Nutrition et sepsis compliqué

Cas clinique

- Homme de 39 ans
- Antécédents:

  obésité

  hypercholestérolémie

  pneumonie base droite
- Mode de vie:

  Marié, 1 fille

  Tabac - Alcool -

  Allergie -

Affection néoplasique

- Lymphome Hodgkinien scléronodulaire stade IV (gglions cervicaux, axillaires, médiastinaux et nodule pulmonaire)
- Chimiothérapie: 4 cures de BEACOPP (bléomycine, étoposide, adriamycine, cyclophosphamide,vincristine, procarbazine, prednisone)
- Rémission complète

Traitement à domicile

- Zovirax 800 mg 5x/j
- Bactrim F 3x/sem
- Diflucan 200 mg/j
- Folavit 1/j
- Befact F 1/j
- Médrol 64 mg/j
- Pariet 10 mg/j
- Zyloric 300 mg/j

Affection actuelle

- Toux depuis 12 heures
- Dyspnée
- Pyrexie
- Malaise lipothymique
- Constipation
- Nausées
- Anorexie

Examen physique

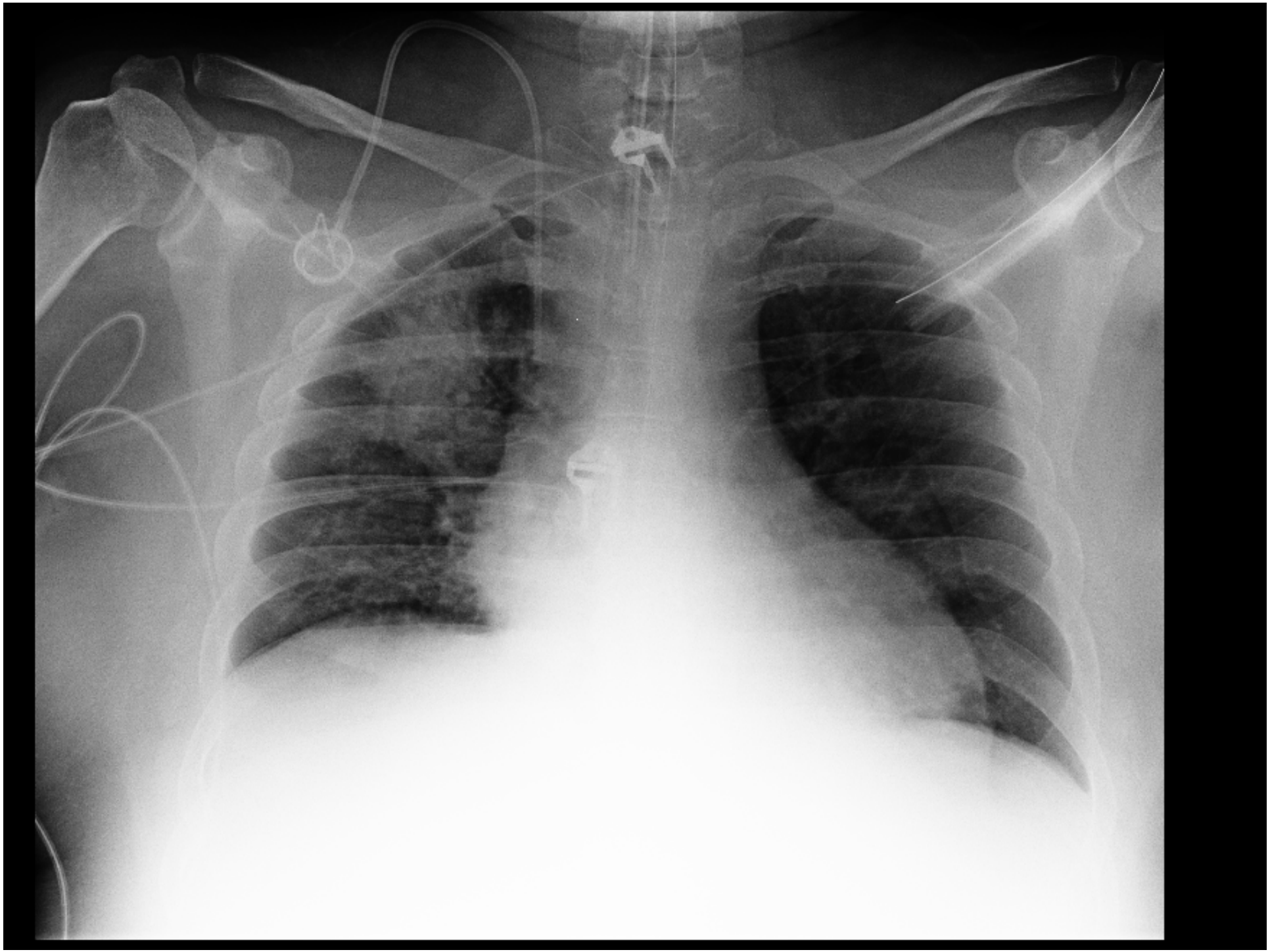
- TA: 97/41, RC: 152/min, RR 34/min, t ° 38,1
- conscient, collaborant, bradypsychique
- Râles crépitants pulmonaires droits>gauches
- Abdomen: souple, dépressible, indolore, péristaltisme faible

Examens complémentaires

- Gazo: sous NRM 100%

  pH 7.45/PaCO2 36 mmHg/PaO2 57 mm Hg/ lactate 5 mmol/l

- Labo: créatinine 1,4 mg/dl, CRP 127 mg/l, plaquettes 122000/mm³, leucocytes 2400 (PMN 280)



Traitement

- O2 NRM 100%
- Perfusion 3l NaCl 0,9%
- Tazocin 4x4 g IV/j
- Amukin 1,5 g IV/j
- Biclar 2x500 mg IV/j
- Diflucan 200 mg IV/j

Evolution: choc septique

- Hypotension réfractaire au remplissage (FEVG normale)
  R/ lévophed 1γ/kg/min+ solucortef 100mg IV 4x/j
- Hypoxémie (PaO2/FiO2=100)
  R/intubation, ventilation mécanique
- Dysfonction rénale (oligurie, créatinine 3,1 mg/dl)
- Acidose métabolique (pH 7,27; PaCO2 43 mm Hg; lactate 4,33 mmol/l)
- CIVD (D-dimères 8148 ng/ml, PTT 50%, APTT 79 sec, plaquettes 72000/mm^3)
- Foie de choc (GOT 757 U/l, GPT 785 U/l, bilirubine 0.9 mg/dl, Ppase alcalines 305 U/l)

Quid de la nutrition?

- quand commencer ?
- entérale ou parentérale ?
- combien de calories?
- supplément ou pas?

