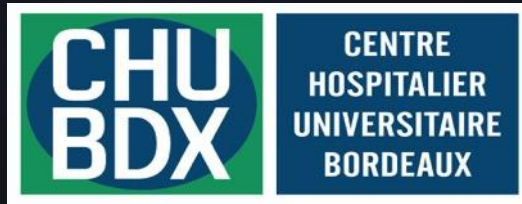


Nutrition en réanimation en 2022



Laurent.petit@chu-bordeaux.fr



- Activités de conseil, fonctions de gouvernance, rédaction de rapports

Non

Société(s) :

- **Essais cliniques, autres travaux, communications de promotion**

Oui

Société(s) : Baxter, Nutricia, Fresenius, Pyzer

- Intérêts financiers (actions, obligations)

Non

Société(s) :

- Liens avec des personnes ayant des intérêts financiers ou impliquées dans la gouvernance

Non

Société(s) :

- Réception de dons sur une association dont je suis responsable

Non

Société(s) :

- Perception de fonds d'une association dont je suis responsable et qui a reçu un don

Non

Société(s) :

- Détention d'un brevet, rédaction d'un ouvrage utilisé par l'industrie

Non

Société(s) :

* *Rayer la mention inutile*

Questions



- Les modifications métabolique ?
- Quels sont les délais et les quantité à administrer ?
- Comment nourrir ?
- Sortie de la phase aigue



CrossMark

RECOMMANDATIONS FORMALISÉES D'EXPERTS

Nutrition artificielle en réanimation

Guidelines for nutrition support in critically ill patient

J.-Y. Lefrant^{a,*}, D. Hurel^b, N.J. Cano^{c,d,e}, C. Ichai^f, J.-C. Preiser^g, F. Tamion^h

^a Services des réanimations, division anesthésie réanimation douleur urgence, CHU de Nîmes, place du Pr-Robert-Debré, 30029 Nîmes cedex 9, France

^b Service de réanimation médico-chirurgicale, centre hospitalier François-Quesnay, 2, boulevard Sully, 78201 Mantes-la-Jolie cedex, France

^c Service de nutrition, CHU de Clermont-Ferrand, 63003 Clermont-Ferrand cedex, France

^d Unité de nutrition humaine, Clermont université, université d'Auvergne, BP 10448, 63000 Clermont-Ferrand, France

^e Inra, UMR 1019, UNH, CRNH Auvergne, 63000 Clermont-Ferrand, France

^f Service de réanimation médico-chirurgicale, hôpital Saint-Roch, CHU de Nice, 5, rue Pierre-Dévoluy, 06006 Nice cedex 1, France

^g Service des soins intensifs, hôpital universitaire Erasme, 808, route de Lennik, 1070 Bruxelles, Belgique

^h Service de réanimation médicale, hôpital Charles-Nicolle, CHU de Rouen, 1, rue de Germont, 76081 Rouen cedex, France

Disponible sur Internet le 22 février 2014



SFAR

Société Française d'Anesthésie et de Réanimation



2016

Clinical Guidelines

Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.)

aspen | LEADING THE SCIENCE AND PRACTICE OF CLINICAL NUTRITION
Advanced Society for Parenteral and Enteral Nutrition

Journal of Parenteral and Enteral Nutrition
Volume 40 Number 2
February 2016 159-211
© 2016 American Society for Parenteral and Enteral Nutrition and Society of Critical Care Medicine
DOI: 10.1177/0148607115621863
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online.sagepub.com

CONFERENCE REPORTS AND EXPERT PANEL

Early enteral nutrition in critically ill patients: ESICM clinical practice guidelines



Annika Reintam Blaser^{1,2*}, Joel Starkopf^{1,3}, Waleed Alhazzani^{4,5}, Mette M. Berger⁶, Michael P. Casaer⁷, Adam M. Deane⁸, Sonja Fruhwald⁹, Michael Hiesmayr¹⁰, Carole Ichai¹¹, Stephan M. Jakob¹², Cecilia I. Loudet¹³, Manu L. N. G. Malbrain¹⁴, Juan C. Montejó González¹⁵, Catherine Paugam-Burtz¹⁶, Martijn Poeze¹⁷, Jean-Charles Preiser¹⁸, Pierre Singer^{19,20}, Arthur R.H. van Zanten²¹, Jan De Waele²², Julia Wendon²³, Jan Wernerman²⁴, Tony Whitehouse²⁵, Alexander Wilmer²⁶, Heleen M. Oudemans-van Straaten²⁷ and ESICM Working Group on Gastrointestinal Function

Clinical Nutrition xxx (2018) 1–32

2019



Contents lists available at ScienceDirect

Clinical Nutrition

journal homepage: <http://www.elsevier.com/locate/clnu>



ESPEN Guideline

ESPEN guideline on clinical nutrition in the intensive care unit

CLINICAL GUIDELINES

aspen | LEADING THE SCIENCE AND PRACTICE OF CLINICAL NUTRITION
Advanced Society for Parenteral and Enteral Nutrition

2022



Guidelines for the provision of nutrition support therapy in the adult critically ill patient: The American Society for Parenteral and Enteral Nutrition



dénutrition

autophagie

effet métabolique



Figure 1. Kafka's nightmare illustrates how deep the physical changes are for a patient after a critical illness and an intensive care unit stay.

Dénutrition et réanimation

Moisey et al. *Critical Care* (2022) 26:270
<https://doi.org/10.1186/s13054-022-04143-5>

Critical Care

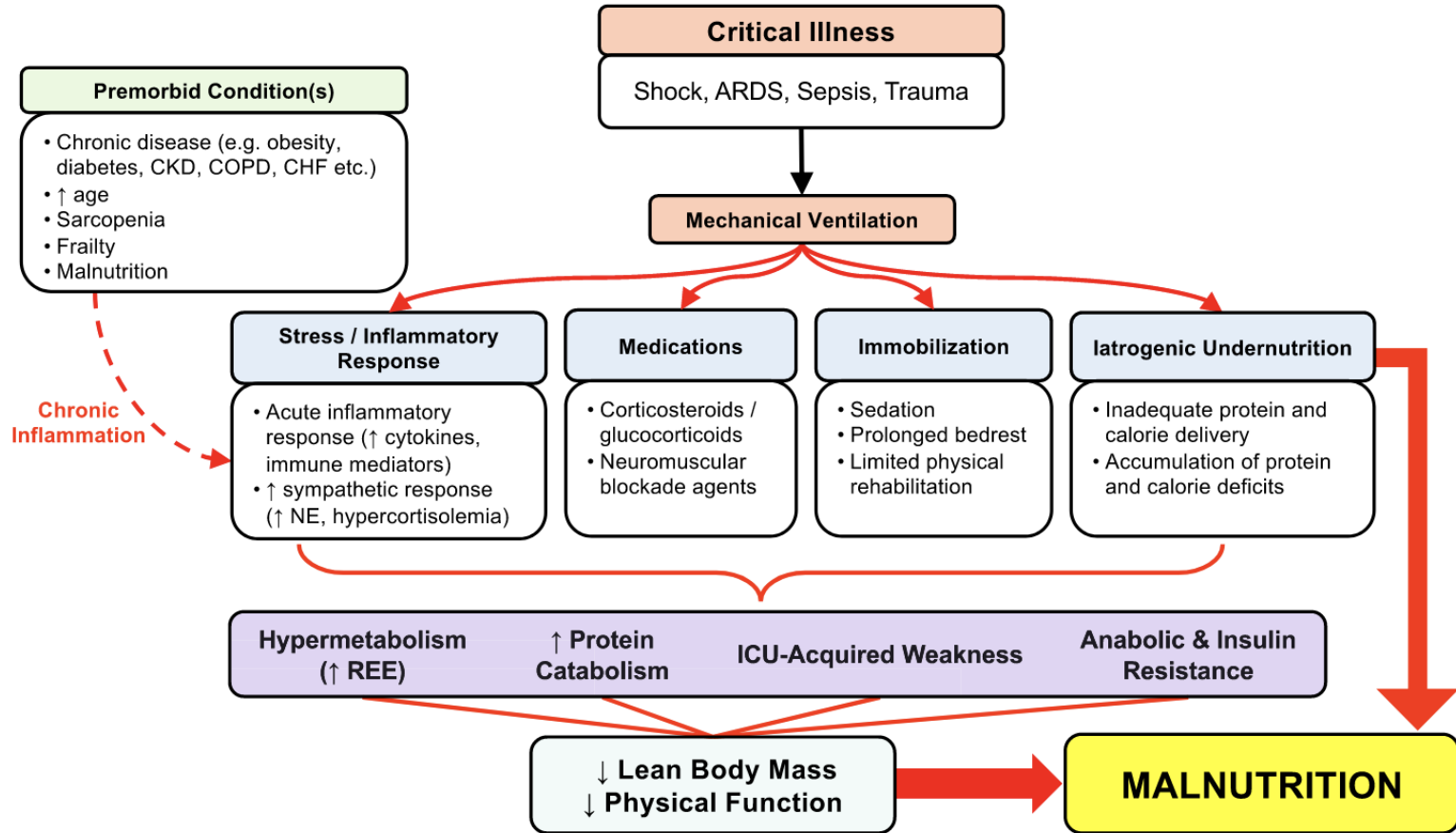
REVIEW

Open Access

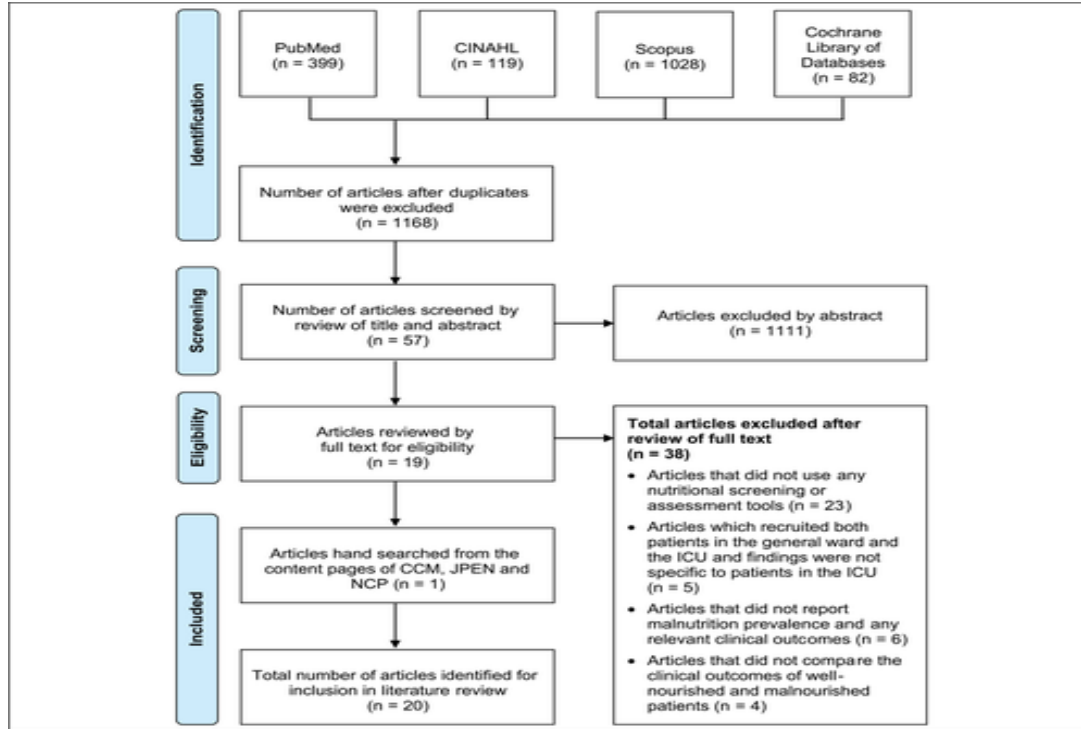
The role of nutrition rehabilitation in the recovery of survivors of critical illness: underrecognized and underappreciated



Lesley L. Moisey^{1*}, Judith L. Merriweather² and John W. Drover³



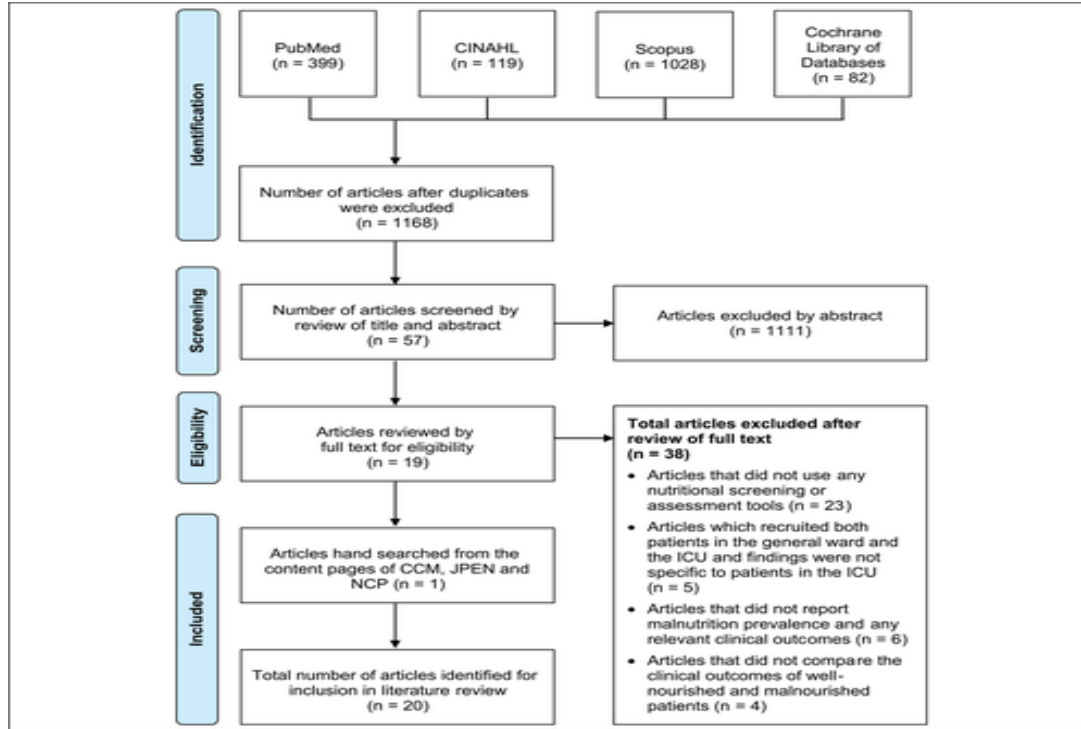
Dénutrition et réanimation



incidence : 38 à 78 %



Dénutrition et réanimation



incidence : 38 à 78 %

Associée de façon indépendante

➔ Mortalité hospitalière

➔ Durée de séjour

➔ infections

➔ Réadmission



Recommandation 1 « Every critically ill patient staying for more than 48 h in the ICU should be considered at risk for malnutrition. Strong consensus (96% agreement) »

Dénutrition et évaluation

Heyland *et al. Critical Care* 2011, **15**:R268
<http://ccforum.com/content/15/6/R268>



RESEARCH

Open Access

Identifying critically ill patients who benefit the most from nutrition therapy: the development and initial validation of a novel risk assessment tool

Based on expert consensus, we suggest a determination of nutrition risk (eg, nutritional risk screening [NRS 2002], NUTRIC score) be performed on all patients admitted to the ICU

Tableau 1: Variables liées au score NUTRIC

Variable	Plage	Points
Âge	< 50	0
	50 - < 75	1
	> 75	2
APACHE II	< 15	0
	15 - < 20	1
	20-28	2
	> 28	3
SOFA	< 6	0
	6 - < 10	1
	> 10	2
Nombre de maladies concomitantes	0-1	0
	> 2	1
Nombre de jours entre l'admission à l'hôpital et l'admission à l'USI	0 - < 1	0
	> 1	1
Taux d'IL-6	0 - < 400	0
	> 400	1

Limite > 4

Tableau 2: Système de notation NUTRIC – taux d'IL-6 disponible

Somme des points	Catégorie	Explication
6-10	Score élevé	➤ Associé à des résultats cliniques moins favorables (mortalité, ventilation). ➤ Ces patients sont les plus susceptibles de bénéficier d'une thérapie nutritionnelle énergétique.
0-5	Score faible	➤ Ces patients présentent un faible risque de malnutrition.

