Early enteral nutrition in critical illness: How early is early?

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Summary of this talk

- Provide a context for this talk.
- Review the most recent clinical recommendations on early EN.
- Compare evidence supporting the 2015 Canadian nutrition guideline to the 2016 ASPEN guideline.
- Conclude.

Background: Review of the Guidelines

- The concept of ‘early’ enteral feeding was popularised in the mid ‘80s.

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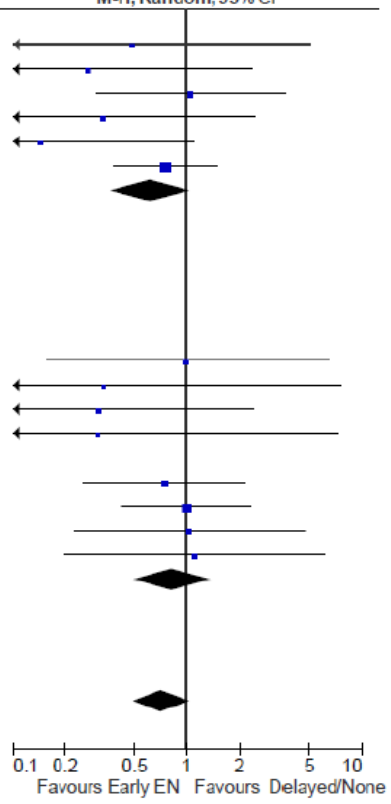
2015 Canadian guideline

< 48 h – *Canadian guideline*

Figure 1. Studies comparing early EN vs delayed nutrient intake: Mortality

Study or Subgroup	Early EN Events	Total	Delayed/None Events	Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
1.1.1 EN vs IV Fluids/No EN							
Moore	1	32	2	31	2.5%	0.48 [0.05, 5.07]	1986
Chuntrasakul	1	21	3	17	2.9%	0.27 [0.03, 2.37]	1996
Singh	4	21	4	22	8.7%	1.05 [0.30, 3.66]	1998
Pupelis 2000	1	11	5	18	3.4%	0.33 [0.04, 2.45]	2000
Pupelis 2001	1	30	7	30	3.3%	0.14 [0.02, 1.09]	2001
Malhotra	12	100	16	100	28.2%	0.75 [0.37, 1.50]	2004
Subtotal (95% CI)		**215**		**218**	**49.0%**	**0.62 [0.37, 1.05]**	
Total events	20		37				
Heterogeneity: Tau² = 0.00; Chi² = 4.10, df = 5 (P = 0.54); I² = 0%							
Test for overall effect: Z = 1.78 (P = 0.08)							
1.1.2 EN vs Delayed EN							
Chiarelli	0	10	0	10		Not estimable	1990
Eyer	2	19	2	19	4.0%	1.00 [0.16, 6.38]	1993
Kompan 1999	0	14	1	14	1.4%	0.33 [0.01, 7.55]	1999
Minard	1	12	4	15	3.2%	0.31 [0.04, 2.44]	2000
Kompan 2004	0	27	1	25	1.4%	0.31 [0.01, 7.26]	2004
Dvorak	0	7	0	10		Not estimable	2004
Peck	4	14	5	13	11.8%	0.74 [0.25, 2.18]	2004
Nguyen 2008	6	14	6	14	18.7%	1.00 [0.43, 2.35]	2008
Moses	3	29	3	30	5.9%	1.03 [0.23, 4.71]	2009
Chourdakis	3	34	2	25	4.7%	1.10 [0.20, 6.12]	2012
Subtotal (95% CI)		**180**		**175**	**51.0%**	**0.83 [0.49, 1.39]**	
Total events	19		24				
Heterogeneity: Tau² = 0.00; Chi² = 2.07, df = 7 (P = 0.96); I² = 0%							
Test for overall effect: Z = 0.72 (P = 0.47)							
Total (95% CI)		**395**		**393**	**100.0%**	**0.72 [0.50, 1.04]**	
Total events	39		61				
Heterogeneity: Tau² = 0.00; Chi² = 6.83, df = 13 (P = 0.91); I² = 0%							
Test for overall effect: Z = 1.76 (P = 0.08)							
Test for subgroup differences: Chi² = 0.58, df = 1 (P = 0.44), I² = 0%							



- 16 clinical trials
- p=0.08 (trend)
- mortality reduction by 6%

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2016 ASPEN guideline

< 48 h – *2016 ASPEN*

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Sagar 1979	0	15	0	15		Not estimable	1979
Moore 1986	1	32	2	31	2.3%	0.48 [0.05, 5.07]	1986
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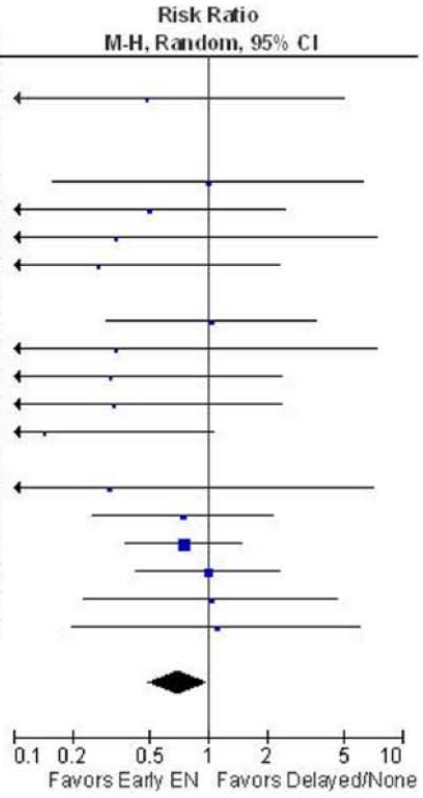
Total (95% CI)		**469**		**467**	**100.0%**	**0.70 [0.49, 1.00]**	
Total events	41		66				

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 7.23$, df = 15 (P = 0.95); $I^2 = 0\%$

Test for overall effect: Z = 1.97 (P = 0.05)



- 21 clinical trials
- p=0.05 (significant)
- mortality reduction by 5%

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2015 Canadian vs. 2016 ASPEN guideline

- We need to understand why the 2016 ASPEN guideline has 5 more clinical trials than the 2015 Canadian guideline.

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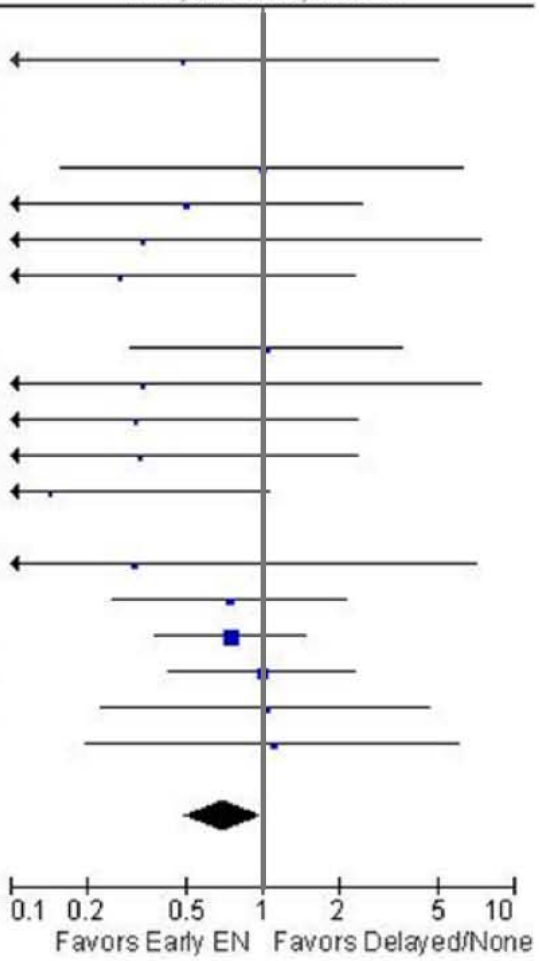