CARING FOR THE CRITICALLY ILL PATIENT

Effect of Evidence-Based Feeding Guidelines on Mortality of Critically Ill Adults

A Cluster Randomized Controlled Trial

Gordon S. Doig, PhD
Fiona Simpson, MND
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Geoff Dobb, FJFICM
for the Nutrition Guidelines Investigators of the ANZICS Clinical Trials Group

JAMA. 2008;300(23):2731-2741

Multicentre, cluster-randomized clinical trial of algorithms for critical-care enteral and parenteral therapy (ACCEPT)

Claudio M. Martin, Gordon S. Doig, Daren K. Heyland, Teresa Morrison, William J. Sibbald, for the Southwestern Ontario Critical Care Research Network

Table 4: Primary outcomes in the randomized phase

	Appropriately randomized hospitals					All 14 hospitals; actual values		
	Actual values			Design effect*				
Outcome	Control	Intervention	*p* value	C_1	C_2	Control	Intervention	*p* value
Hospital mortality rate, %	37	27	0.058	1.79	1.65	37	24	0.047
Mean hospital stay, d	35	25	0.003	20.33	63.29	34.3	25.4	0.006
Mean ICU stay, d	11.8	10.9	0.7	9.16	86.63	11.7	10.8	0.65

*The design effect is the ratio of the total number of subjects required with cluster randomization to the number required with simple randomization. For example, if 100 patients were required per group to obtain statistical significance in a mortality-rate difference in a simple randomized trial, 179 and 165 patients per group would be required in a cluster-randomized trial. The design effects for hospital and ICU stay were obtained with the method of Rao and Scott[22] for the appropriately randomized hospitals.

CMAJ 2004;170(2):197-204

Effect of Evidence-Based Feeding Guidelines on Mortality of Critically Ill Adults

A Cluster Randomized Controlled Trial

Recommendation Grades

Grade A+: >1 well-conducted, adequately powered RCT with consistent results between studies (no heterogeneity); level of evidence required: I

Grade A: ≥1 well-conducted, adequately powered RCT; level of evidence required: I

Grade A–: >1 well-conducted, adequately powered RCT with inconsistent results (heterogeneity) between studies; level of evidence required: I

Grade B+: >1 well-conducted RCT with consistent results between studies; level of evidence required: II

Grade B: ≥1 well-conducted RCT; level of evidence required: II

Grade B–: >1 well-conducted RCT with inconsistent results (heterogeneity) between studies; level of evidence required: II

Levels of Evidence[a]

Level I: adequately powered (low false positive or false negative), well-conducted RCT

Level II: small, underpowered (high false positive and false negative), well-conducted RCT

Gordon S. Doig, PhD

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Effect of Evidence-Based Feeding Guidelines on Mortality of Critically Ill Adults

A Cluster Randomized Controlled Trial

Box. Evidence-Based Recommendations Approved (Ratified) for Inclusion in the Guideline at the Consensus Conference

Aucune étude du niveau 1 et donc aucune recommendation d'un grade A(+)…

Grade B+

Recommendation favoring enteral nutrition over standard care (nothing by mouth)

5 Level II randomized controlled trials (RCTs). Supported by positive meta-analysis and validated evidence-based guideline (EBG) (Algorithms for Critical Care Enteral and Parenteral Therapy [ACCEPT] trial).

Recommendation favoring early parenteral nutrition (<24 hours) over delayed (>24 hours) enteral nutrition

5 Level II RCTs. Supported by positive meta-analysis and validated evidence-based guideline (ACCEPT).

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A Cluster Randomized Controlled Trial

Grade B

Recommendation favoring early enteral nutrition (<24 hours) over delayed (>24 hours) enteral nutrition

3 Level II RCTs. Supported by validated evidence-based guideline (ACCEPT).

Recommendation favoring parenteral nutrition over standard care (intravenous glucose)

5 Level II RCTs. Supported by validated evidence-based guideline (ACCEPT).

Recommendation favoring early enteral nutrition (<24 hours) over parenteral nutrition

6 Level II RCTs. Supported by validated evidence-based guideline (ACCEPT).

Recommendation favoring postpyloric feeding when gastric feeding not tolerated

8 Level II RCTs. Supported by validated evidence-based guideline (ACCEPT).

Recommendation favoring prokinetics when gastric feeding not tolerated

5 Level II RCTs. Supported by validated evidence-based guideline (ACCEPT).

Recommendation favoring enteral nutrition supplemented with parenteral nutrition if 80% of goals not met by 72 hours with enteral nutrition alone (after consideration of postpyloric feeding, prokinetics, or both)

4 Level II RCTs. Supported by validated evidence-based guideline (ACCEPT).

Recommendation favoring protocolized management of diarrhea

Supported by validated evidence-based guideline (ACCEPT).

Recommendation favoring protocolized definition of intolerance of enteral nutrition, which includes gastric residual values >200 mL

Supported by validated evidence-based guideline (ACCEPT).

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A Cluster Randomized Controlled Trial

Grade B–

Consider parenteral nutrition with glutamine instead of standard parenteral nutrition

4 Level II RCTs. Supported by meta-analysis, heterogeneity present.

Glutamine may be beneficial in select patients. To identify which patients may benefit, each constituent RCT should be reviewed and clinical judgment should be exercised.

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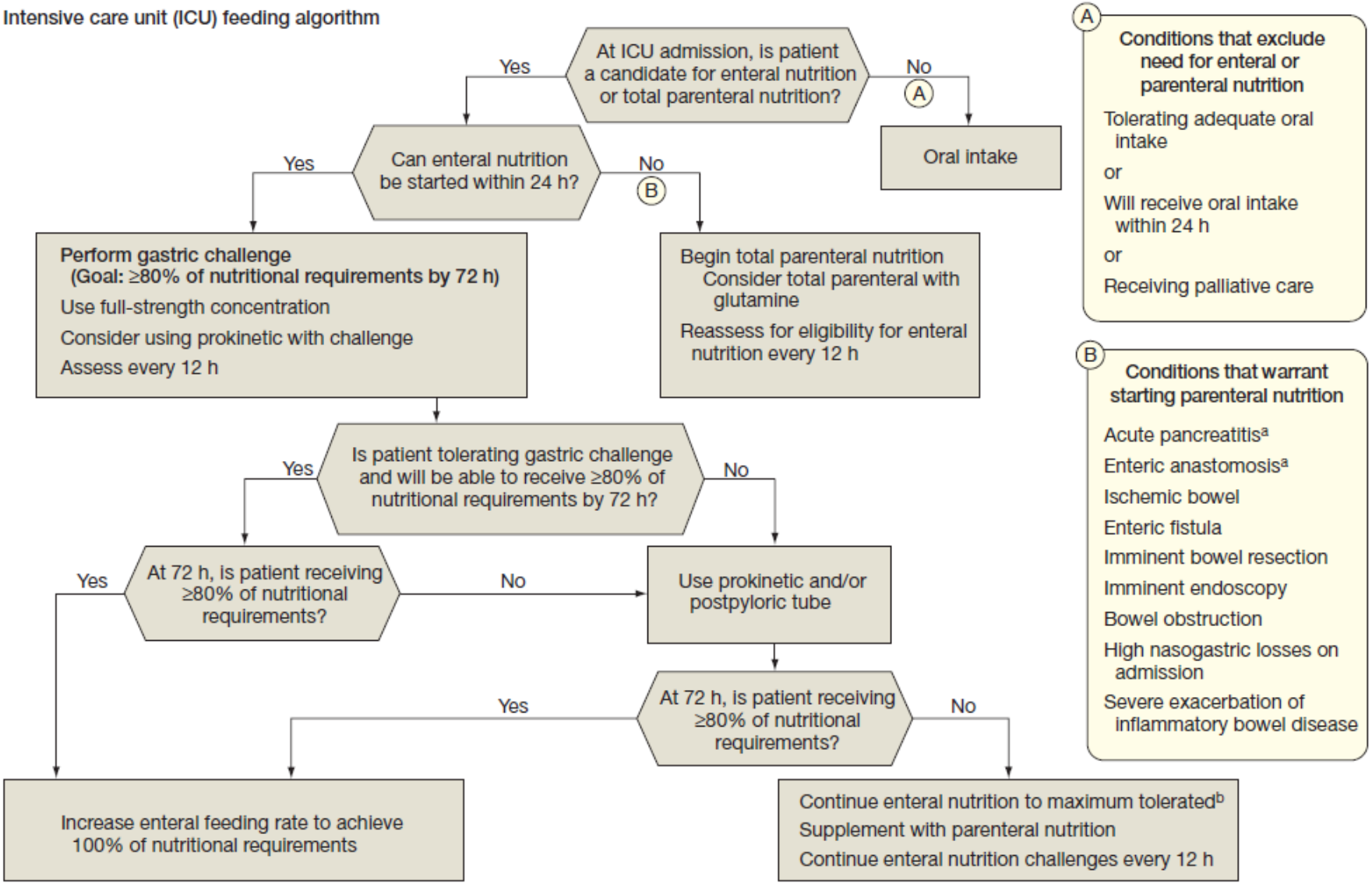
Conclusion