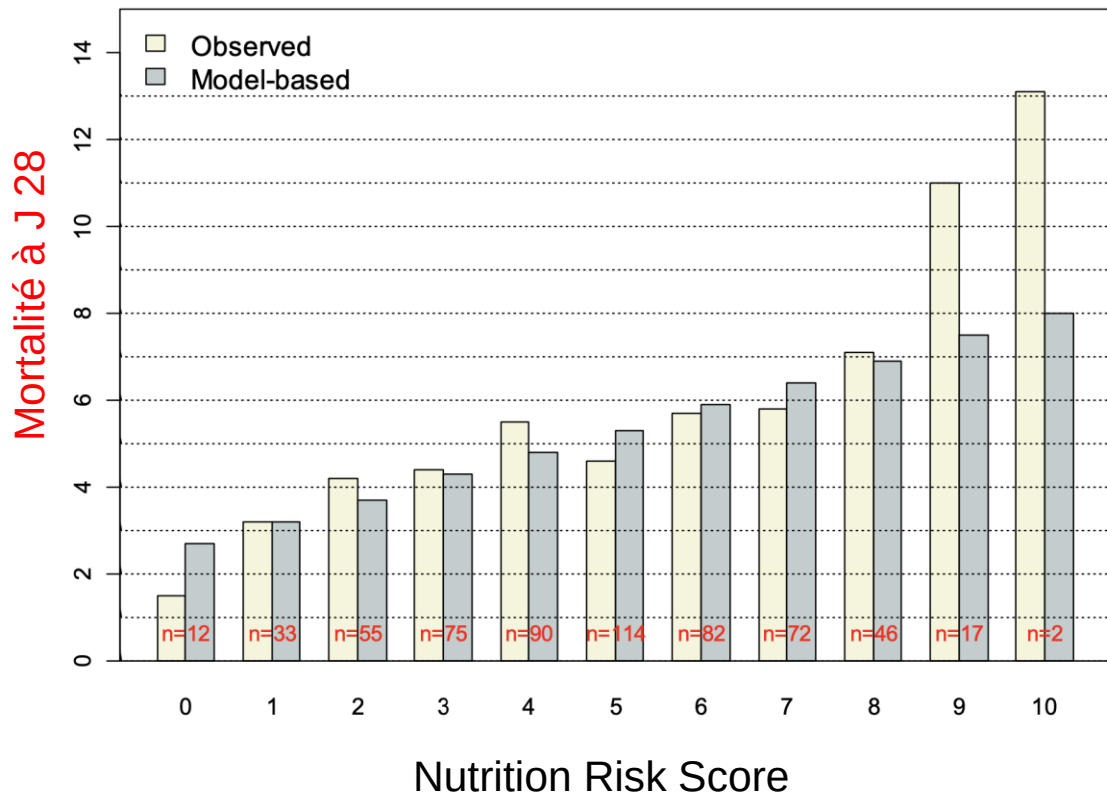
Tableau 3: Système de notation NUTRIC – taux d'IL-6 non disponible*

Somme des points	Catégorie	Explication
5-9	Score élevé	➤ Associé à des résultats cliniques moins favorables (mortalité, ventilation). ➤ Ces patients sont les plus susceptibles de bénéficier d'une thérapie nutritionnelle énergétique.
0-4	Score faible	➤ Ces patients présentent un faible risque de malnutrition.

RESEARCH

Open Access

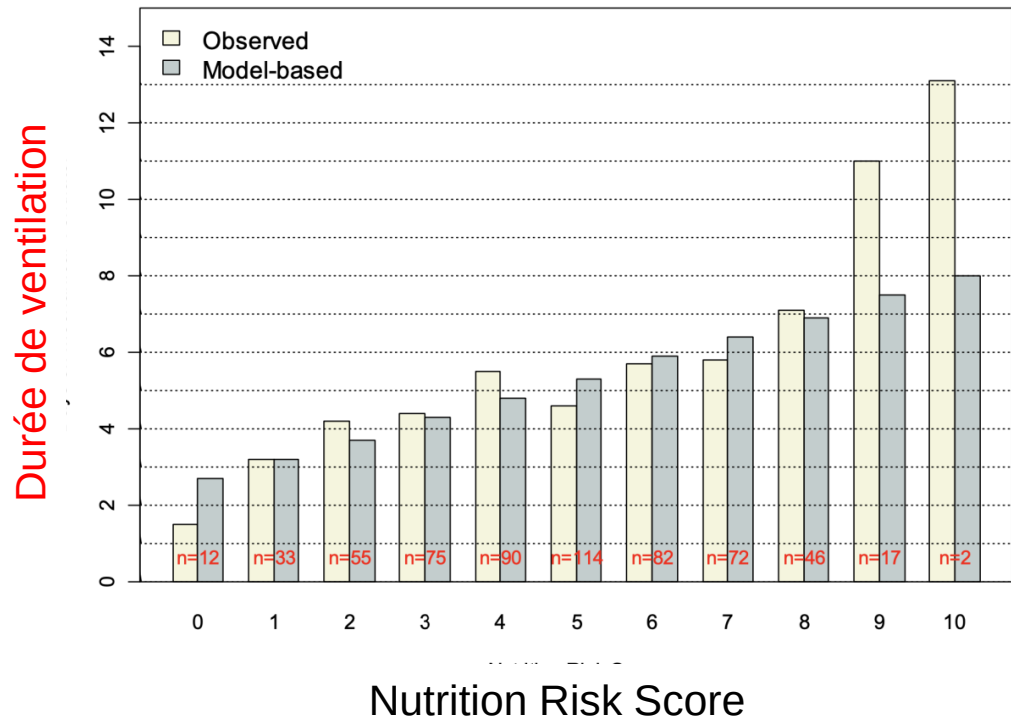
Identifying critically ill patients who benefit the most from nutrition therapy: the development and initial validation of a novel risk assessment tool



RESEARCH

Open Access

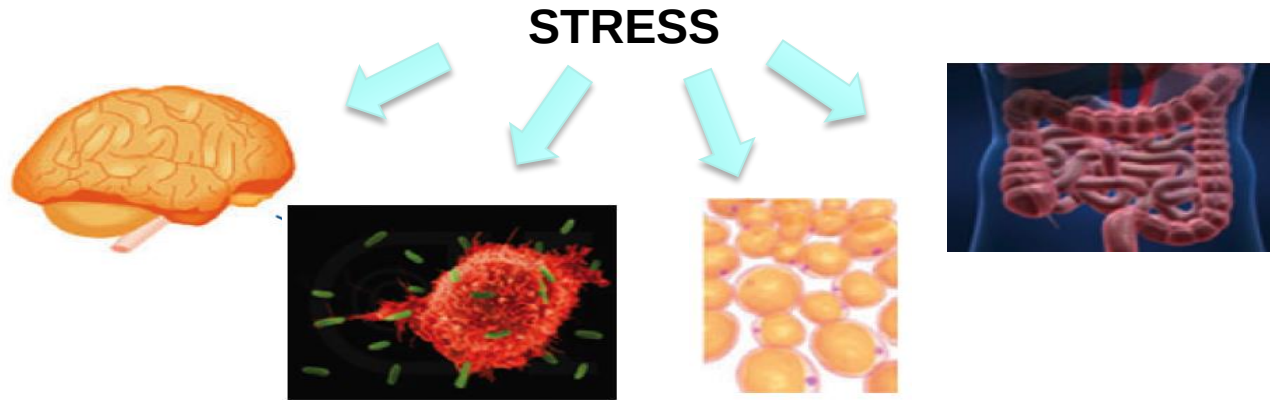
Identifying critically ill patients who benefit the most from nutrition therapy: the development and initial validation of a novel risk assessment tool