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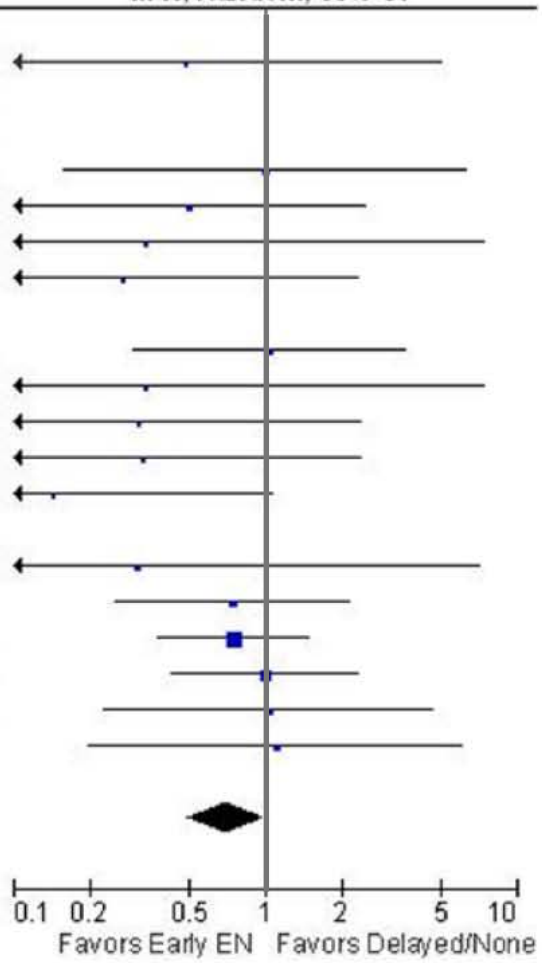

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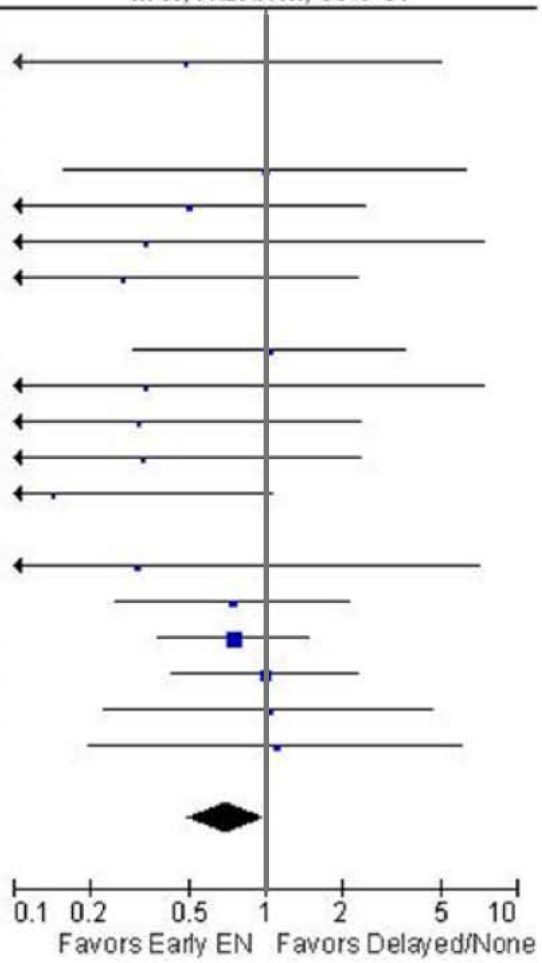

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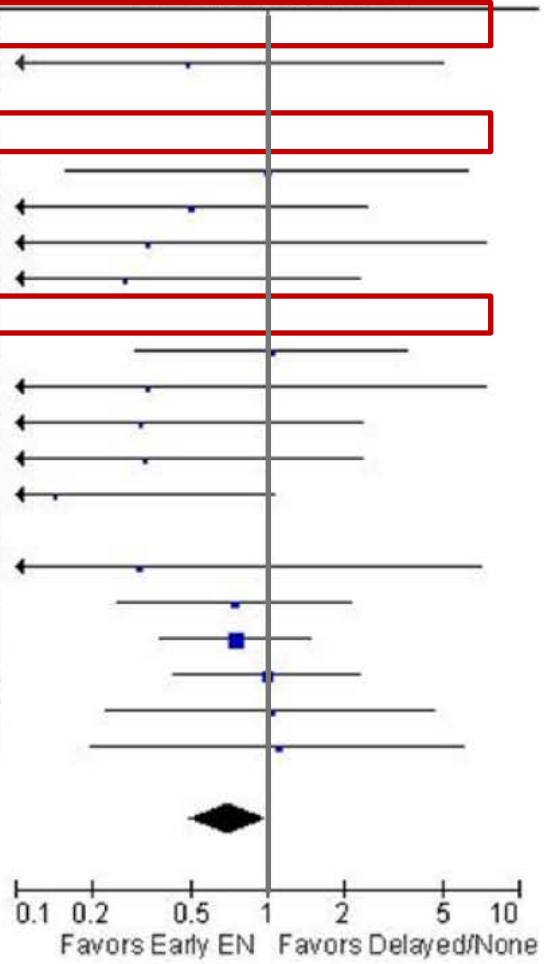
Chourdakis 2012	3	34	2	25	4.4%	1.10 [0.20, 6.12]	2012
Total (95% CI)		**469**		**467**	**100.0%**	**0.70 [0.49, 1.00]**	
Total events	41		66				

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 7.23$, df = 15 ($P = 0.95$); $I^2 = 0\%$

Test for overall effect: $Z = 1.97$ ($P = 0.05$)



2015 Canadian vs. 2016 ASPEN guideline

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2015 Canadian vs. 2016 ASPEN guideline

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Sagar 1979	0	15	0	15		Not estimable	1979
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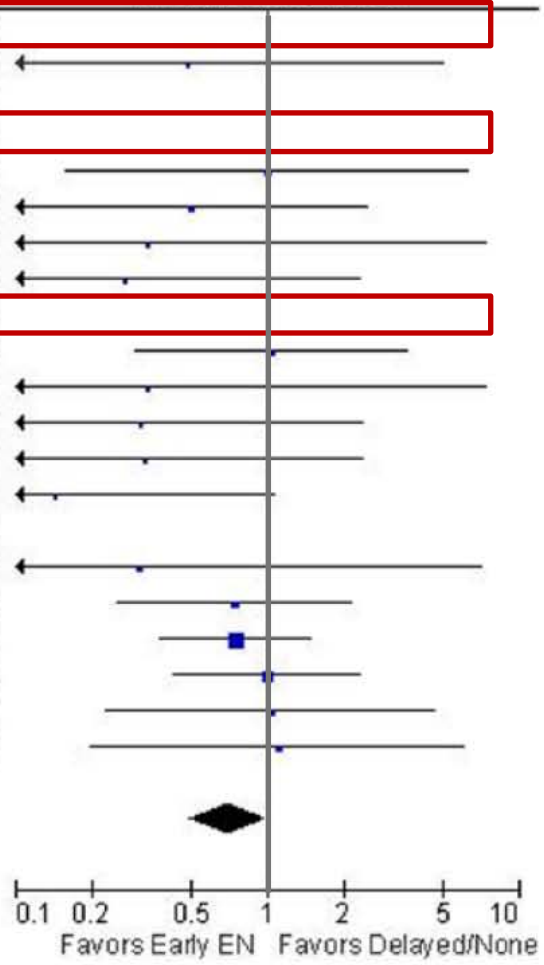

