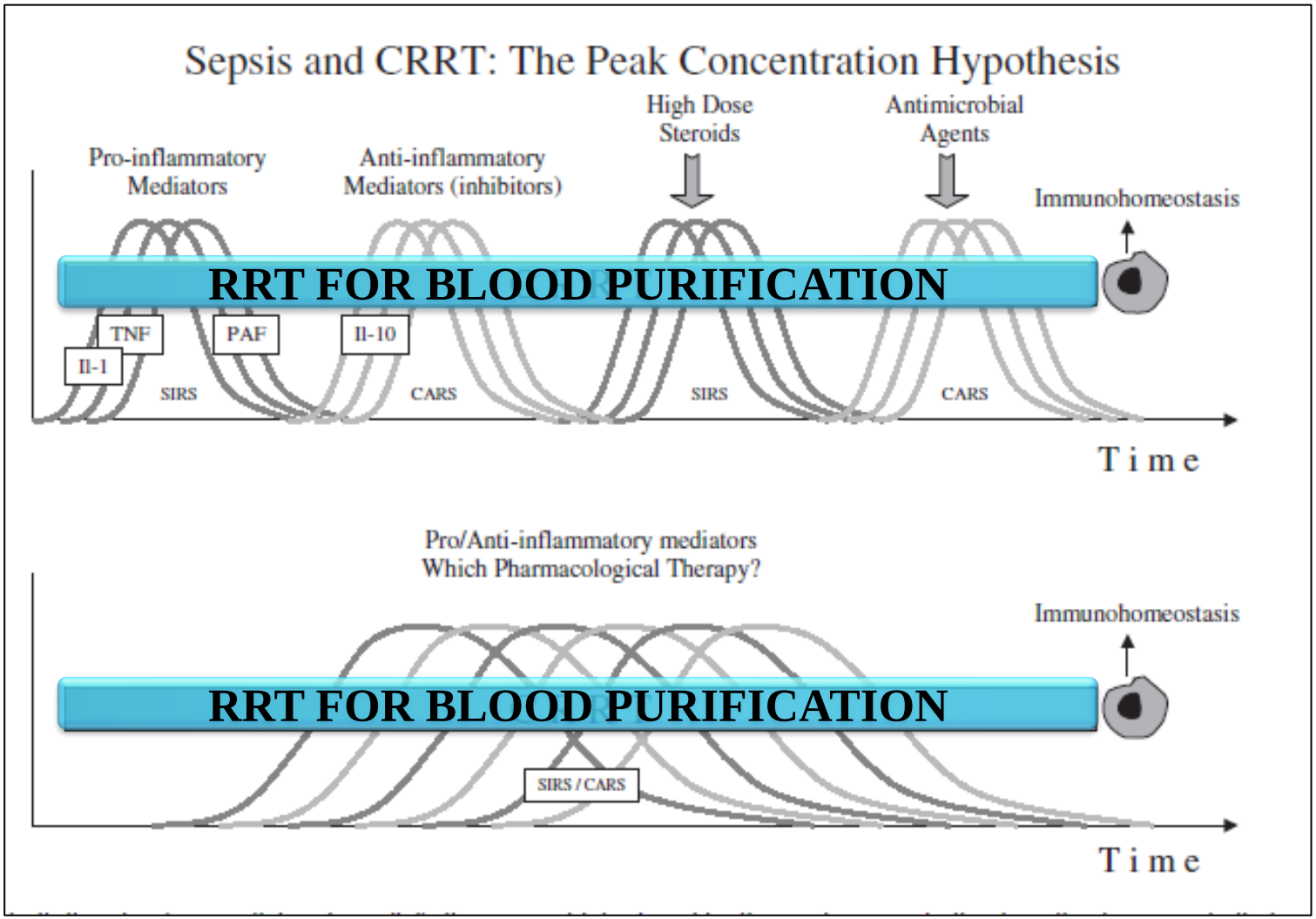
AKI incidence **40%** in patients with **sepsis**

Suppléance de la défaillance rénale

for almost **50% of all AKI patients** treated in the ICU

Robert W et al N Engl J Med 2004
Telma Pais et al Int. J. Mol. Sci. 2024

RRT FOR BLOOD PURIFICATION



Ronco et al, Artif Organs, 2003

RRT FOR BLOOD PURIFICATION

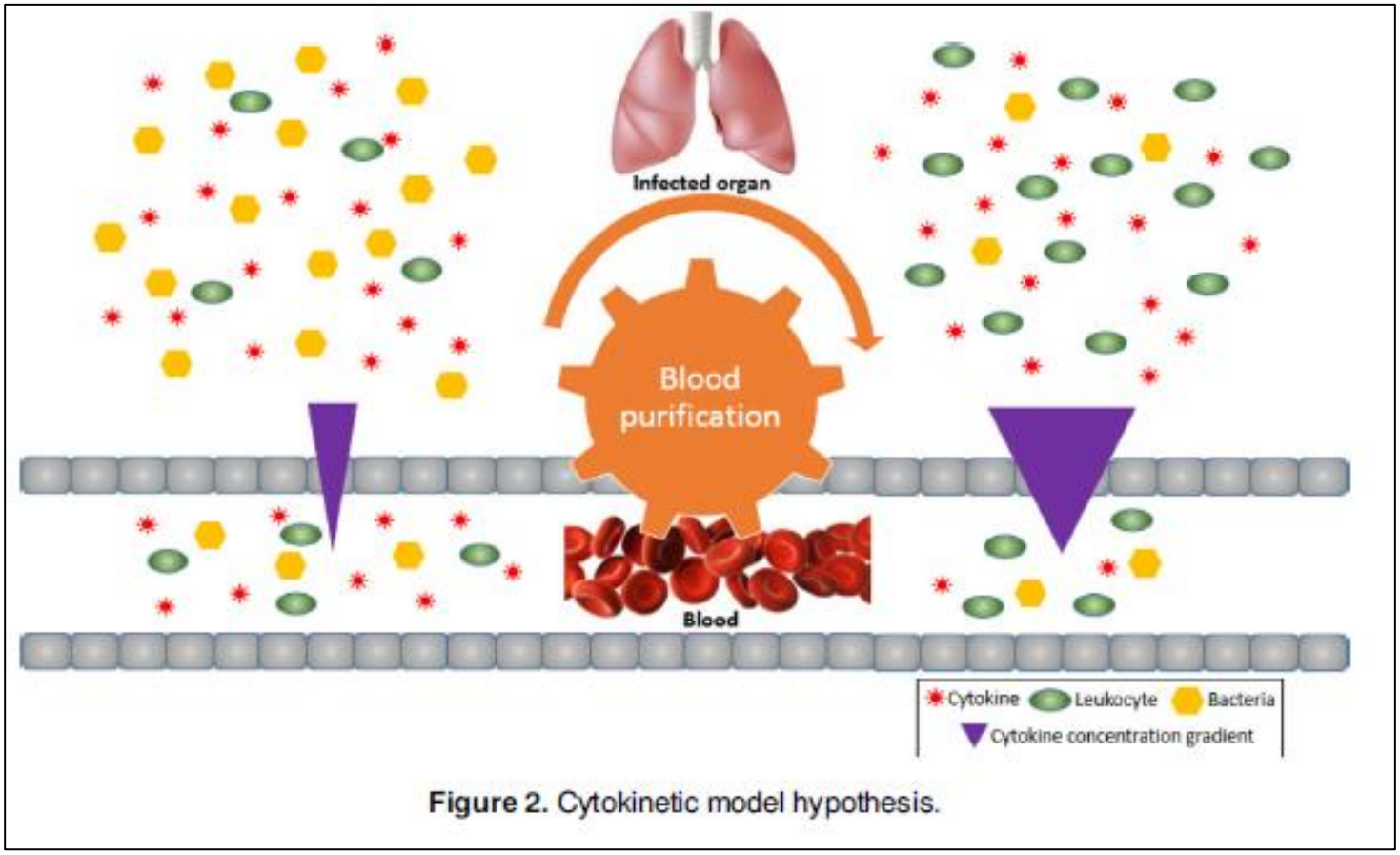


Figure 2. Cytokinetic model hypothesis.

Thibaut Girardot et al, Seminars in Nephrology 2019

EER POUR SUPPLÉANCE DE LA DÉFAILLANCE RENALE ASSOCIÉE AU SEPSIS

SA-AKI

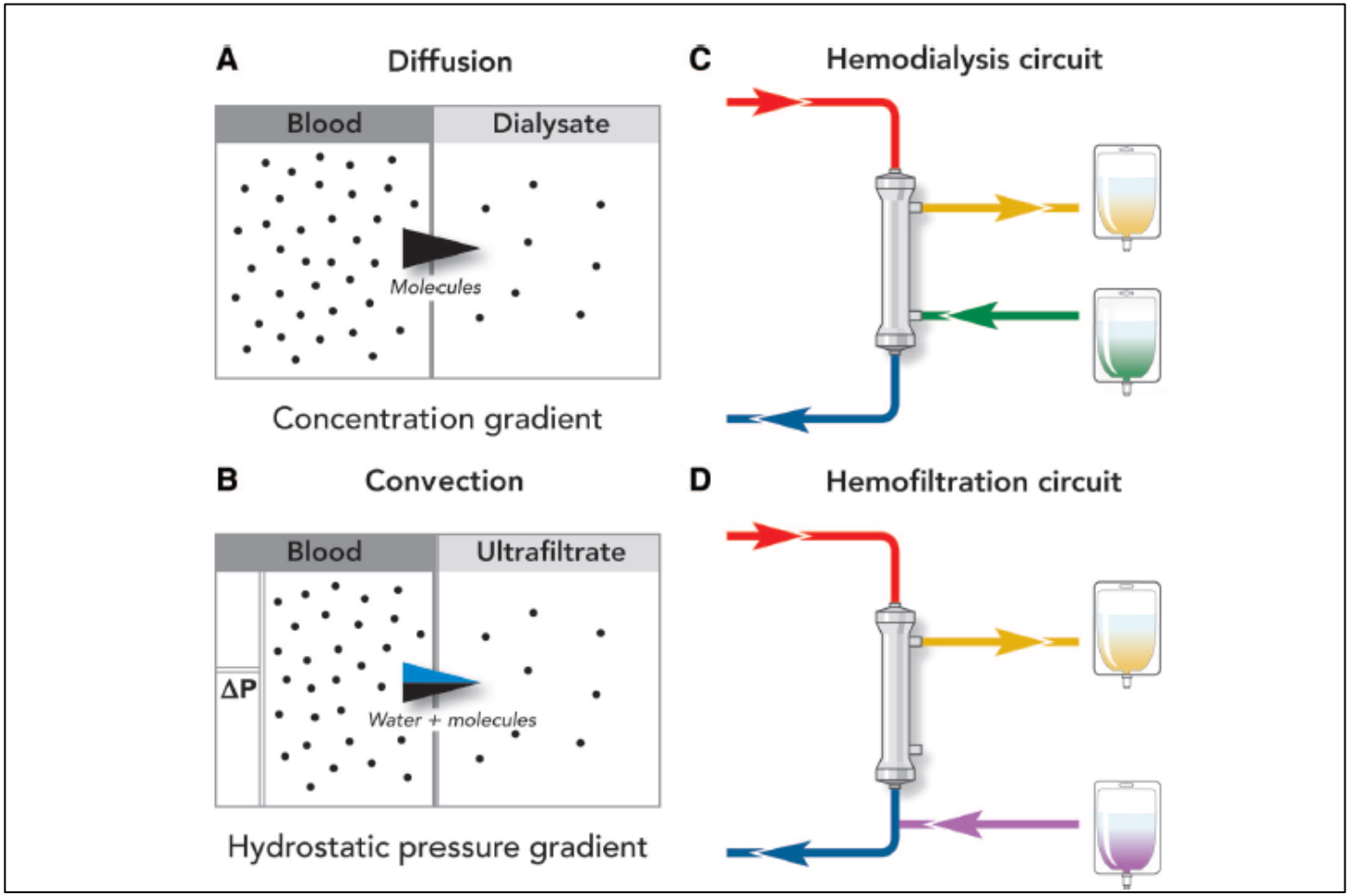
RRT FOR SA-AKI / QUELLE MODALITÉ ??

Modalité : Continue vs intermittente?
Convection vs Diffusion ?

Timing précoce ou tardive ?

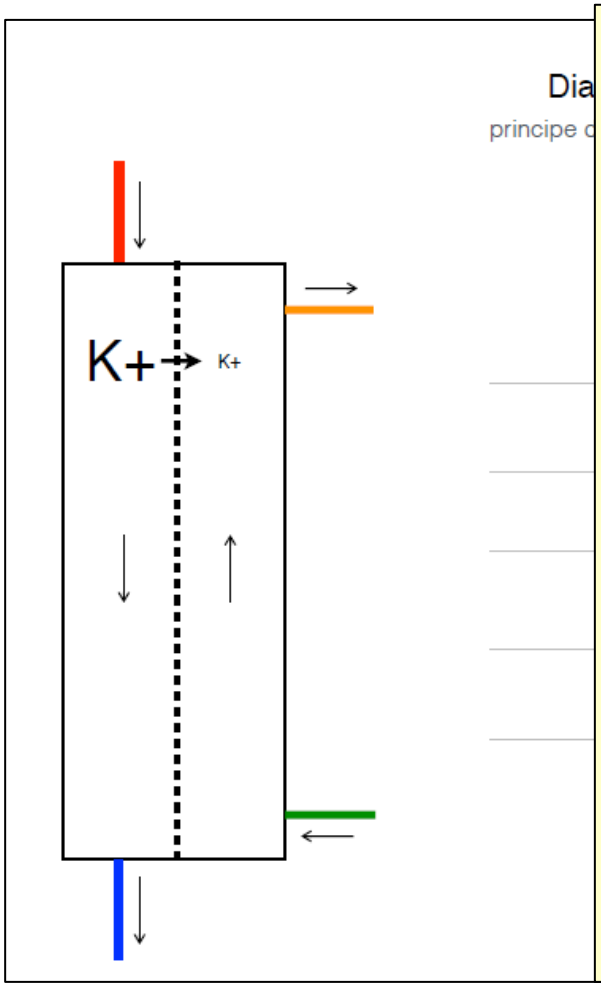
Dose de dialyse?