- Commencer tôt
- >> entérale

Figure 2. Algorithm of Evidence-Based Feeding Guideline



Effect of Evidence-Based Feeding Guidelines on Mortality of Critically Ill Adults

A Cluster Randomized Controlled Trial

Table 2. Measures of Nutritional Support Guideline Uptake

Process Measure	Value (95% CI) Guideline (14 ICUs, 561 Patients)[a]	Control (13 ICUs, 557 Patients)[a]	Difference[b]	*P* Value[c]
Mean time from ICU admission to EN, PN, ICU discharge, or death, d[d]				
All patients	0.91 (0.73 to 1.13)	2.14 (1.73 to 2.66)	−1.23 (−1.54 to −0.73)	<.001
Mean time from ICU admission to EN or PN, d				
Patients initially receiving EN	0.75 (0.64 to 0.87)	1.37 (1.17 to 1.60)	−0.62 (−0.82 to −0.36)	<.001
Patients initially receiving PN	1.04 (0.90 to 1.20)	1.40 (1.21 to 1.61)	−0.35 (−0.61 to −0.01)	.04
Mean nutrition support days/10 patient-days				
EN and/or PN	8.08 (7.69 to 8.50)	6.90 (6.56 to 7.26)	1.18 (0.41 to 2.03)	.002
EN	7.15 (6.69 to 7.65)	5.83 (5.46 to 6.24)	1.31 (0.41 to 2.34)	.003
PN	1.46 (1.20 to 1.77)	1.56 (1.29 to 1.90)	−0.10 (−0.59 to 0.57)	.74
100% of caloric goals met	6.10 (5.60 to 6.65)	5.02 (4.61 to 5.48)	1.07 (0.12 to 2.22)	.03
Other process measures				
Patients never fed at any time during ICU stay, No. (%)	32 (5.7) [4.3 to 7.5]	157 (28.2) [21.2 to 37.5]	−22.5 (18.1 to 25.0)[e]	<.001
Patients fed within 24 h of ICU admission, No. (%)	341 (60.8) [45.7 to 80.]	208 (37.3) [28.1 to 49.6]	23.4 (12.9 to 36.2)[e]	<.001
Mean energy delivered (all patients), kcal/patient-day	1241 (1121 to 1374)	1065 (961 to 1179)	177 (−51 to 457)	.14
Mean protein delivered (all patients), g/patient-day	50.1 (45.4 to 55.3)	44.2 (40.0 to 48.9)	5.8 (−3.7 to 16.9)	.22
Mean energy delivered from EN (patients receiving EN), kcal/fed patient-day	1377 (1318 to 1440)	1347 (1289 to 1408)	31 (−85 to 157)	.62
Mean energy delivered from PN (patients receiving PN), kcal/fed patient-day	1735 (1707 to 1764)	1779 (1750 to 1808)	−43 (−99 to 14)	.14
Mean days of prokinetic use (patients receiving EN), prokinetic days/10 EN-fed patient-days	4.47 (3.87 to 5.17)	4.02 (3.48 to 4.66)	0.45 (−0.67 to 1.95)	.47
Patients receiving prokinetics, No. (%)	296 (52.8) [43.1 to 64.6]	206 (36.9) [30.2 to 45.2]	15.9 (−1.8 to 42.2)[e]	.09
Mean days of post-pyloric feeding (patients receiving EN), postpyloric days/10 EN-fed patient-days	1.16 (0.85 to 1.59)	1.57 (1.15 to 2.16)	−0.42 (−0.95 to 0.60)	.34

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Effect of Evidence-Based Feeding Guidelines on Mortality of Critically Ill Adults

A Cluster Randomized Controlled Trial

Table 3. Patient Outcomes, All Enrolled Patients

Outcome Measure	Guideline (14 ICUs, 561 Patients)	Control (13 ICUs, 557 Patients)	Difference (95% CI)[a]	*P* Value[b]	ICC or Design Effect	
					Control	Guideline
Deaths at hospital discharge, No. (%) [95% CI][c]	172 (28.9) [24.7 to 33.7]	153 (27.4) [23.5 to 32.1]	1.4 (–6.3 to 12.0)[d]	.75	0.06138[e]	0.00448[e]
Mean length of stay (per patient), d (95% CI)[c]						
Hospital	24.2 (22.2 to 26.3)	24.3 (22.3 to 26.4)	–0.08 (–3.8 to 4.4)	.97	2.36	2.02
ICU	9.1 (8.2 to 10.1)	9.9 (8.9 to 11.1)	–0.86 (–2.6 to 1.3)	.42	3.61	3.51

Table 5. Secondary Outcomes and Concomitant Therapies

Mean Events	Value (95% CI)			*P* Value[c]
	Guideline (14 ICUs, 561 Patients)[a]	Control (13 ICUs, 557 Patients)[a]	Difference[b]	
Secondary outcomes				
Witnessed aspiration (patients receiving EN), events/1000 fed patient-days	2.19 (1.18 to 4.08)	4.33 (2.33 to 8.05)	–2.14 (–3.69 to 3.26)	.28
Witnessed aspiration and new pulmonary infiltrates within 24 h (patients receiving EN), events/1000 fed patient-days	0.83 (0.47 to 1.45)	0.93 (0.53 to 1.63)	–0.10 (–0.66 to 1.61)	.84
Serum albumin <25 g/L, days/10 patient-days	4.58 (4.37 to 4.80)	4.31 (4.12 to 4.53)	0.26 (–0.15 to 0.71)	.22
Therapeutic interventions, treatment days/10 patient-days				
Renal replacement therapy	0.75 (0.63 to 0.90)	0.91 (0.77 to 1.09)	–0.16 (–0.38 to 0.16)	.29
Invasive mechanical ventilation	7.69 (6.54 to 9.04)	7.21 (6.14 to 8.48)	0.48 (–1.65 to 3.42)	.70
Systemic antibiotics	7.41 (7.11 to 7.74)	7.19 (6.90 to 7.50)	0.23 (–0.37 to 0.88)	.47

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?????