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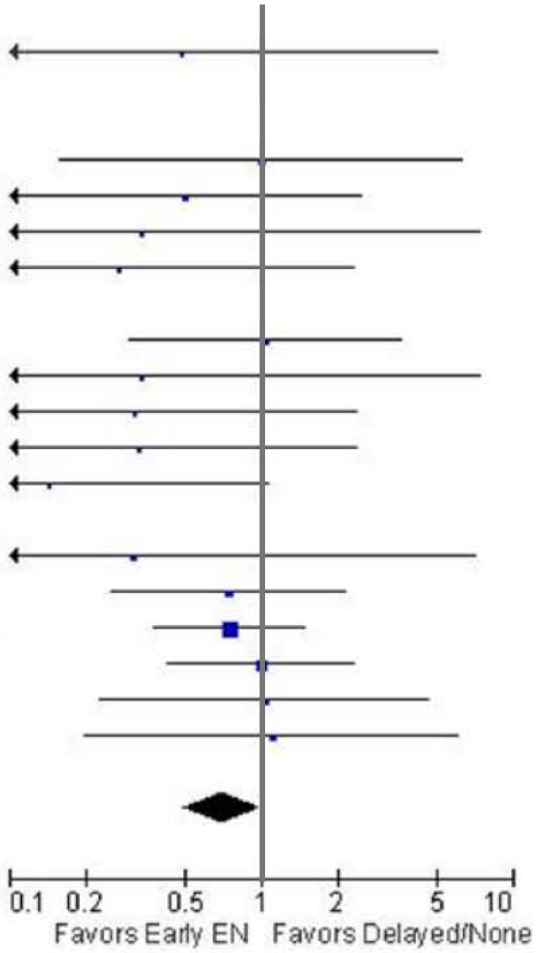

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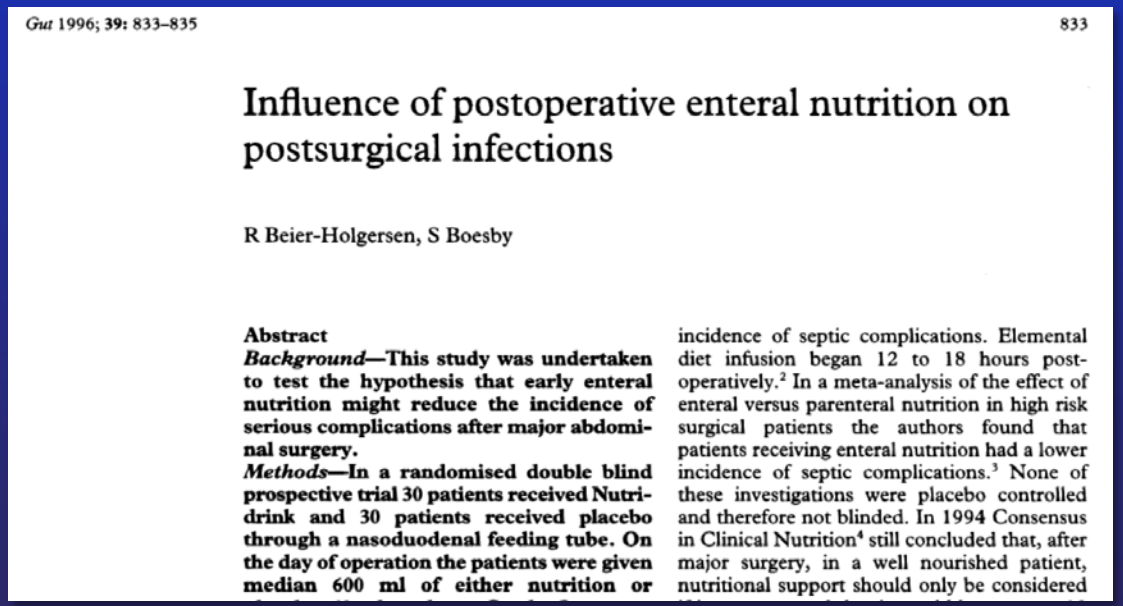

Gut 1996; **39:** 833–835

Influence of postoperative enteral nutrition on postsurgical infections

R Beier-Holgersen, S Boesby

Abstract

***Background*—This study was undertaken to test the hypothesis that early enteral nutrition might reduce the incidence of serious complications after major abdominal surgery.**

***Methods*—In a randomised double blind prospective trial 30 patients received Nutridrink and 30 patients received placebo through a nasoduodenal feeding tube. On the day of operation the patients were given median 600 ml of either nutrition or**

incidence of septic complications. Elemental diet infusion began 12 to 18 hours postoperatively.[2] In a meta-analysis of the effect of enteral versus parenteral nutrition in high risk surgical patients the authors found that patients receiving enteral nutrition had a lower incidence of septic complications.[3] None of these investigations were placebo controlled and therefore not blinded. In 1994 Consensus in Clinical Nutrition[4] still concluded that, after major surgery, in a well nourished patient, nutritional support should only be considered

2015 Canadian vs. 2016 ASPEN guideline

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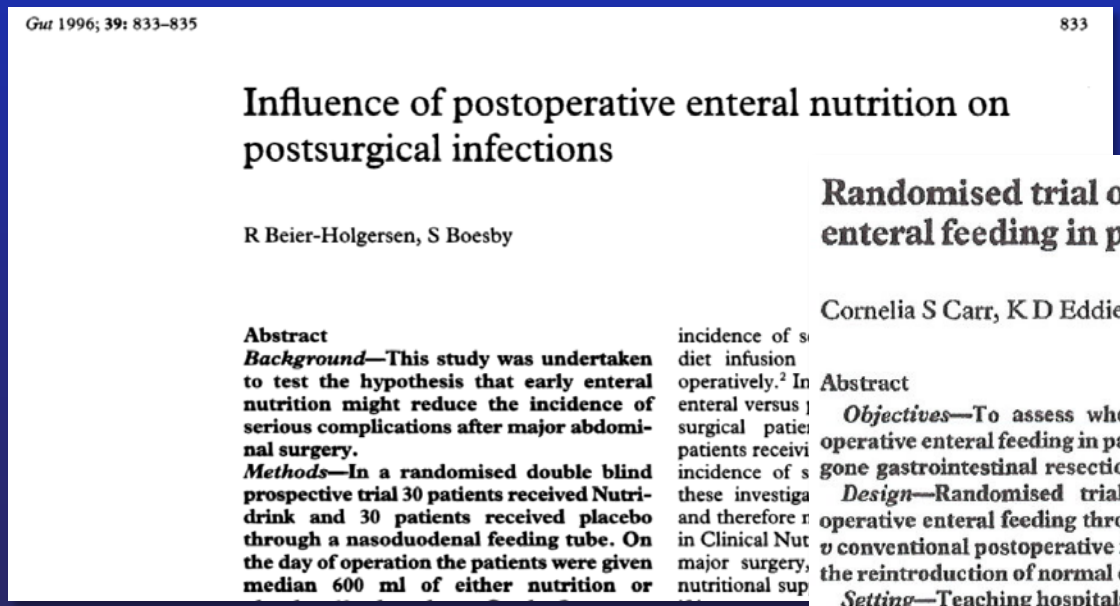

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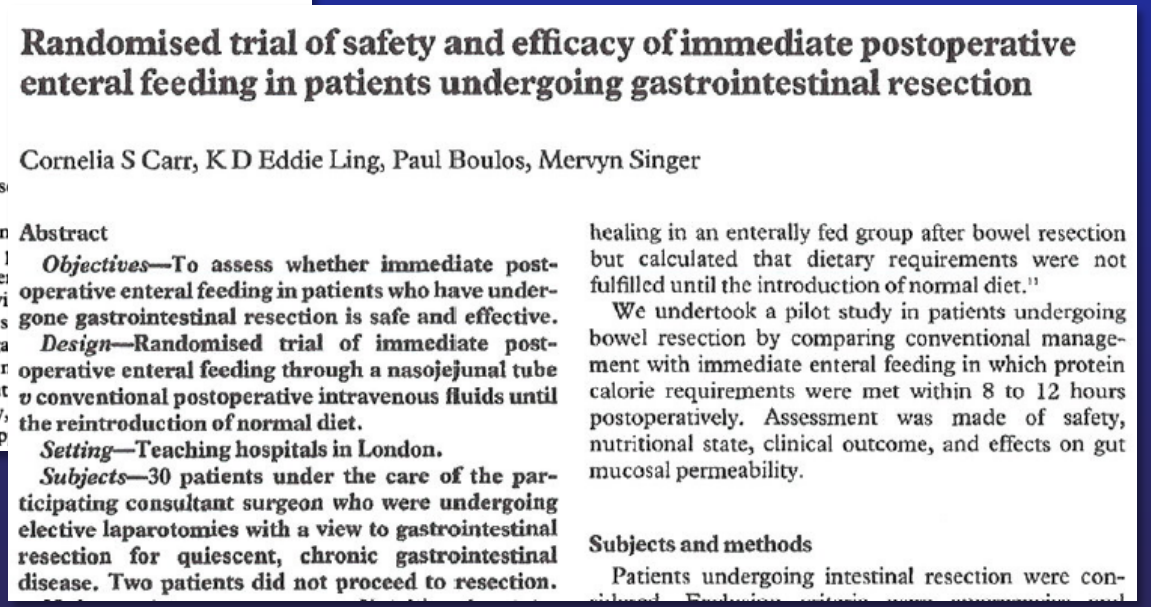