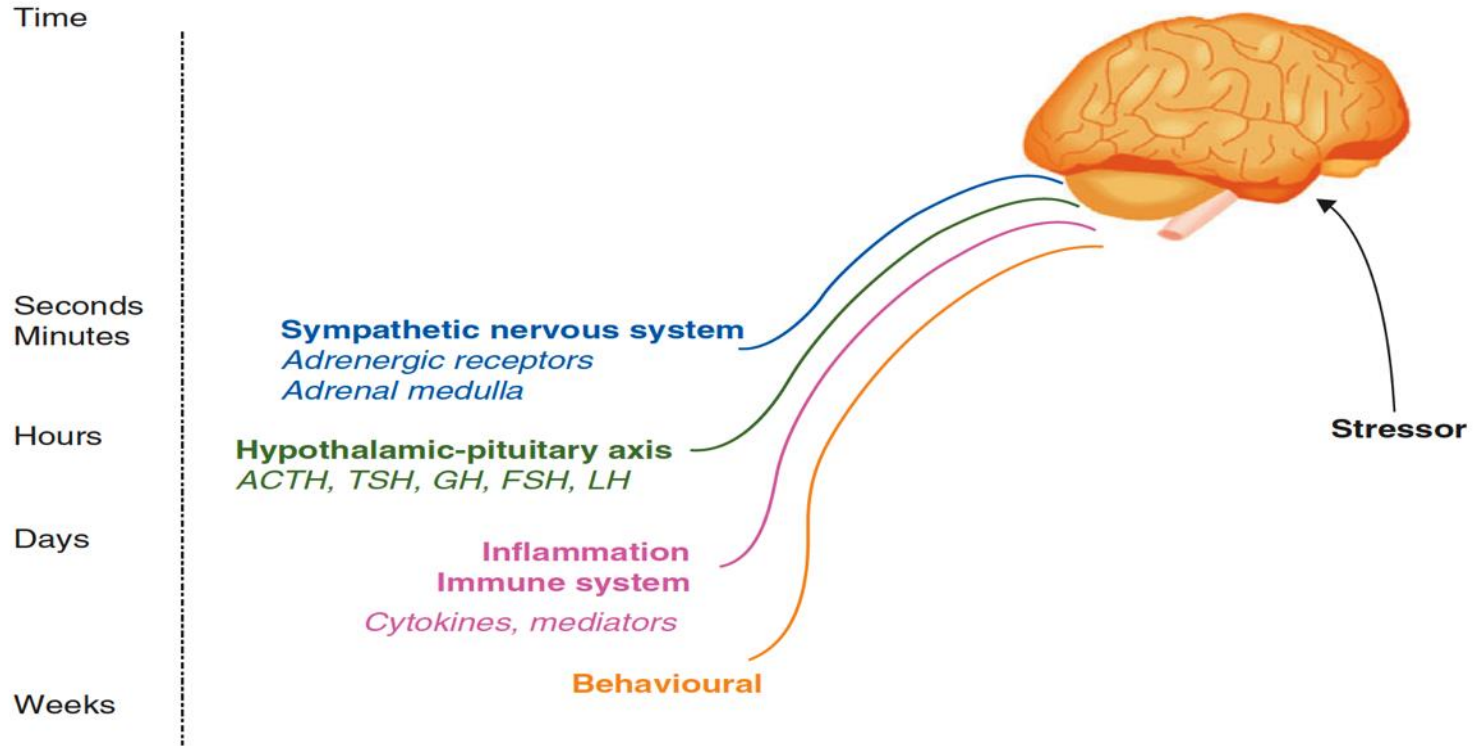


Effet métabolique de l'agression

Metabolic response to the stress of critical illness

J.-C. Preiser^{1*}, C. Ichai², J.-C. Orban² and A. B. J. Groeneveld³





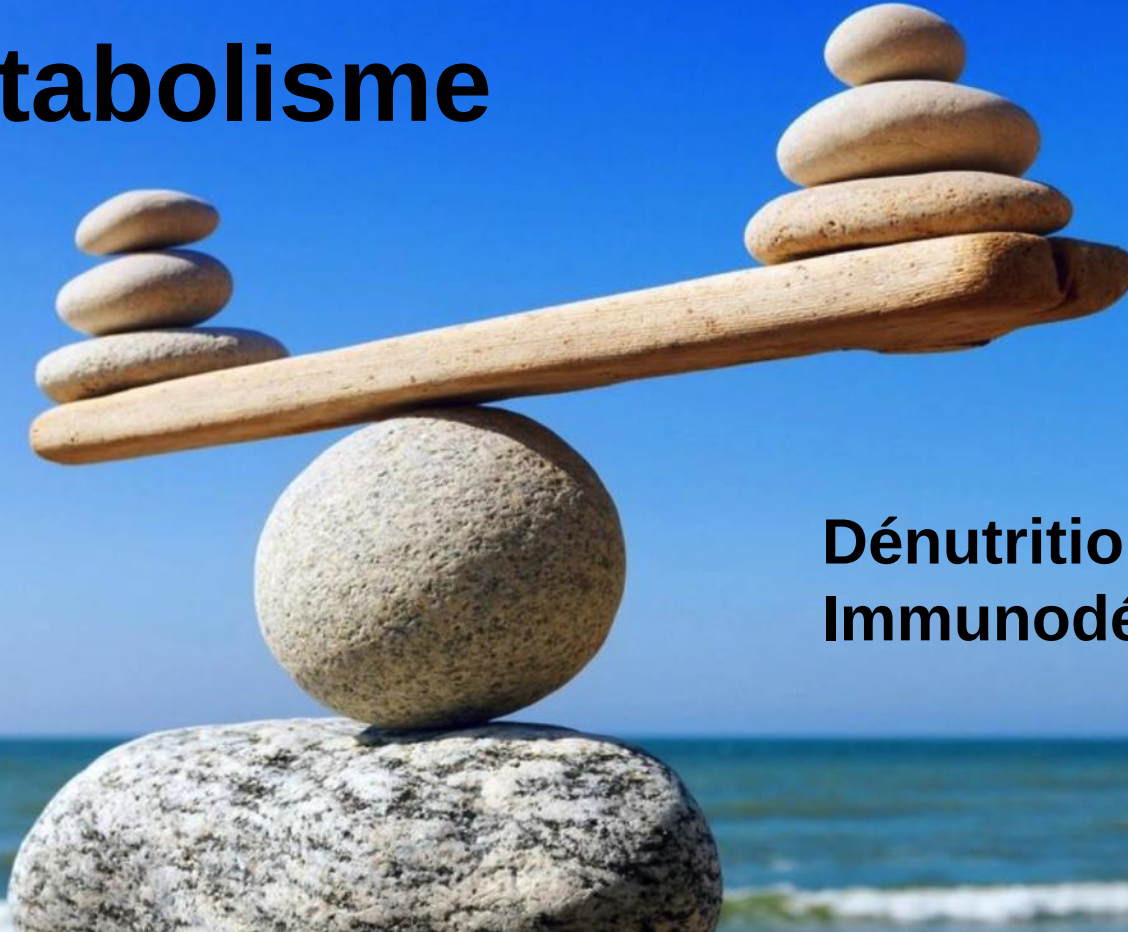
anabolisme

Catabolisme



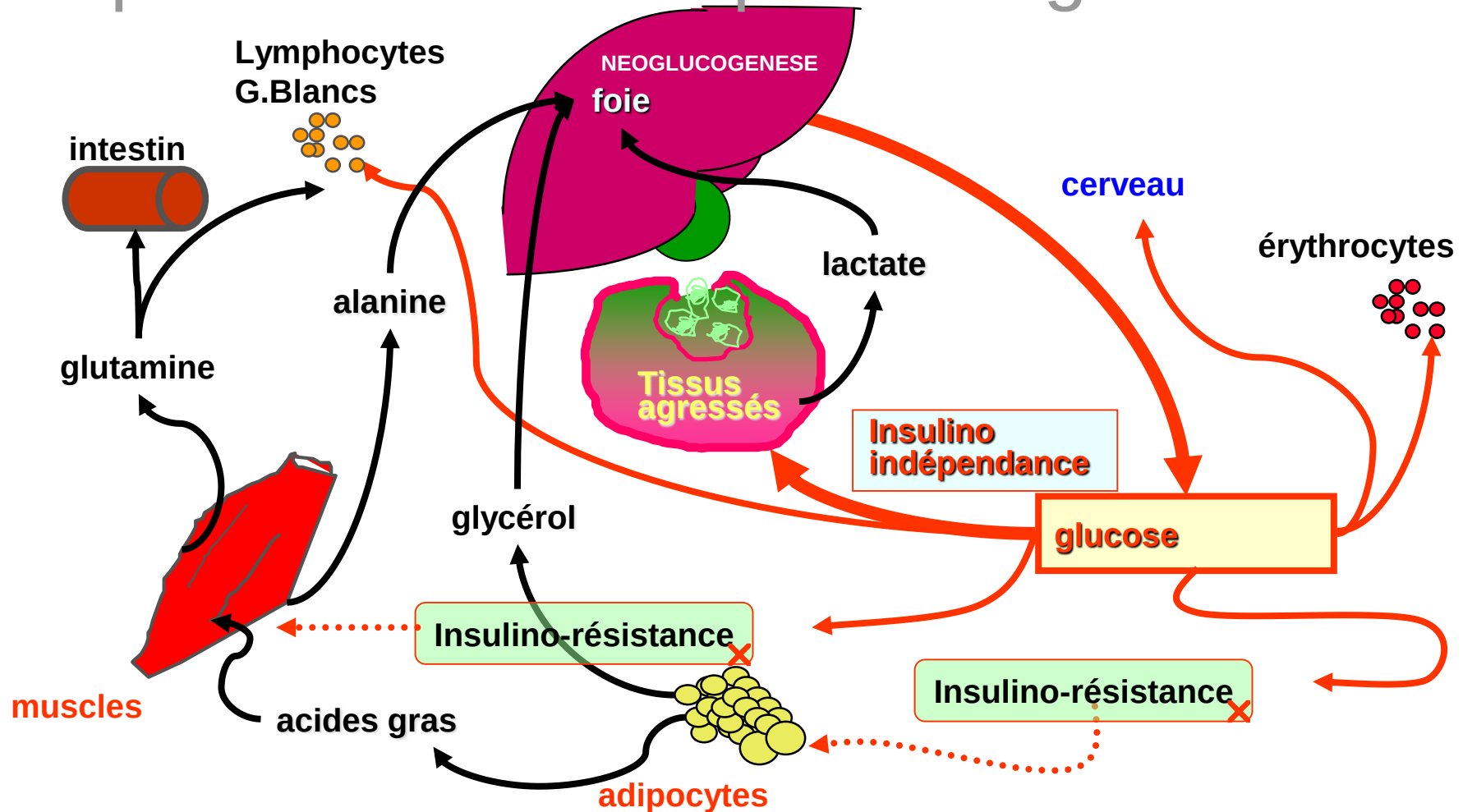
anabolisme

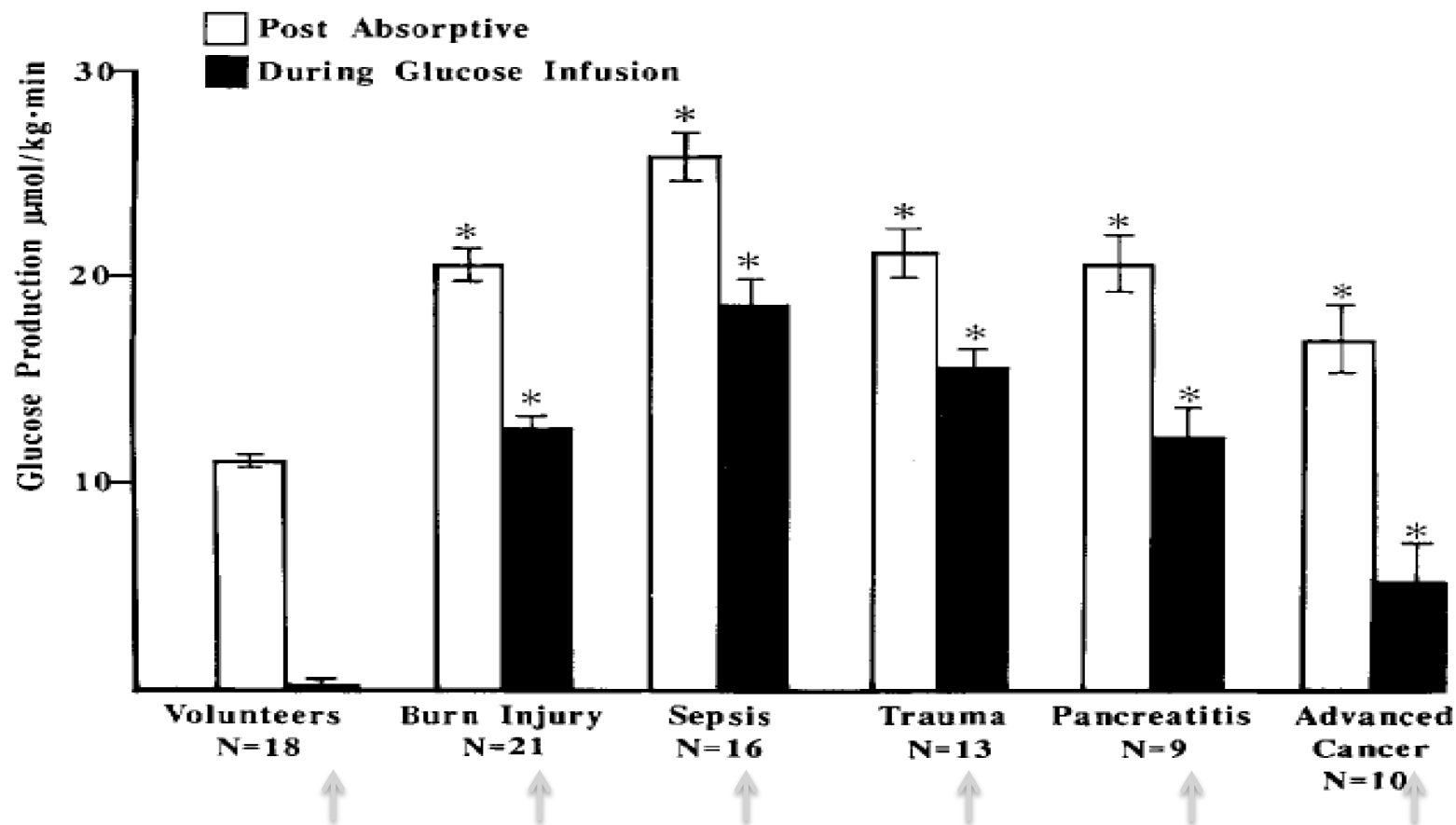
Catabolisme



**Dénutrition
Immunodépression**

Adaptations métaboliques à l'agression





Perfusion de glucose



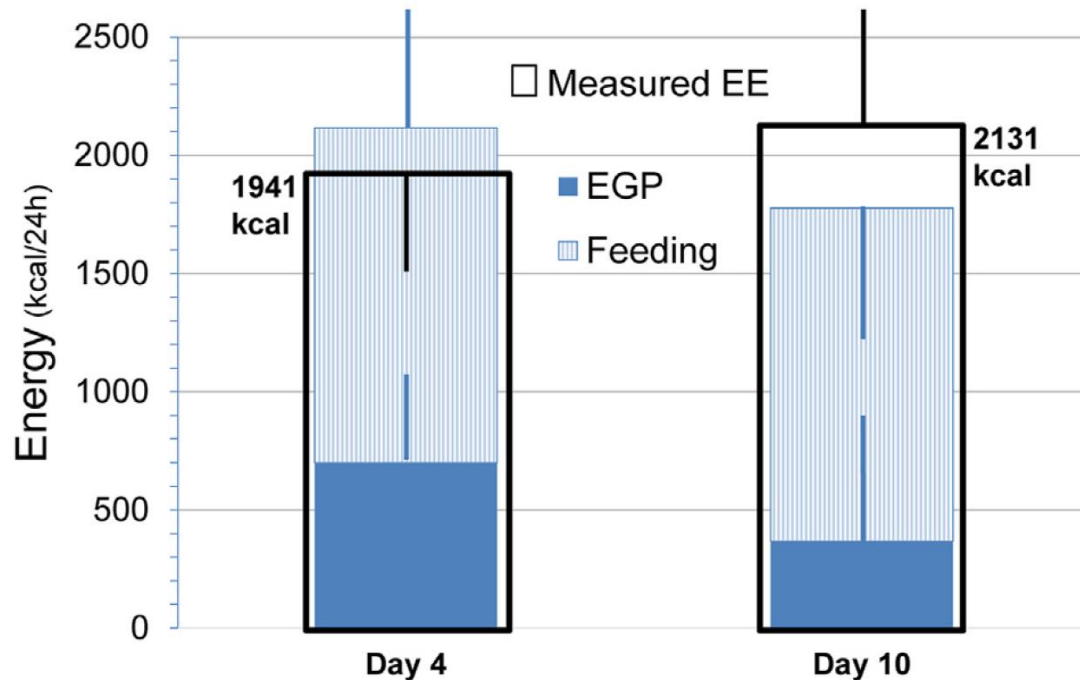
Original article

Magnitude of gluconeogenesis and endogenous glucose production: are they predictable in clinical settings?

Isabelle Udin ^{a, b, *}, Marc Habisreutinger ^c, Luc Tappy ^d,
Mette M. Berger ^a

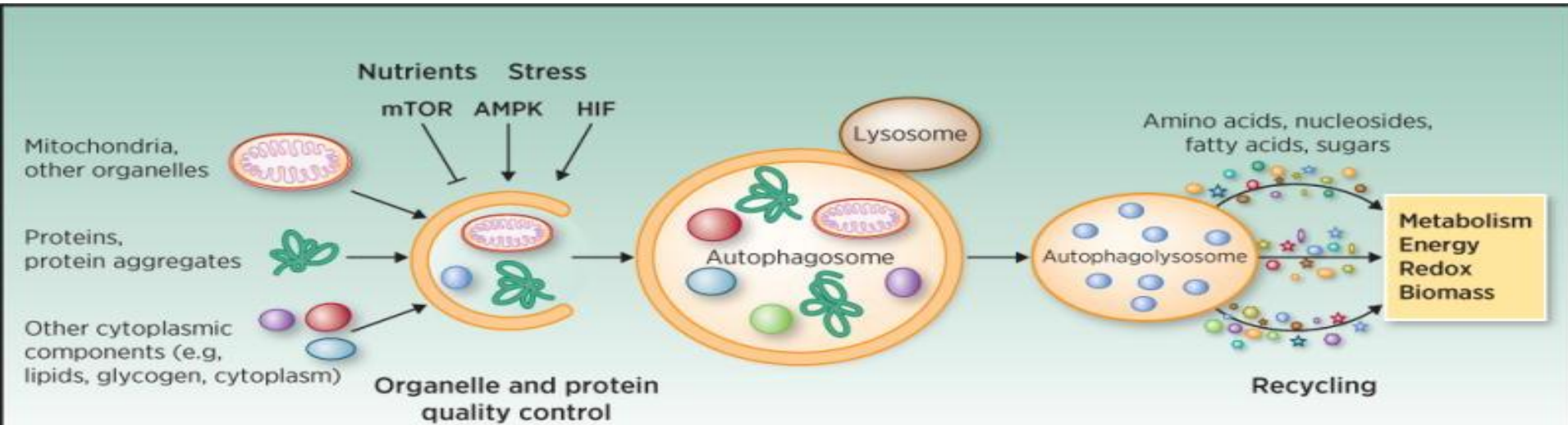
Apport glucose par alimentation

Production endogène de glucose



autophagie et réanimation

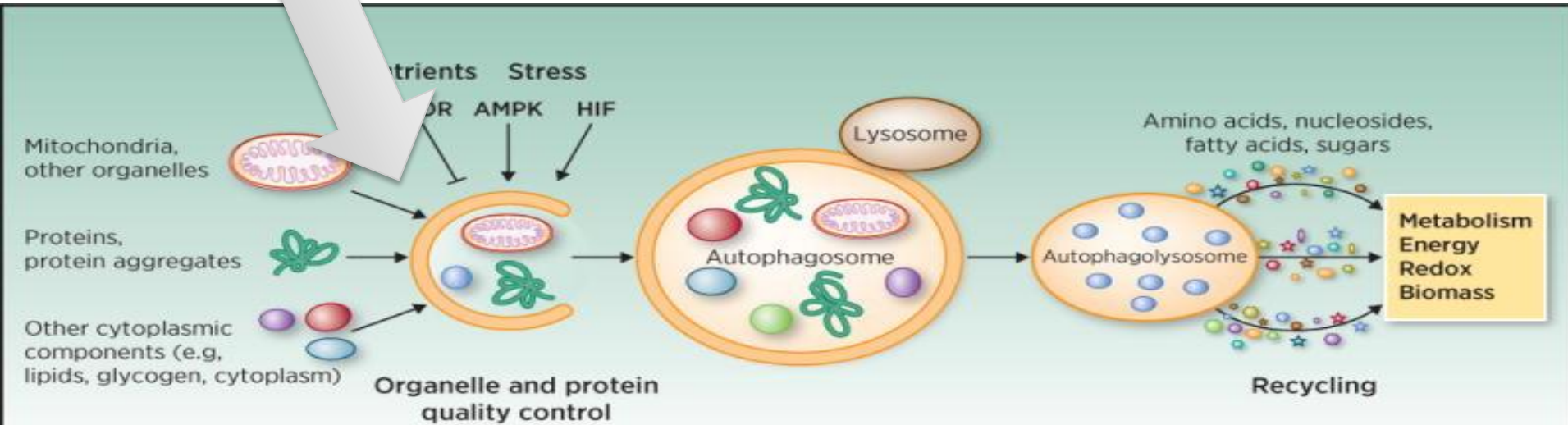
autophagie et réanimation



autophagie et réanimation

Hyperglycémie

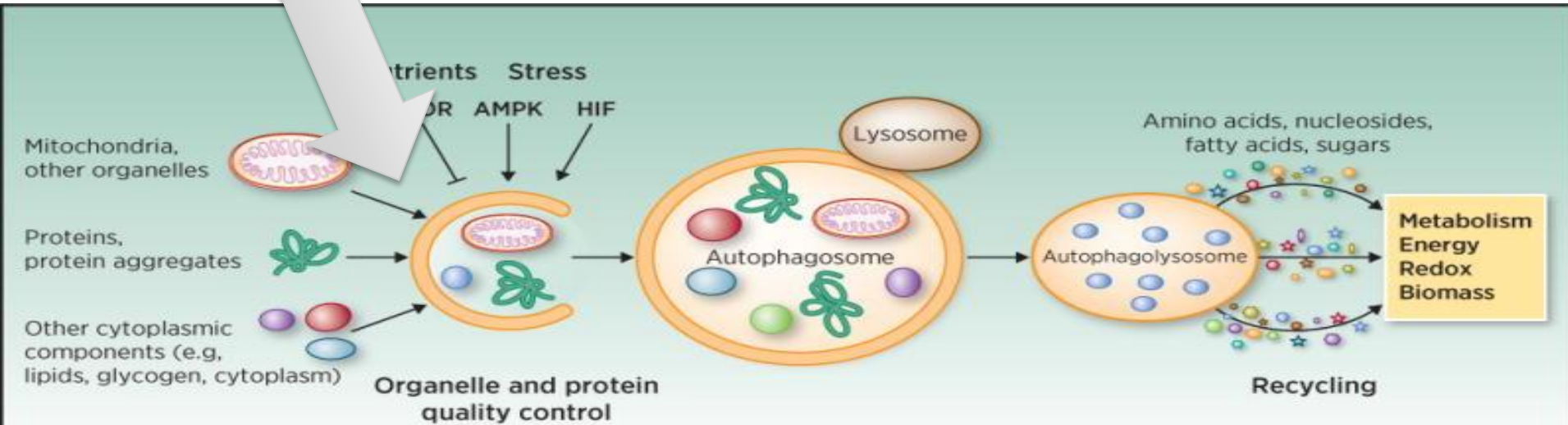
Inhibition



autophagie et réanimation

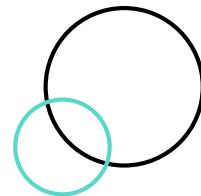
Nutrition excessive

Inhibition ?





Quand initier la nutrition ?



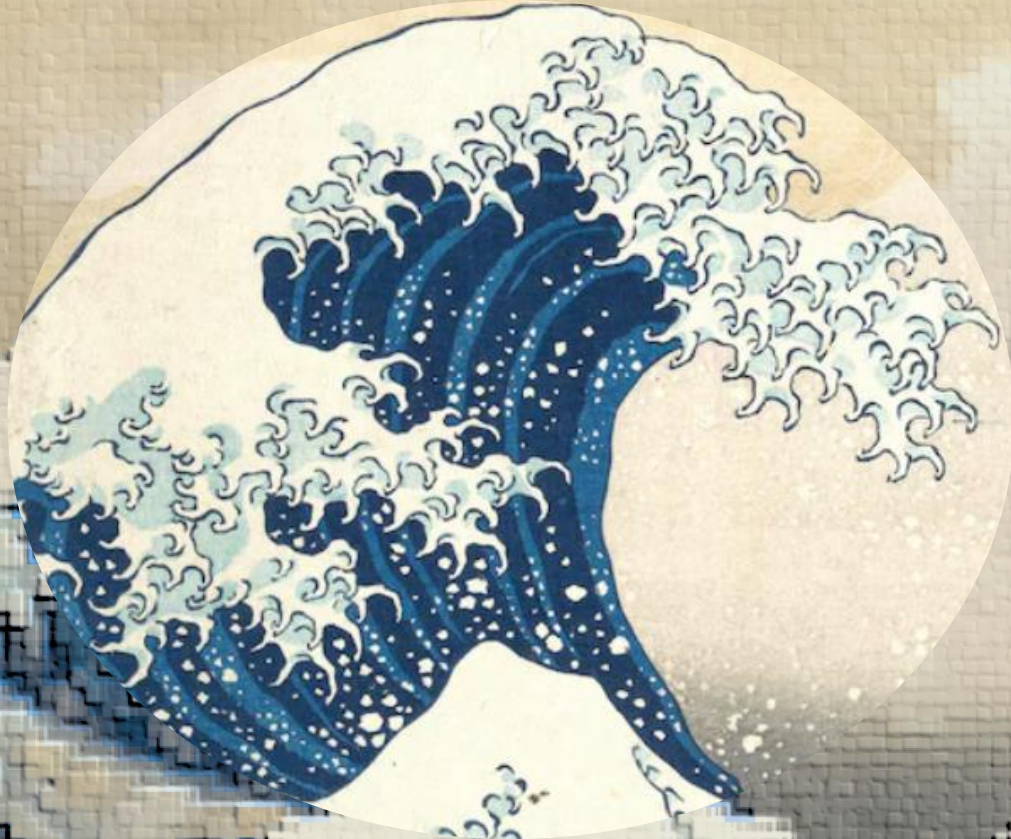
Recommandation 1 « Every critically ill patient staying for more than 48 h in the ICU should be considered at risk for malnutrition. Strong consensus (96% agreement) »

Quand initier la nutrition ?