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Conclusion

- Commencer tôt
- >> entérale
- Mais pas d’impact sur la mortalité…

Conclusion

- Commencer tôt
- >> entérale
- Mais pas d’impact sur la mortalité…
- Combien de calories ?

Online-table 3 : Calculation of caloric target [25]

Caloric target = Caloric need x Corrected Ideal Body Weight

Formula for calculating Ideal Body Weight (IBW)		
Female patient	45.5 + [0.91 x (height in cm – 152.4)]	
Male patient	50 + [0.91 x (height in cm – 152.4)]	
Corrected Ideal body weight		
If BMI < 18.5	(IBW + Actual Body Weight) / 2	
If 27 ≥ BMI ≥ 18.5	IBW	
If BMI > 27	IBW x 1.2	
Caloric need (Kcal/kg/day)		
	Female patient	Male patient
Age > 60 years	24	30
Age ≤ 60 years	30	36

2638 kcal / j (avec un max. de 2880 kcal / j)

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Patients initially receiving PN	1.04 (0.90 to 1.20)	1.40 (1.21 to 1.61)	–0.35 (–0.61 to –0.01)	.04
Mean nutrition support days/10 patient-days				
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Conclusion

- Commencer tôt
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Conclusion

- Commencer tôt
- >> enterale
- Mais pas d’impact sur la mortalité…
- Combien de calories ? ????
- + parentérale ?

Nutrition Support in Critical Illness — Bridging the Evidence Gap

Thomas R. Ziegler, M.D.

European guidelines suggest that parenteral nutrition be initiated within the first few days after ICU admission,[9] whereas American–Canadian guidelines suggest withholding parenteral nutrition for 7 days in patients without preexisting malnutrition.[10]

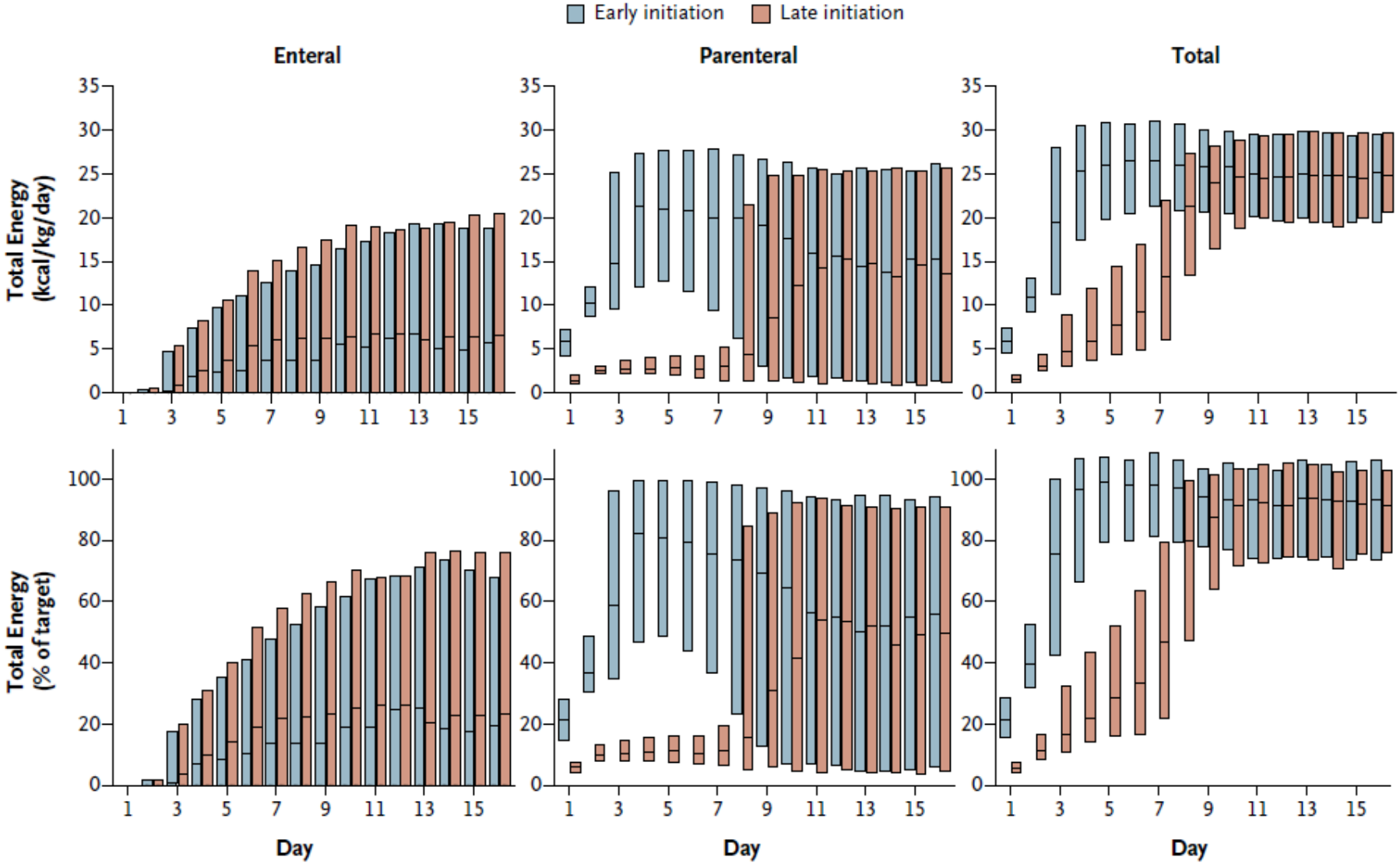
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Early versus Late Parenteral Nutrition in Critically Ill Adults

Michael P. Casaer, M.D., Dieter Mesotten, M.D., Ph.D., Greet Hermans, M.D., Ph.D., Pieter J. Wouters, R.N., M.Sc., Miet Schetz, M.D., Ph.D., Geert Meyfroidt, M.D., Ph.D., Sophie Van Cromphaut, M.D., Ph.D., Catherine Ingels, M.D., Philippe Meersseman, M.D., Jan Muller, M.D., Dirk Vlasselaers, M.D., Ph.D., Yves Debaveye, M.D., Ph.D., Lars Desmet, M.D., Jasperina Dubois, M.D., Aime Van Assche, M.D., Simon Vanderheyden, B.Sc., Alexander Wilmer, M.D., Ph.D., and Greet Van den Berghe, M.D., Ph.D.

