Balance hydrique en réanimation

- Pronostic des patients septiques -

21 Octobre 2016

Université de Lille 2 DROIT ET SANTÉ

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DESC Réanimation Médicale
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Le remplissage vasculaire en bref

- Consommation annuelle hospitalière de NaCl 0,9% *(données Baxter HealthCare)*
  - ✓ 10 millions de litres au Royaume-Uni
  - ✓ 200 millions de litres aux USA

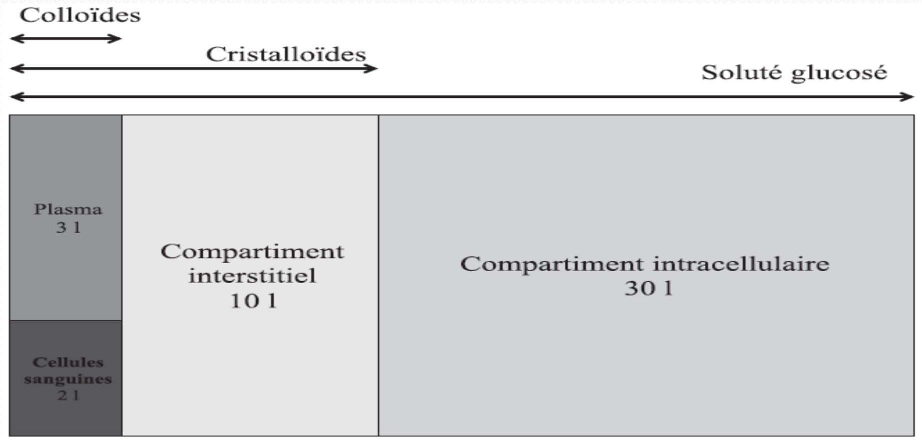
- Recommandations dans le sepsis
  - ✓ Attitude « agressive » durant 24h
  - ✓ Surviving Sepsis Campaign 2012

- Etude de Rivers (EGDT) en 2001 :
  - ✓ 4,9L de cristalloïdes dans les 6 premières heures
  - ✓ 13,4L dans les 72 premières heures

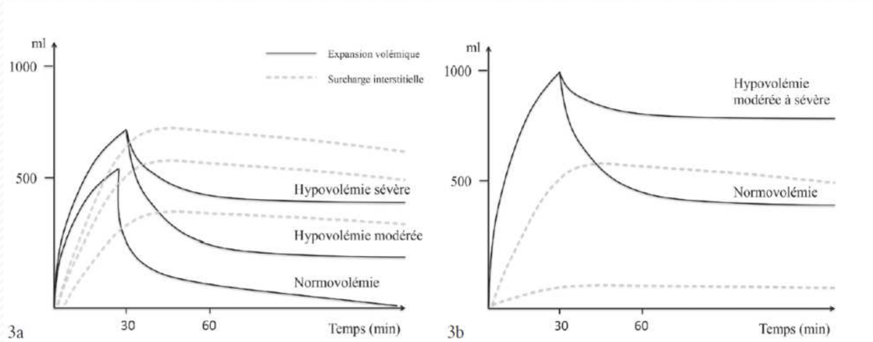
PK/PD des solutés de remplissage

- **Capacité d'expansion volémique** et **durée d'action** variables
  - ✓ Faible en volume et en durée pour les **cristalloïdes**
  - ✓ Forte en volume et plus durable pour les **colloïdes**

Muller L, Roger C, Boutin C, Lefrant JY. Pharmacocinétique et pharmacodynamie des solutés de remplissage vasculaire. JEPU 2014



- Caractéristiques différentes **selon la volémie du patient**



Caractéristiques générales des solutés

Tableau I

Caractéristiques générales des principaux solutés de remplissage (Kd = Kilodalton ; HEA = hydroxyéthylamidon).

Type de soluté	Osmolalité (mmol/l)	Composition de la solution	Pouvoir d'expansion (1 = 100 % du volume perfusé reste en intra vasculaire)	Durée action (h)
Cristalloïdes isotoniques				
Ringer lactate (RL)	277	NaCl 0,6 % + lactate	0,19	
NaCl 0,9 %	308	NaCl 0,9 %	0,22	
Isofundine®	304	NaCl 0,8 % + acetate	0,2	
Cristalloïdes hypertoniques				
Hyperhes®	2 464	NaCl 7,2 % + HEA	2-3	-
RescueFlow®	2 400	NaCl 7,5 % + dextran 70	2-3	-
Colloïde naturel : albumine				
4 %	250-350	NaCl 0,9 %	0,7	1-3
20 %	300	NaCl 0,9 %	3,5	1-3
Colloïdes de synthèse				
Gélatines				
Gélatines fluides modifiées				
à 3 % : Plasmion®	320	RL	0,8-1	3
à 3 % : Plasmagel®	350	NaCl 0,9 %	0,8-1	3
à 2,5 % : Plasmagel® désodé	320	SG 5 %	0,8-1	3
à 4 % : Gelofusine®	308	NaCl 0,9 %	0,8-1	3
Gélatine à pont d'urée				
A 3,5 % : Haemaccel®	300	NaCl 0,9 %	0,8-1	3
Hydroxyéthylamidons				
Haut poids moléculaire (≥ 200 Kd)				
à 6 % : Elohes®	304	NaCl 0,9 %	1-1,4	12-24
à 6 % : Hesteril®	308	NaCl 0,9 %	1-1,4	3-6
à 6 % : Heafusine®	310	NaCl 0,9 %	1-1,4	3-6
à 10 % : Heafusine®	310	NaCl 0,9 %	1,2-1,5	3-6
Bas poids moléculaire (130 Kd)				
à 6 % : Voluven® (amidon de maïs)	308	NaCl 0,9 %	1	6
à 6 % : Restorvol® (amidon de pomme de terre)	309	NaCl 0,9 %	1	6

?