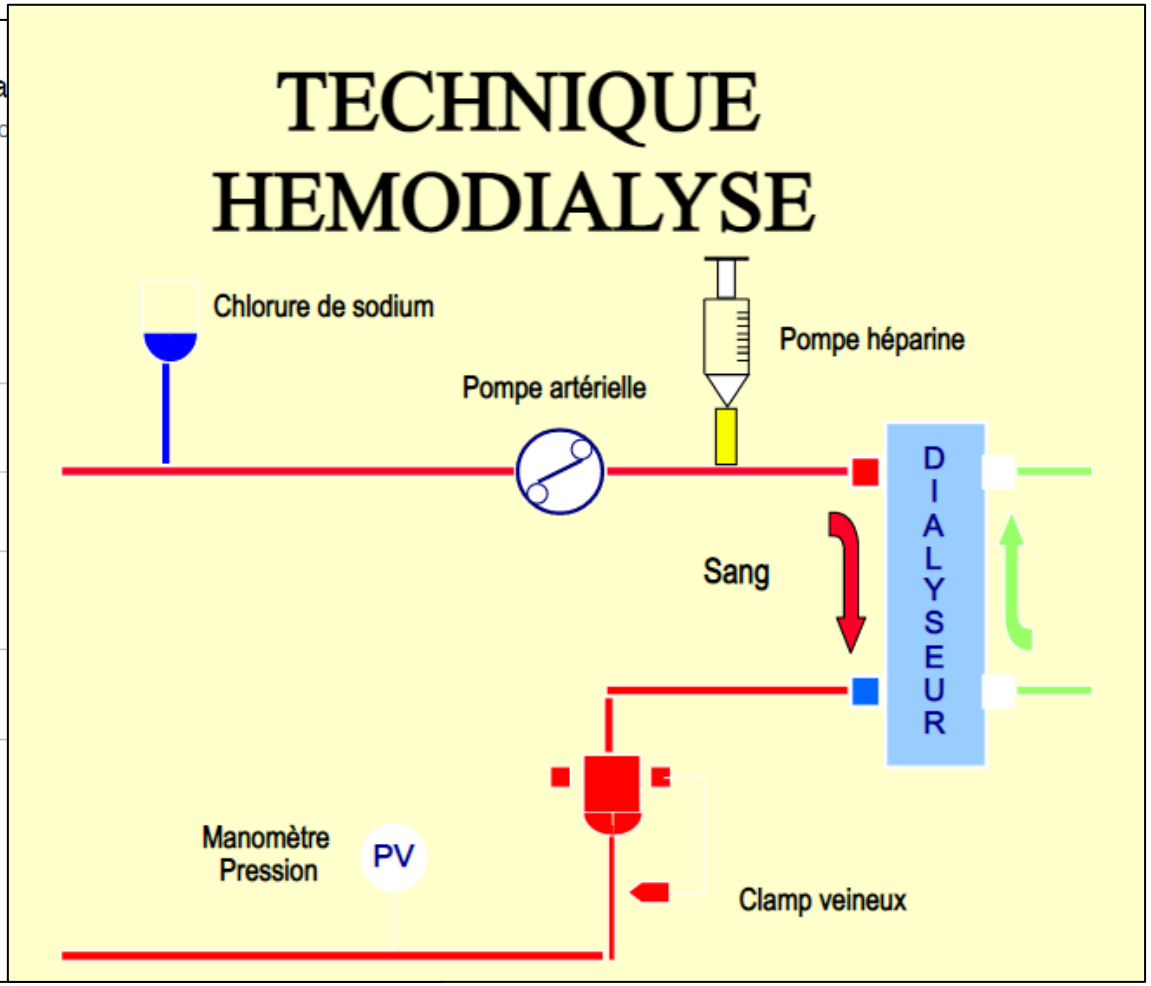
EER / RAPPEL THEORIQUE



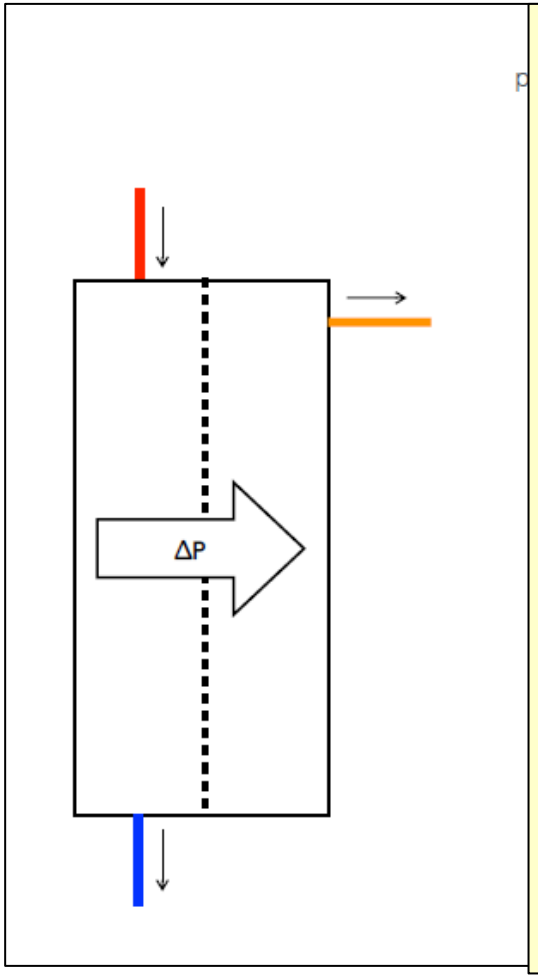
Rimmelé et al Anesthesiology, 2012

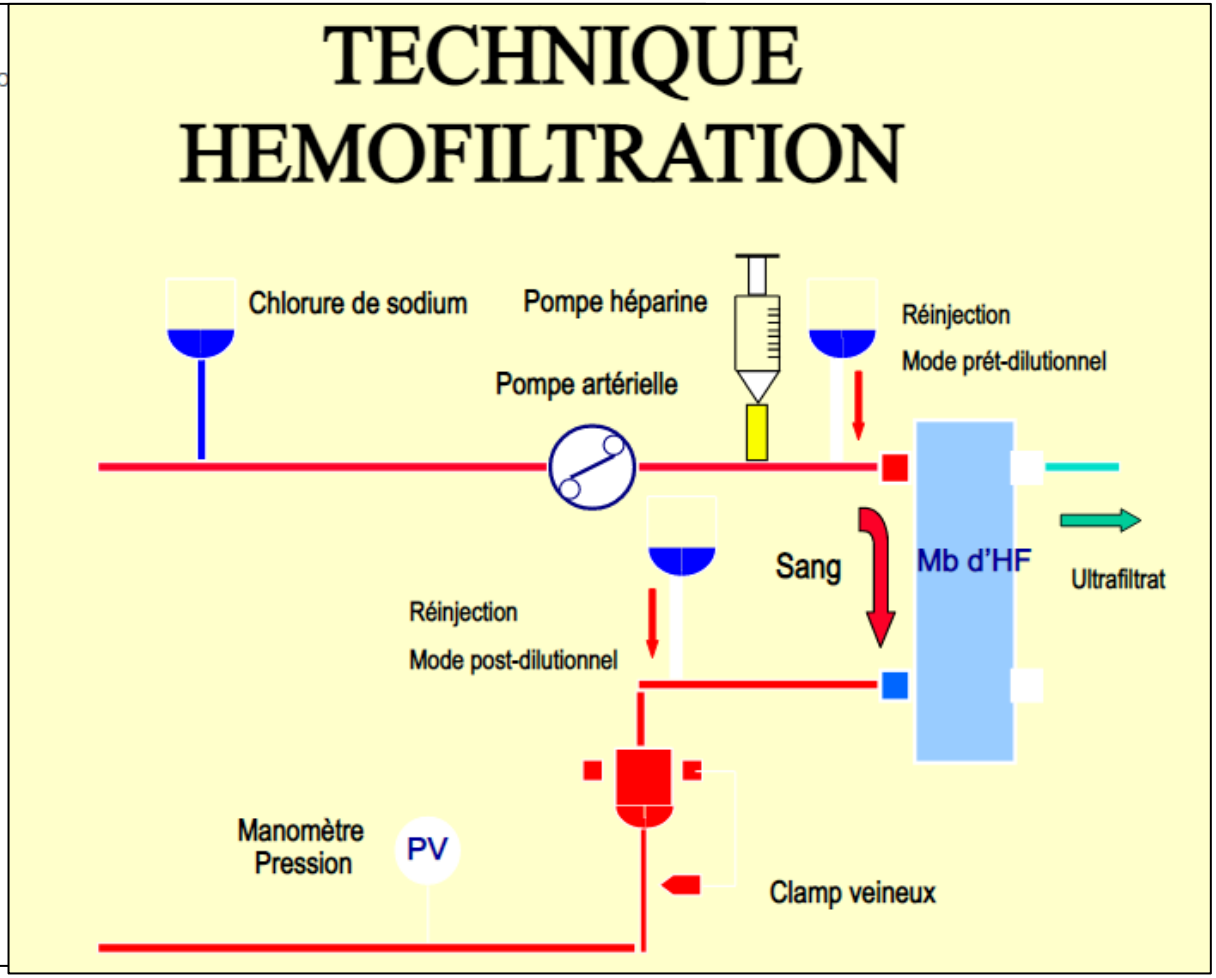
EER / RAPPEL THEORIQUE



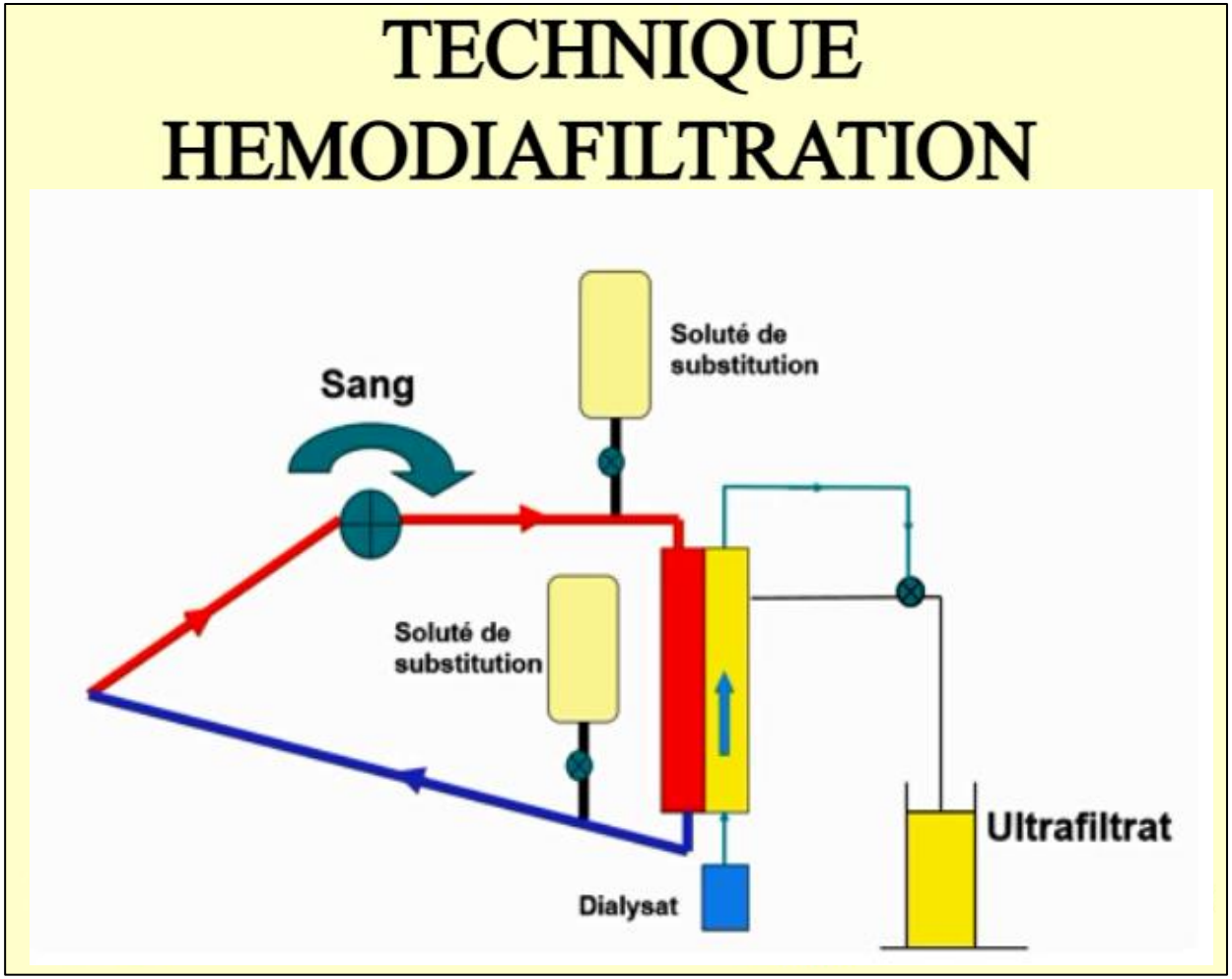


EER / RAPPEL THEORIQUE





EER / RAPPEL THEORIQUE



Continuous venovenous haemodiafiltration versus intermittent haemodialysis for acute renal failure in patients with multiple-organ dysfunction syndrome: a multicentre randomised trial

Lancet 2006; 368: 379–85

…y Boulain, Jean-Louis Pallot,

	Intermittent haemodialysis (n=184)	Continuous venovenous haemodiafiltration (n=175)
Age (years)	65 (6…	
Weight (kg)	79 (7…	
Sex		
Male	132 (7…	
Female	52 (2…	
Reason for admission		
Medical	134 (7…	
Surgical	50 (2…	
Previous health status		
No or moderate limitation	106 (5…	
Serious limitation or bedridden	78 (4…	
SAPS II score	64 (6…	
LOD score	10 (9…	
Catecholamine	158 (86%)	155 (89%)
Mechanical ventilation	174 (95%)	171 (98%)
Delayed ARF	123 (67%)	123 (70%)
Median time from admission to inclusion (days)	2	3
Oliguria	101 (55%)	107 (61%)
Presence of sepsis	127 (69%)	98 (56%)
Urea (mmol/L)	31 (29–33)	29 (26–31)
Serum creatinine (µmol/L)	432 (407–457)	422 (381–464)

	Intermittent haemodialysis	Continuous venovenous haemodiafiltration
Duration of sessions (h)	5·2 (5·1–5·3)	continuous
Blood flow (mL per min)	278 (275–281)	146 (145–147)
Dialysate flow*	500	1099 (1068–1128)
Ultrafiltration flow (mL per h)		1278 (1255–1301)
Net ultrafiltration† (mL per day)	2213 (2141–2285)	2107 (2011–2203)
Mean urea (mmol/L)	15·7 (7·5)	14·8 (9·1)

Continuous venovenous haemodiafiltration versus intermittent haemodialysis for acute renal failure in patients with multiple-organ dysfunction syndrome: a multicentre randomised trial