N Engl J Med 2011;365:506-17.


Early initiation
Late initiation
Enteral
Parenteral
Total
Total Energy (kcal/kg/day)
Total Energy (% of target)
Day
No. in ICU
Late initiation 2328 1399 913 655 436 313
Early initiation 2312 1438 975 736 517 371

Early versus Late Parenteral Nutrition in Critically Ill Adults

Table 2. Outcomes.*

Variable	Late-Initiation Group (N=2328)	Early-Initiation Group (N=2312)	P Value
Safety outcome			
Vital status — no. (%)			
Discharged live from ICU within 8 days	1750 (75.2)	1658 (71.7)	0.007
Death			
In ICU	141 (6.1)	146 (6.3)	0.76
In hospital	242 (10.4)	251 (10.9)	0.63
Within 90 days after enrollment†	257 (11.2)	255 (11.2)	1.00
Nutrition-related complication — no. (%)	423 (18.2)	434 (18.8)	0.62
Hypoglycemia during intervention — no. (%)‡	81 (3.5)	45 (1.9)	0.001
Primary outcome			
Duration of stay in ICU§			
Median (interquartile range) — days	3 (2–7)	4 (2–9)	0.02
Duration >3 days — no. (%)	1117 (48.0)	1185 (51.3)	0.02
Hazard ratio (95% CI) for time to discharge alive from ICU	1.06 (1.00–1.13)		0.04

N Engl J Med 2011;365:506-17.

Early versus Late Parenteral Nutrition in Critically Ill Adults

Table 2. Outcomes.*

Variable	Late-Initiation Group (N=2328)	Early-Initiation Group (N=2312)	P Value
Secondary outcome			
New infection — no. (%)			
Any	531 (22.8)	605 (26.2)	0.008
Airway or lung	381 (16.4)	447 (19.3)	0.009
Bloodstream	142 (6.1)	174 (7.5)	0.05
Wound	64 (2.7)	98 (4.2)	0.006
Urinary tract	60 (2.6)	72 (3.1)	0.28
Inflammation			
Median peak C-reactive protein level during ICU stay (interquartile range) — mg/liter	190.6 (100.8–263.2)	159.7 (84.3–243.5)	<0.001
Mechanical ventilation			
Median duration (interquartile range) — days	2 (1–5)	2 (1–5)	0.02
Duration >2 days — no. (%)	846 (36.3)	930 (40.2)	0.006
Hazard ratio (95% CI) for time to definitive weaning from ventilation	1.06 (0.99–1.12)		0.07
Tracheostomy — no. (%)	134 (5.8)	162 (7.0)	0.08

N Engl J Med 2011;365:506-17.

Clin Chem Lab Med 2009;47(11):1417–1422 © 2009 by Walter de Gruyter • Berlin • New York. DOI 10.1515/CCLM.2009.312

A new turbidimetric method for assaying serum C-reactive protein based on phosphocholine interaction

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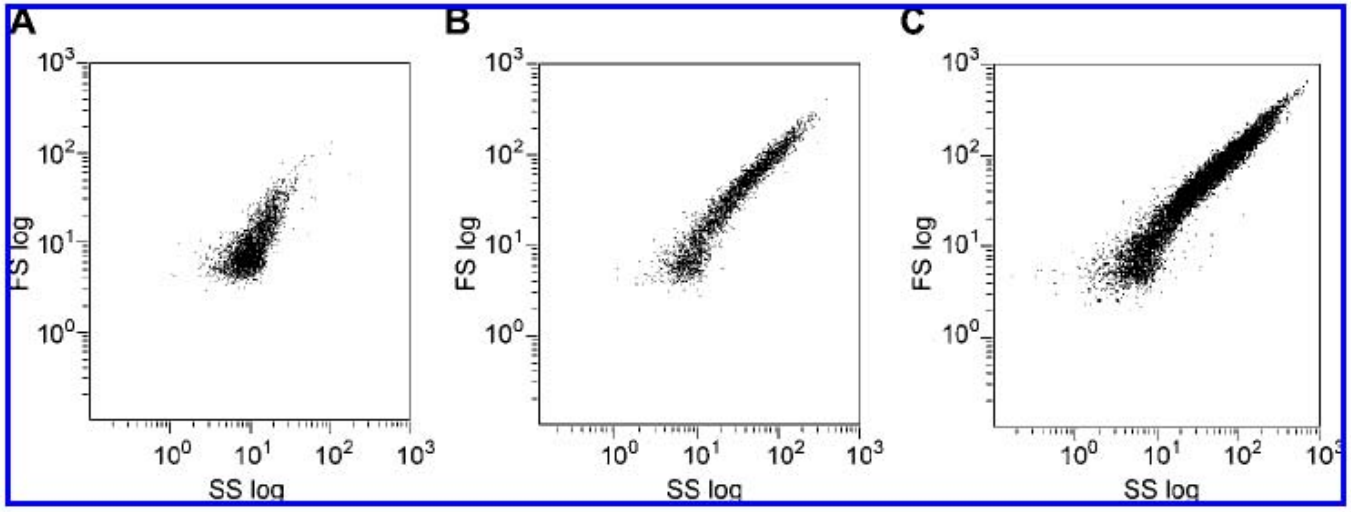

Figure 1 Flow cytometric analysis of CRP-phosphocholine complexes illuminated by the argon-ion laser beam at 488 nm (x-axis: side scatter signal; y-axis: forward scatter signal) following incubation of serum containing 1 mg/L (A); 100 mg/L (B) and 190 mg/L of CRP (C) with soy oil emulsion (30 min, 37°C).

Early versus Late Parenteral Nutrition in Critically Ill Adults

Table 2. Outcomes.*

Variable	Late-Initiation Group (N=2328)	Early-Initiation Group (N=2312)	P Value
Secondary outcome			
New infection — no. (%)			
Any	531 (22.8)	605 (26.2)	0.008
Airway or lung	381 (16.4)	447 (19.3)	0.009
Bloodstream	142 (6.1)	174 (7.5)	0.05
Wound	64 (2.7)	98 (4.2)	0.006
Urinary tract	60 (2.6)	72 (3.1)	0.28
Inflammation			
Median peak C-reactive protein level during ICU stay (interquartile range) — mg/liter	190.6 (100.8–263.2)	159.7 (84.3–243.5)	<0.001
Mechanical ventilation			
Median duration (interquartile range) — days	2 (1–5)	2 (1–5)	0.02
Duration >2 days — no. (%)	846 (36.3)	930 (40.2)	0.006
Hazard ratio (95% CI) for time to definitive weaning from ventilation	1.06 (0.99–1.12)		0.07
Tracheostomy — no. (%)	134 (5.8)	162 (7.0)	0.08

N Engl J Med 2011;365:506-17.