- Redistribution des fluides dans les différents compartiments
  - ✓ Courte durée d'action du RV par cristalloïdes

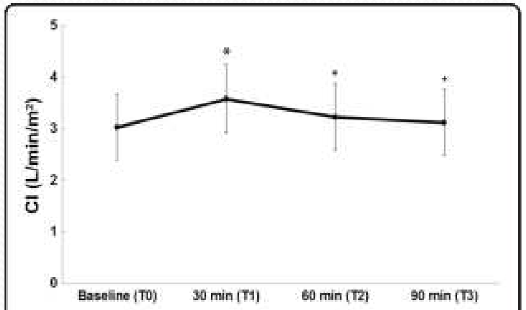


Figure 2 Cardiac index. CI, cardiac index. Baseline, 3.03 ± 0.64; T1, 3.58 ± 0.66; T2, 3.23 ± 0.65; T3, 3.12 ± 0.64. *$p < 0.05$ versus baseline, +$p < 0.05$ versus T1.

Retour au VES de base après 30-60minutes !

- Chez des patients sains : Redistribution = 85% après 4 heures

Chowdhury AH et al. , A randomised, controlled, double-blind crossover study on the effects of 2-L infusions of 0,9% saline on renal blood flow velocity and renal cortical tissue perfusion in healthy volunteers. Ann Surg 2012 ; 256 : 18-24.

- Chez des patients septiques : <5% en intravasculaire à +90min

Sanchez M, Jimenez-Lendinez M, Cidoncha M et al : Comparison of fluid compartments and fluid responsiveness in septic and non-septic patients. Anaesth Intensive Care 2011

Marik et al. Annals of Intensive Care 2011, 1:1
http://www.annalsofintensivecare.com/content/1/1/1

Annals of Intensive Care
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RE ... ess

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< 50

... 002, 121(6):2000–2008

RV potentiellement délétère dans 50% des cas !

Sepsis et Remplissage vasculaire

Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock: 2012

R. Phillip Dellinger, MD[1]; Mitchell M. Levy, MD[2]; Andrew Rhodes, MB BS[3]; Djillali Annane, MD[4]; Herwig Gerlach, MD, PhD[5]; Steven M. Opal, MD[6]; Jonathan E. Sevransky, MD[7]; Charles L. Sprung, MD[8]; Ivor S. Douglas, MD[9]; Roman Jaeschke, MD[10]; Tiffany M. Osborn, MD, MPH[11]; Mark E. Nunnally, MD[12]; Sean R. Townsend, MD[13]; Konrad Reinhart, MD[14]; Ruth M. Kleinpell, PhD, RN-CS[15]; Derek C. Angus, MD, MPH[16]; Clifford S. Deutschman, MD, MS[17]; Flavia R. Machado, MD, PhD[18]; Gordon D. Rubenfeld, MD[19]; Steven A. Webb, MB BS, PhD[20]; Richard J. Beale, MB BS[21]; Jean-Louis Vincent, MD, PhD[22]; Rui Moreno, MD, PhD[23]; and the Surviving Sepsis Campaign Guidelines Committee including the Pediatric Subgroup*

initial fluid resuscitation with crystalloid (1B) and consideration of the addition of albumin in patients who continue to require substantial amounts of crystalloid to maintain adequate mean arterial pressure (2C) and the avoidance of hetastarch formulations (1C); initial fluid challenge in patients with sepsis-induced tissue hypoperfusion and suspicion of hypovolemia to achieve a minimum of 30 mL/kg of crystalloids (more rapid administration and greater amounts of fluid may be needed in some patients) (1C); fluid challenge technique continued as long as hemodynamic improvement, as based on either dynamic or static variables (UG); norepinephrine as the first-choice vasopressor to maintain mean arterial pressure ≥ 65 mm Hg (1B); epinephrine

Clinical Review & Education

Special Communication | CARING FOR THE CRITICALLY ILL PATIENT

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

Mervyn Singer, MD, FRCP; Clifford S. Deutschman, MD, MS; Christopher Warren Seymour, MD, MSc; Manu Shankar-Hari, MSc, MD, FFICM; Djillali Annane, MD, PhD; Michael Bauer, MD; Rinaldo Bellomo, MD; Gordon R. Bernard, MD; Jean-Daniel Chiche, MD, PhD; Craig M. Coopersmith, MD; Richard S. Hotchkiss, MD; Mitchell M. Levy, MD; John C. Marshall, MD; Greg S. Martin, MD, MSc; Steven M. Opal, MD; Gordon D. Rubenfeld, MD, MS; Tom van der Poll, MD, PhD; Jean-Louis Vincent, MD, PhD; Derek C. Angus, MD, MPH