Randomised trial of safety and efficacy of immediate postoperative enteral feeding in patients undergoing gastrointestinal resection

Cornelia S Carr, K D Eddie Ling, Paul Boulos, Mervyn Singer

Abstract

***Objectives*—To assess whether immediate postoperative enteral feeding in patients who have undergone gastrointestinal resection is safe and effective.**

***Design*—Randomised trial of immediate postoperative enteral feeding through a nasojejunal tube *v* conventional postoperative intravenous fluids until the reintroduction of normal diet.**

***Setting*—Teaching hospitals in London.**

***Subjects*—30 patients under the care of the participating consultant surgeon who were undergoing elective laparotomies with a view to gastrointestinal resection for quiescent, chronic gastrointestinal disease. Two patients did not proceed to resection.**

healing in an enterally fed group after bowel resection but calculated that dietary requirements were not fulfilled until the introduction of normal diet.[11]

We undertook a pilot study in patients undergoing bowel resection by comparing conventional management with immediate enteral feeding in which protein calorie requirements were met within 8 to 12 hours postoperatively. Assessment was made of safety, nutritional state, clinical outcome, and effects on gut mucosal permeability.

Subjects and methods

Patients undergoing intestinal resection were con-

2015 Canadian vs. 2016 ASPEN guideline

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- Beier-Holgersen 1996, Carr 1996
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J Gastrointest Surg (2009) 13:569–575
DOI 10.1007/s11605-008-0592-x

REVIEW ARTICLE

Early Enteral Nutrition Within 24 h of Intestinal Surgery Versus Later Commencement of Feeding: A Systematic review and Meta-analysis

Stephen J. Lewis · Henning K. Andersen · Steve Thomas

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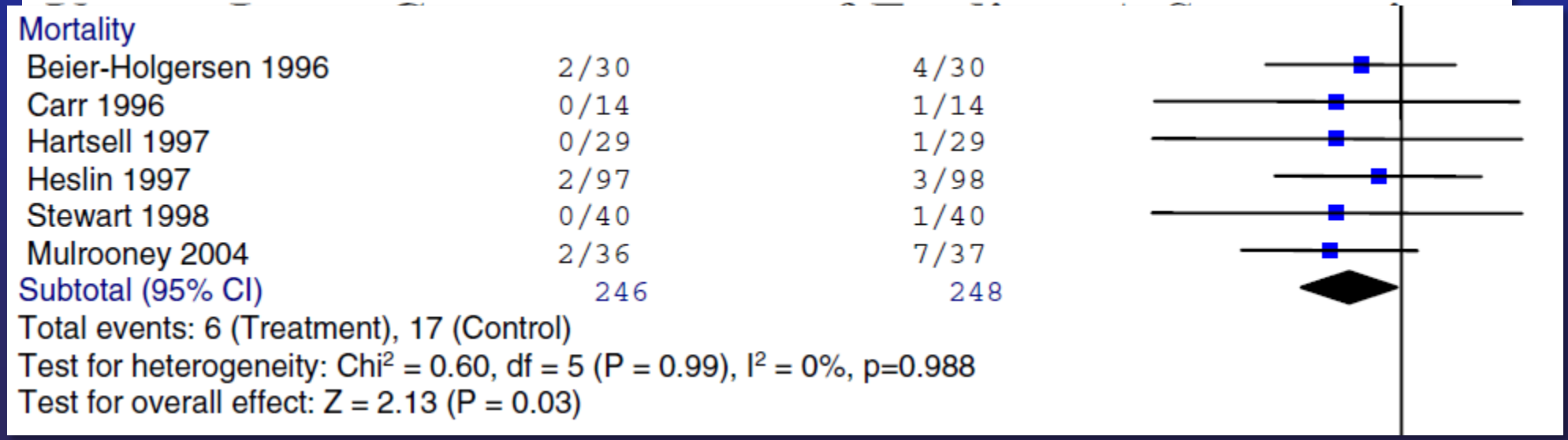

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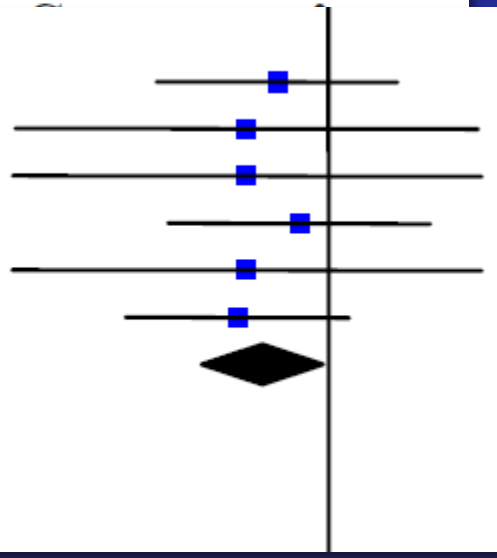
REVIEW ARTICLE

Early Enteral Nutrition Within 24 h of Intestinal Surgery

Mortality

Beier-Holgersen 1996	2/30	4/30
Carr 1996	0/14	1/14
Hartsell 1997	0/29	1/29
Heslin 1997	2/97	3/98
Stewart 1998	0/40	1/40
Mulrooney 2004	2/36	7/37
Subtotal (95% CI)	246	248

Total events: 6 (Treatment), 17 (Control)
Test for heterogeneity: $Chi^2 = 0.60$, $df = 5$ ($P = 0.99$), $I^2 = 0\%$, $p=0.988$
Test for overall effect: $Z = 2.13$ ($P = 0.03$)



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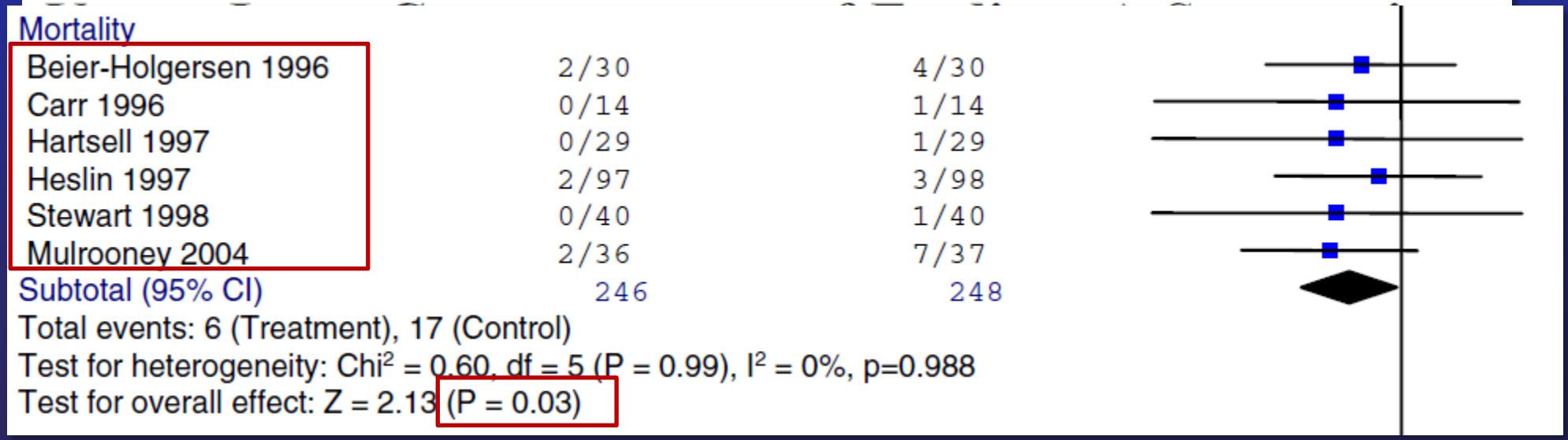