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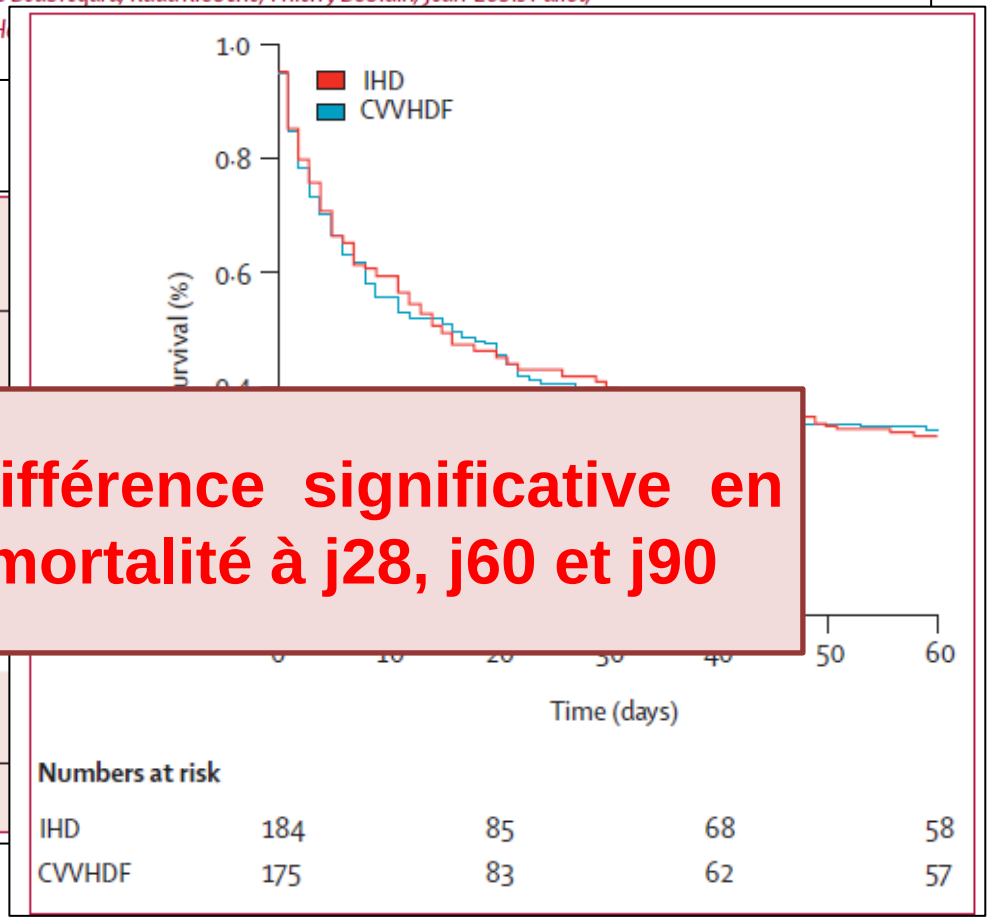
Christophe Vinsonneau, Christophe Camus, Alain Combes, Marie Alyette Costa de Beauregard, Kada Klouche, Thierry Boulain, Jean-Louis Pallot, Jean-Daniel Chiche, Pierre Taupin, Paul Landais, Jean-François Dhainaut, for the H

	Intermittent haemodialysis
Survival	
Day 28	
Day 60 (primary endpoint)	
Day 90	
Renal support duration (days)	
Length of ICU stay (days)	
Length of hospital stay (days)	

Values are mean (95% CI). ICU=intensive-care unit.

Table 3: Outcomes according to treatment group



Pas de différence significative en terme de mortalité à j28, j60 et j90

Continuous venovenous haemodiafiltration versus intermittent haemodialysis for acute renal failure in patients with multiple-organ dysfunction syndrome: a multicentre randomised trial

Lancet 2006; 368: 379–85

Christophe Vinsonneau, Christophe Camus, Alain Combes, Marie Alyette Costa de Beauregard, Kada Klouche, Thierry Boulain, Jean-Louis Pallot, Jean-Daniel Chiche, Pierre Taupin, Paul Landais, Jean-François Dhainaut, for the Hemodiafe Study Group*

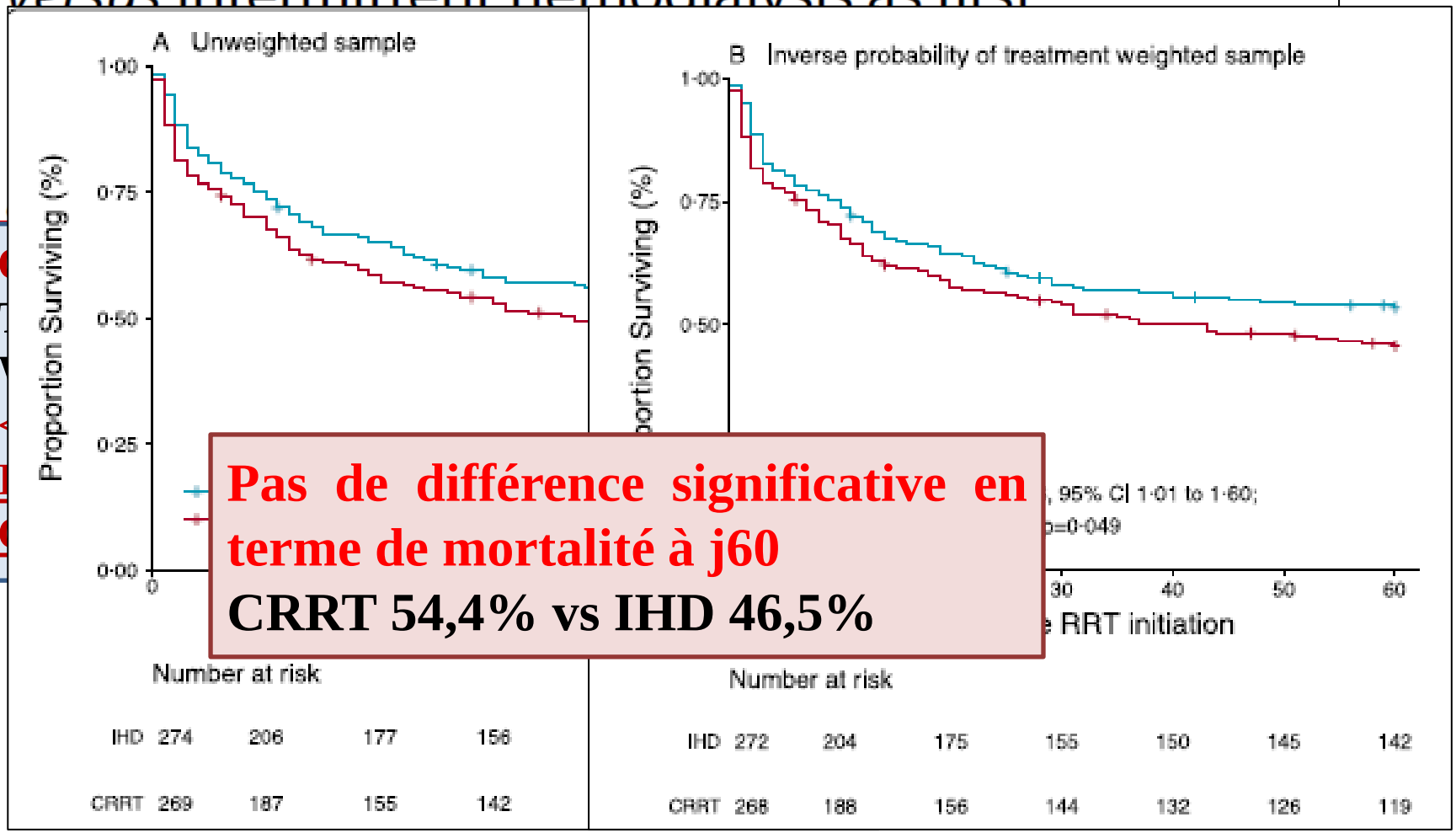
	Intermittent haemodialysis (n=184)	Continuous venovenous haemofiltration (n=175)	p value
Hypotension*	72 (39%)	61 (35%)	0·47
Bleeding event†	13 (7%)	12 (7%)	0·89
Thrombocytopenia	22 (12%		
Hypoglycaemia	12 (7%		
Hypophosphataemia	13 (7%		
Hypothermia	10 (5%		
Arrhythmia	18 (10%)	9 (5%)	0·15
Catheter infection	2 (1%)	3 (2%)	0·95

Pas de différence significative en terme de tolérance hémodynamique

RESEARCH

Critical care 2022

Continuous renal replacement therapy *versus* intermittent hemodialysis as first



Pas de différence significative en terme de mortalité à j60

CRRT 54,4% vs IHD 46,5%

Clinical Trial > Intensive Care Med. 2023 Nov;49(11):1305-131

doi: 10.1007/s00134-023-07211-8. Epub 2023 Oct 10.

Intensive care Med 2023

Initiation of continuous renal replacement therapy versus intermittent hemodialysis in critically ill patients with severe acute kidney injury: a secondary analysis of STARRT-AKI trial

Results: We identified 1590 trial participants who initially received CRRT and 606 who initially received IHD. The composite outcome of death or RRT dependence at 90-days occurred in 823 (51.8%) patients who commenced CRRT and 329 (54.
0.90; 95% confidence interval (CI) 0.7
weighting, initial receipt of CRRT was
days compared with initial receipt of
predominantly driven by a lower risk of RRT dependence at 90-days (OR 0.61; 95% CI 0.39-0.94).

initiation of CRRT, as compared to IHD, was associated with a significant reduction in the composite outcome of death or RRT dependence at 90-days.

Conclusions: In critically ill patients with severe AKI, initiation of CRRT, as compared to IHD, was associated with a significant reduction in the composite outcome of death or RRT dependence at 90-days.

LES RECOMMANDATIONS / TECHNIQUE

Réanimation
DOI 10.1007/s13546-014-0917-6

RÉFÉRENTIEL / *GUIDELINES*

2014

Les techniques d'EER, continues et intermittentes, peuvent être utilisées indifféremment, mais en tenant compte de la disponibilité de la technique et de l'expérience de l'équipe.
Accord fort

et de la Société francophone de dialyse (SFD)

Les techniques d'EER diffusives ou convectives peuvent être utilisées indifféremment, mais en tenant compte de la disponibilité de la technique et de l'expérience de l'équipe.
Accord fort

Vely, David Osman, Ly Van Vong

LES RECOMMANDATIONS

Intensive Care Med (2021) 47:1181–1247
https://doi.org/10.1007/s00134-021-06506-y

Intensive Care Med 2021

GUIDELINES

Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021

Check for updates

In adults with sepsis or septic shock and AKI who require renal replacement therapy, we suggest using either continuous or intermittent renal replacement therapy
Weak recommendation, low quality of evidence

Theodore Iwashyna[35], Shevin Jacob[34], Ruth Kleinpell[35], Michael Klompas[36,37], Younsuck Koh[38], Anand Kumar[39], Arthur Kwizera[40], Suzana Lobo[41], Henry Masur[42], Steven McGloughlin[43], Sangeeta Mehta[44], Yatin Mehta[45],

Initiation Strategies for Renal-Replacement Therapy in the Intensive Care Unit

Stéphane Gaudry, M.D., David Hajage, M.D., Fréderique

AKIKI NEJM 2016

Table 1. Characteristics of the Patients at Baseline.*

Characteristic	Early Strategy (N=311)	Delayed Strategy (N=308)
Age — yr	64.8±14.2	67.4±13.4
Physiological sup		
Invasive mech	266 (86)	267 (87)
Vasopressor s	265 (85)	263 (85)
Sepsis status — r		
Sepsis	25 (8)	21 (7)
Severe sepsis	16 (5)	19 (6)
Septic shock	209 (67)	204 (66)
Patients with oliguria or anuria — no. (%)	202 (65)	191 (62)
Serum creatinine — mg/dl	3.25±1.40	3.20±1.32
Blood urea nitrogen — mg/dl	53±24	54±24
Serum potassium — mmol/liter	4.4±0.7	4.4±0.7
Serum bicarbonate — mmol/liter	18.7±5.1	18.8±5.5

EARLY : KDIGO 3 , 4 h après
DELAYED : KDIGO 3 , 57 h après
Techniques : HDI ou CCRT

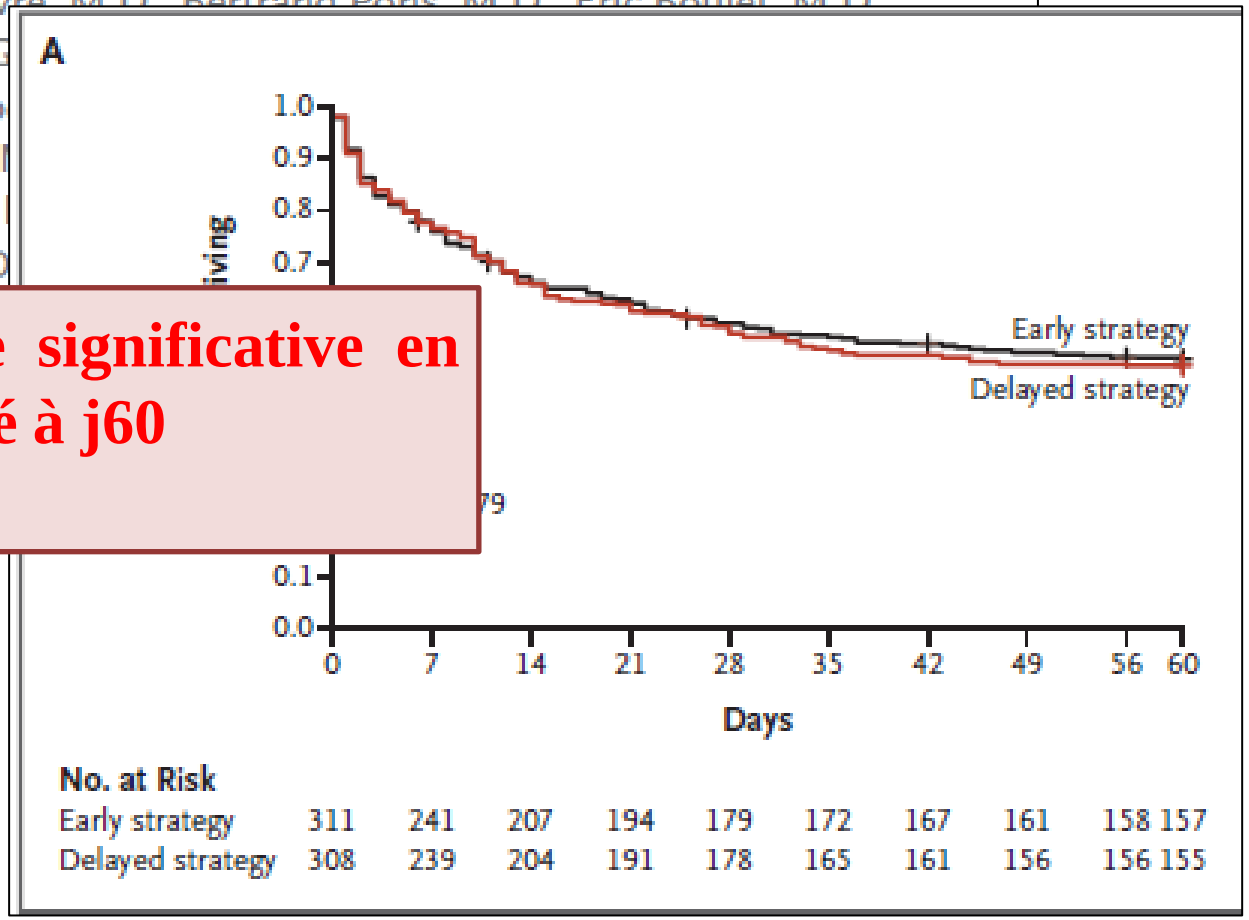
Initiation Strategies for Renal-Replacement Therapy in the Intensive Care Unit