Early versus Late Parenteral Nutrition in Critically Ill Adults

Table 2. Outcomes.*

Variable	Late-Initiation Group (N = 2328)	Early-Initiation Group (N = 2312)	P Value
Kidney failure			
Modified RIFLE category — no. (%)¶	104 (4.6)	131 (5.8)	0.06
Renal-replacement therapy — no. (%)	201 (8.6)	205 (8.9)	0.77
Median duration of renal-replacement therapy (interquartile range) — days	7 (3–16)	10 (5–23)	0.008
Duration of hospital stay			
Median (interquartile range) — days	14 (9–27)	16 (9–29)	0.004
Duration >15 days — no. (%)	1060 (45.5)	1159 (50.1)	0.001
Hazard ratio (95% CI) for time to discharge alive from hospital	1.06 (1.00–1.13)		0.04
Functional status at hospital discharge			
Distance on 6-min walk test			
No. of patients evaluated	624	603	
Distance (interquartile range) — m	277 (210–345)	283 (205–336)	0.57
Activities of daily living			
No. of patients evaluated	1060	996	
Independent in all activities — no. (%)	779 (73.5)	752 (75.5)	0.31
Mean total incremental health care cost (interquartile range) — €‖	16,863 (8,793–17,774)	17,973 (8,749–18,677)	0.04

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Conclusion

- Commencer tôt
- >> entérale
- Mais pas d'impact sur la mortalité…
- Combien de calories ? ????
- + parentérale ? Pas < 7 jours !

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Intensive Care Med (2008) 34:1980–1990
DOI 10.1007/s00134-008-1213-6

REVIEW

Paul E. Marik
Gary P. Zaloga

Immunonutrition in critically ill patients: a systematic review and analysis of the literature

Table 1 Nutritional composition of the commercially available immuno-modulating formulas used in the study subjects

	Impact	Stressen	Immun-aid	Perative	Oxepa	Crucial
Manufacturer	Novartis/Nestle	Nutricia	McGraw Inc	Ross-Abbott	Ross-Abbott	Nestle
K cal/ml	1	1.25	1	1.3	1.5	1.5
% Protein (g/l)	22 (56)	24 (75)	32 (80)	21 (66)	17 (63)	25 (94)
% CHO (g/l)	53 (134)	46 (145)	48 (120)	55 (177)	28 (106)	36 (134)
% Lipids (g/l)	25 (28)	30 (42)	20 (22)	25 (37)	55 (94)	39 (67.6)
Glutamine (g/l)	5.9[a]	13.4[b]	12[b]	5[a]	6.7[a]	7.2[a]
Added arginine (g/l)	12	9	15	6.5	0	15
EPA/DHA (g/l)	1.7	1	0	0	6.6	4.3
GLA (g/l)	0	0	0	0	4	0
Selenium (ug/l)	100	140	100	61	74	100

EPA Eicosapentaenoic acid, *DHA* docosahexaenoic acid, *GLA* gamma-linolenic acid
[a] Inherent glutamine in the protein (no added glutamine)
[b] Added glutamine

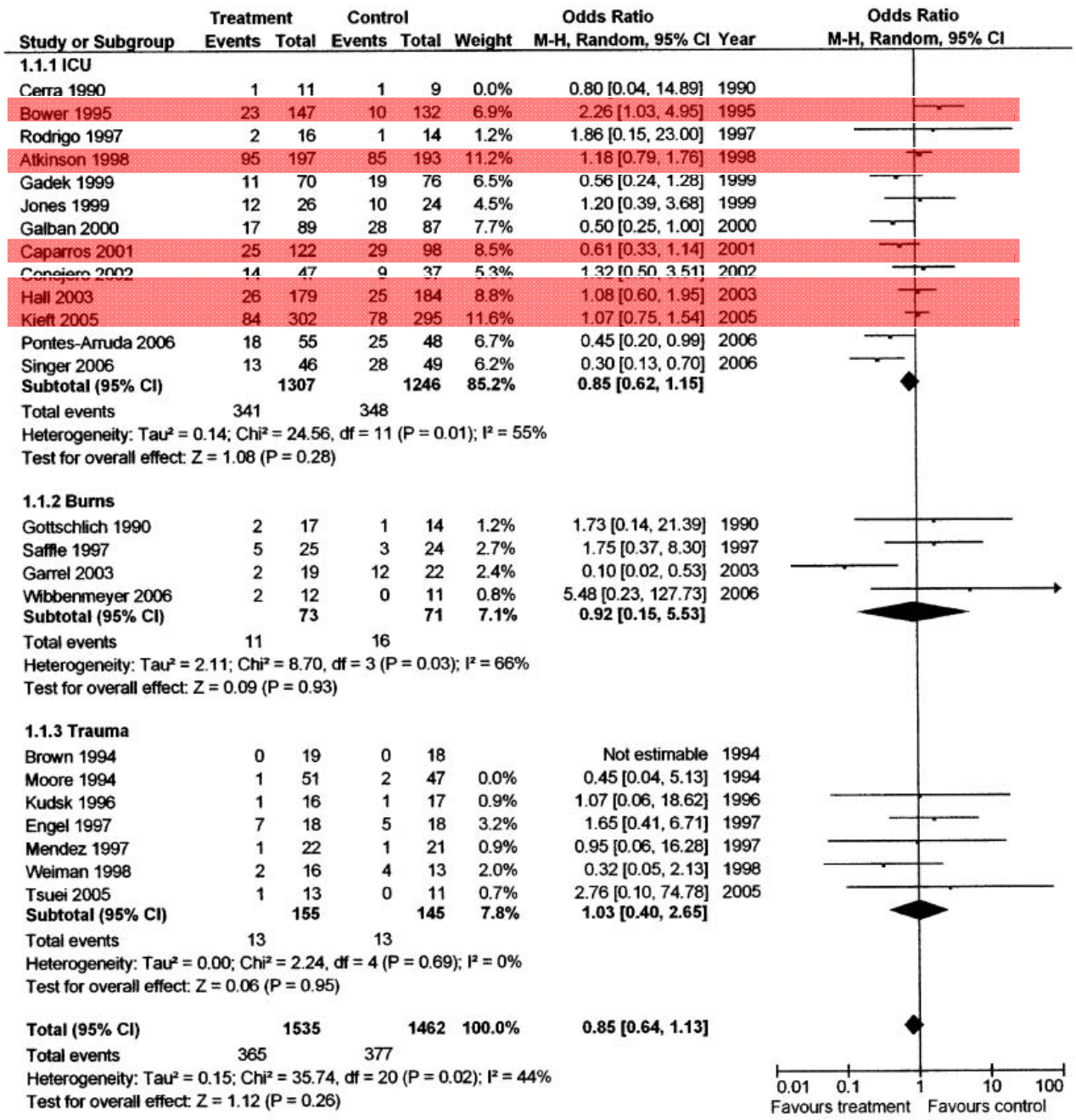

Fig. 2 Effect of immunomodulating diets on mortality with treatment effect (odds ratio and 95% confidence interval) on a log scale