RECOMMENDATIONS Sepsis should be defined as life-threatening organ dysfunction caused by a dysregulated host response to infection. For clinical operationalization, organ dysfunction can be represented by an increase in the Sequential [Sepsis-related] Organ Failure Assessment (SOFA) score of 2 points or more, which is associated with an in-hospital mortality greater than 10%. Septic shock should be defined as a subset of sepsis in which particularly profound circulatory, cellular, and metabolic abnormalities are associated with a greater risk of mortality than with sepsis alone. Patients with septic shock can be clinically identified by a vasopressor requirement to maintain a mean arterial pressure of 65 mm Hg or greater and serum lactate level greater than 2 mmol/L (>18 mg/dL) in the absence of hypovolemia. This combination is associated with hospital mortality rates greater than 40%. In out-of-hospital, emergency department, or general hospital ward settings, adult patients with suspected infection can be rapidly identified as being more likely to have poor outcomes typical of sepsis if they have at least 2 of the following clinical criteria that together constitute a new bedside clinical score termed quickSOFA (qSOFA): respiratory rate of 22/min or greater, altered mentation, or systolic blood pressure of 100 mm Hg or less.

Cordemans *et al. Annals of Intensive Care* 2012, **2**(Suppl 1):S1
http://www.annalsofintensivecare.com/content/2/S1/S1

Annals of Intensive Care
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RESEARCH Open Access

Fluid management in critically ill patients: the role of extravascular lung water, abdominal hypertension, capillary leak, and fluid balance

Colin Cordemans[1], Inneke De laet[1], Niels Van Regenmortel[1], Karen Schoonheydt[1], Hilde Dits[1], Wolfgang Huber[2], Manu LNG Malbrain[1*]

- Lésions inflammatoires aiguës = cascade proinflammatoire
  - ✓ Dysfonction microcirculatoire
  - ✓ Fuite capillaire

  Choc distributif

- « Sur »remplissage et lésions microvasculaires et/ou tissulaires
  - ✓ Accumulation de fluides dans compartiment interstitiel

    Marik PE : Iatrogenic salt water drowning and the hazards of a high central venous pressure. Ann Intensive Care 2014
  - ✓ Tendance à l'hyperpression intra-abdominale
  - ✓ Morbidité augmentée en cas de balance hydrique positive

    Vincent JL, Sakr Y, Sprung CL, Ranieri VM, Reinhart K, Gerlach H, Moreno R, Carlet J, Le Gall JR, Payen D: Sepsis in European intensive care units: results of the SOAP study. Critical care medicine 2006, 34(2):344-353.

Balance hydrique et fonction rénale

- **Rôle de l'œdème interstitiel pour les organes encapsulés**
  - ✓ Augmentation de la pression interstitielle (+ effet de l'HIA)
  - ✓ Retentissement sur le débit sanguin régional

Prowle JR, Echeverri JE, Ligabo EV, Ronco C, Bellomo R ; fluid balance and acute kidney injuri. Nat Rev Nephrol 2010

- **Effet de l'hémodilution sur la créatininémie ?**

Intensive Care Med (2015) 41:160–161
DOI 10.1007/s00134-014-3538-7

John R. Prowle
Andrew Leitch
Christopher J. Kirwan
Lui G. Forni

$$\text{Corrected pCr} = \text{pCr} \times \frac{0.6 \times (\text{admission weight}) + \sum(\text{daily cumulative fluid balance})}{0.6 \times (\text{admission weight})}$$

Positive fluid balance and AKI diagnosis: assessing the extent and duration of 'creatinine dilution'

=> Récupération d'AKI manqués?

Accepted: 28 October 2014
Published online: 15 November 2014

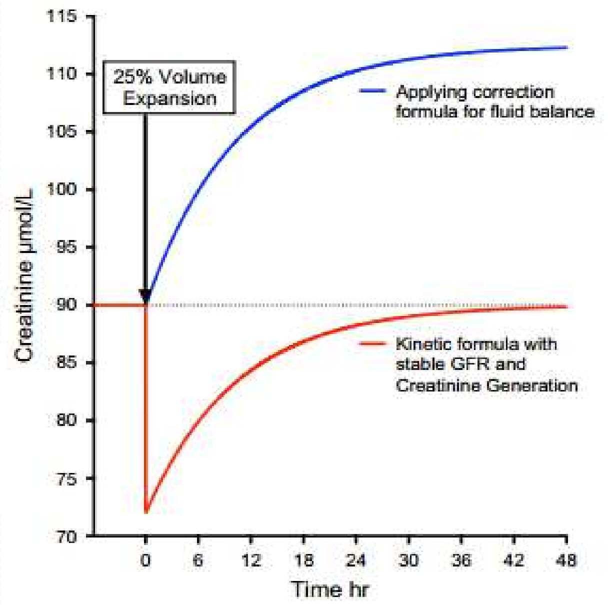

Fig. 1 Predicted plasma creatinine changes over 48 h in an 80-kg, 50-year-old man (baseline total body water 48 kg) with a baseline creatinine of 90 µmol/L. A 25 % acute volume expansion is applied at $t = 0$ (12 L) with fluid intake equal to fluid losses thereafter. GFR and creatinine generation rate are assumed to be unchanged and creatinine distributed evenly in a single compartment. A 20 % (12 µmol/L) decrease in pCr occurs acutely; however, half of this fall is recovered by 7 h and, by 24 h, pCr is 98 % of baseline despite a cumulative 12 L +ve fluid balance. Application of the correction formula [1] for fluid balance results in a 22 % over-estimation of baseline creatinine at 24 h