Pas de nutrition

Pas de nutrition



Quand initier la nutrition ?



Dés la stabilisation

Medical nutrition therapy shall be considered for all patients staying in the ICU, mainly for more than 48 h - Grade : GPP
strong consensus (100% agreement)

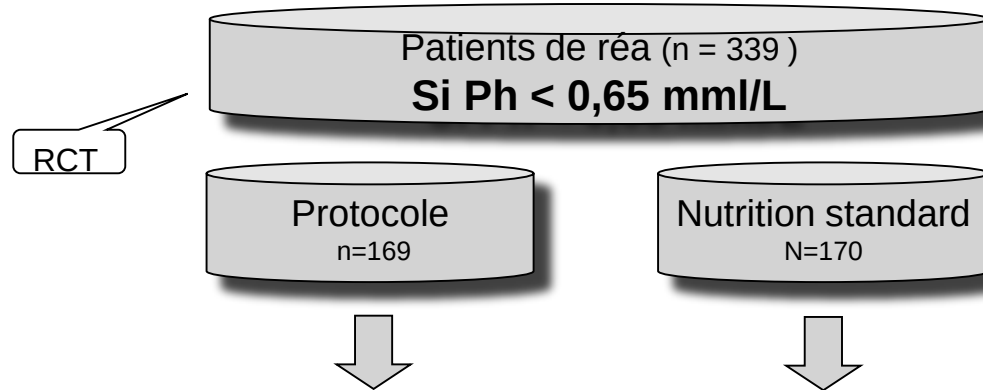
Dés la stabilisation « ioniques »

In patients with **refeeding hypophosphatemia** (< 0.65 mmol/l), energy supply should be restricted for 48 h and then gradually increased. Grade B - strong consensus (100%)

Electrolytes (potassium, magnesium, phosphate) should be measured at least once daily for the first week. Grade : GPP strong consensus (92%)

Restricted versus continued standard caloric intake during the management of refeeding syndrome in critically ill adults: a randomised, parallel-group, multicentre, single-blind controlled trial

*Gordon S Doig, Fiona Simpson, Philippa T Heighes, Rinaldo Bellomo, Douglas Chesher, Ian D Caterson, Michael C Reade, Peter W J Harrigan, for the Refeeding Syndrome Trial Investigators Group**

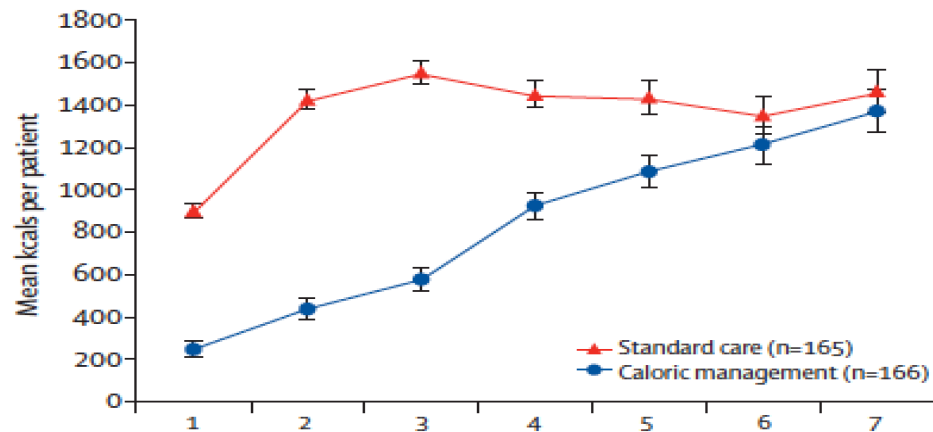


- 20 kcal/h
- Stabilisation 2-3 j
- Puis 40 kcal/h J+1
- Puis 60 kcal/h J+2
- Puis 100 % DE
- ➡ 20kcal/h si Ph<0,71)

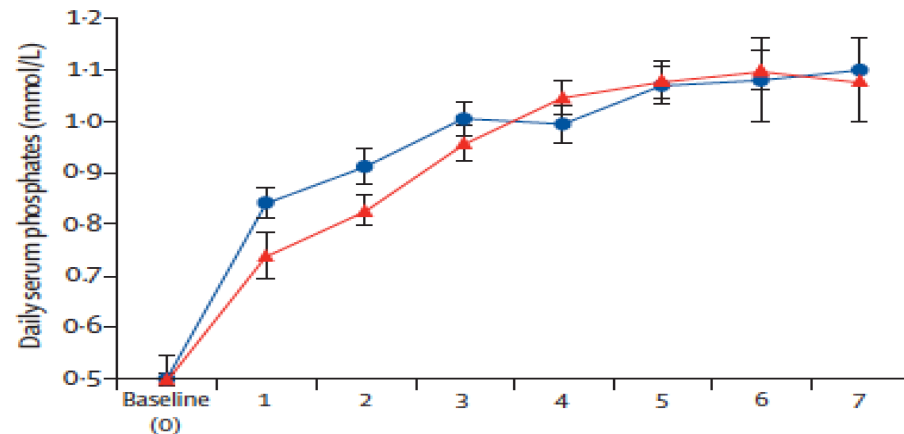
Mortalité / Morbidité ?

Study process measures

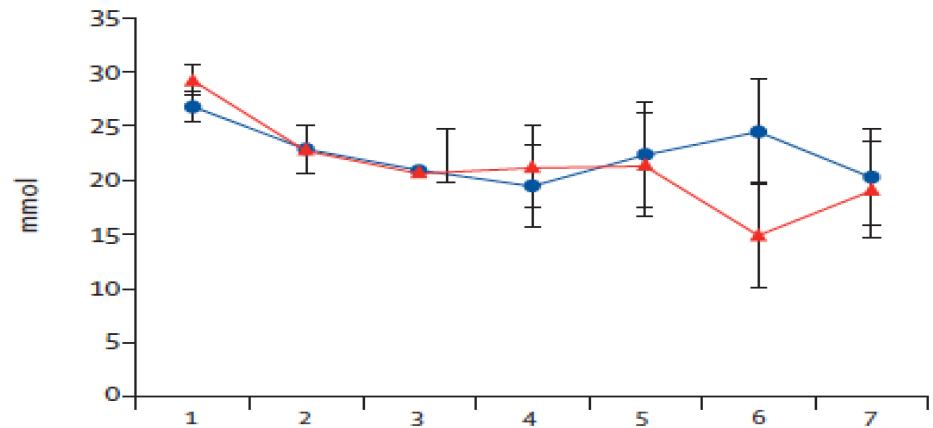
A Mean caloric intake per study day



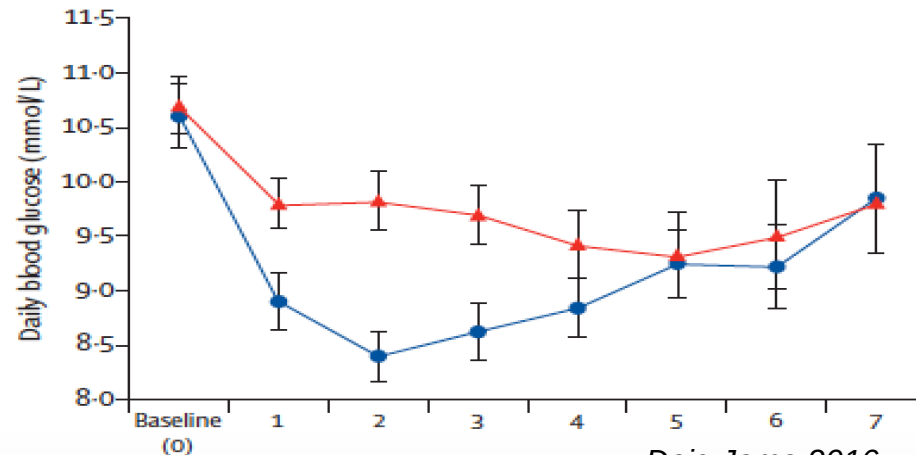
D Lowest daily serum phosphates



B Intravenous phosphate replacement dose



E Highest daily blood glucose



	Standard care (n=165 patients)	Caloric management (n=166 patients)	Risk difference (95% CI)	p value
Vital status (% alive)				
ICU discharge status	150/165 (91%)	157/166 (95%)	3.7% (-5.3 to 12.7)	0.20
Hospital discharge status	135/165 (82%)	151/166 (91%)	9.2% (0.7 to 17.7)	0.017
Day 60 status	128/163 (79%)*	149/164 (91%)*	12.3% (3.9 to 20.7)	0.002
Day 90 status	128/163 (79%)*	143/164 (87%)*	8.7% (0.04 to 17.0)	0.041
Length of stay (days)				
ICU	10.0 (9.2 to 10.9)	11.4 (10.5 to 12.4)	1.4 (-0.42 to 3.5)	0.14
Hospital	21.7 (20.0 to 23.5)	27.9 (25.7 to 30.3)	6.2 (2.0 to 11.2)	0.003
Quality of life and physical function scores† (n responses available for analysis)				
RAND-36 general health	53.4 (22.6; n=124/128)	46.0 (26.0 n=136/143)	-7.5 (-13.4 to -1.5)	0.014
ECOG performance status	1.3 (1.0; n=125/128)	1.5 (1.1; n=135/143)	0.18 (-0.08 to 0.43)	0.18
RAND-36 physical function	47.3 (35.0; n=123/128)	40.9 (33.4; n=135/143)	-6.4 (-14.8 to 2.0)	0.13

Quels besoins énergétiques : formules ?

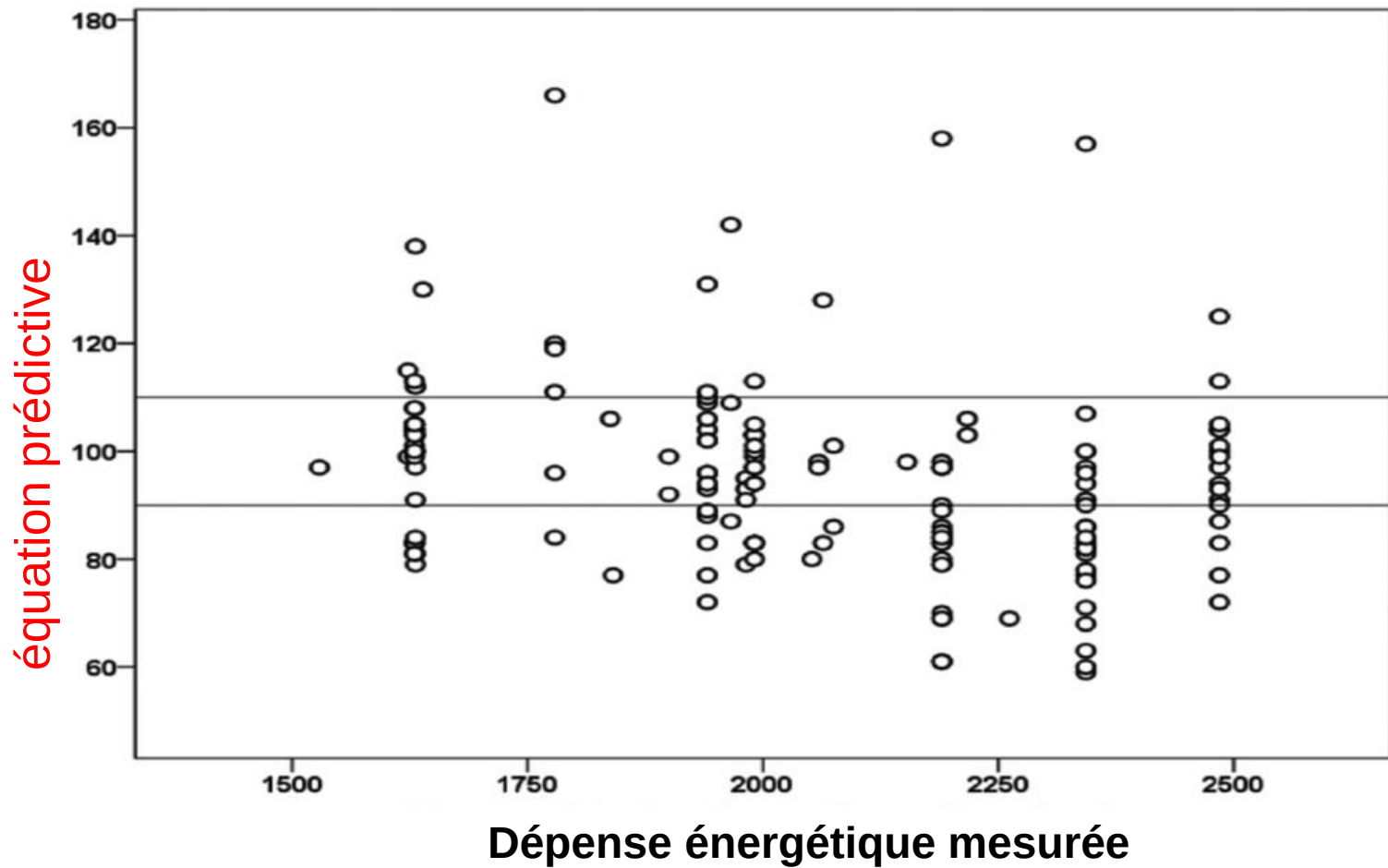
Apports caloriques = **x** kcal/**kg**/jour

Quels besoins énergétiques : formules ?

Table 2. Rates of Underprescription and Overprescription of Energy Needs at a Group Level.

Predictive Equation Subgroup	Underestimation: No. of Estimates <90% of IC Values	Overestimation: No. of Estimates >110% of IC Values	No. of Predictive Equations Compared to IC Measurements
Fixed prescriptions	13 (39%)	4 (12%)	33
HB	31 (54%)	4 (7%)	57
IJ	2 (20%)	4 (40%)	10
Other	8 (21%)	7 (18%)	38
PSU	6 (27%)	0 (0%)	22
Total	60 (38%)	19 (12%)	160

HB, Harris-Benedict; IC, indirect calorimetry; IJ, Ireton-Jones; PSU, Penn-State.



Estimation / mesures des besoins caloriques

2

Table 2. Rates of Underprescription and Overprescription of Energy Needs at a Group Level.

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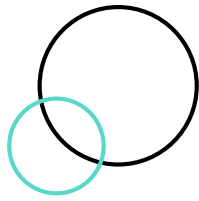
HB, Harris-Benedict; IC, indirect calorimetry; IJ, Ireton-Jones; PSU, Penn-State.

50 % patients mal classés

Tatucu-Babet jpen 2015

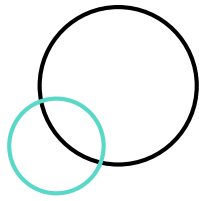
In critically ill mechanically ventilated patients, EE should be determined by using indirect calorimetry.
Grade of recommendation: B strong consensus (95% agreement)

Estimation / mesures des besoins caloriques?



**In critically ill mechanically ventilated patients, EE should be determined by using indirect calorimetry.
Grade of recommendation: B strong consensus (95% agreement)**

Estimation / mesures des besoins caloriques?