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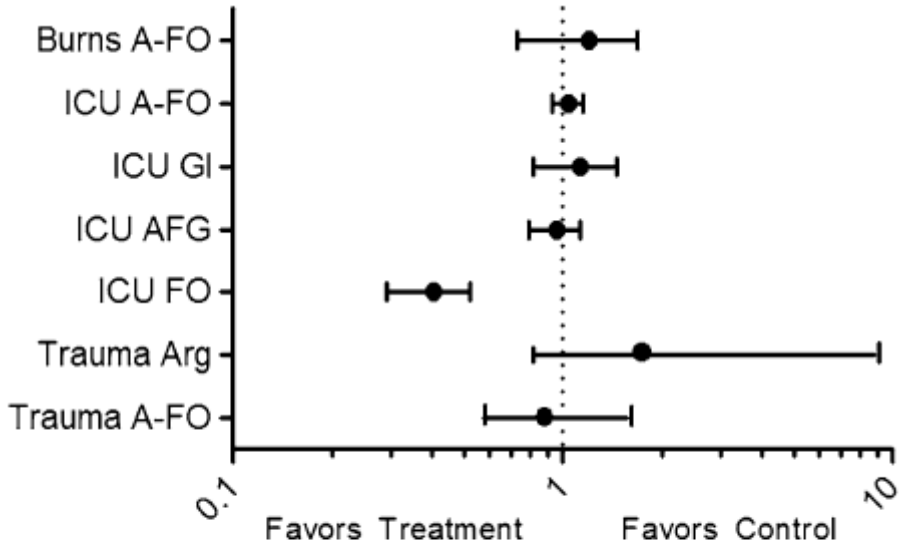

Fig. 3 Odds ratio (with 95% confidence interval) of the treatment effect (for two or more studies) of the immunomodulating diets on mortality (*Arg* arginine, *A–FO* arginine + fish oil, *FO* fish oil, *AFG* arginine + fish oil + glutamine, *Gl* glutamine)

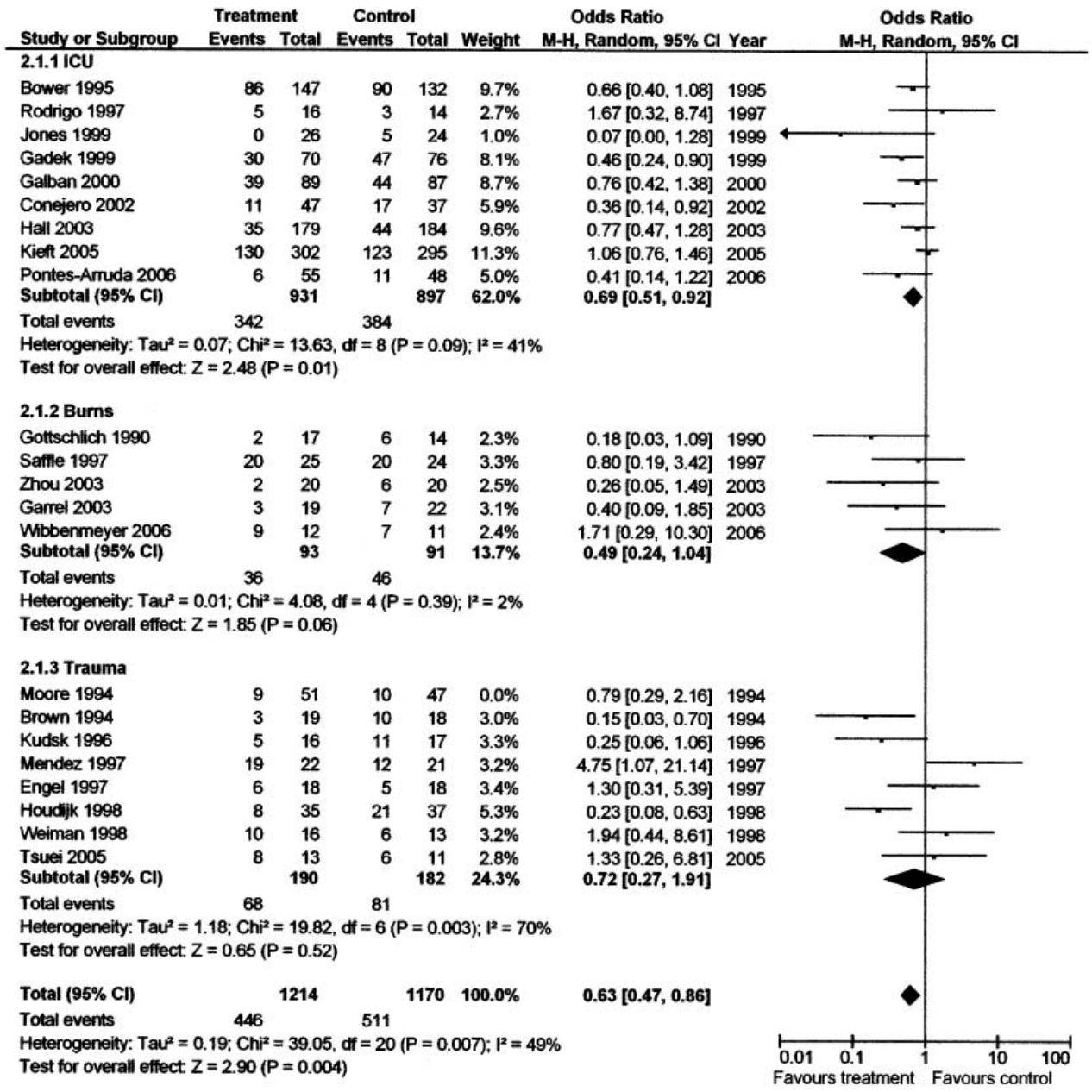

Fig. 4 Effect of immunomodulating diets on acquisition of new infections. Weight is the relative contribution of each study to the overall treatment effect (odds ratio and 95% confidence interval) on a log scale assuming a random effects model