AKIKI NEJM 2016

Stéphane Gaudry, M.D., David Hajage, M.D., Fréderique
Laurent Martin-Lefevre, M.D., Bertrand Pons, M.D., Eric Boulet, M.D.
Alexandre Boyer, M.D., G
Dorothée Carp
Alexandre Lautrette,
Saad Nseir, M.D., Ph.D.,
Jean-Marie Forel, M.D

Pas de différence significative en terme de mortalité à j60

48,5% vs 49,7%



JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

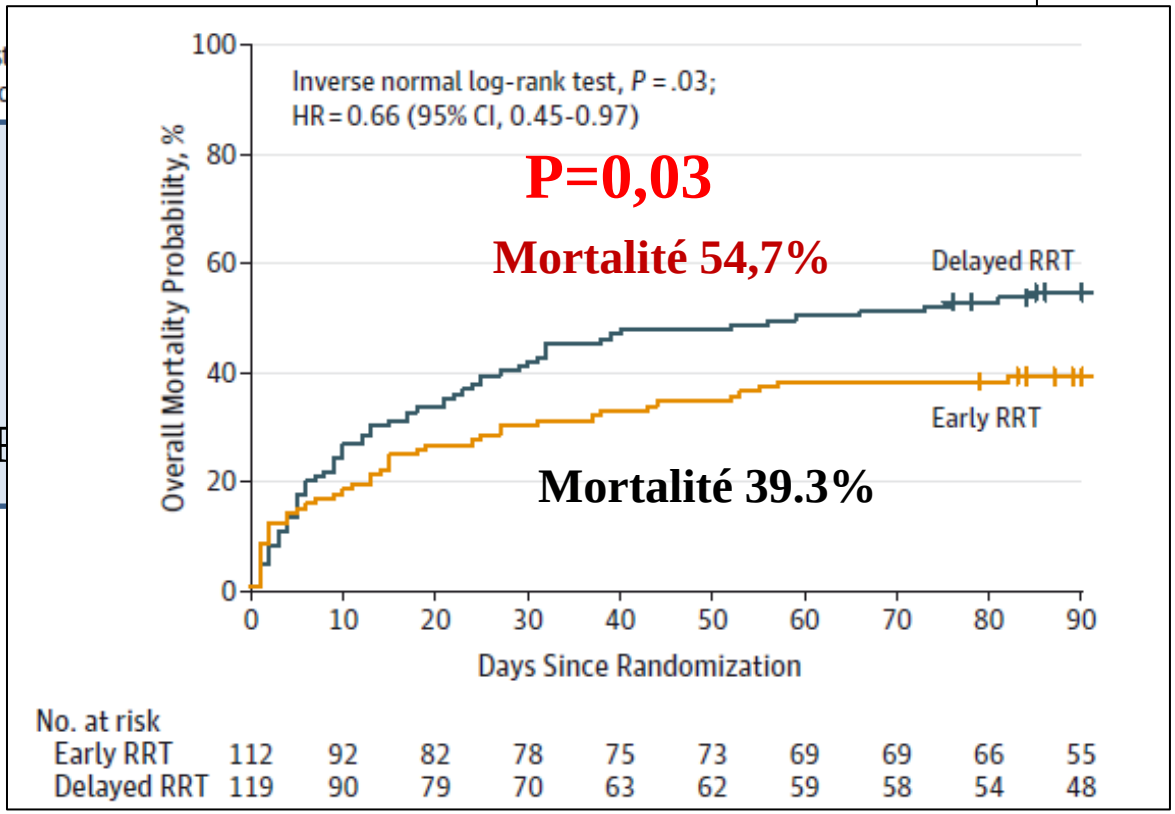
Effect of Early vs Delayed Initiation of Renal Replacement Therapy on Mortality in Critically Ill Patients With Acute Kidney Injury

The ELAIN Randomized Clinical Trial

Alexander Zarbock, MD; John A. Kellum, MD; Christ
Hermann Pavenstädt, MD; Andreea Boanta, MD; Jo

ELAIN JAMA 2016

EARLY:**112 patients**
KDIGO 2 , 6 h après
DELAYED:119 patients
KDIGO 3 , 25 h après
TECHNIQUE: CVVHDF



JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

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Alexander Zarbock, MD; John A. Kellum, MD; Christoph Schmidt, MD; Hugo Van Aken, MD; Carola Wempe, PhD; Hermann Pavenstädt, MD; Andreea Boanta, MD; Joachim Gerß, PhD; Melanie Meersch, MD

ELAIN JAMA 2016

Table 3. Clinical Outcomes for Early vs Delayed Renal Replacement Therapy (RRT) Among Critically Ill Patients

				Absolute e, %	OR or HR (95% CI)
Primary Outcome, No. (%)					
90-d All-cause mortality				−2.6)	HR: 0.66 (0.45 to 0.97)
Secondary Outcomes, No. (%)					
Recovery of renal function at day 90[e]					
Yes	60 (53.6)	46 (38.7)	.02	14.9 (2.2 to 27.6)	OR: 0.55 (0.32 to 0.93)[f]
No[g]	52 (46.4)	73 (61.3)			

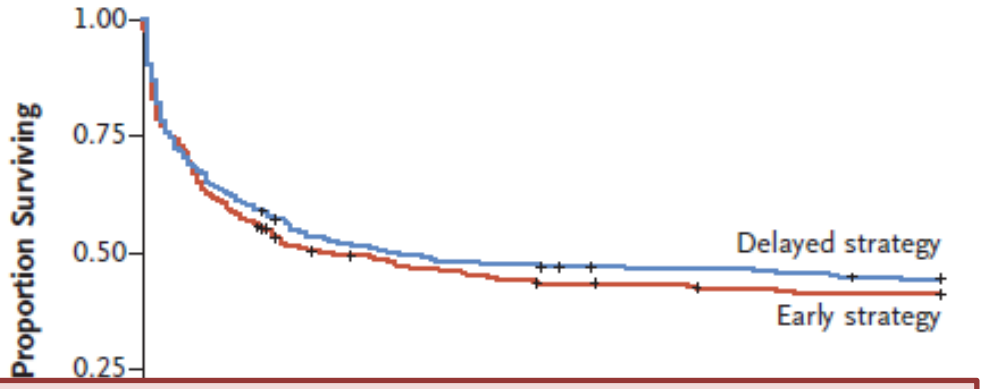
Meilleure récupération de la fonction rénale à j90 dans le groupe Précoce

Timing of Renal-Replacement Therapy in Patients with Acute Kidney Injury and Sepsis

S.D. Barbar, R. Clere-Jehl, A. Bourredjem, R. He
C. Lebert, J. Bohé, J. Badie, J.-P. Eraldi, J.-P. Rigaud, B. Levy, S. Siami,
G. Louis, L. Bouadma, J.-M. Constantin, E. Mercier, K. Klouche, D. du Cheyron,
G. Piton, D. Annane, S.
C. Schwebel, L. Chimot, P.
B. Louart, R. Trusson
for the IDEAL-ICU Trial Inve

IDEAL ICU NEJM 2018

EARLY:246 patients KDIGO 3 , 12 h après
DELAYED:242 patients indication clinique ou après 48 h si non résolution de l'IRA



Pas de différence significative en terme de mortalité à j90
58% vs 54%

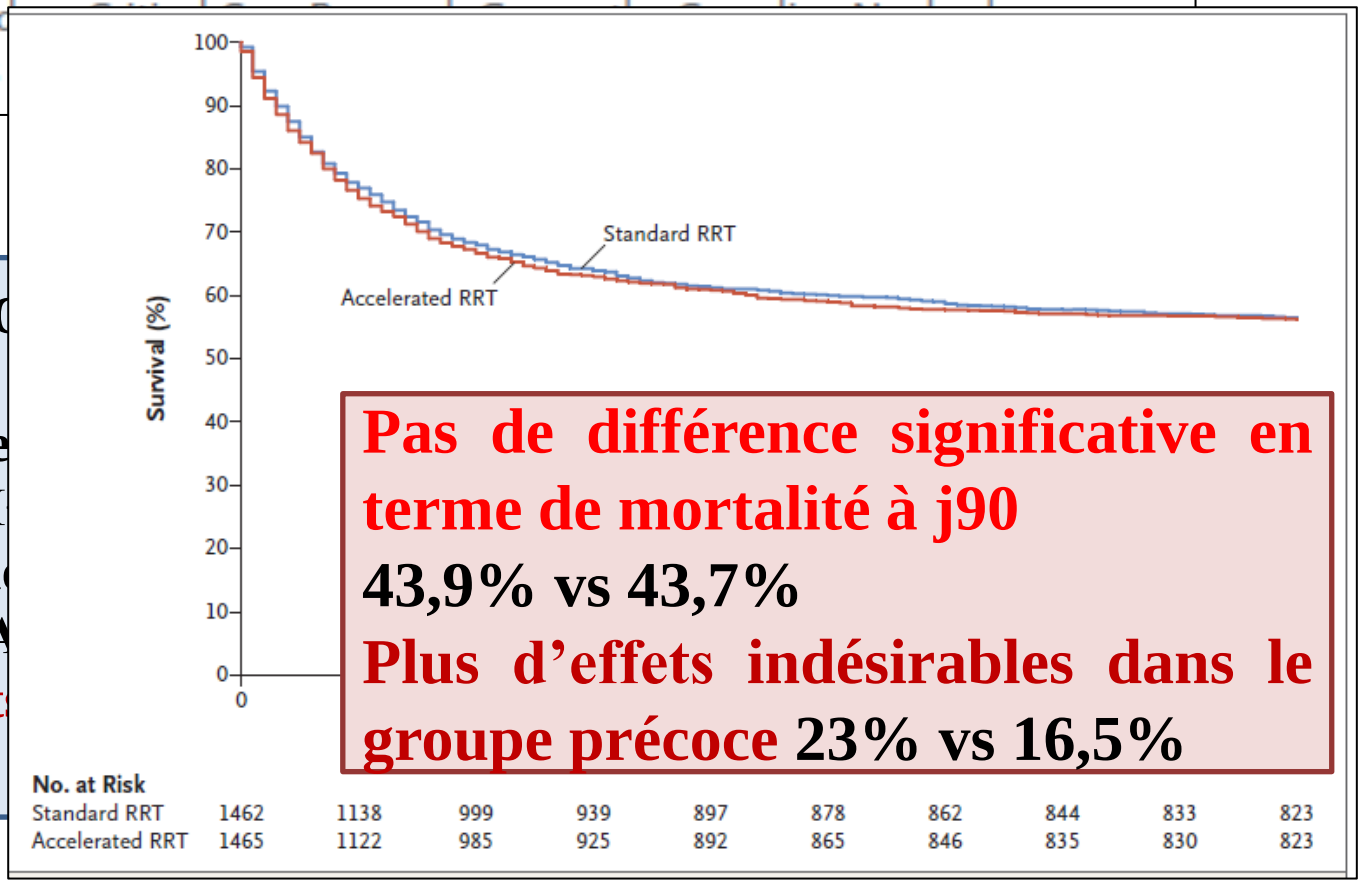
No. at R							
Delayed strategy	242	137	117	112	107	105	101
Early strategy	246	127	109	99	98	92	92

Timing of Initiation of Renal-Replacement Therapy in Acute Kidney Injury

The STARRT-AKI Investigators, for the Canadian
the Australian and New Zealand Intensive Care Society Clinical Trials Group,
the United King
Trials

STARRT AKI NEJM 2020

EARLY: KDIG
dans les 12 h
DELAYED: atte
jusqu'à k>6, pH
surcharge hydri
AKI >72 h l'IRA
44% des patient
choc septique



Pas de différence significative en terme de mortalité à j90
43,9% vs 43,7%
Plus d'effets indésirables dans le groupe précoce 23% vs 16,5%

Delayed versus early initiation of renal replacement therapy for severe acute kidney injury: a systematic review and individual patient data meta-analysis of randomised clinical

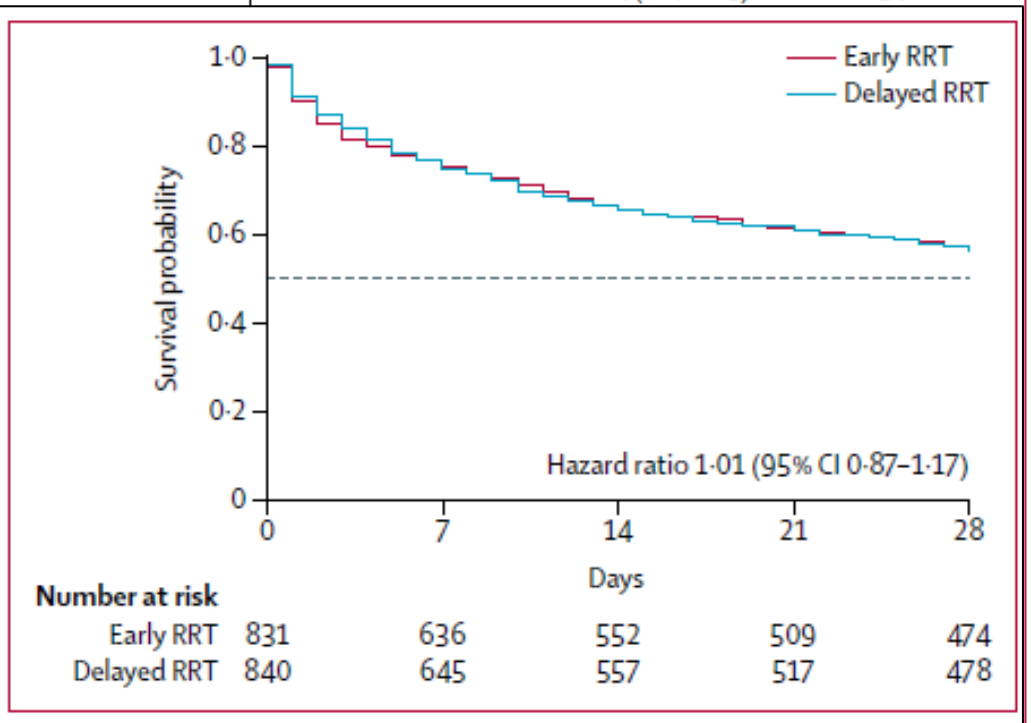
LANCET 2020

Delayed RRT group (n=946) Early RRT group (n=933)