IMC extrême
Patients « complexes »

In critically ill mechanically ventilated patients, EE should be determined by using indirect calorimetry.
Grade of recommendation: B strong consensus (95% agreement)

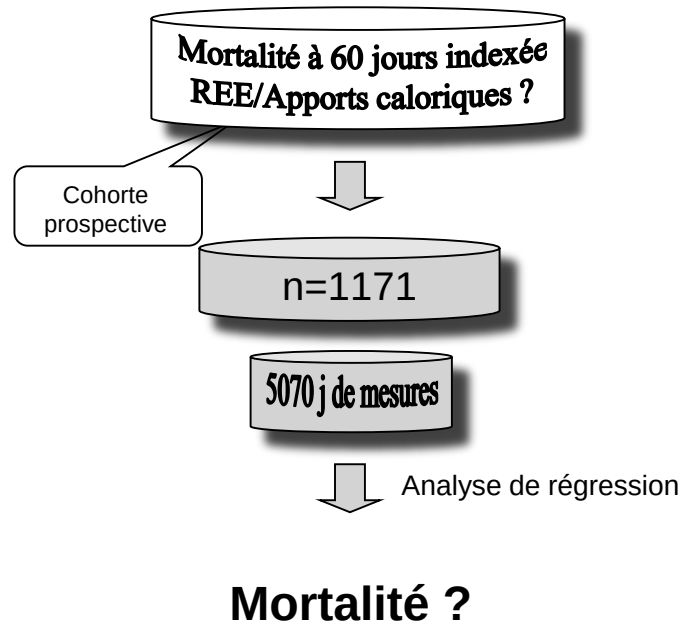
RESEARCH

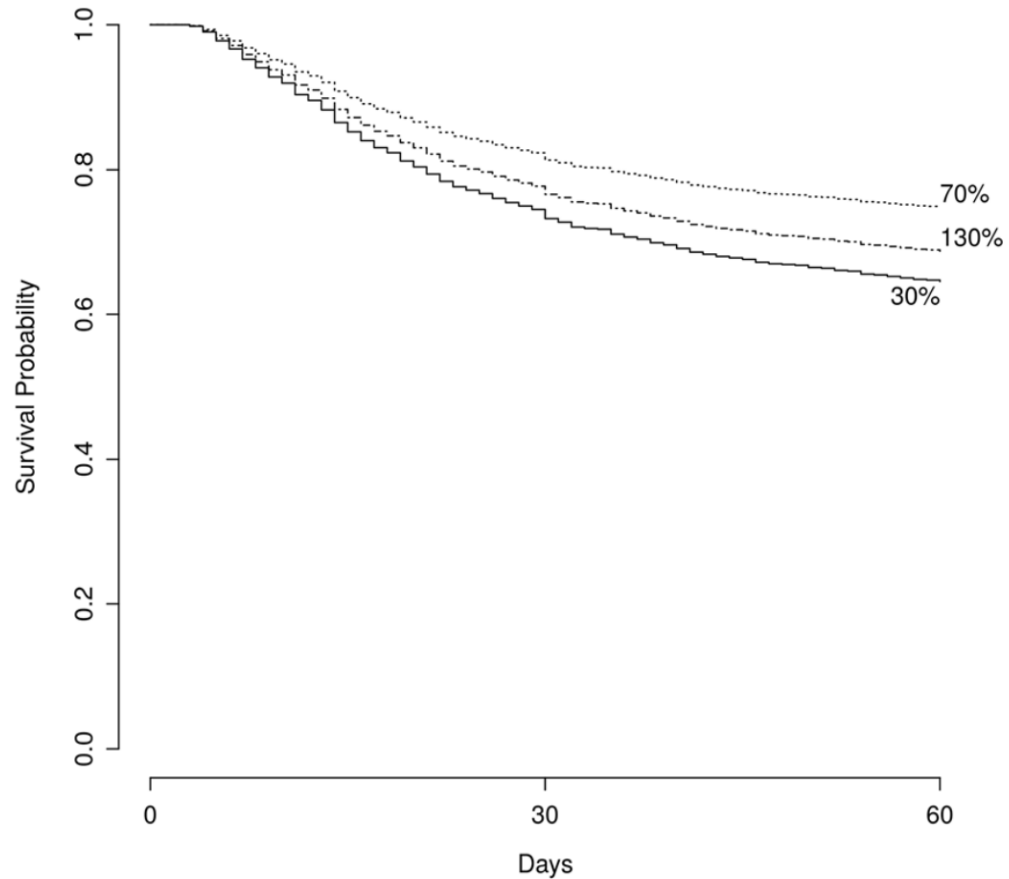
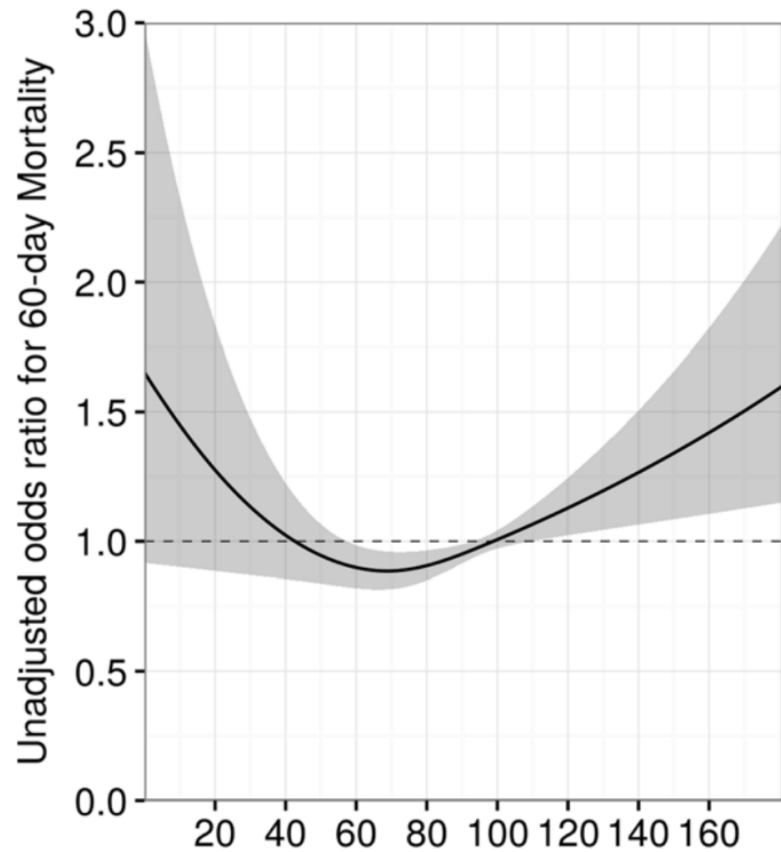
Open Access



Resting energy expenditure, calorie and protein consumption in critically ill patients: a retrospective cohort study

Oren Zusman^{1*}, Miriam Theilla^{2,3}, Jonathan Cohen^{2,4}, Ilya Kagan², Itai Bendavid² and Pierre Singer^{2,4}

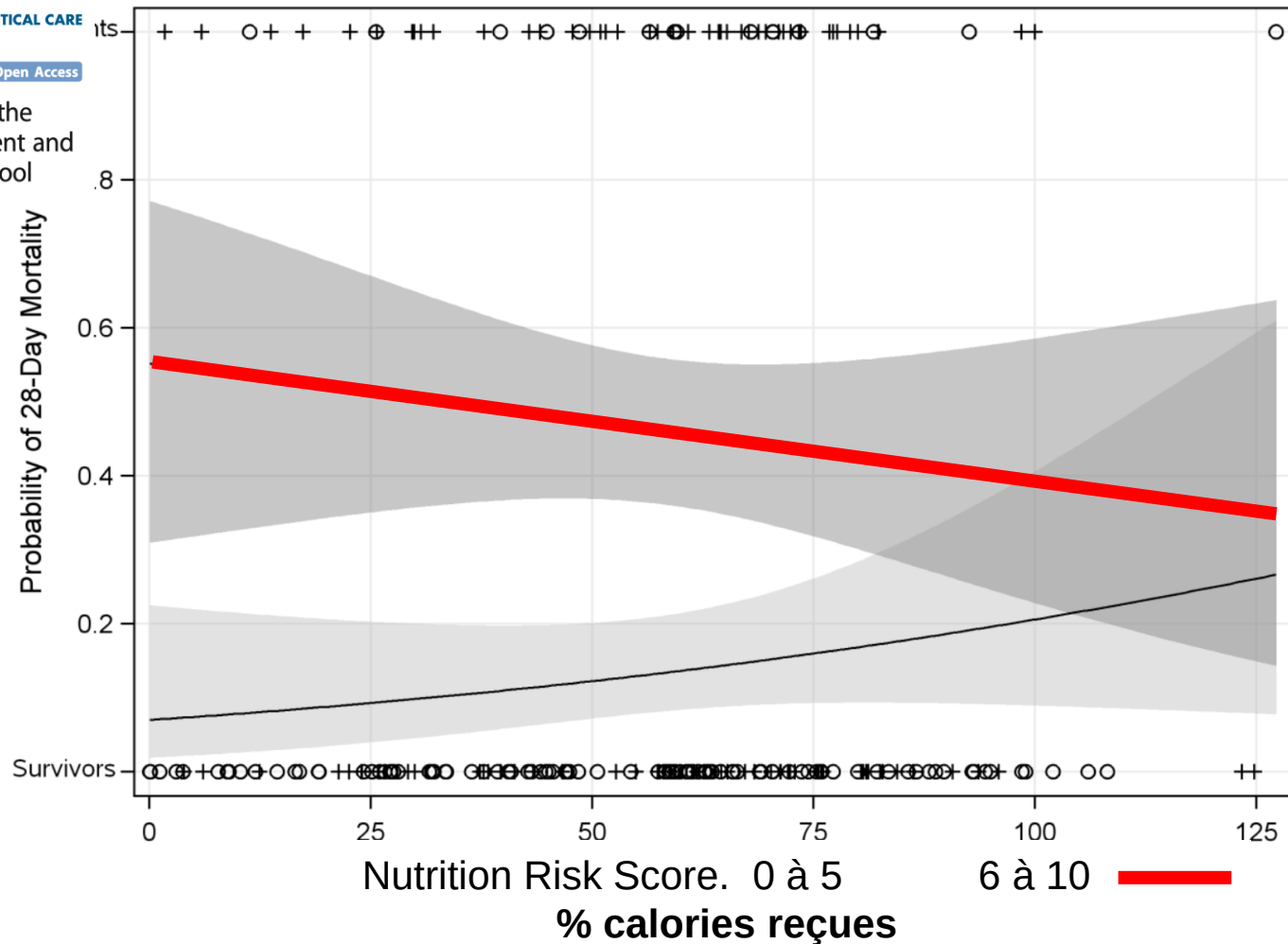




% de calories délivrées par rapport à la dépense énergétique mesurée

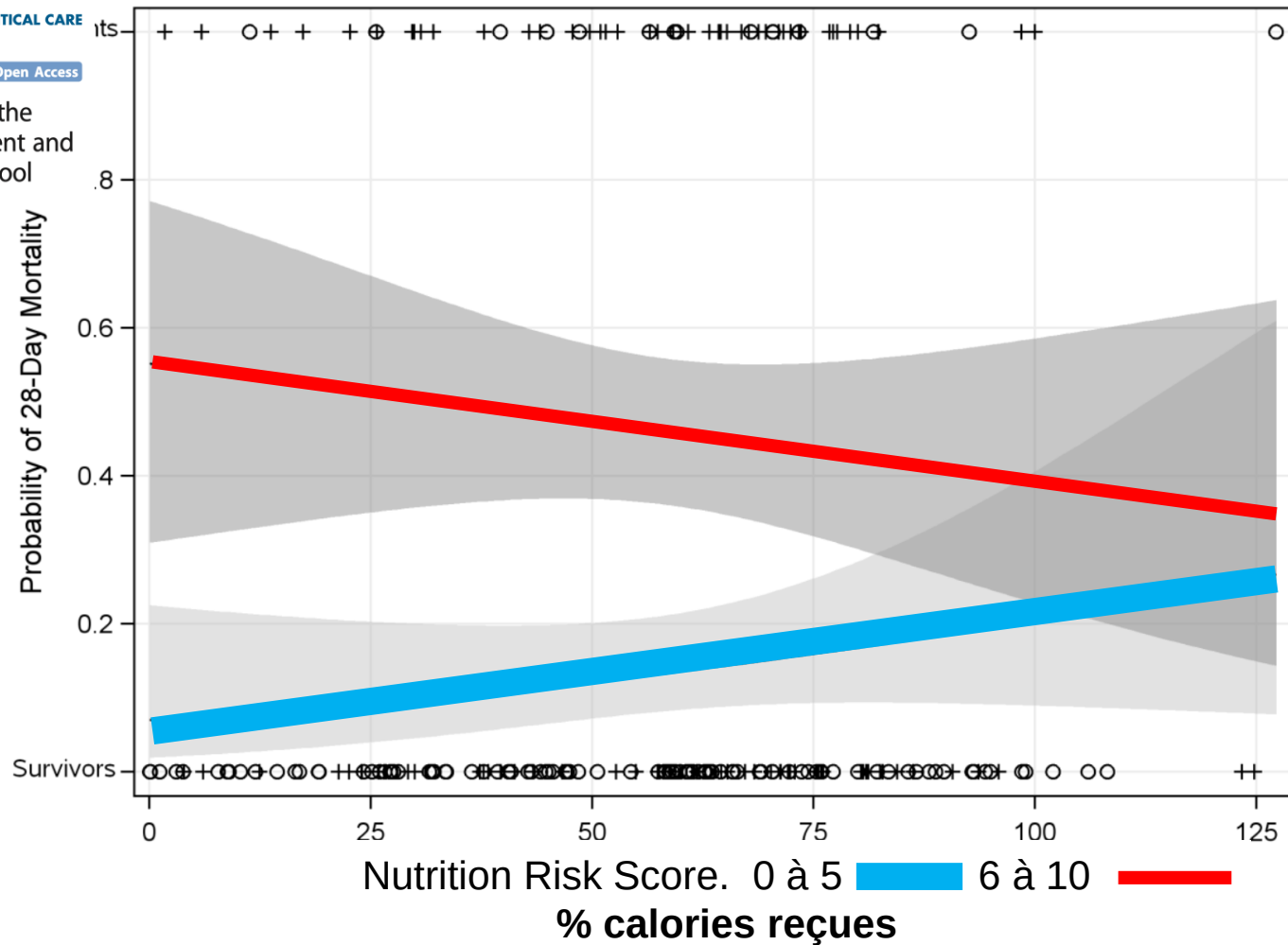
Identifying critically ill patients who benefit the most from nutrition therapy: the development and initial validation of a novel risk assessment tool

**% calories reçues
Par rapport au score de
dénutrition**



High nutrition risk identifies those patients most likely to benefit from early EN therapy.

Identifying critically ill patients who benefit the most from nutrition therapy: the development and initial validation of a novel risk assessment tool



High nutrition risk identifies those patients most likely to benefit from early EN therapy.

PHASE AIGUE



**Apports
réduits**

8 – 20 kcal/kg/j
≤ 70% dépense
énergétique mesurée

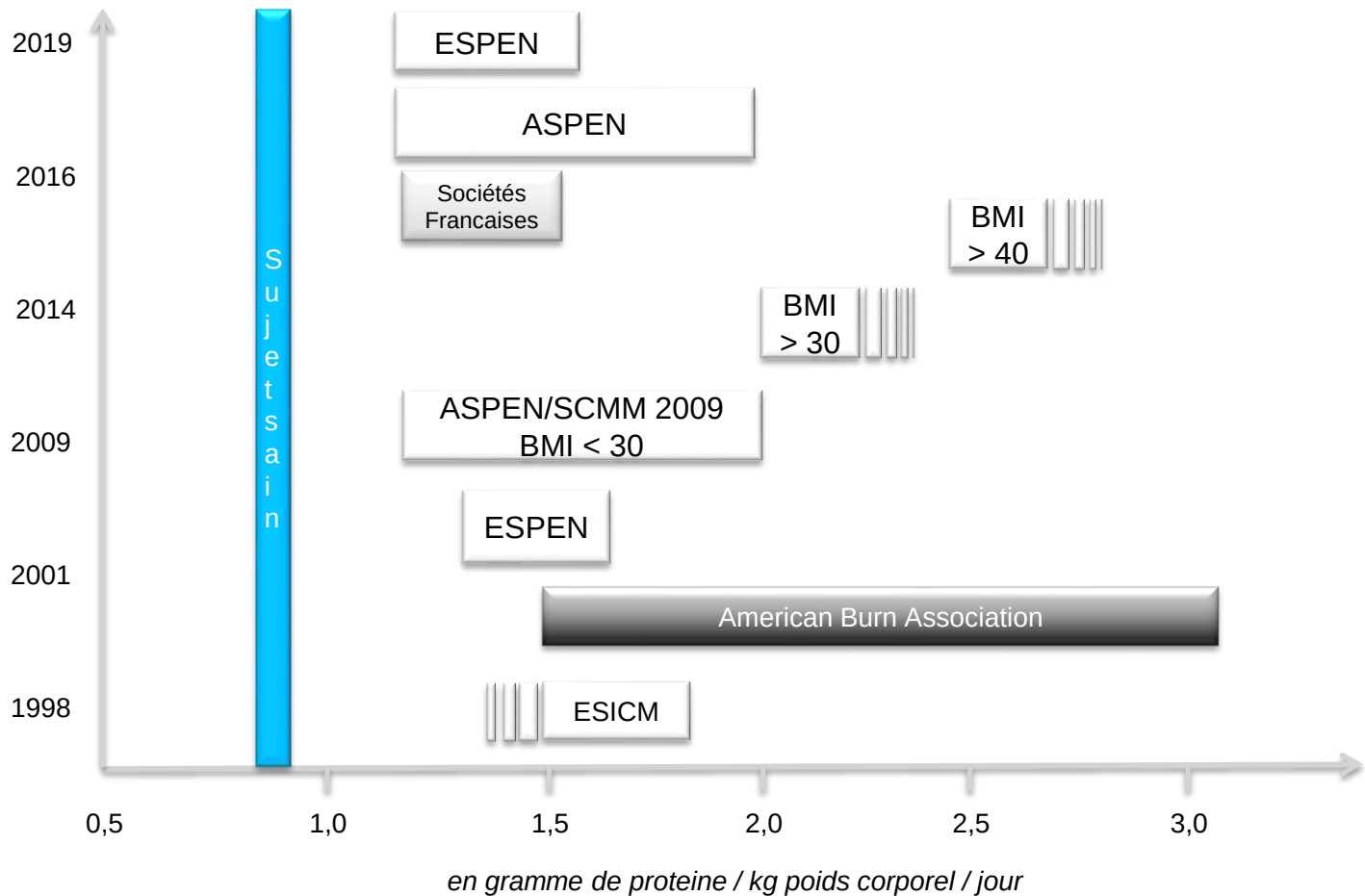
Instabilité

Stabilité



Quels besoins protéiques ?