Cordemans *et al. Annals of Intensive Care* 2012, **2**(Suppl 1):S1
http://www.annalsofintensivecare.com/content/2/S1/S1

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RESEARCH

Fluid management in critically ill patier role of extravascular lung water, abdor hypertension, capillary leak, and fluid b

Colin Cordemans[1], Inneke De laet[1], Niels Van Regenmortel[1], Karen Schoonheydt[1], Hilde I
Manu LNG Malbrain[1*]

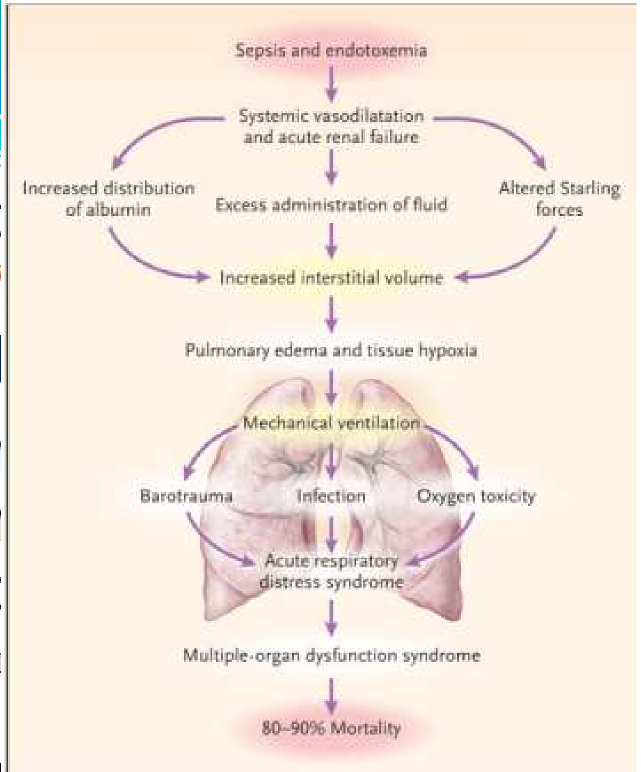


Figure 2. Effects of Systemic Arterial Vasodilatation in Patients with Sepsis and Acute Renal Failure.

Sepsis and endotoxemia with acute renal failure can lead to early noncardiogenic pulmonary edema, hypoxia, and the need for mechanical ventilation. With prolonged ventilatory support, acute respiratory distress syndrome, multiple-organ dysfunction syndrome, and an extremely high mortality can occur. The goal is to intervene early to prevent excessive fluid administration and to lessen fluid overload by hemofiltration. This will prevent the need for long-term mechanical ventilation that could lead to damage to the pulmonary capillaries. It could also prevent tissue hypoxia and the acute respiratory distress syndrome and reduce the risk of death.

- **Poumon** = Exposition maximale à la cascad
  - ✓ Reçoit la totalité du débit cardiaque
  - ✓ Reflète les variations microcirculatoires d

    Schrier RW, Wang W: Acute renal failure and sepsis. The New England journal of medicine 20

- Intérêt de la mesure de l'Eau Pulmonaire Extra-Vasculaire(EPEV)?
  - ✓ Aide à la distinction entre œdème hydrostatique et interstitiel

    Monnet X et al : Assessing pulmonary permeability by transpulmonary thermodilution allows differentiation of hydrostatic pulmonary edema from ALI/ARDS. Intensive care medicine 2007, 33(3):448-453.
  - ✓ Corrélation avec la gravité du sepsis et/ou du SDRA induit

    Kuzkov VV et al : Extravascular lung water determined with single transpulmonary thermodilution correlates with the severity of sepsis induced acute lung injury. Critical care medicine 2006, 34(6):1647-1653.