A

	28-day mortality, n/N (%)		Risk ratio (95% CI)	Weight (%)
	Delayed RRT	Early RRT		
Combes et al, 2015	10/22 (45%)	11/20 (55%)	0·83 (0·45–1·51)	3·1
Wald et al, 2015	15/52 (29%)	13/48 (27%)	1·07 (0·57–2·00)	2·9
Gaudry et al, 2016	134/308 (44%)	129/308 (42%)	1·04 (0·87–1·25)	34·2
Zarbock et al, 2016	48/119 (40%)	34/112 (30%)		
Barbar et al, 2018	102/241 (42%)	111/245 (45%)		
Lumlertgul et al, 2018	35/60 (58%)	36/58 (62%)		
Srisawat et al, 2018	9/18 (50%)	10/20 (50%)		
Geri et al, 2019	13/17 (76%)	11/16 (69%)		
Total	**366/837 (44%)**	**355/827 (43%)**		
Random-effects one-step model				
Random-effects two-step model				
I^2=0·0%				
τ^2=0·0				

NS



B

	28-day mortality, n/N (%)	
	Delayed RRT	Early RRT

Comparison of two delayed strategies for renal replacement therapy initiation for severe acute kidney injury (AKIKI 2): a multicentre, open-label, randomised, controlled trial

Stéphane Gaudry, David Hajage, Laurent Martin-L
Béatrice La Combe, Bertrand Pons, Nicolas de Prost
Guillaume Chevrel, Julien Bohé, Elisabeth Coupez, M
Eric Boulet, Karim Lakhal, Nadia Aissaoui, Steven C
Karim Asehnoune, Guillaume Geri, Kada Klouche, C
Jean-Damien Ricard, Jean-Pierre Quenot†, Didier D*

DELAYED: KDIGO 3 urée<40, oligurie>72 h
MORE DELAYED: attendre jusqu'à hyperK, urée>50, acidose métab, surcharge hydrique

	Delayed RRT strategy group (n=137)	More-delayed RRT strategy group (n=141)	p value
RRT-free days			
All patients	12 (0–25)	10 (0–24)	0·93
Survivors	24 (15–27)	23 (14–28)	0·54
Number of patients who actually received RRT	134 (98%)	111 (79%)	<0·0001
Time from randomisation to RRT, h	3 (2–5)	33 (24–60)	<0·0001
Number of RRT sessions*	5 (2–10)	5 (2–10)	0·75
Duration of RRT days*	5 (2–10)	5 (2–10)	0·75
Modality, first day*			
Intermittent RRT	81 (60%)	64 (58%)	0·53
Continuous RRT	52 (39%)	44 (40%)	..
Both modalities	1 (1%)	3 (3%)	..
Mortality			
At day 28	52 (38%)	63 (45%)	0·26
At day 60	60 (44%)	77 (55%)	0·071
At ICU discharge	55 (40%)	66 (47%)	0·26
At hospital discharge	61 (45%)	75 (53%)	0·15
RRT dependence‡			
At day 28	13 (16)	7 (11)	0·33
At day 60	3 (4)	1 (2)	0·62

LES RECOMMANDATIONS / TIMING

Réanimation
DOI 10.1007/s13546-014-0917-6

RÉFÉRENTIEL / *GUIDELINES*

2014

Il faut considérer « précoce » l'initiation d'une EER, au stade KDIGO 2 ou dans les 24 heures suivant l'apparition d'une insuffisance rénale aiguë dont la réversibilité semble peu probable.
(Avis d'experts) Accord faible

et de la Société francophone de dialyse (SFD)

Il faut considérer « tardive » l'initiation de l'EER à plus de 48 heures de la survenue d'une insuffisance rénale aiguë KDIGO 3 ou lors de l'apparition d'une situation mettant en jeu le pronostic vital et en rapport avec l'insuffisance rénale aiguë.
(Avis d'experts) Accord faible

LES RECOMMANDATIONS / TIMING

Réanimation
DOI 10.1007/s13546-014-0917-6

RÉFÉRENTIEL / *GUIDELINES*

2014

Il faut initier sans délai l'EER dans les situations mettant en jeu le pronostic vital (hyperkaliémie, acidose métabolique, syndrome de lyse, oedème pulmonaire réfractaire au traitement médical).
(Avis d'experts) Accord fort

et de la Société francophone de dialyse (SFD)

Les données disponibles sont insuffisantes pour définir le délai optimal avant instauration de l'EER en dehors des situations mettant en jeu le pronostic vital.
(Avis d'experts) Accord fort

Open Access Research

BMJ Open

High-dose versus low-dose haemofiltration for the treatment of critically ill patients with acute kidney injury: an updated systematic review and meta-analysis

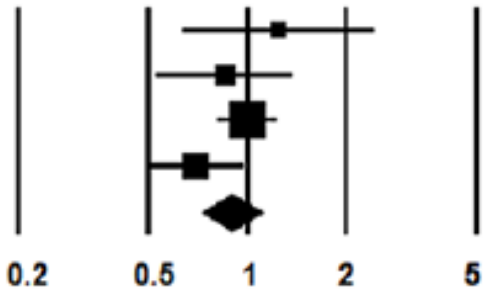
2017

8 st
HV
SV
Ma
Per
pat

(A) 90-day mortality

Pas de difference mortalité j90

Study name	Statistics for each study				
	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
Joannes-Boyau (2013)	1.24	0.63	2.43	0.63	0.53
Zhang (2012)	0.85	0.53	1.38	-0.64	0.52
Bellomo (2009)	1.00	0.81	1.22	-0.03	0.97
Ronco (2000)	0.70	0.50	0.97	-2.12	0.03
Pooled	0.90	0.73	1.11	-1.00	0.32



Heterogeneity test: Q = 4.10, P = 0.25, I^2 = 26.7%

LES RECOMMANDATIONS / DOSE DE DIALYSE

Réanimation
DOI 10.1007/s13546-014-0917-6

RÉFÉRENTIEL / *GUIDELINES*

2014

En épuration extrarénale intermittente il faut probablement que la dose de dialyse minimale délivrée soit de

1) **trois séances par semaine de quatre heures au moins avec un débit sang > 200 ml/min et un débit dialysat > 500 ml/min,**
2) **l'obtention d'un Kt/V > 3,9 par semaine,**
3) **le maintien d'une concentration en urée prédialytique de 20–25 mmol/l.**

Accord fort

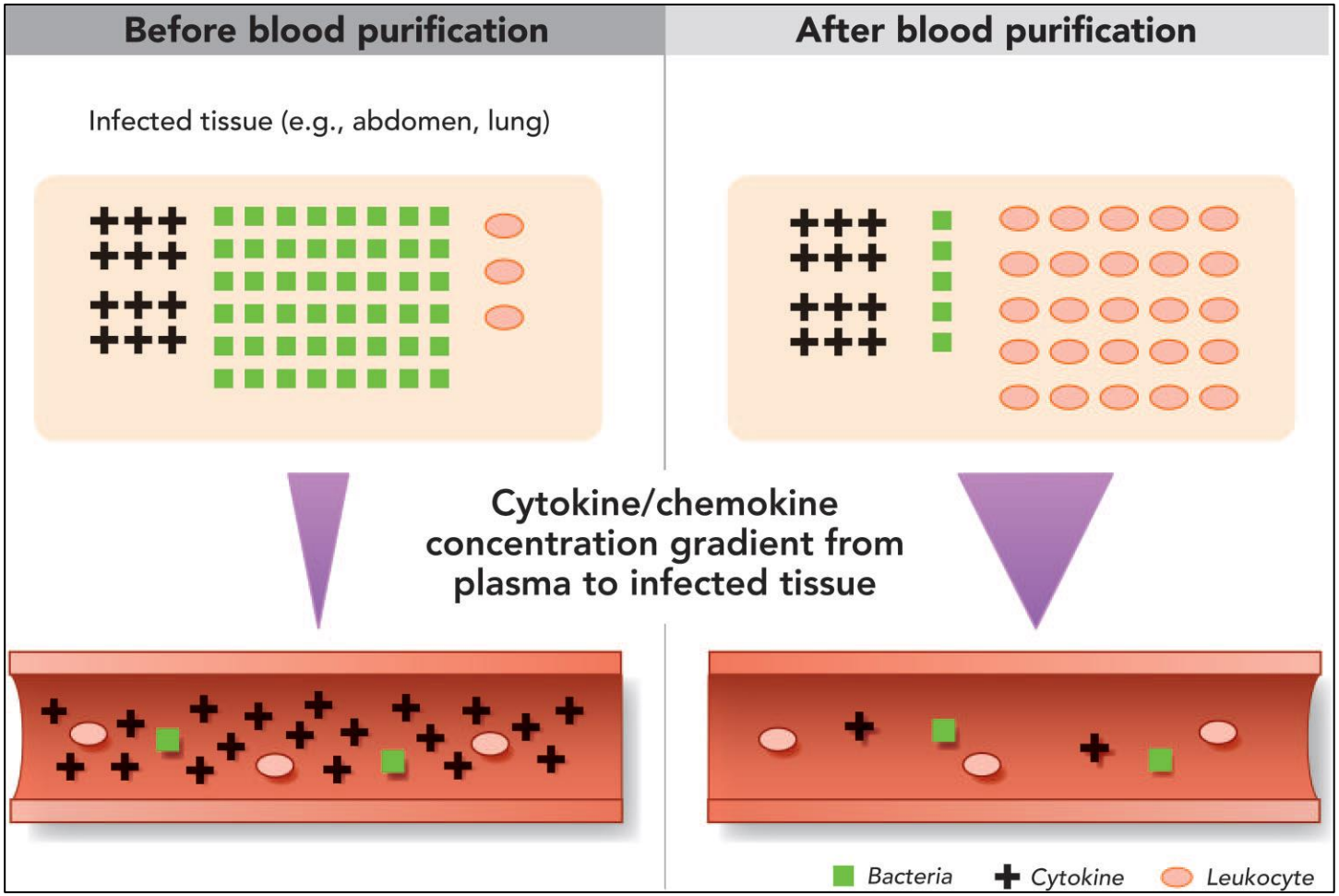
En épuration extrarénale continue, il faut probablement que la dose de dialyse minimale délivrée soit de 20–25 ml/kg par heure d'effluent, obtenus par filtration et/ou diffusion.

Accord fort

EER ET PURIFICATION SANGUINE AU COURS DU CHOC SEPTIQUE

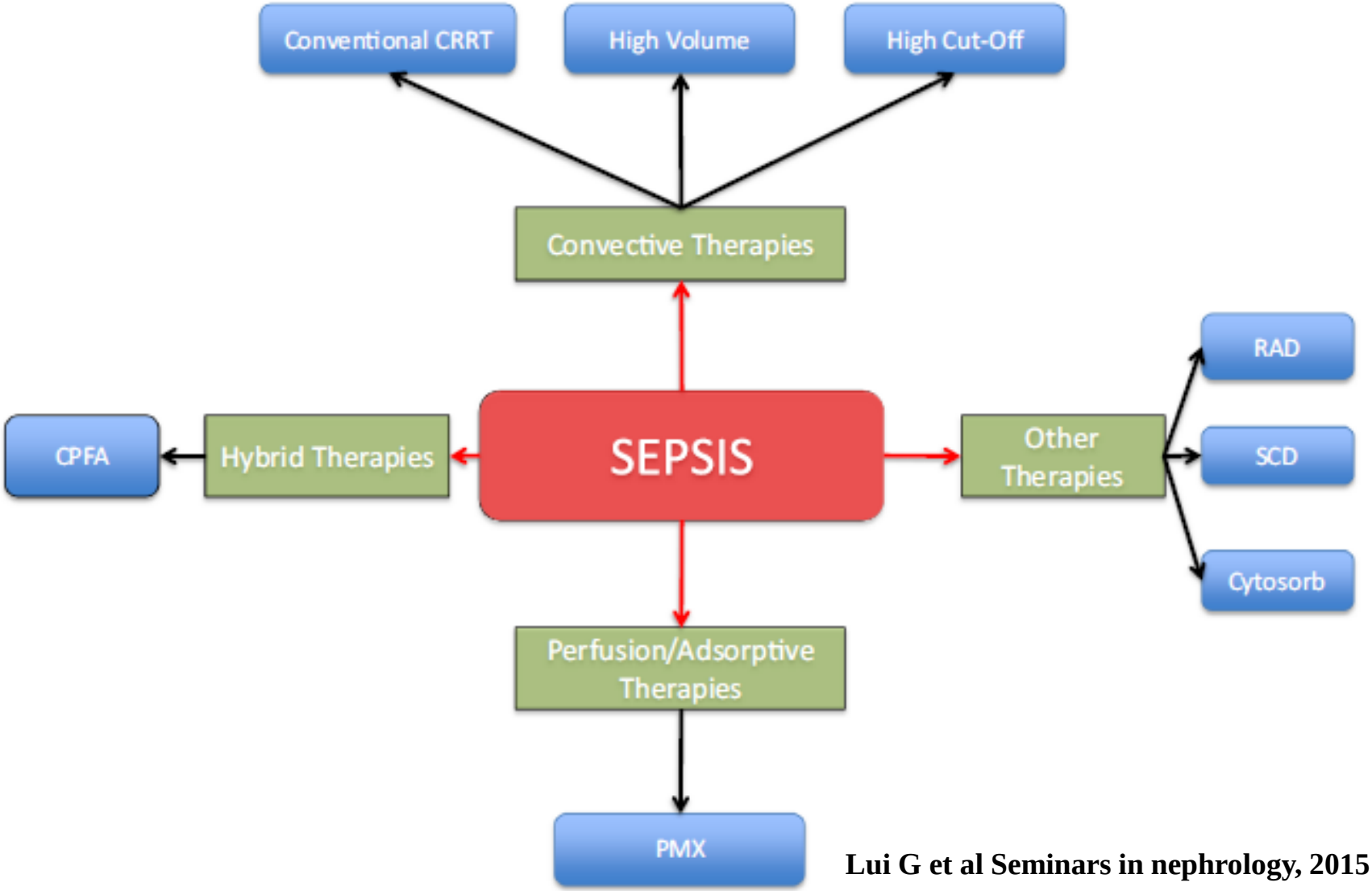
AU DELÀ DE LA SUPPLÉANCE RÉNALE !