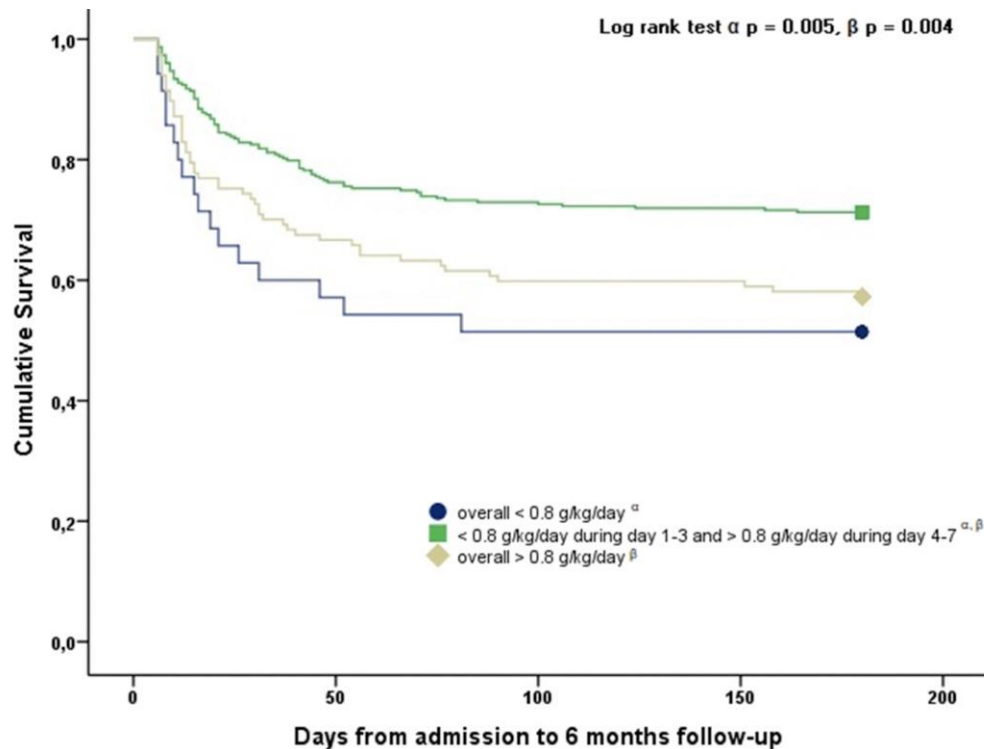
Recommandations concernant les apports journaliers en protéines



Original article

Timing of PROTein INTake and clinical outcomes of adult critically ill patients on prolonged mechanical VENTilation: The PROTINVENT retrospective study

W.A.C. (Kristine) Koekkoek^{a,1}, C.H. (Coralien) van Setten^{a,1}, Laura E. Olthof^a, J.C.N. (Hans) Kars^b, Arthur R.H. van Zanten^{a,2}



PHASE AIGUE



**Apports
réduits**

8 – 20 kcal/kg/j
≤ 70% dépense
énergétique mesurée

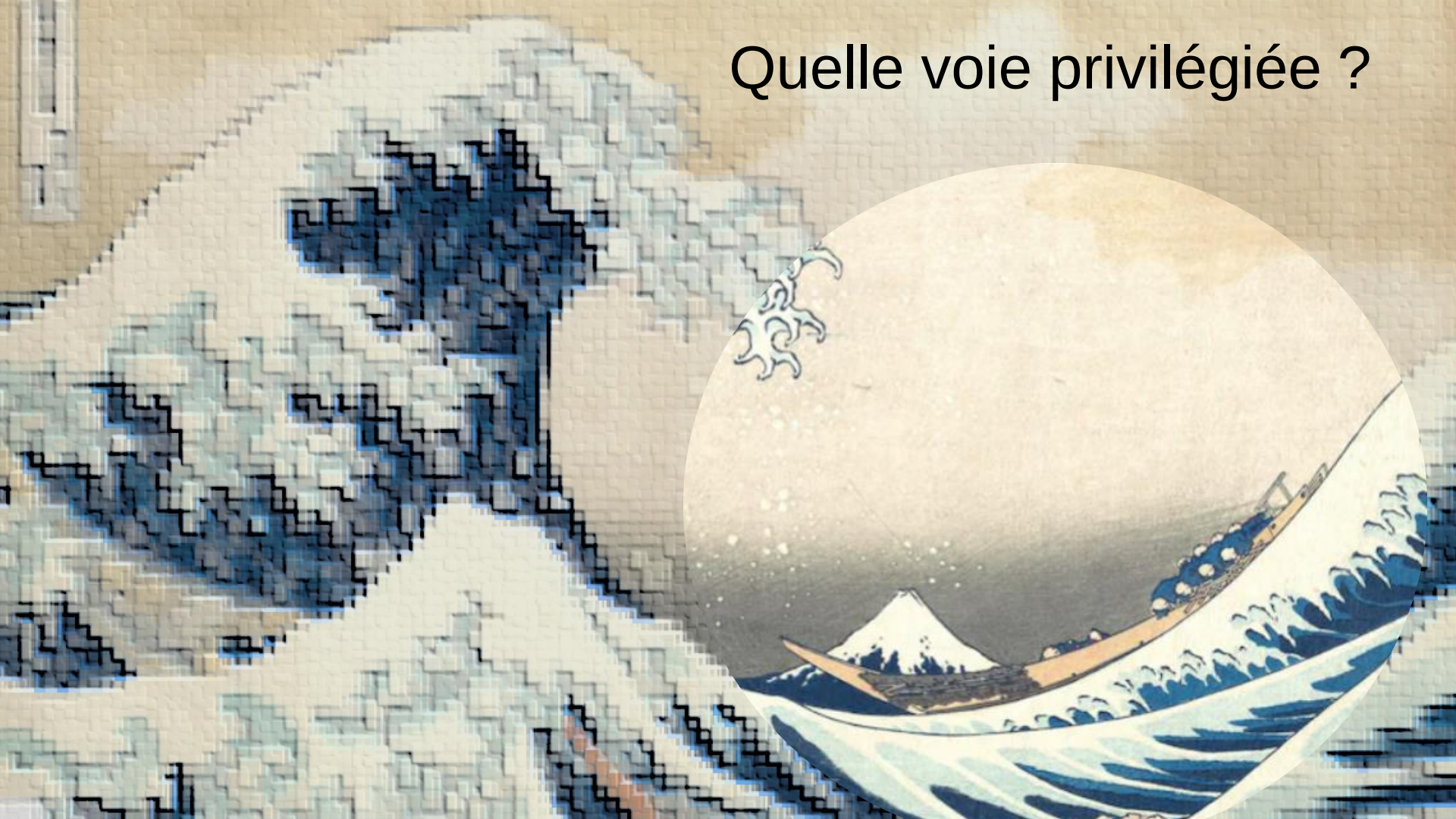
protéines
Max 1,3 g/kg/j

Instabilité

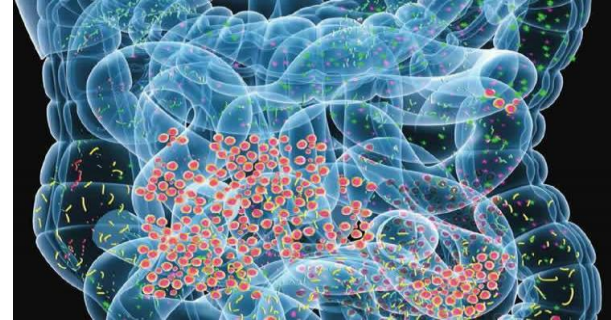
Stabilité



Quelle voie privilégiée ?



Tube digestif en réanimation



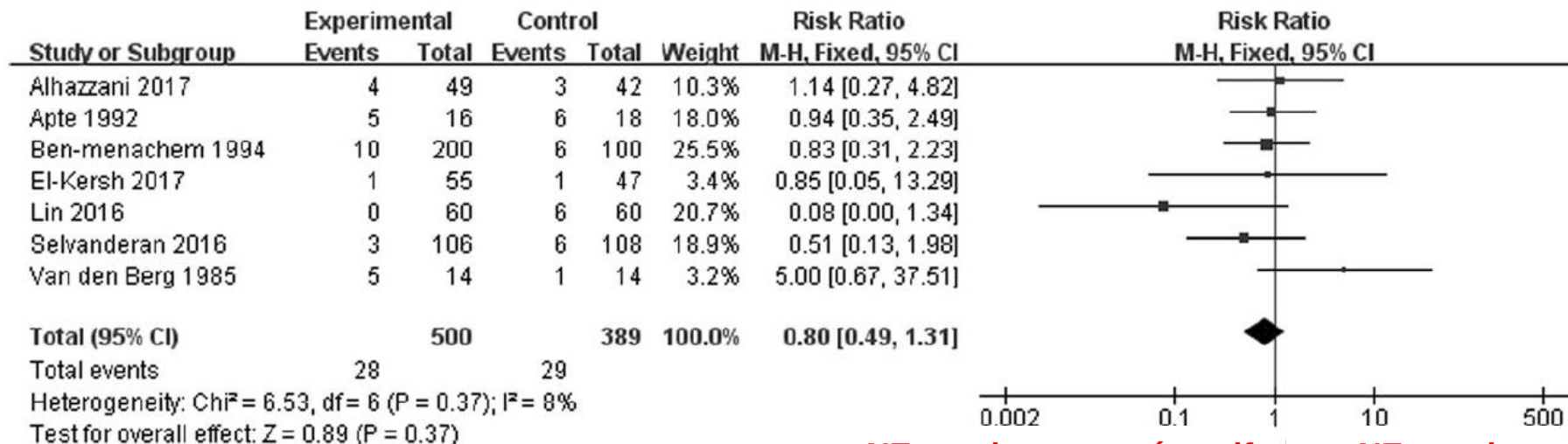
- **70 % du tissu lymphoïde de l'organisme**
- **Absence de NE :**
 - Atrophie villositaire, disparition tight junction
 - Favorise la translocation bactérienne (Gianotti CCM 1994)
- **Microbiote:**
 - Déséquilibre entre les espèces
 - Activation Toll like recepteur -> inflammation (TNF, Inf...)

RESEARCH

Open Access



Stress ulcer prophylaxis in intensive care unit patients receiving enteral nutrition: a systematic review and meta-analysis



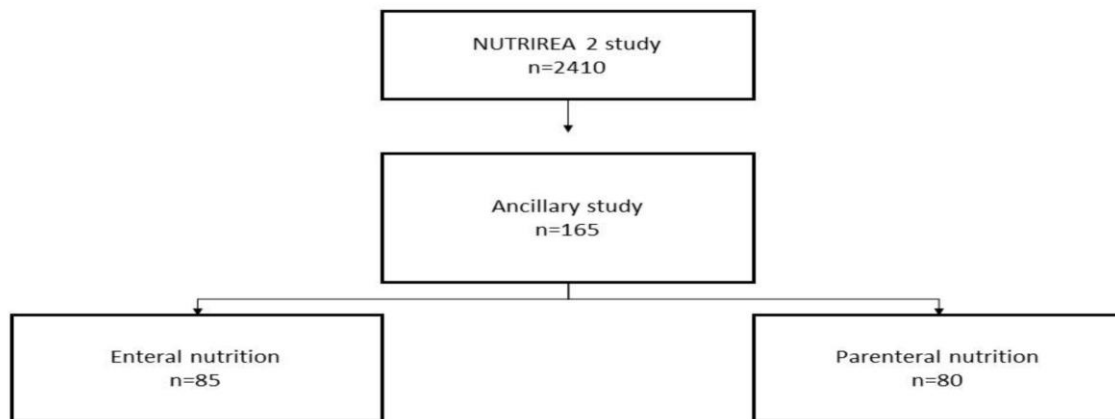
NE + traitement préventif

NE seule

Enteral versus parenteral early nutrition in ventilated adults with shock: a randomised, controlled, multicentre, open-label, parallel-group study (NUTRIREA-2)



Jean Reignier, Julie Boisramé-Helms, Laurent Brisard, Jean-Baptiste Lascarrou, Ali Ait Hssain, Nadia Anguel, Laurent Argaud, Karim Asehnoune, Pierre Asfar, Frédéric Bellec, Vlad Botoc, Anne Bretagnol, Hoang-Nam Bui, Emmanuel Canet, Daniel Da Silva, Michael Darmon, Vincent Das, Jérôme Devaquet, Michel Djibre, Frédérique Ganster, Maité Garrouste-Orgeas, Stéphane Gaudry, Olivier Gontier, Claude Guérin, Bertrand Guidet, Christophe Guitton, Jean-Etienne Herbrecht, Jean-Claude Lacherade, Philippe Letocart, Frédéric Martino, Virginie Maxime, Emmanuelle Mercier, Jean-Paul Mira, Saad Nseir, Gael Piton, Jean-Pierre Quenot, Jack Richecoeur, Jean-Philippe Rigaud, René Robert, Nathalie Rolin, Carole Schwebel, Michel Sirodot, François Tinturier, Didier Thévenin, Bruno Giraudeau, Amélie Le Gouge, for the NUTRIREA-2 Trial Investigators and the Clinical Research in Intensive Care and Sepsis (CRICS) group

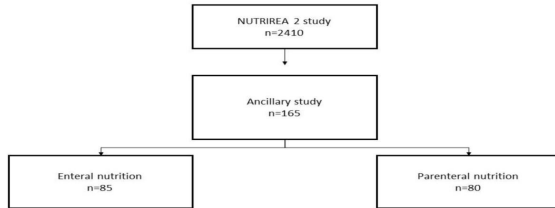


Enteral versus parenteral early nutrition in ventilated adults with shock: a randomised, controlled, multicentre, open-label, parallel-group study (NUTRIREA-2)



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Citrulline : marqueur masse entérocytaire active

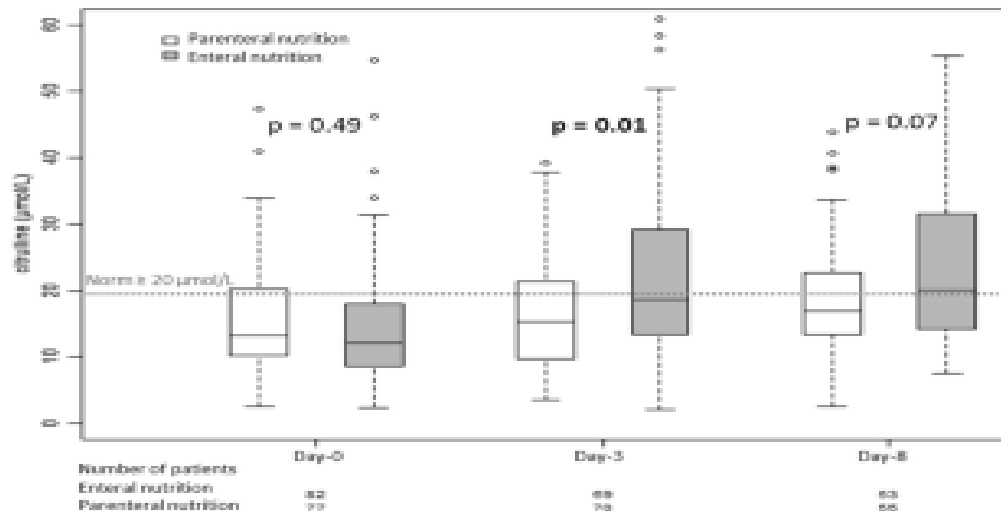


Effet de la nutrition entérale versus parentérale

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Citrulline augmente avec EN

La nutrition entérale fait-elle
vraiment mieux ?