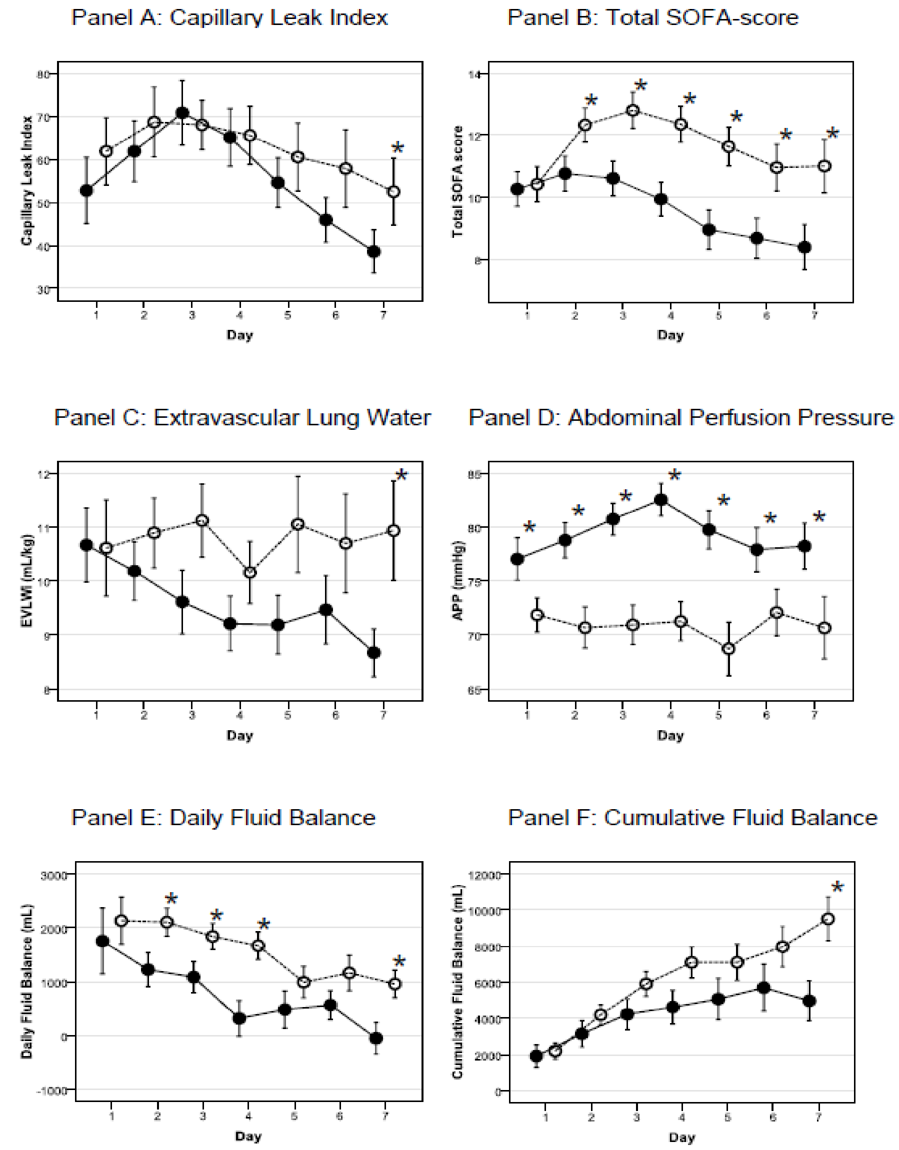
    Phillips CR, Chesnutt MS, Smith SM: Extravascular lung water in sepsis associated acute respiratory distress syndrome: indexing with predicted body weight improves correlation with severity of illness and survival. Critical care medicine 2008, 36(1):69-73.

Cordemans *et al. Annals of Intensive Care* 2012, **2**(Suppl 1):S1
http://www.annalsofintensivecare.com/content/2/S1/S1

Table 2 Analysis of EVLWI

Variable	Survivors (*n* = 58)	Nonsurvivors (*n* = 65)	*p* value
$EVLWI_{min}$ (mL/kg)	7.3 ± 2.7	8.5 ± 4.1	0.059
$EVLWI_{max}$ (mL/kg)	11.7 ± 4.3	13.7 ± 5.9	0.041
$EVLWI_{mean}$ (mL/kg)	9.2 ± 3.3	10.7 ± 4.6	0.043
Day $EVLWI_{max}$ (day)	2.4 ± 1.4	3.1 ± 2.2	0.026
ΔEVLWI (mL/kg)	−1.3 ± 3.5	2.1 ± 5.0	<0.001
Δ_{max}EVLWI (mL/kg)	−3.3 ± 3.8	2.5 ± 5.3	<0.001

$EVLWI_{min}$, minimal EVLWI during ICU stay; $EVLWI_{max}$, maximal EVLWI during ICU stay; $EVLWI_{mean}$, mean EVLWI during ICU stay; ΔEVLWI, difference between first and last extravascular lung water index; Δ_{max}EVLWI, maximal difference between extravascular lung water index.



- Comparaison des groupes « survivants » et « non-survivants »
  - ✓ Meilleur facteur prédictif de mortalité : **EVLWImax** (>11ml/kg)
    - ➢ Plus d'ALI et volumes courants plus élevés dans ce sous-groupe
  - ✓ Meilleur facteur prédictif de survie : **Δmax EVLWI** (AUC = 0,822)
    - ➢ Meilleur cut-off < - 2 ml/kg (sensibilité=74%, spécificité=78%, VPP=75%)

Cordemans et al. Annals of Intensive Care 2012, 2(Suppl 1):S1
http://www.annalsofintensivecare.com/content/2/S1/S1

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Fluid management in critically ill patients: the role of extravascular lung water, abdominal hypertension, capillary leak, and fluid balance

Colin Cordemans[1], Inneke De laet[1], Niels Van Regenmortel[1], Karen Schoonheydt[1], Hilde Dits[1], Wolfgang Huber[2], Manu LNG Malbrain[1*]