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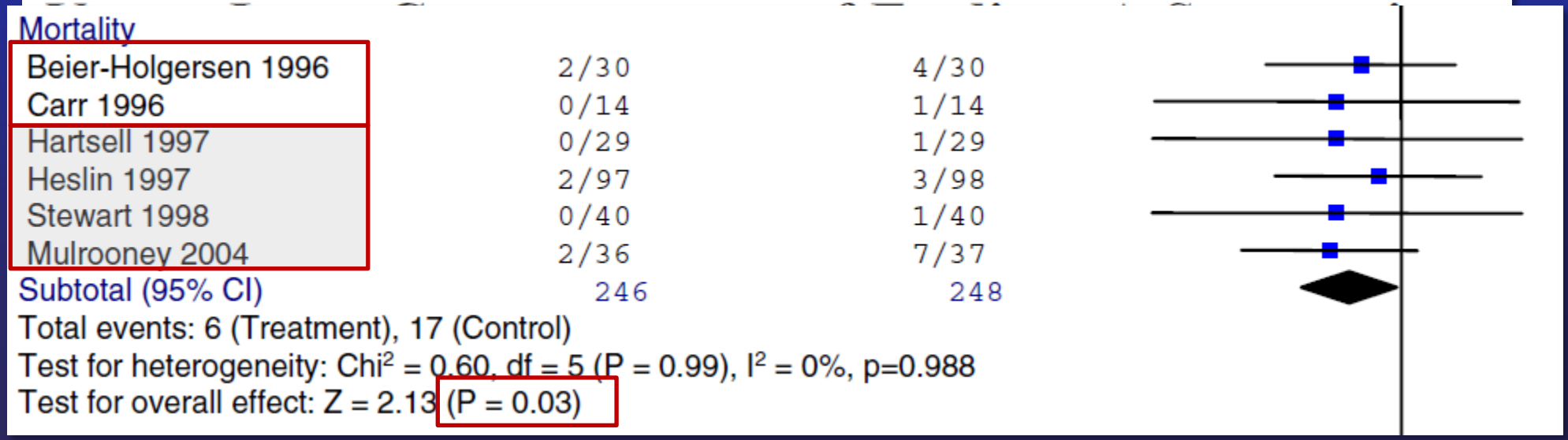

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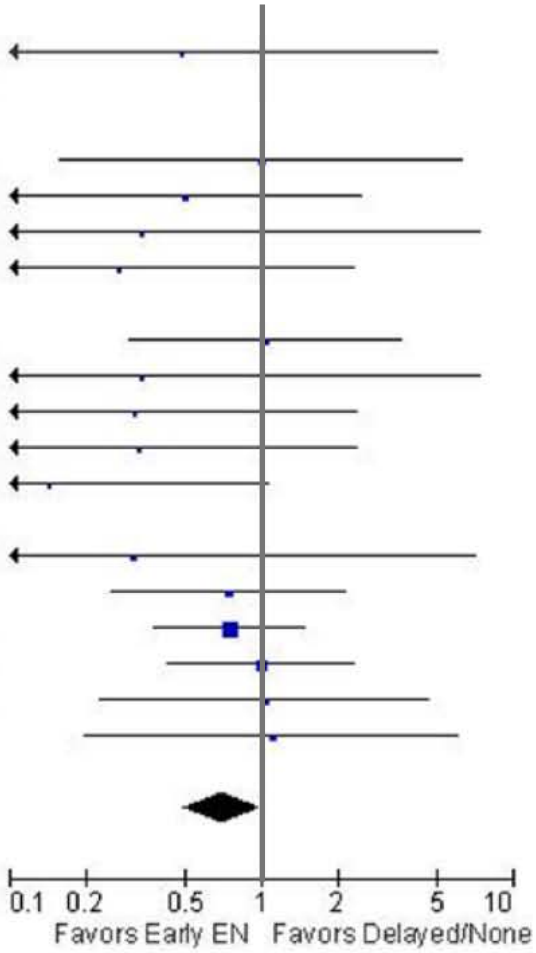

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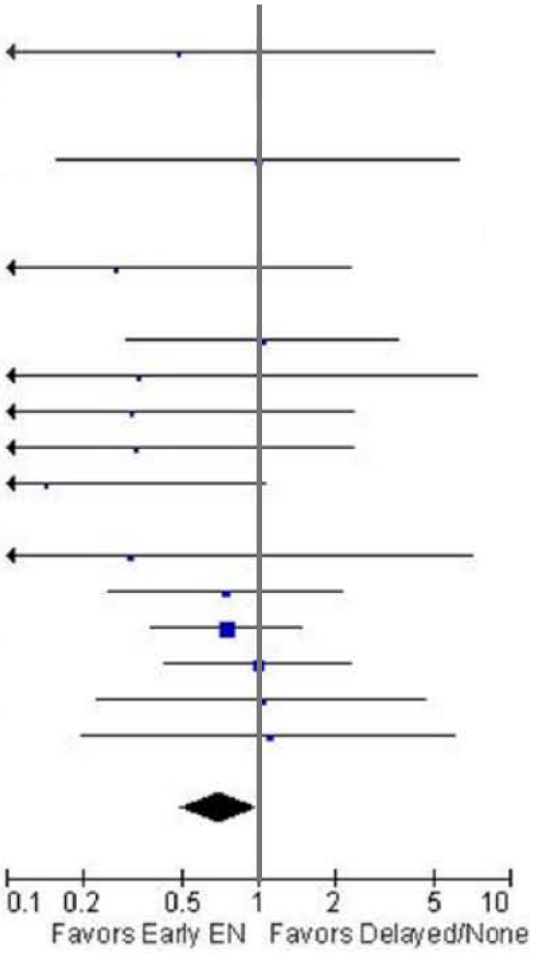