RRT FOR BLOOD PURIFICATION



Rimmelé et al Anesthesiology, 2012

RRT FOR BLOOD PURIFICATION



Lui G et al Seminars in nephrology, 2015

RRT FOR BLOOD PURIFICATION

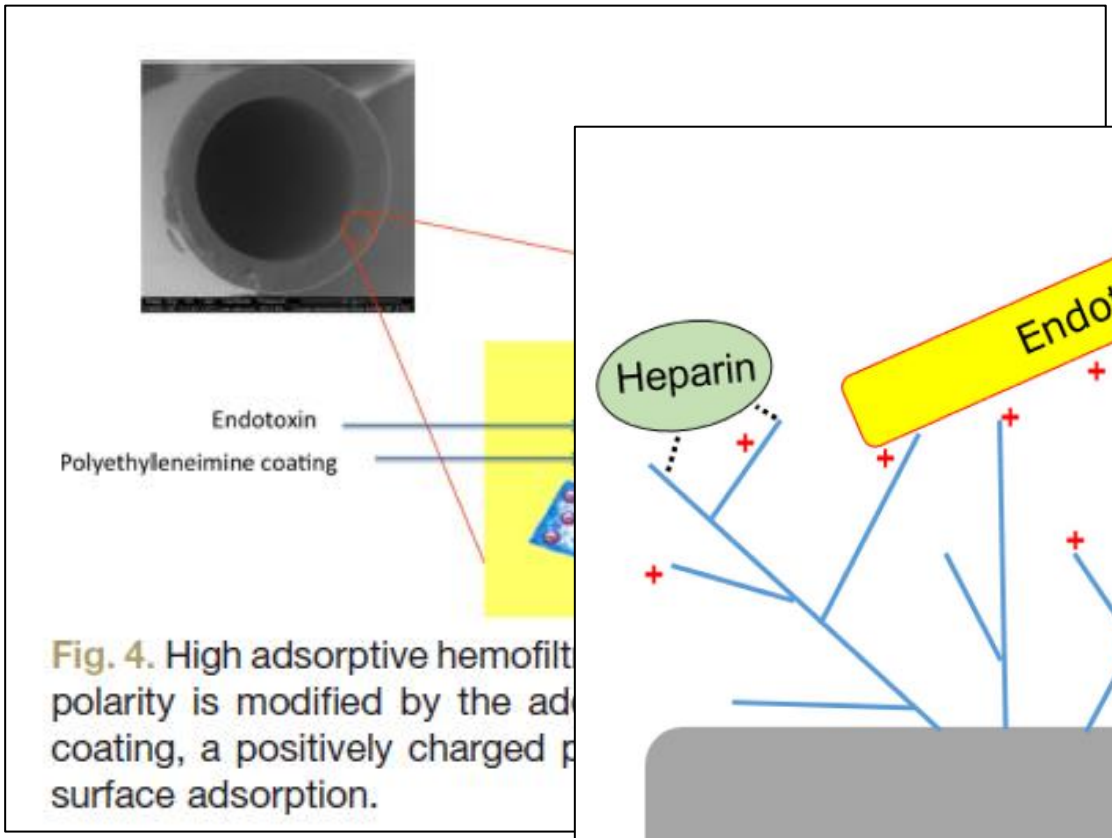


Fig. 4. High adsorptive hemofilt
polarity is modified by the ad
coating, a positively charged p
surface adsorption.

Rimmelé et al Anesthesiology, 2

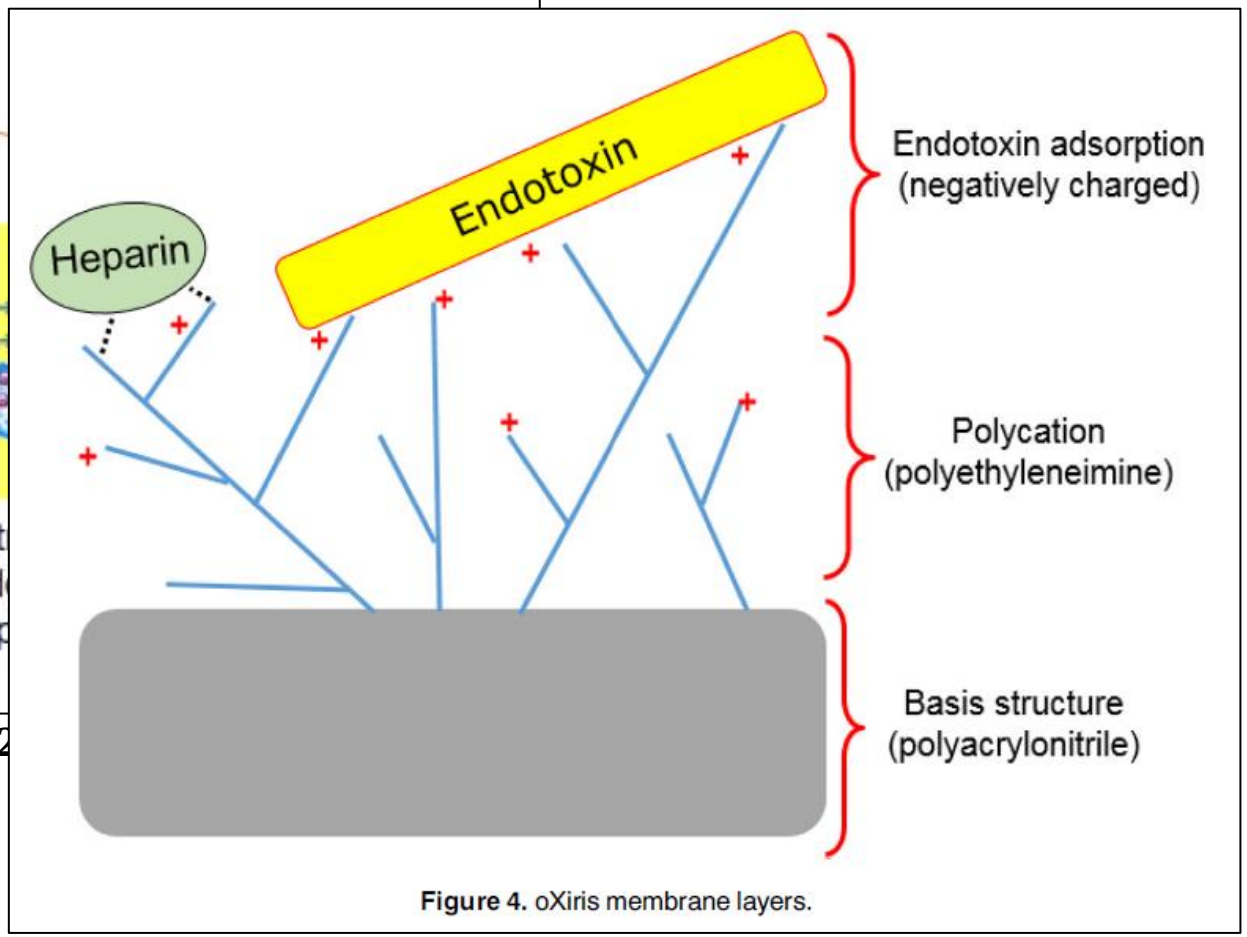


Figure 4. oXiris membrane layers.

Thibaut Girardot et al, Seminars in Nephrology 2019

Intensive Care Med (2013) 39:1535–1546
DOI 10.1007/s00134-013-2967-z

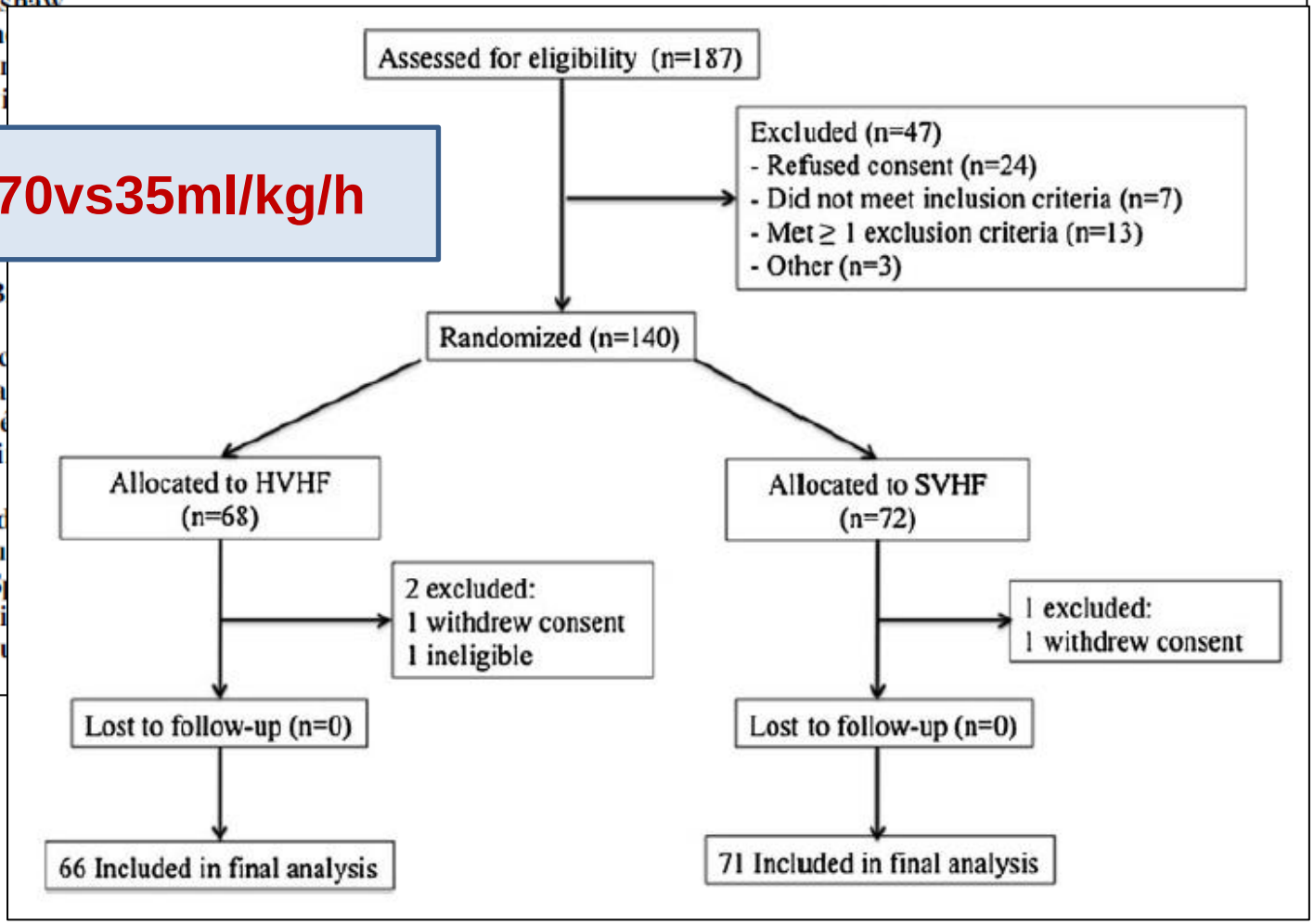
ORIGINAL

IVOIRE STUDY
Intensive Care Med 2013

Olivier Joannes-Boyau
Patrick M. Honoré
Paul Perez
Sean M. Bagshaw
Hubert Gran
Jean-Luc Ca
Antoine Dewi
Claire Fla
Wilfried P
Anne-Soph
Catherine
Rita Jacobs
Christophe B
Hervé Floch
Olivier Branc
Stephane Fra
Hadrien Roz
Vincent Colli
Willem Boer
Joachim Cald
Bernard Gau
Herbert D. S
Gérard Janvi
Alexandre Ou

High-volume versus standard-volume haemofiltration for septic shock patients

70vs35ml/kg/h



Intensive Care Med (2013) 39:1535–1546
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ORIGINAL

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Intensive Care Med 2013

Olivier Joannes-Boyau
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Sean
Hub
Jean
Ant
Clai
Will
Ann
Cath
Rita
Chri
Herv
Oliv
Step
Had
Vinc
Will
Joac
Bern
Herl
Géra
Alex