- Pression abdominale et balance hydrique

Table 3 Analysis by IAH

Variable (1 week after ICU admission)	No IAH (n = 64)	IAH (n = 21)	p value
SOFA score			
Respiratory	1.5 ± 1.5	1.7 ± 1.8	0.374
Nervous	2.4 ± 1.6	3.5 ± 1.0	0.004
Cardiovascular	2.0 ± 1.6	2.7 ± 1.3	0.092
Liver	0.6 ± 1.0	1.2 ± 1.4	0.038
Coagulation	0.8 ± 1.1	1.3 ± 1.1	0.084
Renal	1.1 ± 1.5	2.4 ± 1.8	0.002
Total	8.3 ± 4.9	12.8 ± 4.9	0.001
Respiratory variables			
Tidal volume (mL/kg of PBW)	8.9 ± 2	8.4 ± 2.3	0.343
Plateau pressure (cmH_2O)	24.4 ± 6.9	29.1 ± 6	0.010
PEEP (cmH_2O)	7.3 ± 2.9	10.2 ± 3.7	0.001
Dynamic compliance (mL/cmH_2O)	43.9 ± 24.2	38.4 ± 13	0.353
PaO_2/FIO_2	275.7 ± 98.4	257.8 ± 106.2	0.486
Ventilator-free days	2.1 ± 2.1	1.4 ± 2.1	0.479
Cumulative fluid balance (mL)	5,943 ± 7,125	10,176 ± 7,523	0.024
EVLWI (mL/kg)	9.8 ± 4.3	9.2 ± 3.7	0.592

IAH, intra-abdominal hypertension; SOFA, sequential organ failure assessment; PBW, predicted body weight; PEEP, positive end-expiratory pressure; EVLWI, extravascular lung water index.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Comparison of Two Fluid-Management Strategies in Acute Lung Injury

The Nati y Distress

Table 2. Furosemide Dose, Fluid Intake, Fluid Ou

Day	Furosemide				Fluid Balance	
	Liberal	Conservative		tive	Liberal	Conservative
	mg/24 hr (no. of patients)				*ml/24 hr (no. of patients)*	
1	74.27±7.48 (133)	148.94±8.52 (312)	5	0 (491)	2529.5±148.99 (484)	1186.7±151.01 (491)
2	72.46±6.65 (146)	157.35±8.91 (304)	4	57 (480)	1642.9±151.71 (479)	−376.1±161.08 (480)
3	65.28±6.49 (140)	166.90±10.01 (269)	3	48 (465)	936.12±115.32 (465)	−408.5±135.90 (464)
4	80.74±10.23 (129)	154.25±10.61 (228)	3	38 (434)	563.88±100.98 (444)	−165.5±119.92 (434)
5	73.06±8.41 (119)	164.71±12.06 (197)	3	98 (408)	483.03±109.98 (421)	−226.3±115.22 (408)
6	58.20±6.68 (106)	158.87±13.45 (165)	3	81 (379)	508.04±111.75 (410)	−144.9±110.25 (378)
7	51.03±4.31 (87)	127.86±11.61 (137)	3	16 (346)	458.95±106.85 (385)	130.08±118.47 (346)

* Plus–minus values are means ±SE. Numbers in emide on that day or the number of patients with a flu-
id measurement. P<0.001 for all comparisons ex 4 (P=0.008), day 5 (P=0.58), day 6 (P=0.94), and
day 7 (P=0.61); and fluid balance on day 7 (P=0

Table 3. Main Outcome Variables.*

Outcome	Conservative Strategy	Liberal Strategy	P Value
Death at 60 days (%)	25.5	28.4	0.30
Ventilator-free days from day 1 to day 28†	14.6±0.5	12.1±0.5	<0.001
ICU-free days†			
Days 1 to 7	0.9±0.1	0.6±0.1	<0.001
Days 1 to 28	13.4±0.4	11.2±0.4	<0.001
Organ-failure–free days†‡			
Days 1 to 7			
Cardiovascular failure	3.9±0.1	4.2±0.1	0.04
CNS failure	3.4±0.2	2.9±0.2	0.02
Renal failure	5.5±0.1	5.6±0.1	0.45
Hepatic failure	5.7±0.1	5.5±0.1	0.12
Coagulation abnormalities	5.6±0.1	5.4±0.1	0.23
Days 1 to 28			
Cardiovascular failure	19.0±0.5	19.1±0.4	0.85
CNS failure	18.8±0.5	17.2±0.5	0.03
Renal failure	21.5±0.5	21.2±0.5	0.59
Hepatic failure	22.0±0.4	21.2±0.5	0.18
Coagulation abnormalities	22.0±0.4	21.5±0.4	0.37
Dialysis to day 60			
Patients (%)	10	14	0.06
Days	11.0±1.7	10.9±1.4	0.96

- Pas de différenc *25,5%, p=0,30)*
- Critères second **restrictive**
  - ✓ Meilleur in *PaO2) x 100]*
  - ✓ Plus de jo *5, P<0,001)*
  - ✓ Plus de jo */S 11,2±0,4, P<0,001)*
  - ✓ Pas de dif défaillance d'organe

Quand désescalader?

- **J3** = tournant décisif dans le sepsis
  - ✓ Normalisation de la microcirculation chez le patient septique

    Boerma EC, van der Voort PH, Spronk PE, Ince C: Relationship between sublingual and intestinal microcirculatory perfusion in patients with abdominal sepsis. Critical care medicine 2007, 35(4):1055-1060.