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ORIGINAL ARTICLE

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Nutrition entérale

versus

Nutrition parentérale

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Nutrition entérale

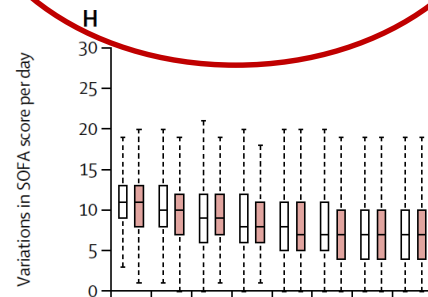
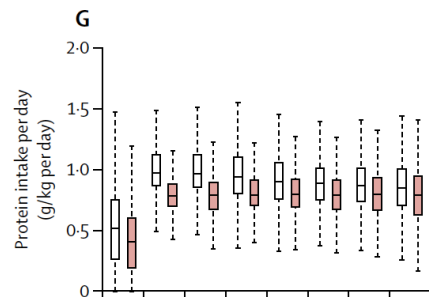
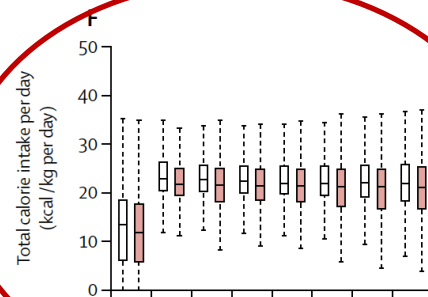
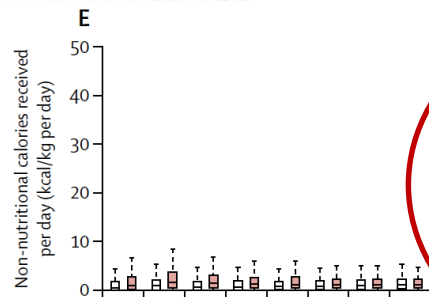
Nutrition parentérale

Mortalité 28 jours ?

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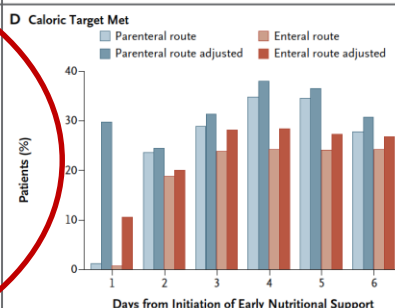
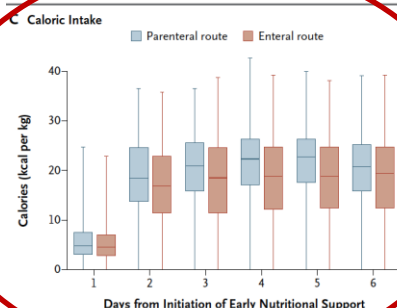
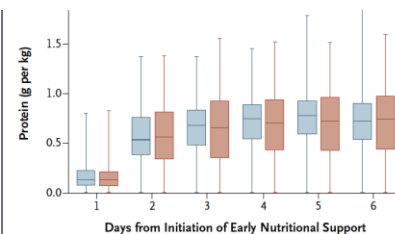
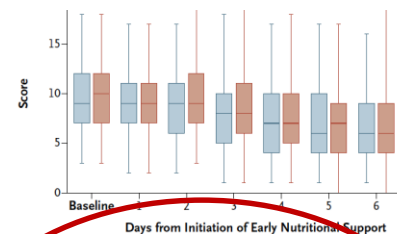
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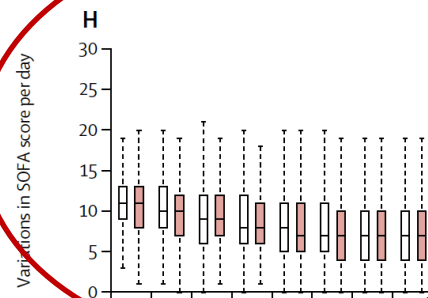
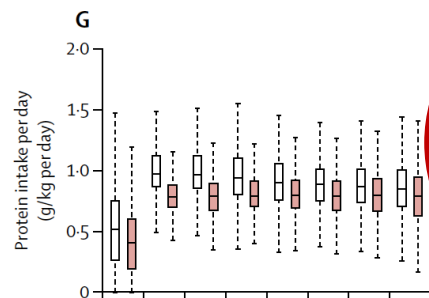
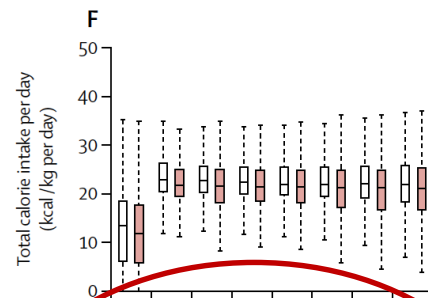
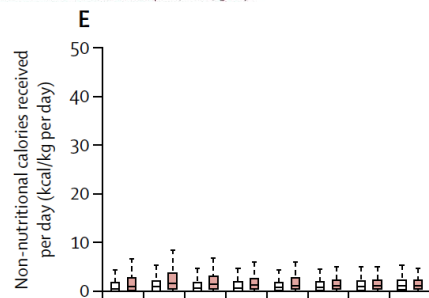
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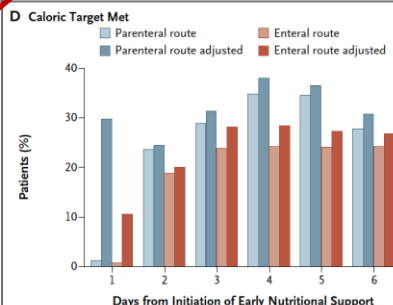
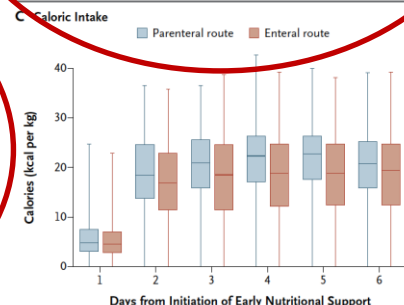
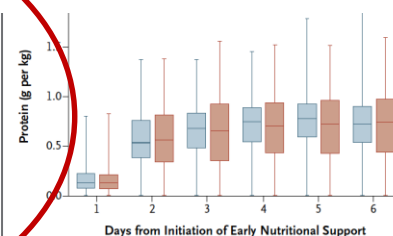
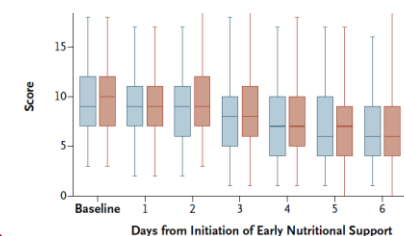
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	Enteral group (n=1202)	Parenteral group (n=1208)	Absolute difference estimate (95% CI)	Hazard ratio (95% CI)	p value
Primary outcome					
Day 28 mortality	443/1202 (37%)	422/1208 (35%)	2.0 (-1.9 to 5.8)	--	0.33
Secondary outcomes					
Day 90 mortality	530/1185 (45%)	507/1192 (43%)	2.2 (-1.8 to 6.2)	--	0.28
ICU mortality*	429 (33%)	405 (31%)	--	1.10 (0.96 to 1.26)	0.17
Hospital mortality*	498 (36%)	479 (34%)	--	1.08 (0.95 to 1.22)	0.25
ICU length of stay (days)	9.0 (5.0 to 16.0)	10.0 (5.0 to 17.0)	--	--	0.08
Acute-care hospital length of stay (days)	17.0 (8.0 to 32.0)	18.0 (9.0 to 33.0)	--	--	0.11
Days without vasopressor support*	20.0 (0.0 to 25.0)	21.0 (0.0 to 26.0)	--	--	0.10
Days without dialysis*	27.0 (0.0 to 28.0)	27.0 (0.0 to 28.0)	--	--	0.52
Days without mechanical ventilation*	11.0 (0.0 to 23.0)	12.0 (0.0 to 23.0)	--	--	0.54
Infections					
ICU-acquired infection*	173 (14%)	194 (16%)	--	0.89 (0.72 to 1.09)	0.25
Ventilator-associated pneumonia*	113 (9%)	118 (10%)	--	0.96 (0.74 to 1.24)	0.75
Bacteraemia*	38 (3%)	55 (5%)	--	0.69 (0.46 to 1.04)	0.08
CVC-related infection*	29 (2%)	27 (2%)	--	1.07 (0.64 to 1.81)	0.79
Urinary tract infection*	18 (2%)	16 (1%)	--	1.13 (0.58 to 2.21)	0.73
Soft-tissue infection					
Patients (n)	1/1202	6/1208	--	--	--
Other infection*	11 (1%)	21 (2%)	--	0.52 (0.25 to 1.09)	0.08
Gastrointestinal complications					
Vomiting*	406 (34%)	246 (24%)	--	1.89 (1.62 to 2.20)	<0.0001
Diarrhoea*	432 (36%)	393 (33%)	--	1.20 (1.05 to 1.37)	0.009
Bowel ischaemia*	19 (2%)	5 (<1%)	--	3.84 (1.43 to 10.3)	0.007
Acute colonic pseudo-obstruction*	11 (1%)	3 (<1%)	--	3.7 (1.03 to 13.2)	0.04

ORIGINAL ARTICLE

Trial of the Route of Early Nutritional Support in Critically Ill Adults

Sheila E. Harvey, Ph.D., Francesca Parrott, M.Sci., David A. Harrison, Ph.D.,

Outcome	Parenteral Group (N=1191)	Enteral Group (N=1197)	Absolute Difference between Groups (95% CI)	Relative Risk (95% CI)	P Value
Primary outcome: death within 30 days — no./total no. (%)	393/1188 (33.1)	409/1195 (34.2)	1.15 (-2.65 to 4.94)†	0.97 (0.86 to 1.08)‡	0.57§
Secondary outcomes					
No. of days alive and free of specified organ support up to 30 days¶					
Free of advanced respiratory support	14.3±12.1	14.3±12.2	0.04 (-0.94 to 1.01)		0.94
Free of advanced cardiovascular support	18.9±13.5	18.5±13.6	0.41 (-0.63 to 1.53)		0.44
Free of renal support	19.1±13.9	18.8±14.0	0.26 (-0.85 to 1.47)		0.66
Free of neurologic support	19.2±13.8	18.9±14.0	0.34 (-0.81 to 1.36)		0.57
Free of gastrointestinal support	13.0±11.7	13.2±11.8	-0.12 (-1.05 to 0.80)		0.81
No. of treated infectious complica- tions per patient‡	0.22±0.60	0.21±0.56	0.01 (-0.04 to 0.06)		0.72
Noninfectious complications — no./total no. (%)					
Episodes of hypoglycemia	44/1191 (3.7)**	74/1197 (6.2)††	2.49 (0.75 to 4.22)‡		0.006§
Elevated liver enzymes	212/1191 (17.8)	179/1197 (15.0)	-2.85 (-5.81 to 0.12)‡		0.07§
Nausea requiring treatment	44/1191 (3.7)	53/1197 (4.4)	0.73 (-0.85 to 2.32)‡		0.41§
Abdominal distention	78/1191 (6.5)	99/1197 (8.3)	1.72 (-0.38 to 3.82)‡		0.12§
Vomiting	100/1191 (8.4)	194/1197 (16.2)	7.81 (5.20 to 10.43)‡		<0.001§
New or substantially worsened pressure ulcers	181/1190 (15.2)	179/1195 (15.0)	-0.23 (-3.10 to 2.64)‡		0.91§
Median no. of days in the ICU (IQR)‡‡	8.1 (4.0–15.8)	7.3 (3.9–14.3)			0.15
Median no. of days in acute care hospital (IQR)‡‡	17 (8–34)	16 (8–33)			0.32

Quelle voie privilégiée ?

Dysfonction intestinale ?

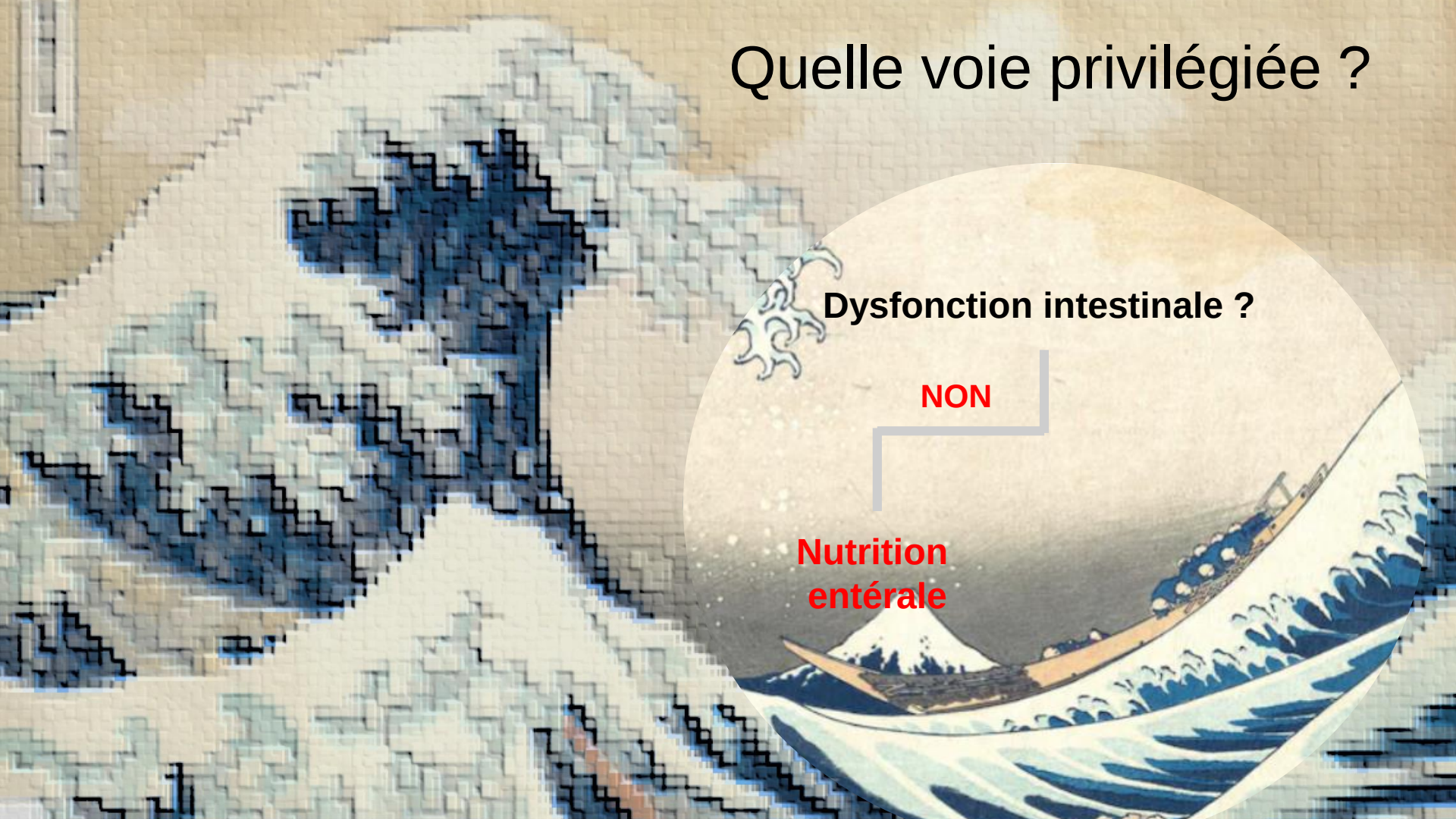


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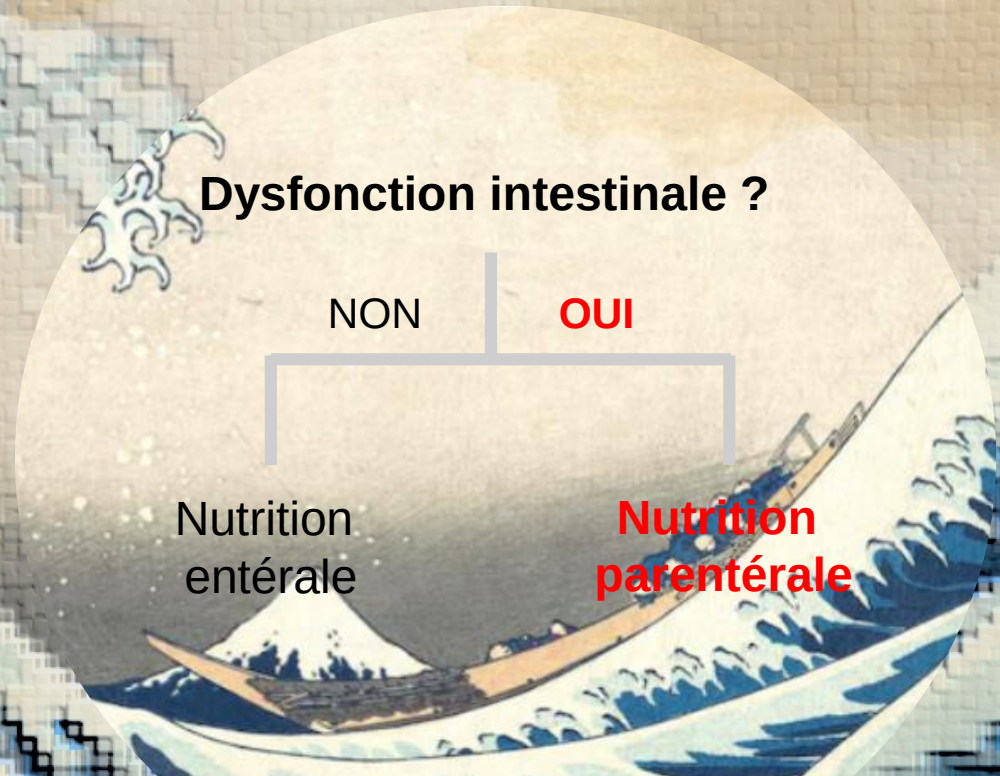
Dysfonction intestinale ?