High-volume versus standard-volume

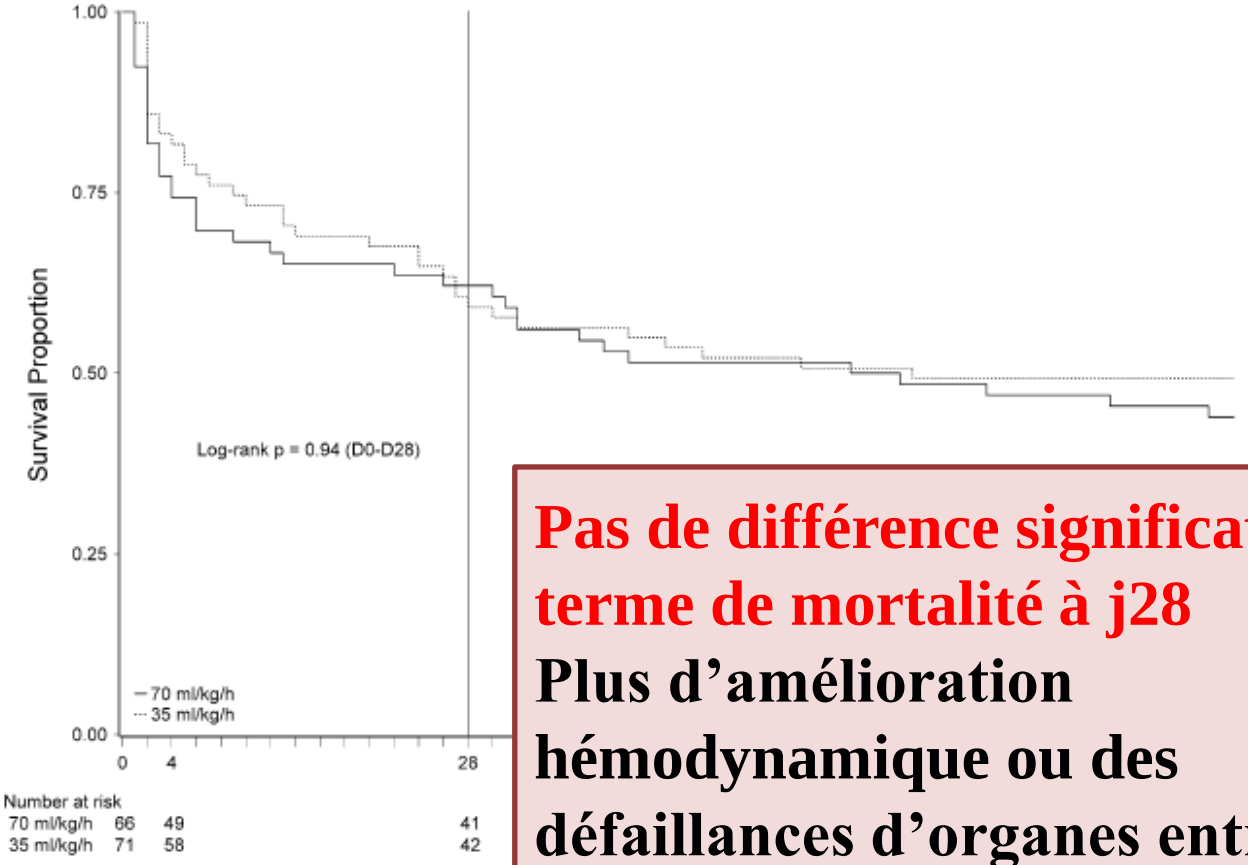


Fig. 2 Survival of participants in the IVOIRE (hIgh VO
underwent haemofiltration at 70 mL/kg/h and 35 mL/kg/

Pas de différence significative en terme de mortalité à j28

Plus d'amélioration hémodynamique ou des défaillances d'organes entre groupe HVHF vs SVHF

Clark *et al. Critical Care* 2014, **18**:R7
http://ccforum.com/content/18/1/R7

CRITICAL CARE

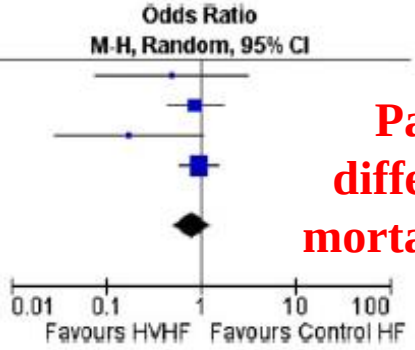
RESEARCH Open Access

2014

High-volume hemofiltration for septic acute kidney injury: a systematic review and meta-analysis

Study or Subgroup	HVHF Events	HVHF Total	Control HF Events	Control HF Total	Weight	Odds Ratio M-H, Random, 95% CI
Boussekey et al.	3	9	5	10	5.7%	0.50 [0.08, 3.21]
Joannes-Boyau et al.	25	66	29	71	33.2%	0.88 [0.44, 1.75]
Sanchez et al.	2	15	7	15	6.0%	0.18 [0.03, 1.07]
Zhang et al.	81	141	81	139	55.1%	0.97 [0.60, 1.55]
Total (95% CI)		**231**		**235**	**100.0%**	**0.82 [0.52, 1.28]**
Total events	111		122			

Heterogeneity: Tau² = 0.04; Chi² = 3.55, df = 3 (P = 0.31); I² = 16%
Test for overall effect: Z = 0.88 (P = 0.38)



Pas de difference mortalité j28

Figure 2 Forest plot for odds o

Plus d'effets indésirables:
hypophosphatémie et hypokalémie groupe HVHF

Original Article

The therapeutic effect of high-volume hemofiltration on sepsis: a systematic review and meta-analysis

2020

Fan Yin[1], Fang Zhang[1], Shijian Liu[2], Botao Ning[1]

[1]Department of Pediatric Intensive Care Unit, [2]Clinical Research Center, Shanghai Children's Medical Center, Shanghai Jiao Tong University School of Medicine, Shanghai 200127, China

Contributions: (I) Conception and design: B Ning, S Liu; (II) Administrative support: None; (III) Provision of study materials or patients: F Yin, F Zhang; (IV) Collection and assembly of data: F Yin, S Liu; (V) Data analysis and interpretation: F Yin; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Botao Ning; Shijian Liu. Department of Pediatric Intensive Care Unit, Shanghai Children's Medical Center, Shanghai Jiao Tong

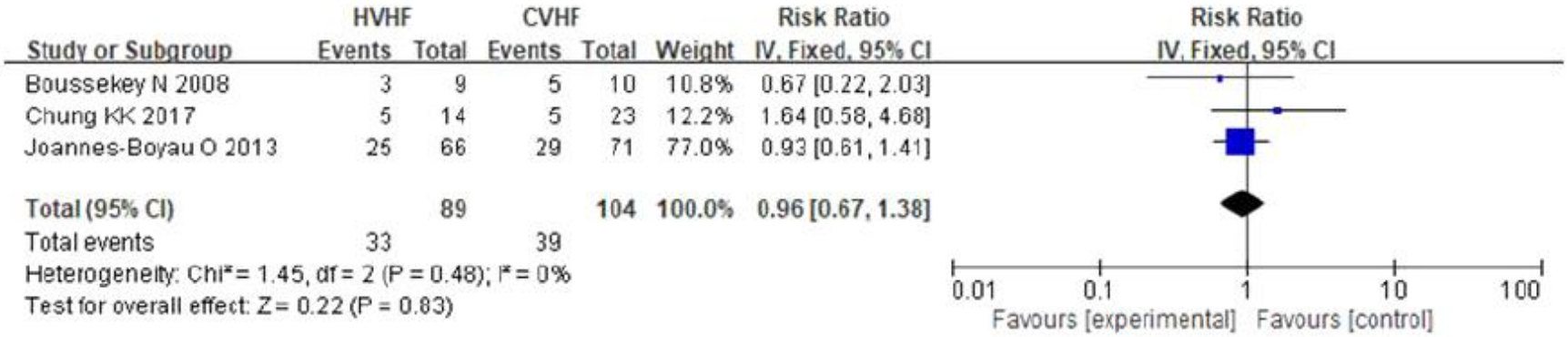


Figure 4 Forest plot of comparison in relative risk of mortality.

Pas de différence significative en terme de mortalité

Intensive Care Med
DOI 10.1007/s00134-015-4056-y

SEVEN-DAY PROFILE PUBLICATION

2015

Jean-Pierre Quenot
Christine Binquet
Christophe Vinsonneau
Saber-David Barbar
Sandrine Vinault

Very high volume hemofiltration with the Cascade system in septic shock patients

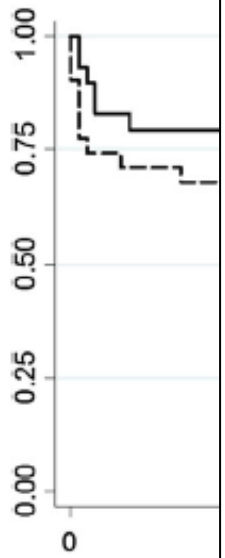


Fig. 2 Cumulative survival probabilities in each group at 90 days

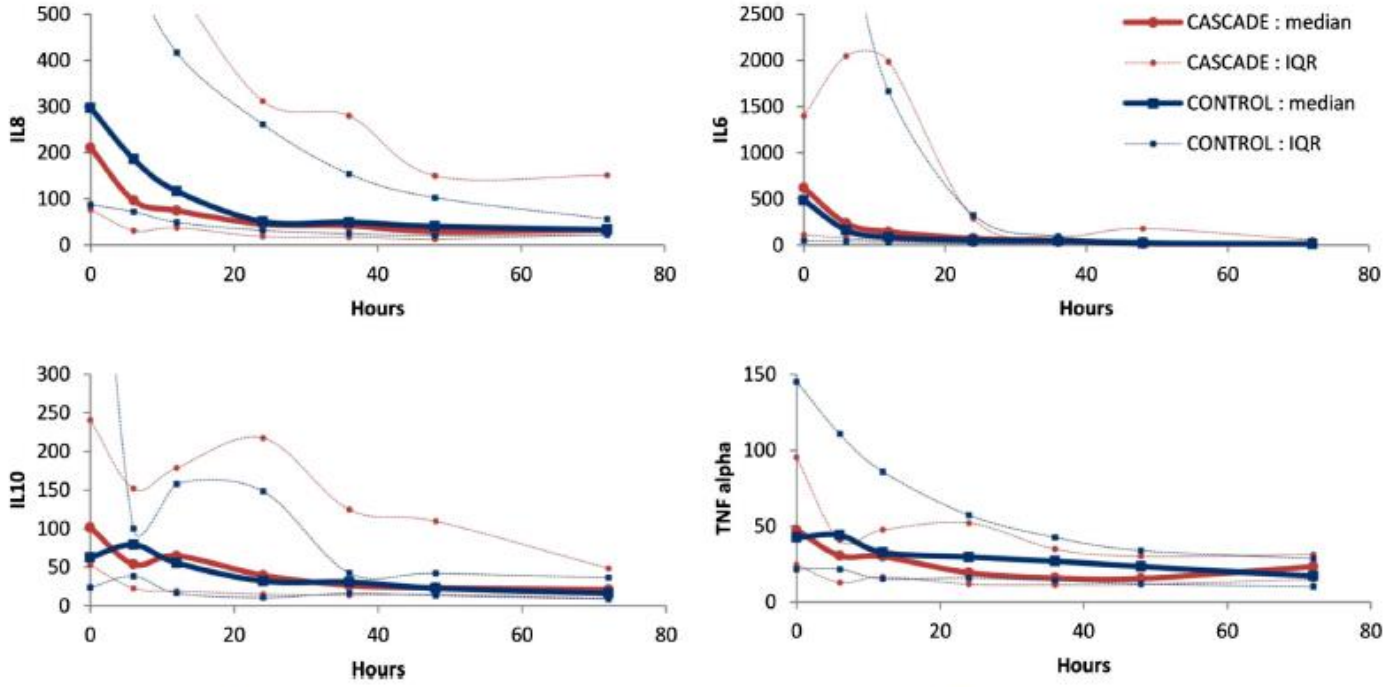
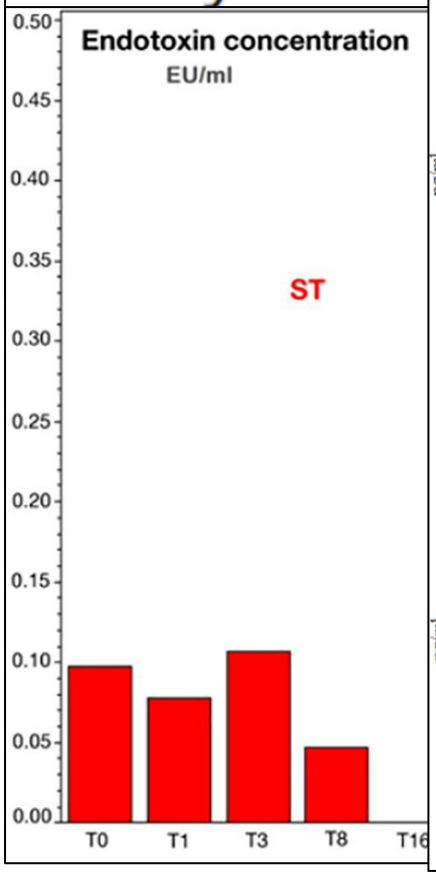


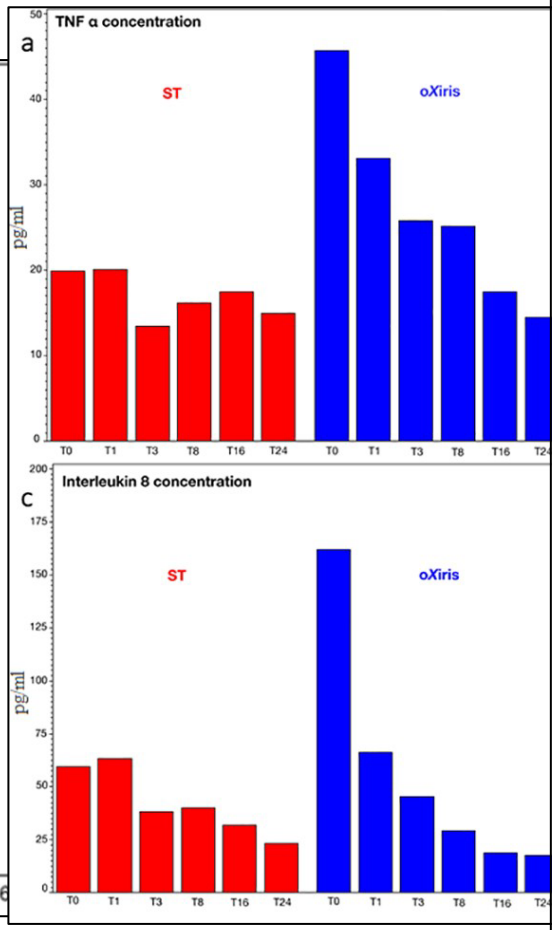
Fig. 3 Circulating cytokine levels (pg/mL) in the control and Cascade groups at 0, 12, 18, 24, 36, 48, and 72 h