- 48% des patients septiques ont des signes de surcharge hydrosodée au 3^{e} jour de réanimation avec EGDT.

  Kelm DJ, Perrin JT, Cartin-Ceba R, Gajic O, Schenck L, Kennedy CC : fluid overload in patients with severe sepsis and septic shock treated with early-goal directed therapy is associated with increased need for fluid-related medical interventions and hospital death. Shock 2014

VIA MEDICA

REVIEWS

Anaesthesiology Intensive Therapy
2014, vol. 46, no 5, 361–380
ISSN 1642–5758
DOI: 10.5603/AIT.2014.0060
www.ait.viamedica.pl

Fluid overload, de-resuscitation, and outcomes in critically ill or injured patients: a systematic review with suggestions for clinical practice

Manu L.N.G. Malbrain[1], Paul E. Marik[2], Ine Witters[1], Colin Cordemans[1], Andrew W. Kirkpatrick[3], Derek J. Roberts[3, 4], Niels Van Regenmortel[1]

- **Revue de littérature récente** par 2 auteurs indépendants
  - ✓ Association entre **balance hydrique** (BH) et **mortalité**
  - ✓ Intérêt particulier pour l'hyperpression intra-abdominale
  - ✓ Sélection d'articles abordant la neutralisation de la BH à J3

- 1 méta-analyse, 11 essais randomisés, 24 études observationnelles …
  - Analyse de **19 902 patients** de réanimation (dont Rivers !)

VIA MEDICA
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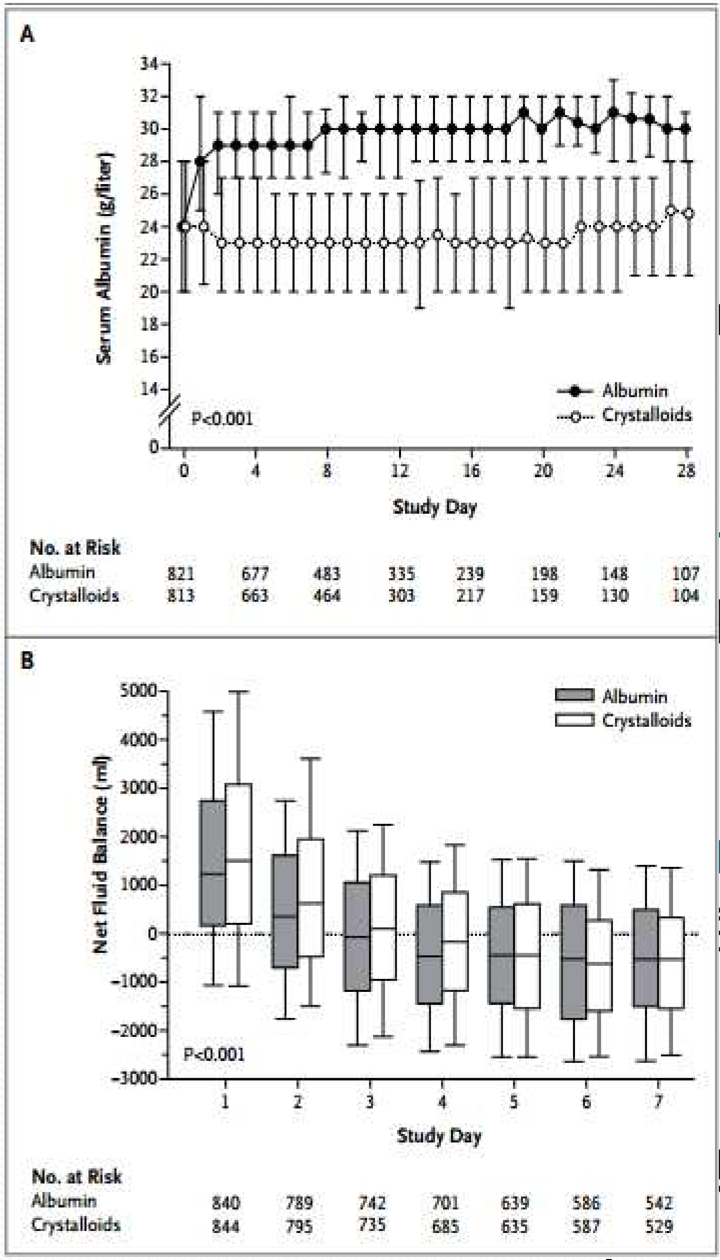
- Balance hydrique cumulée après 1 semaine de réanimation ?
  - ✓ Inférieure de 4,4L chez les survivants
  - ✓ Utilisation d'un protocole « restrictif » : BH diminuée de 5,6L

- Mortalité des patients traités avec un protocole « restrictif » ?
  - ✓ **Diminuée !** (24,7% vs 33,2%) OR 0,42, IC95%[0,32-0,55], P < 0,0001

- Cas particulier de l'hyperpression intra-abdominale ?
  - ✓ BH majorée de 3,4L après 1 semaine pour patients HIA+
  - ✓ Stratégie de diminution de BH => Diminution de la PIA
    - ➢ Si BH abaissée de 4,9L => PIA abaissée de 19,3 ± 9,1mmHg à 11,5±3,9mmHg

Et les patients septiques ??