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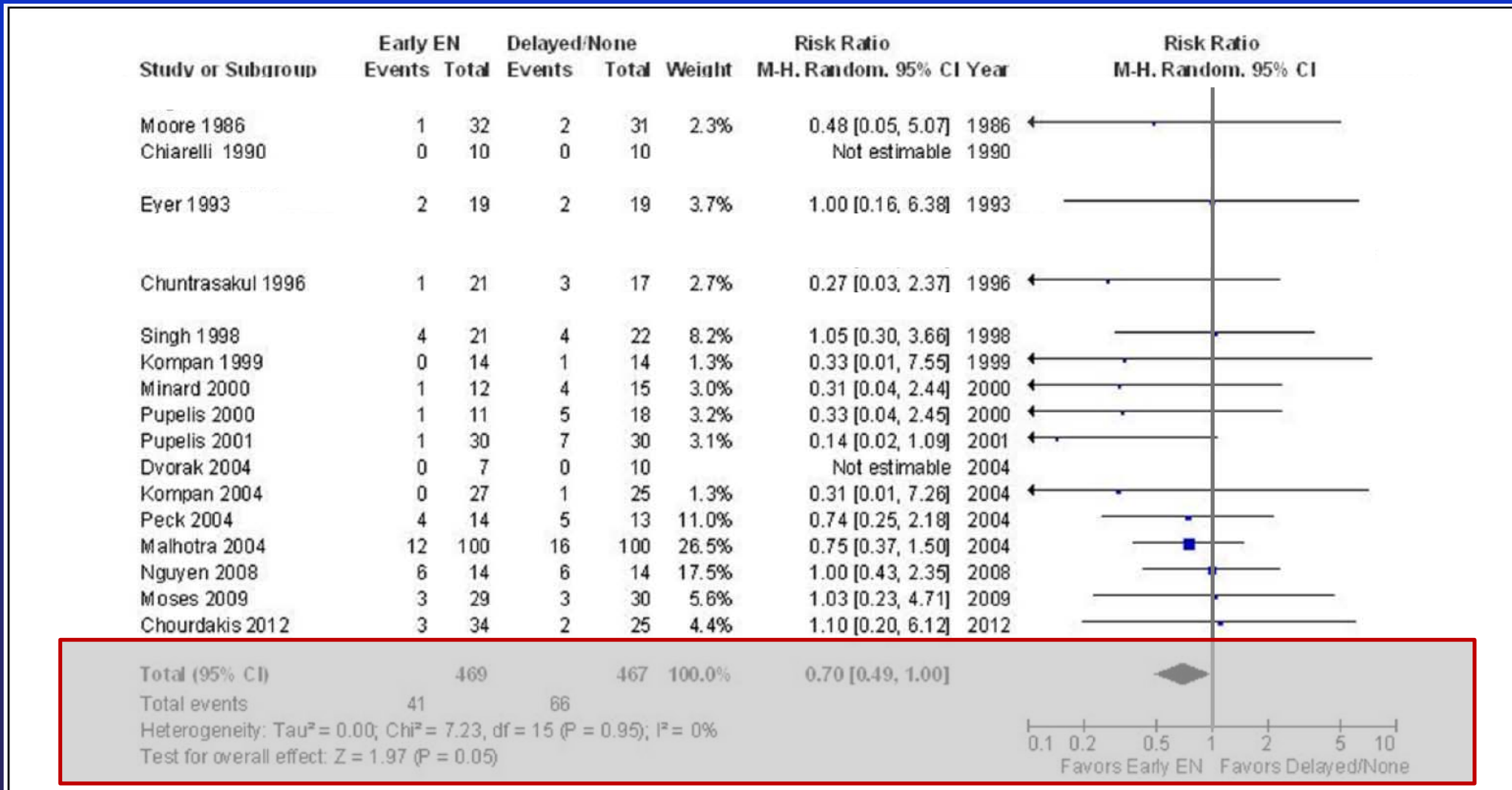

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Risk Ratio M-H, Random, 95% CI

0.1 0.2 0.5 1 2 5 10

Favors Early EN Favors Delayed/None

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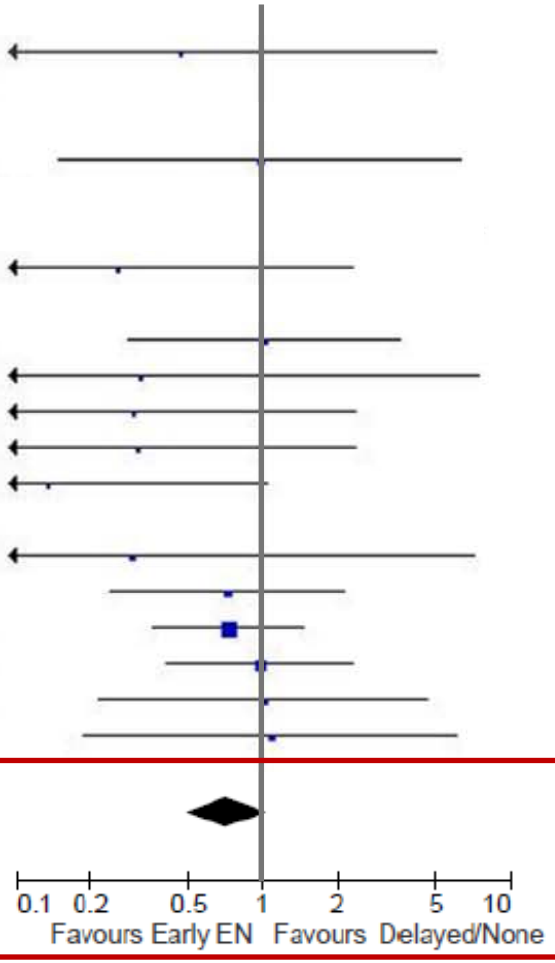
Chourdakis 2012	3	34	2	25	4.4%	1.10 [0.20, 6.12]	2012
Total (95% CI)		395		393	100.0%	0.72 [0.50, 1.04]	
Total events	39		61				

Heterogeneity: Tau² = 0.00; Chi² = 6.83, df = 13 (P = 0.91); I² = 0%

Test for overall effect: Z = 1.76 (P = 0.08)



2015 Canadian vs. 2016 ASPEN guideline

- Sagar 1979, Schroeder 1991 and Walters 1997 have zero deaths.
  - Could not influence the difference in results between the 2015 Canadian and 2016 ASPEN guideline results.
- Beier-Holgersen 1996, Carr 1996
  - Neither study reports any patients requiring care in the ICU, post-op mechanical ventilation or any other interventions requiring ICU admission.
  - *These are elective surgery patients!*
- *With the removal of these five studies (Sagar 1979, Schroeder 1991, Walters 1997, Beier-Holgersen 1996, Carr 1996) the 2016 ASPEN guideline and the 2015 Canadian guideline are in complete agreement: There is a trend (p=0.08) towards a reduction in mortality if EN is started within 48 h of ICU admission.*

Background: Review of the Guidelines

- The concept of 'early' enteral feeding was popularised in the mid '80s.
- Five major clinical practice guidelines recommend *early* EN.

< 48 h –	*Canadian guideline,*	Evidence of trend.
< 24 h –	*ACCEPT guideline (also Canadian),*	Significant evidence.
< 24 h –	*Australian and New Zealand guideline,*	Significant evidence.
< 24 h –	*European (ESPEN) guideline and*	Significant evidence.
< 48 h –	*American (ASPEN and SCCM) guideline*	Evidence of trend.

Moore EE, Jones TN. Benefits of immediate jejunostomy feeding after major abdominal trauma—a prospective, randomized study. *J Trauma* 1986;26:874–881

Heyland DK, *et al*. The 2015 Canadian critical care nutrition guiddline. www.CriticalCareNutrition/cpg.

Martin CM, Doig GS, Heyland DK, Morrison T and Sibbald WJ. Multicentre, cluster randomized clinical trial of algorithms for critical care enteral and parenteral therapy (ACCEPT). *CMAJ* 2004;170(2):197-204.

Doig GS and Simpson F. Evidence-based guidelines for nutritional support of the critically ill: Results of a bi-national guidelines development conference. First Edition, EvidenceBased.net , Sydney, Australia, 2005.

Kreymann KG, Berger MM, Deutz NE, *et al*. ESPEN Guidelines on Enteral Nutrition: Intensive care. *Clinical Nutrition* 2006;25: 210–223.

McClave SA, Taylor BE, Martindale RG, *et al*. 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.). *J Parenter Enteral Nutr* 2016;40(2):159-211.

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Evidence for early EN in critical illness

Intensive Care Med (2009) 35:2018–2027
DOI 10.1007/s00134-009-1664-4

SYSTEMATIC REVIEW

Gordon S. Doig
Philippa T. Heighes
Fiona Simpson
Elizabeth A. Sweetman
Andrew R. Davies

Early enteral nutrition, provided within 24 h of injury or intensive care unit admission, significantly reduces mortality in critically ill patients: a meta-analysis of randomised controlled trials

Doig GS, Heighes PT, Simpson F, Sweetman EA and Davies AR. Enteral nutrition within 24 h of ICU admission significantly reduces mortality: A meta-analysis of RCTs. *Intensive Care Medicine* **2009** Dec;35(Issue 12):2018-2027.

Meta-analysis of early EN in critical illness

Comprehensive Literature search

- MEDLINE (http://www.PubMed.org) and EMBASE (http://www.EMBASE.com)
- Academic and industry experts were contacted,
- Reference lists of identified systematic reviews and evidence-based guidelines were hand searched by at least two authors.
- The search was not restricted by Language.

Doig GS, Heighes PT, Simpson F, Sweetman EA and Davies AR. Enteral nutrition within 24 h of ICU admission significantly reduces mortality: A meta-analysis of RCTs. *Intensive Care Medicine* **2009** Dec;35(Issue 12):2018-2027.