Study or Subgroup	Treatment Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Year
3.1.1 ICU									
Cerra 1990	36.7	8.5	11	54.7	10.5	9	0.0%	-18.00 [-26.50, -9.50]	1990
Bower 1995	27.6	23	147	30.9	26.2	132	9.2%	-3.30 [-9.11, 2.51]	1995
Atkinson 1998	20.6	26.3	197	23.1	31.6	193	9.2%	-2.50 [-8.28, 3.28]	1998
Gadek 1999	27.9	17.5	70	31.1	20.9	76	8.9%	-3.20 [-9.44, 3.04]	1999
Pontes-Arruda 2006	19.3	7.6	55	26.7	6.4	48	11.3%	-7.40 [-10.10, -4.70]	2006
Subtotal (95% CI)			**480**			**458**	**38.6%**	**-5.14 [-7.85, -2.44]**	
Heterogeneity: Tau² = 1.99; Chi² = 3.97, df = 3 (P = 0.26); I² = 24%									
Test for overall effect: Z = 3.73 (P = 0.0002)									
3.1.2 Burns									
Gottschlich 1990	45	12	17	38	11	17	7.7%	7.00 [-0.74, 14.74]	1990
Saffle 1997	37	20	25	38	20	24	5.5%	-1.00 [-12.20, 10.20]	1997
Garrel 2003	36	9	19	42	9	22	9.4%	-6.00 [-11.52, -0.48]	2003
Zhou 2003	67	4	20	73	6	20	11.1%	-6.00 [-9.16, -2.84]	2003
Wibbenmeyer 2006	37.7	24.7	12	30.4	10.4	11	3.8%	7.30 [-7.97, 22.57]	2006
Subtotal (95% CI)			**93**			**94**	**37.5%**	**-1.38 [-6.91, 4.15]**	
Heterogeneity: Tau² = 23.39; Chi² = 12.18, df = 4 (P = 0.02); I² = 67%									
Test for overall effect: Z = 0.49 (P = 0.62)									
3.1.3 Trauma									
Moore 1994	14.6	9.2	51	17.2	19.1	47	0.0%	-2.60 [-8.62, 3.42]	1994
Kudsk 1996	18.3	2.8	16	32.6	6.6	17	10.9%	-14.30 [-17.72, -10.88]	1996
Mendez 1997	34	21.2	22	21.9	11.3	21	6.2%	12.10 [2.01, 22.19]	1997
Weiman 1998	70.2	52.9	16	58.1	30.1	13	1.2%	12.10 [-18.55, 42.75]	1998
Tsuei 2005	22	9	13	27	17	11	5.6%	-5.00 [-16.17, 6.17]	2005
Subtotal (95% CI)			**118**			**109**	**23.9%**	**-0.77 [-15.99, 14.45]**	
Heterogeneity: Tau² = 190.23; Chi² = 26.97, df = 3 (P < 0.00001); I² = 89%									
Test for overall effect: Z = 0.10 (P = 0.92)									
Total (95% CI)			**691**			**661**	**100.0%**	**-3.07 [-6.64, 0.51]**	
Heterogeneity: Tau² = 27.40; Chi² = 54.74, df = 12 (P < 0.00001); I² = 78%									
Test for overall effect: Z = 1.68 (P = 0.09)									

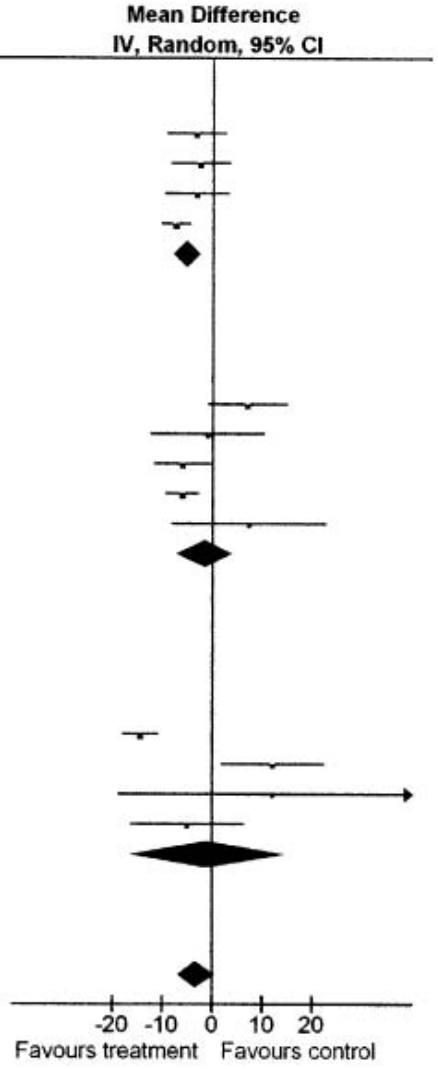

Fig. 5 Effect of immunomodulating diets on length of hospital stay (LOS). Weight is the relative contribution of each study to the overall treatment effect (random effects model of weighted mean difference with 95% confidence interval)

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REVIEW

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Immunonutrition in critically ill patients: a systematic review and analysis of the literature

In summary, current evidence suggests that a fish oil IMD without added arginine reduces mortality, secondary infections and LOS in patients with sepsis, SIRS and ARDS and that glutamine supplementation may be beneficial in burn patients. Arginine containing IMDs appear to have a limited role in trauma patients. The role of a high omega-3 IMD in trauma patients has yet to be determined. Additional prospective, adequately powered pharmaconutrition RCTs are required to support and extend these findings.

Adult Nutritional Products Guide

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DANONE
Nature

DANONE
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Abbott Nutrition Health Institute
Science. Illuminated.

Abbott Nutrition offers continuing education for pediatric and adult therapeutic nutrition.

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Nutrition Support in Critical Illness — Bridging the Evidence Gap

Thomas R. Ziegler, M.D.

Table 1. Major Areas of Uncertainty in the Nutritional Support of Patients in the Intensive Care Unit (ICU).*

Clinical effect of various durations of minimal or no feeding
Optimal timing for the initiation and duration of therapy with enteral nutrition, parenteral nutrition alone or in combination with enteral nutrition, and micronutrients (known essential vitamins, trace elements, and minerals) in enteral and parenteral nutrition
Efficacy of various doses of energy, fat, and protein in enteral and parenteral nutrition
Effect of altered essential and nonessential amino acids (including glutamine) in parenteral nutrition
Efficacy of various doses and formulations of micronutrients in enteral and parenteral nutrition
Efficacy of alternative lipids (e.g., fish oil, olive oil, structured lipids, medium-chain triglycerides, and others, alone and in combination) in enteral and parenteral nutrition
Clinical efficacy of commercially available tube feedings containing combinations of antioxidants, antiinflammatory lipids, arginine, glutamine, and nucleotides in subgroups of patients
Efficacy of longer-term enteral or parenteral nutrition (or both) as needed in the post-ICU hospital and home setting
Effect of approaches for enteral and parenteral nutrition support in specific diagnostic subgroups of patients

Evolution

- Sonde nasogastrique avec gavage
- Levophed diminué puis arrêté le J3
- Détubation le J8
- Normalisation de la fonction rénale et hépatique
- En salle le J11
- Retour à domicile le J16

Conclusions

- Choc septique (pneumonie) avec hypoxémie, insuffisance rénale, foie de choc, CIVD
- Lymphome Hodgkinien en rémission complète
- Commencer tôt >> entérale
- Protocole poussé n’a pas d’impact sur la mortalité
- Addition parentérale prolonge la durée en USI
- « Immunonutrition » ?????????