ORIGINAL ARTICLE

Albumin Replacement in Patients with Severe Sepsis or Septic Shock

Pietro Caironi, M.D., Gianni Tognoni, M.D., Serge Masson, Ph.D., Roberto Fumagalli, M.D., Antonio Pesenti, M.D., Marilena Romero, Ph.D., Caterina Fanizza, M.Stat., Luisa Caspani, M.D., Stefano Faenza, M.D., Giacomo Grasselli, M.D., Gaetano Iapichino, M.D., Massimo Antonelli, M.D., Vieri Parrini, M.D., Gilberto Fiore, M.D., Roberto Latini, M.D., and Luciano Gattinoni, M.D., for the ALBIOS Study Investigators*

- l
- rventionnel dans les 7 premiers jours
  P<0,03) et **BH moins élevée** (P<0,001)
  e volume administré entre les groupes!
- ugement
  é à J28 inchangée
  idem
  ganes : idem
  en réanimation : idem

Et les patients septiques ??

- **Acheampong** (CC 2015)
  - ✓ 173 patients septiques
  - ✓ 1 service
  - ✓ **Balance hydrique ?**
- Etude prospective du bilan
  - ✓ Mortalité = 34%
  - ✓ Apports quotidiens m
- R

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CRITICAL CARE

RESEARCH Open Access

A positive fluid balance is an independent prognostic factor in patients with sepsis

Angela Acheampong and Jean-Louis Vincent*

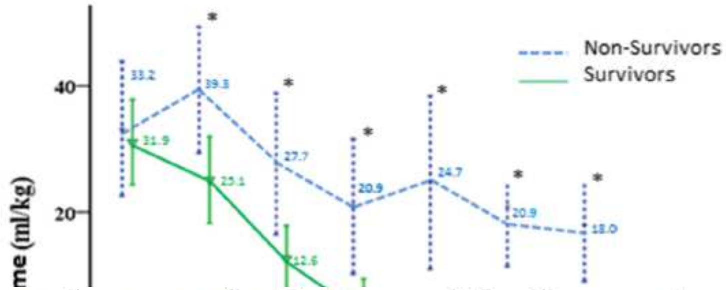

Table 2 Daily mean fluid intake/output and balance in survivors and non-survivors according to the use of diuretics or renal replacement therapy (RRT)

	Spontaneous diuresis			Use of diuretics			RRT[a]		
	Survivors (*n* = 63)	Non-survivors (*n* = 12)	*p* value	Survivors (*n* = 33)	Non-survivors (*n* = 24)	*p* value	Survivors (*n* = 18)	Non-survivors (*n* = 23)	*p* value
Mean daily volume (ml/kg)									
Intake	48 ± 3	55 ± 6	0.31	42 + -3	56 ± 4	0.006	55 ± 8	64 ± 6	0.41
Output	35 ± 2	29 ± 5	0.31	33 ± 2	27 ± 3	0.13	40 ± 5	32 ± 4	0.25
Fluid balance	13 ± 2	26 ± 6	0.03	9 ± 3	28 ± 4	<0.001	16 ± 5	32 ± 6	0.049

Data shown as mean values ± standard error of the mean
[a]Seven patients also received diuretics

ce at the

Et les patients septiques ??

Intensive Care Med
DOI 10.1007/s00134-016-4500-7

SEVEN-DAY PROFILE PUBLICATION

Restricting volumes of resuscitation fluid in adults with septic shock after initial management: the CLASSIC randomised, parallel-group, multicentre feasibility trial

Peter B. Hjortrup[1], Nicolai Haase[1], Helle Bundgaard[2], Simon L. Thomsen[3], Robert Winding[4], Ville Pettilä[5], Anne Aaen[6], David Lodahl[7], Rasmus E. Berthelsen[8], Henrik Christensen[9], Martin B. Madsen[1], Per Winkel[10], Jørn Wetterslev[10], Anders Perner[1,11*], The CLASSIC Trial Group, The Scandinavian Critical Care Trials Group

- **CLASSIC** (ICM 2016)
  - ✓ 151 patients
  - ✓ 9 services de réa
  - ✓ **Intérêt RV ponctuel ?**
- Protocole encadrant le recours aux « bolus » de remplissage
  - ✓ Restrictif : seulement si signes sévères d'hypoperfusion
  - ✓ Standard : si les critères macrocirculatoires s'améliorent
- Analyse des critères de jugement
  - ✓ **Principal** : -1,5L à J5 (et -1,4L durant le séjour)
  - ✓ **Secondaires**
    - ✓ Balance hydrique et apports totaux : idem
    - ✓ Survenue d'évènements graves (ex:ischémiques): idem
    - ✓ Atteinte rénale: moins prononcée dans groupe restrictif

« Take home » messages

- Balance hydrique positive = augmentation de la mortalité

- Pister les apports cachés (perfusions, etc)

- Ne pas banaliser le remplissage vasculaire ponctuel

- Traquer les complications de la surcharge hydro sodée
    - Intérêt de monitorer l'EPEV pour le suivi ?
    - Intérêt de monitorer la PIV systématiquement ?

- Considérer une stratégie restrictive à distance du sepsis initial
    - ROSD : rescue, optimization, stabilization, and de-escalation

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Merci de votre attention !