Meta-analysis of early EN in critical illness

Chiarelli, 1990: 20 pts, burns

Kompan, 1999: 36 pts, trauma

Kompan, 2004: 52 pts, trauma

Nguyen, 2008: 28 pts, med/surg critically ill

Chuntrasakul, 1996: 38 pts, trauma

Pupelis, 2001: 60 pts, severe pancreatitis and peritonitis

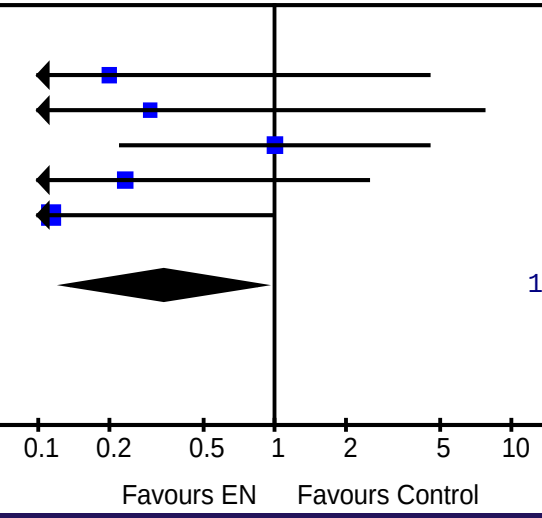
Doig GS, Heighes PT, Simpson F, Sweetman EA and Davies AR. Enteral nutrition within 24 h of ICU admission significantly reduces mortality: A meta-analysis of RCTs. *Intensive Care Medicine* 2009 Dec;35(Issue 12):2018-2027.

Results: Primary MA, mortality

Review: Early EN (<24h) vs Control (Primary Analysis)
Comparison: 01 early EN vs Control
Outcome: 01 Mortality, Intention to treat analysis

Study or sub-category	early EN (<24 h) n/N	Control n/N	OR (fixed) 95% CI	Weight %	OR (fixed) 95% CI
Chiarelli 1990	0/10	0/10			Not estimable
Kompan 1999	0/17	2/19		13.40	0.20 [0.01, 4.47]
Kompan 2004	0/27	1/25		8.89	0.30 [0.01, 7.63]
Nguyen 2008	6/14	6/14		19.95	1.00 [0.22, 4.47]
Chuntrasakul 1996	1/21	3/17		18.38	0.23 [0.02, 2.48]
Pupelis 2001	1/30	7/30		39.38	0.11 [0.01, 0.99]
Total (95% CI)	119	115		100.00	0.34 [0.14, 0.85]

Total events: 8 (early EN (<24 h)), 19 (Control)
Test for heterogeneity: Chi² = 3.20, df = 4 (P = 0.52), I² = 0%
Test for overall effect: Z = 2.31 (P = 0.02)



Significant reduction in mortality (10% absolute reduction, P=0.02)

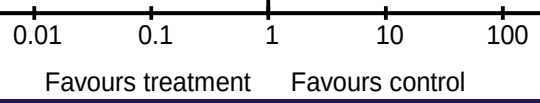
Doig GS, Heighes PT, Simpson F, Sweetman EA and Davies AR. Enteral nutrition within 24 h of ICU admission significantly reduces mortality: A meta-analysis of RCTs. *Intensive Care Medicine* 2009 Dec;35(Issue 12):2018-2027.

Results: Primary MA, Pneumonia

Review: Early EN (<24h) vs Control (Primary Analysis)
Comparison: 01 early EN vs Control
Outcome: 02 Pneumonia, Intention to treat analysis

Study or sub-category	early EN (<24 h) n/N	Control n/N	OR (fixed) 95% CI	Weight %	OR (fixed) 95% CI
Kompan 2004	9/27	16/25		70.15	0.28 [0.09, 0.88]
Nguyen 2008	3/14	6/14		29.85	0.36 [0.07, 1.91]
Total (95% CI)	41	39		100.00	0.31 [0.12, 0.78]

Total events: 12 (early EN (<24 h)), 22 (Control)
Test for heterogeneity: Chi² = 0.06, df = 1 (P = 0.80), I² = 0%
Test for overall effect: Z = 2.47 (P = 0.01)



Significant reduction in pneumonia (27% absolute reduction, P=0.01)

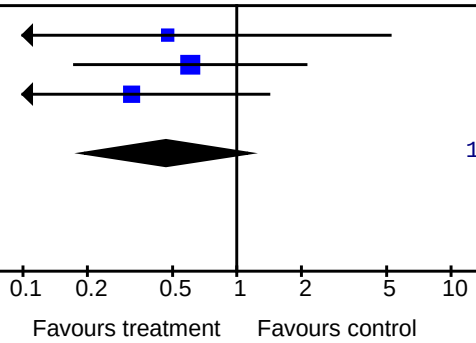
Doig GS, Heighes PT, Simpson F, Sweetman EA and Davies AR. Enteral nutrition within 24 h of ICU admission significantly reduces mortality: A meta-analysis of RCTs. *Intensive Care Medicine* 2009 Dec;35(Issue 12):2018-2027.

Gut dysfunction

Review: Early EN (<24h) vs Standard Care
Comparison: 01 early EN vs Standard Care
Outcome: 03 Complications (Gut Dysfunction)

Study or sub-category	Early EN n/N	Delayed EN n/N	Peto OR 95% CI	Weight %	Peto OR 95% CI
Chiarelli 1990	1/10	2/10		13.65	0.47 [0.04, 5.19]
Kompan 2004	19/27	20/25		50.49	0.60 [0.17, 2.10]
Pupelis 2001	2/30	6/30		35.86	0.32 [0.07, 1.41]
Total (95% CI)	67	65		100.00	0.47 [0.19, 1.13]

Total events: 22 (Early EN), 28 (Delayed EN)
Test for heterogeneity: Chi² = 0.41, df = 2 (P = 0.81), I² = 0%
Test for overall effect: Z = 1.69 (P = 0.09)



Trend towards a reduction in gut dysfunction (10% absolute reduction, p=0.09)

One included trial demonstrated a significantly shorter duration of gut dysfunction (p=0.045)

ICU length of stay

Doig et al

Dovepress

Study or subgroup	EEN Mean [days]	EEN SD [days]	EEN Total	SoC Mean [days]	SoC SD [days]	SoC Total	Weight	Mean difference IV, fixed, 95% CI [days]	Year
Chuntrasakul et al[18]	8.14	6.28	21	8.35	4.78	17	47.7%	−0.21 [−3.73, 3.31]	1996
Pupelis et al[19]	13.9	14.6	30	16	20.5	30	7.3%	−2.10 [−12.86, 8.66]	2001
Kompan et al[20]	15.9	9.7	27	20.6	18.5	25	8.9%	−4.70 [−12.82, 3.42]	2004
Nguyen et al[21]	11.3	2.99	14	15.9	7.11	14	36.1%	−4.60 [−8.64, −0.56]	2008
Total (95% CI)			92			86	100.0%	−2.34 [−4.76, 0.09]	

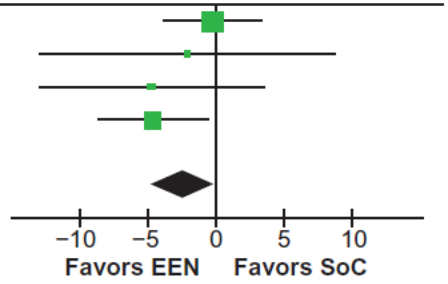


Figure 1 Meta-analysis of ICU length of stay: early enteral nutrition vs standard care.
Notes: Heterogeneity: $\chi^2 = 2.94$, $df = 3$ ($P = 0.40$); $I^2 = 0\%$. Test for overall effect: $Z = 1.87$ ($P = 0.06$).
Abbreviations: CI, confidence interval; EEN, early enteral nutrition; ICU, Intensive Care Unit; IV, inverse variance; SD, standard deviation; SoC, standard of care.

Trend towards reduced length of ICU stay with early EN (2.34 days, P = 0.06)

Doig GS, Chevrou-Severac H and Simpson F. Early enteral nutrition in critical illness: A full economic analysis using US costs. *ClinicoEconomics and Outcomes Research* **2013**;5:429-436.