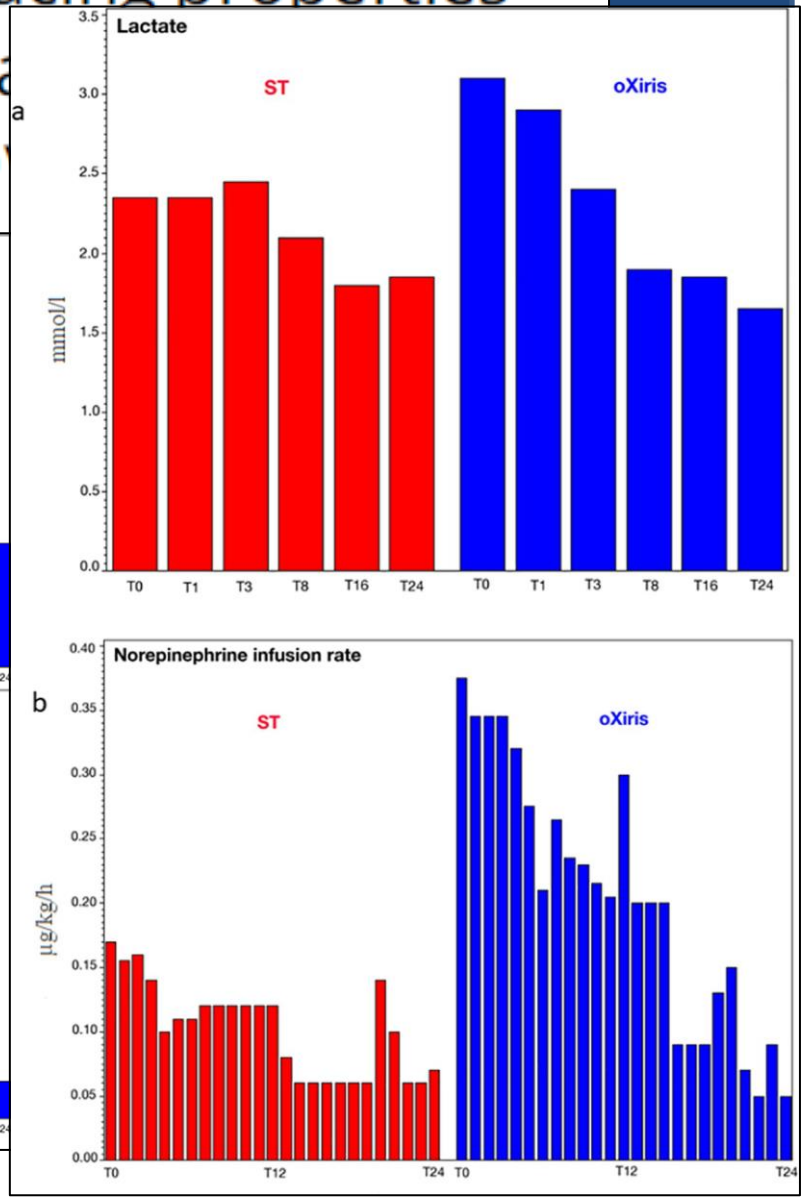
RESEARCH ARTICLE

Endotoxin and cytokine reducing properties of the oXiris membrane in pa shock: A randomized crosso study

Plos One 2019







Wendel-Garcia *et al. Annals of Intensive Care* (2023) 13:127
https://doi.org/10.1186/s13613-023-01224-8

Annals of Intensive Care

2023

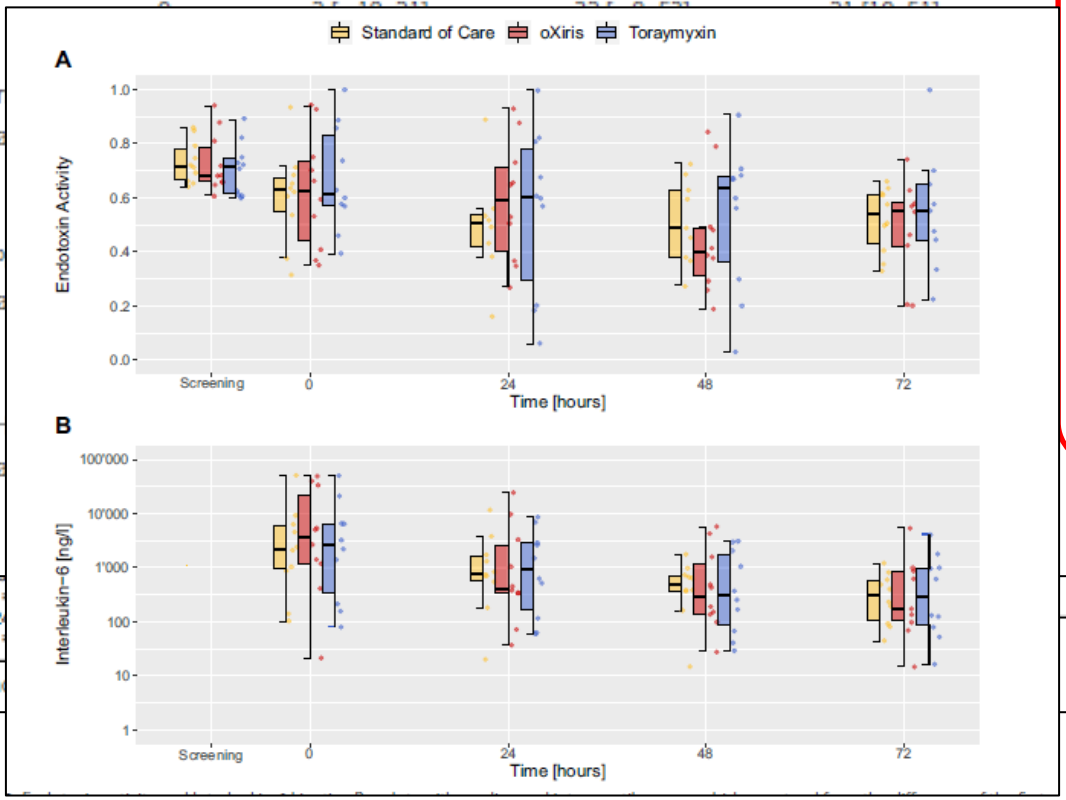
Enrollment

Assessed for eligibility (n = 437)

Excluded (n = 399)

Table 2 Reduction in endotoxin activity, Interleukin-6, procalcitonin and HMGB-1 over time

Intervention arm	Filter intervention				*p*—over groups	*p*—over timepoints
	0 h	24 h	48 h	72 h		
A. Reduction in endotoxin activity [%]					*0.82*	*< 0.01*
Standard of care	0	16 [10–28]	2 [− 18–21]	12 [1–42]		
oXiris						
Toraymyxin						
B. Reduction in In					*0.58*	*< 0.001*
Standard of ca						
oXiris						
Toraymyxin						
C. Reduction in P					*0.16*	*< 0.01*
Standard of ca						
oXiris						
Toraymyxin						
D. Reduction in H					*0.68*	*0.46*
Standard of ca						
oXiris						
Toraymyxin						



- Use of 3 filters (n
- Death less than 2
randomization (n

ig. 1 Screening, ran

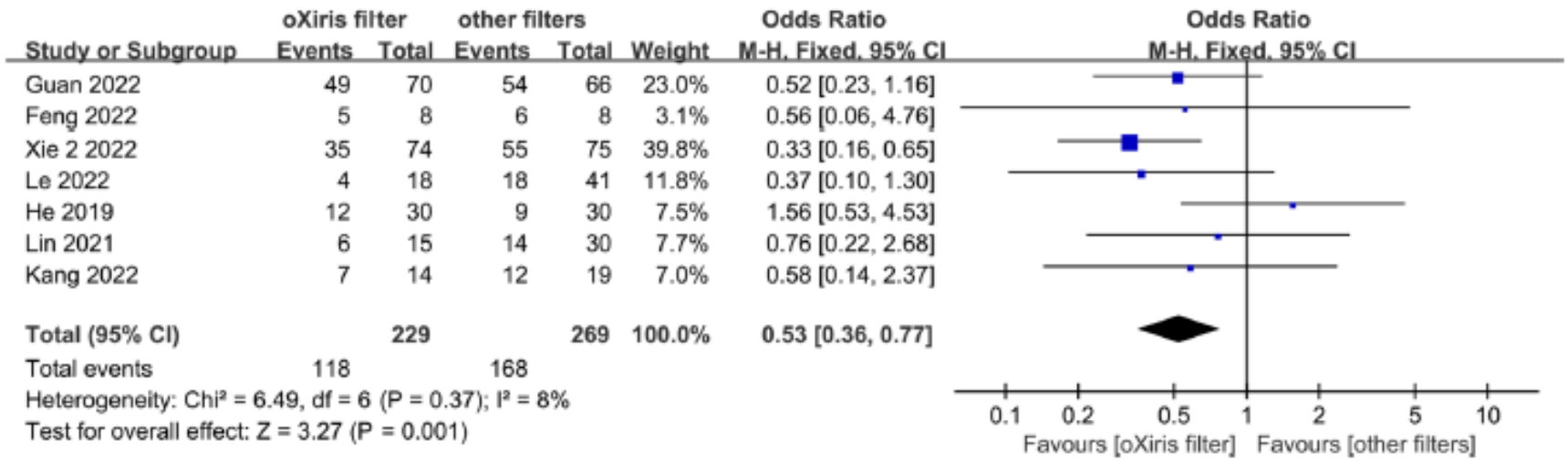


Fig. 3. 28-day mortality (adopting Xie et al.'s data after IPTW)

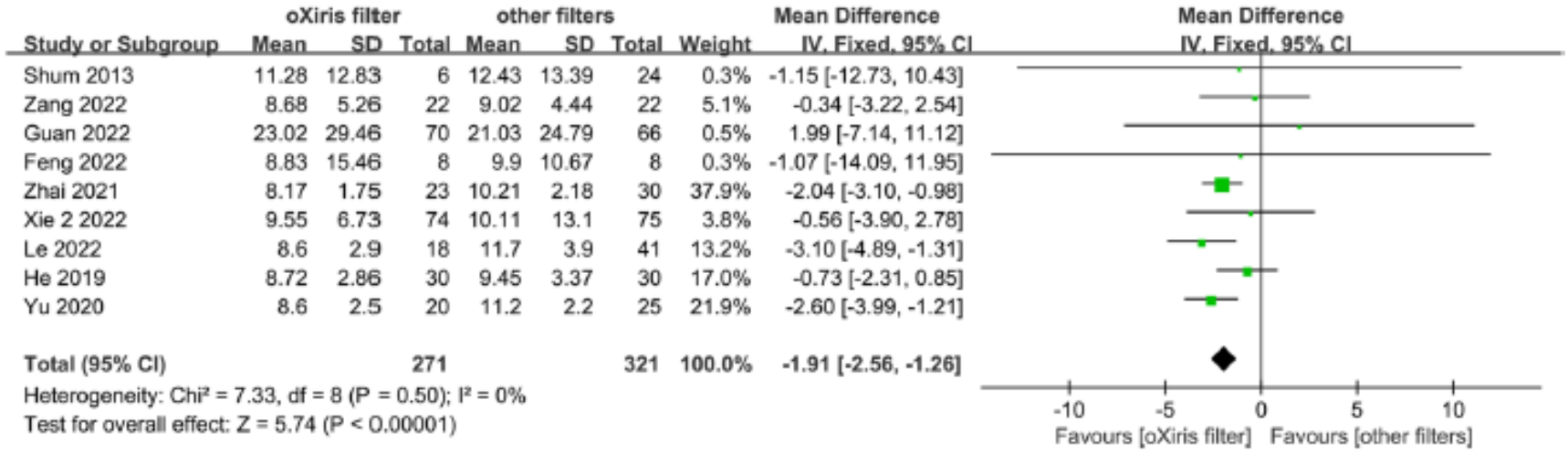


Fig. 4 The length of ICU stay (adopting Xie et al.'s data after IPTW)

LES RECOMMANDATIONS / BLOOD PURIFICATION

Réanimation
DOI 10.1007/s13546-014-0917-6

RÉFÉRENTIEL / *GUIDELINES*

2014

Épuration extrarénale en réanimation adulte et pédiatrique. Recommandations formalisées d'experts sous l'égide

En épuration extrarénale continue, il ne faut pas, sur la seule présence d'un sepsis, intensifier la dose d'épuration.
Accord fort

Renal replacement therapy Adult and Children Intensive Care Unit. Société de réanimation de langue française. Experts Recommandations

Christophe Vinsonneau, Emma Allain-Launay, Clarisse Blayau, Michael Darmon, Damien du Cheyron, Théophile Gaillot, Patrick Honoré, Étienne Javouhey, Thierry Krummel, Annie Lahoche, Matthieu Legrand, Serge Le Tacon, Mehran Monchi, Christophe Ridel, René Robert, Frédérique Schortgen, Bertrand Souweine, Patrick Vaillant, Lionel Velly, David Osman, Ly Van Vong

LES RECOMMANDATIONS / BLOOD PURIFICATION

Intensive Care Med (2021) 47:1181–1247
https://doi.org/10.1007/s00134-021-06506-y

Intensive Care Med 2021

GUIDELINES

Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021

- **There is insufficient evidence to make a recommendation on the use of other blood purification techniques**

Theodore Iwashyna[35], Shevin Jacob[34], Ruth Kleinpell[35], Michael Klompas[36,37], Younsuck Koh[38], Anand Kumar[39], Arthur Kwizera[40], Suzana Lobo[41], Henry Masur[42], Steven McGloughlin[43], Sangeeta Mehta[44], Yatin Mehta[45],

Conclusion

Les données de la littérature sur l'EER comme moyen de suppléance de la défaillance rénale au cours du choc septique (SA-AKI) sont insuffisante pour recommander l'une ou l'autre modalité et définir le timing optimal

- **Continue vs intermittente ????**
- **Précoce vs tardive ?????**

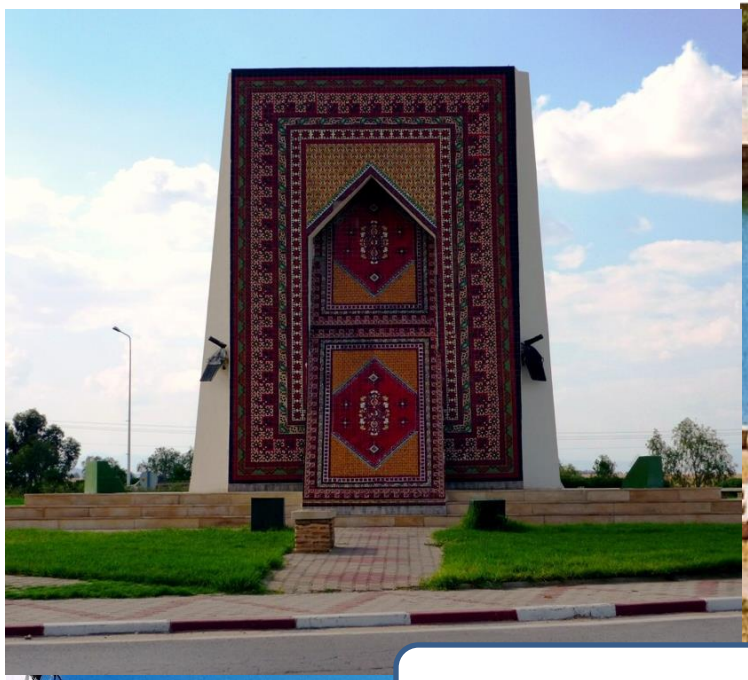
Il faut tenir compte de la disponibilité de la technique et de l'expérience de l'équipe.

Conclusion

Les arguments en faveur ou contre l'EER comme moyen de purification sanguine pour la modulation de l'inflammation ne sont pas suffisamment importants

Pas de recommandations claires a ce jour !!

Il faut continuer la recherche…



Merci pour votre attention