NON

**Nutrition
entérale**



Quelle voie privilégiée ?



If oral intake is not possible, early EN (within 48 h) shall be performed/initiated in ICU patients rather than early PN : Grade A - strong consensus (100%)

Cas particuliers



Nutritional assessment and support during continuous renal replacement therapy

Marlies Ostermann¹  | Nuttha Lumlertgul^{1,2,3} | Ravindra Mehta⁴

Assistance rénale



Majoration des pertes

Glucose

AA

Vitamines

Éléments traces

Nutritional assessment and support during continuous renal replacement therapy

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Assistance rénale



Majoration des pertes

Glucose
AA
Vitamines
Éléments traces

Apports cachés

citrates

Assistance rénale



Instabilité



**Apports
réduits**

20 – 30 kcal/kg/j
≤ 70% dépense
énergétique mesurée

protéines
> 1,5 g/kg/j

Stabilité



Types of Vitamins	Recommended supplementation during CRRT	
Water soluble vitamins	Vitamin B1: 100–200 mg/day	Vitamin B7 (biotin): 200 mg/day
	Vitamin B2: 2 mg/day	Vitamin B9 (folic acid): 1 mg/day
Lipid soluble vitamins	Vitamin B3: 20 mg/day	Vitamin B12: 4 µg/day
	Vitamin B5: 10 mg/day	Vitamin C: 500 mg to 6 g/day
	Vitamin B6: 50–100 mg/day	*Risk of secondary oxalosis
Minerals ⁶⁴	Vitamin E: 10 IU/day	Vitamin A: decrease the amount
	Vitamin K: 4 mg/week	
	Zinc: 5–10 mg/day	Manganese: 0.5 mg/day
	Selenium: 50–70 mcg/day	Copper: 1–2 mg/day
	Chromium: 0.01 mg/day	Double or triple dose of iv containing solutions ⁶⁰



PHASE AIGUE

PHASE DE STABILISATION

Apports
réduits

8 – 20 kcal/kg/j
 $\leq 70\%$ dépense
énergétique mesurée

protéines
Max 1,3 g/kg/j

30-35 kcal/j
Dépense énergétique mesurée

protéines
> 1,5 g/kg/j



Instabilité

Stabilité

Chronicisation

Post Soins critiques



PHASE AIGUE

PHASE DE STABILISATION

Apports
réduits

8 – 20 kcal/kg/j
 $\leq 70\%$ dépense
énergétique mesurée

protéines
Max 1,3 g/kg/j

30-35 kcal/j
Dépense énergétique mesurée (?)

protéines
> 1,5 g/kg/j



Instabilité

Stabilité

Chronicisation

Post Soins critiques



RESEARCH

Open Access



Novel protocol combining physical and nutrition therapies, Intensive Goal-directed REhabilitation with Electrical muscle stimulation and Nutrition (IGREEN) care bundle

RESEARCH

Open Access



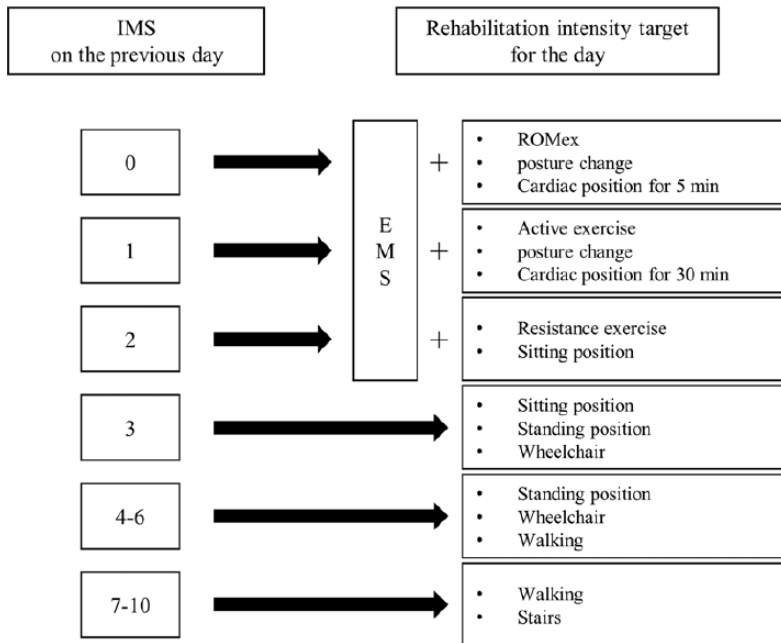
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**Nutrition entérale
+
Exercices**

**Nutrition entérale
seule**

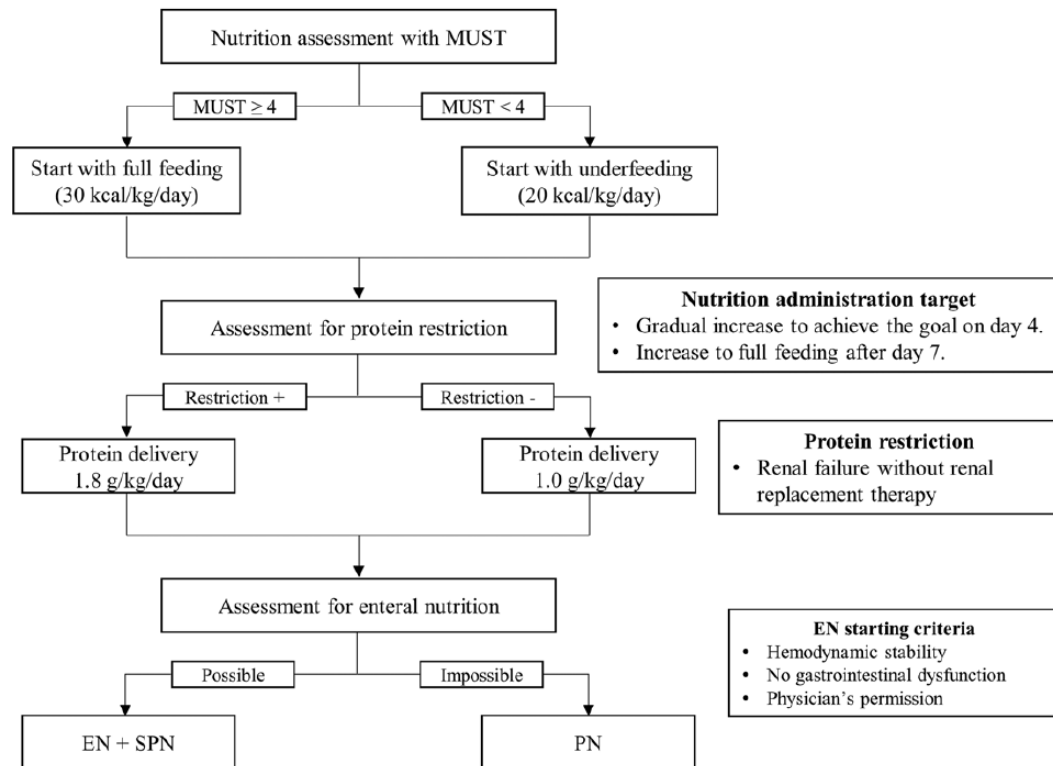
Critères fonctionnels ?

Rehabilitation Protocol



If the patient cannot achieve the standing position, EMS was added.

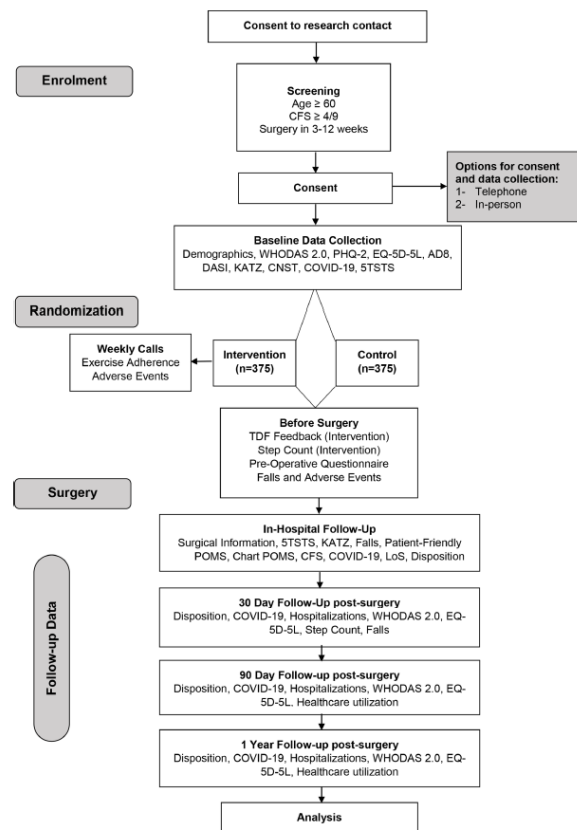
Nutrition Protocol



	IGREEN <i>n</i> = 56	Standard care <i>n</i> = 45	<i>p</i> value
Primary endpoint			
Femoral muscle volume			
Day1, mL, median (IQR)	3730 (2268, 4573)	3230 (2410, 4640)	0.49
Day10, mL, median (IQR)	3145 (2298, 4220)	2810 (1960, 4230)	0.38
Loss from day 1 to 10, %	11.6 (5.9)	14.5 (7.6)	0.03*
Secondary endpoint			
Rehabilitation			
IMS 1 achieved, d, median (IQR)	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	0.54
IMS 3 achieved, d, median (IQR)	3.0 (2.0, 5.0)	5.0 (3.0, 5.8)	0.01*
IMS 4 achieved, d, median (IQR)	3.0 (2.0, 6.0)	5.0 (4.0, 7.0)	0.02*
MRC score, median (IQR)	49.5 (23.0, 58.0)	55.0 (37.0, 60.0)	0.26
Grip strength, kg, median (IQR)	14.1 (0.0, 20.1)	15.0 (0.0, 24.0)	0.8
FSS-ICU, median (IQR)	9.0 (3.0, 19.0)	9.5 (1.0, 19.5)	0.99
Barthel Index, median (IQR)	52.5 (5.0, 93.8)	70.0 (0.0, 100.0)	0.64
Nutrition			
Mean calorie delivery, kcal/kg/day	20.1 (5.7)	16.6 (5.6)	< 0.01*
Mean protein delivery, g/kg/day	1.4 (0.4)	0.8 (0.3)	< 0.01*
Cumulative nitrogen balance	− 27.8 (44.8)	− 42.1 (57.1)	0.16
EN failure, <i>n</i> (%)	4 (7.1)	4 (8.9)	1

BMJ Open PREPARE trial: a protocol for a multicentre randomised trial of frailty-focused preoperative exercise to decrease postoperative complication rates and disability scores

Daniel I McIsaac ¹, Dean A Fergusson ², Rachel Khadaroo,³
Amanda Meliambro,⁴ John Muscedere,⁵ Chelsia Gillis,⁶ Emily Hladkiewicz,
Monica Taljaard ^{2,7} The PREPARE Investigators



Dysphagia in the intensive care unit: epidemiology, mechanisms, and clinical management



Patrick Zuercher^{1*} , Céline S. Moret¹, Rainer Dziewas² and Joerg C. Schefold¹

Trouble de la déglutition : jusqu'à 2/3 des patients

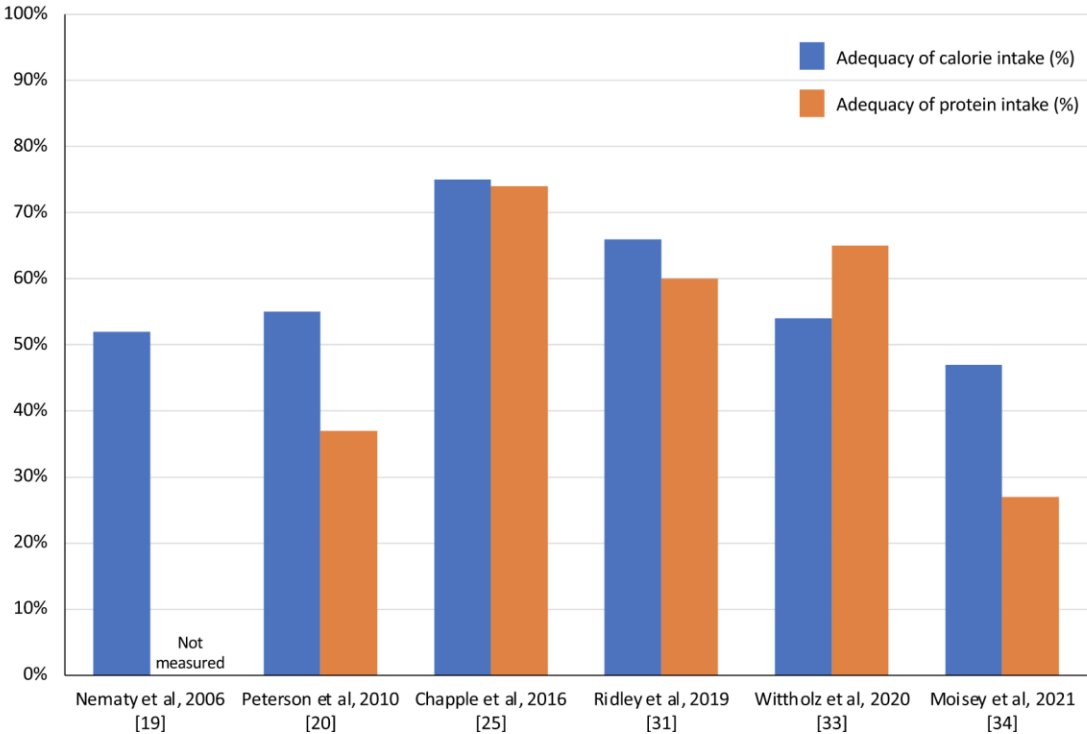
REVIEW Open Access



The role of nutrition rehabilitation in the recovery of survivors of critical illness: underrecognized and underappreciated

Lesley L. Moisey^{1*}, Judith L. Merriweather² and John W. Drover³

Nutrition orale





nutrients



Review

Oral Nutrition during and after Critical Illness: SPICES for Quality of Care!

Marjorie Fadeur ^{1,2}, Jean-Charles Preiser ³ , Anne-Marie Verbrugge ², Benoit Misset ⁴ and Anne-Françoise Rousseau ^{2,4,*} 

Review

Oral Nutrition during and after Critical Illness: SPICES for Quality of Care!

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Conclusion



Evaluation de la dénutrition



Apport nutritionnel progressif personnalisation



Intérêt de l'exercice physique



Préparation de la sortie

PHASE AIGUE

PHASE DE STABILISATION

Apports
réduits

8 – 20 kcal/kg/j
≤ 70% dépense
énergétique mesurée

protéines
Max 1,3 g/kg/j

30-35 kcal/j
Dépense énergétique mesurée (?)

protéines
> 1,5 g/kg/j



Instabilité

Stabilité

Chronicisation

Post Soins critiques