Duration of MV

Study or subgroup	EEN Mean [days]	EEN SD [days]	EEN Total	SoC Mean [days]	SoC SD [days]	SoC Total	Weight	Mean difference IV, fixed, 95% CI [days]
Chuntrasakul et al[18]	5.29	6.28	21	6.12	5.32	17	48.1%	−0.83 [−4.52, 2.86]
Kompan et al[20]	12.9	8.1	27	15.6	16.1	25	13.3%	−2.70 [−9.71, 4.31]
Nguyen et al[21]	9.2	3.37	14	13.7	7.11	14	38.6%	−4.50 [−8.62, −0.38]
Total (95% CI)			62			56	100.0%	−2.49 [−5.05, 0.07]

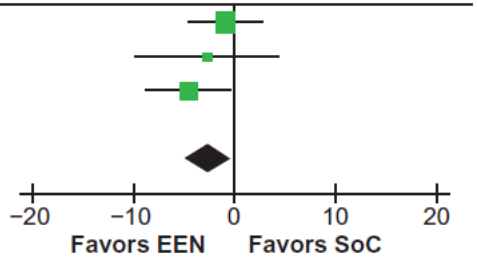


Figure 2 Meta-analysis of duration of mechanical ventilation: early enteral nutrition vs standard care.
Notes: Heterogeneity: $\chi^2 = 1.69$, $df = 2$ ($P = 0.43$); $I^2 = 0\%$. Test for overall effect: $Z = 1.91$ ($P = 0.06$).
Abbreviations: CI, confidence interval; EEN, early enteral nutrition; IV, inverse variance; SD, standard deviation; SoC, standard of care.

Trend towards reduced mechanical ventilation with early EN (2.49 days, P = 0.06)

Doig GS, Chevrou-Severac H and Simpson F. Early enteral nutrition in critical illness: A full economic analysis using US costs. *ClinicoEconomics and Outcomes Research* **2013**;5:429-436.

Early EN in Upper GI Sx: Indirect evidence

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- A Meta-analysis comparing RCT's of early feeding (within 24h) versus no feeding in patients undergoing gastrointestinal surgery.
- 13 studies, 1,173 patients

Lewis SJ, Andersen HK, Thomas S. Early enteral nutrition within 24 h of Intestinal Surgery versus later commencement of feeding: A systematic review and Meta-analysis. *J Gastrointest Surg* 2009;13:569-575.

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- Early feeding was not associated with any harms:
  - Wound infections (7.1% eEN vs 9.3%, p=0.26)
  - Anastomotic dehiscence (2.8% eEN vs 4.3%, p=0.27)
  - Pneumonia (2.3% eEN vs 3.3%, p=0.46)

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"There is no obvious benefit for keeping patients "nil by mouth" after gastrointestinal surgery"

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Summary

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Meta-analysis of all available trials demonstrate a significant reduction in mortality if EN is provided within 24 h of ICU admission.

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Meta-analysis of all available trials demonstrate a trend towards a reduction in mortality if EN is provided within 48h of ICU admission.

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Meta-analysis of all available trials demonstrate a trend towards a reduction in mortality if EN is provided within 48h of ICU admission.

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Indirect evidence from elective GI surgery patients demonstrates a significant reduction in mortality if EN is commenced on the same day as surgery (< 24 h).

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Pneumonia, gut dysfunction, duration of mechanical ventilation and ICU stay may also be reduced if EN is commenced within 24 h of ICU admission.

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How was early (< 24 h) EN initiation achieved?

Study	Patient population	Early EN intervention
Chiarelli 1990	Thermal injury (25% to 60% TBSA). No inhalational injury. Mean survival probability 0.73±0.10.	**Immediately after admission: 50 ml/h** 'homemade' EN (1900kcal/L and 79 g protein/L) via NGT increasing over 3-4 days. Goals set with **Curreri formula**. Rate did not exceed 150 ml/h.
Chuntrasakul 1996	Trauma (ISS > 20 and < 40). Mean ISS 29±1.5	**Immediately after resuscitation or surgery: 30 mls/h** ¾-strength EN (Traumacal™) via NGT, concentration increased over time. Goals estimated using **modified Harris-Benedict** equation. TPN was added if goals were not met.
Kompan 1999	Trauma (ISS > 25) Mean ISS 33.6±10 Mean APACHE II 11.5±5.8	**Immediately after resuscitation:** EN (Jevity™) **started at 20 ml/h** via NGT. Increased to 50% of estimated goal on Day 1, 75% of estimated goal on Day 2 and 100% of goal on Day 3. Estimated **goal was set at 25-35 nonprotein kcal/kg per day** and 0.2 – 0.3 g nitrogen / kg per day at 72 hours post ICU admission. TPN was added to meet estimated requirements.
Pupelis 2001	Severe pancreatitis and peritonitis Mean APACHE II 11.5±5.4	**Within 12 h of surgery:** EN (Nutrison Standard™ or Nutrison Pepti™) via NJT **started at 20-25ml/h**. Increase based in individual tolerance to **1 L per day** by Day 3 post-op. Patients also received an average of 500kcals/day from IV dextrose.
Kompan 2004	Trauma (ISS > 20). Mean APACHE II 11.3±4.8	**Immediately after resuscitation:** Same protocol as Kompan 1999 except goal set at an average of 25 nonprotein kcal/kg.
Nguyen 2008	Mechanically ventilated ICU patients APACHE II 22.4±1.2	**Within 24 h of admission:** EN via NGT at **40 ml/h** and increased by 20ml/h q6h to goal, if tolerated (aspirates <250mls). **Goal was determined by a dietitian**, based on patient's BMI.

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Doig GS, Heighes PT, Simpson F, Sweetman EA and Davies AR. Enteral nutrition within 24 h of ICU admission significantly reduces mortality: A meta-analysis of RCTs. *Intensive Care Medicine* 2009 Dec;35(Issue 12):2018-2027.

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Summary

Meta-analysis of all available trials demonstrate a significant reduction in mortality if EN is provided within 24 h of ICU admission.

Meta-analysis of all available trials demonstrate a trend towards a reduction in mortality if EN is provided within 48h of ICU admission.

There is no evidence of any mortality benefit if EN is commenced later than 48 h after ICU admission.

Indirect evidence from elective GI surgery patients demonstrates a significant reduction in mortality if EN is commenced on the same day as surgery (< 24 h).

Furthermore, pneumonia, gut dysfunction, duration of mechanical ventilation and ICU stay may also be reduced if EN is commenced within 24 h of ICU admission.

Commence EN as soon as shock is stabilised

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How early is early?

- Early EN defined as *within 24 hours* of injury or ICU admission

Research

Recherche

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

Abstract

Background: The provision of nutritional support for patients in intensive care units (ICUs) varies widely both within and between institutions. We tested the hypothesis that evidence-based algorithms to improve nutritional support in the ICU would improve patient outcomes.

Methods: A cluster-randomized controlled trial was performed in the ICUs of 11 community and 3 teaching hospitals between October 1997 and September 1998. Hospital ICUs were stratified by hospital type and randomized to the intervention or control arm. Patients at least 16 years of age with an expected ICU stay of at least 48 hours were enrolled in the study

If EN is preferable, starting sooner may be better. Data from the few animal and clinical studies on this topic support this hypothesis.[7] However, recent observational studies have documented low rates of "optimal" use of EN in the critical care setting.[8–10] EN is often started several days after admission, patients do not tolerate adequate amounts of EN, and PN is used excessively in some patients (up to 60% in some countries).[8–10] Using an audit of intensive care units (ICUs) in community and teaching hospitals, our Critical Care Research Network (CCR-Net) also documented delays in the institution of nutritional support that included both enteral and parenteral routes.[11] Several studies have

Martin CM, Doig GS, Heyland DK, Morrison T and Sibbald WJ. Multicentre, cluster randomized clinical trial of algorithms for critical care enteral and parenteral therapy (ACCEPT). *CMAJ* 2004;170(2):197-204.

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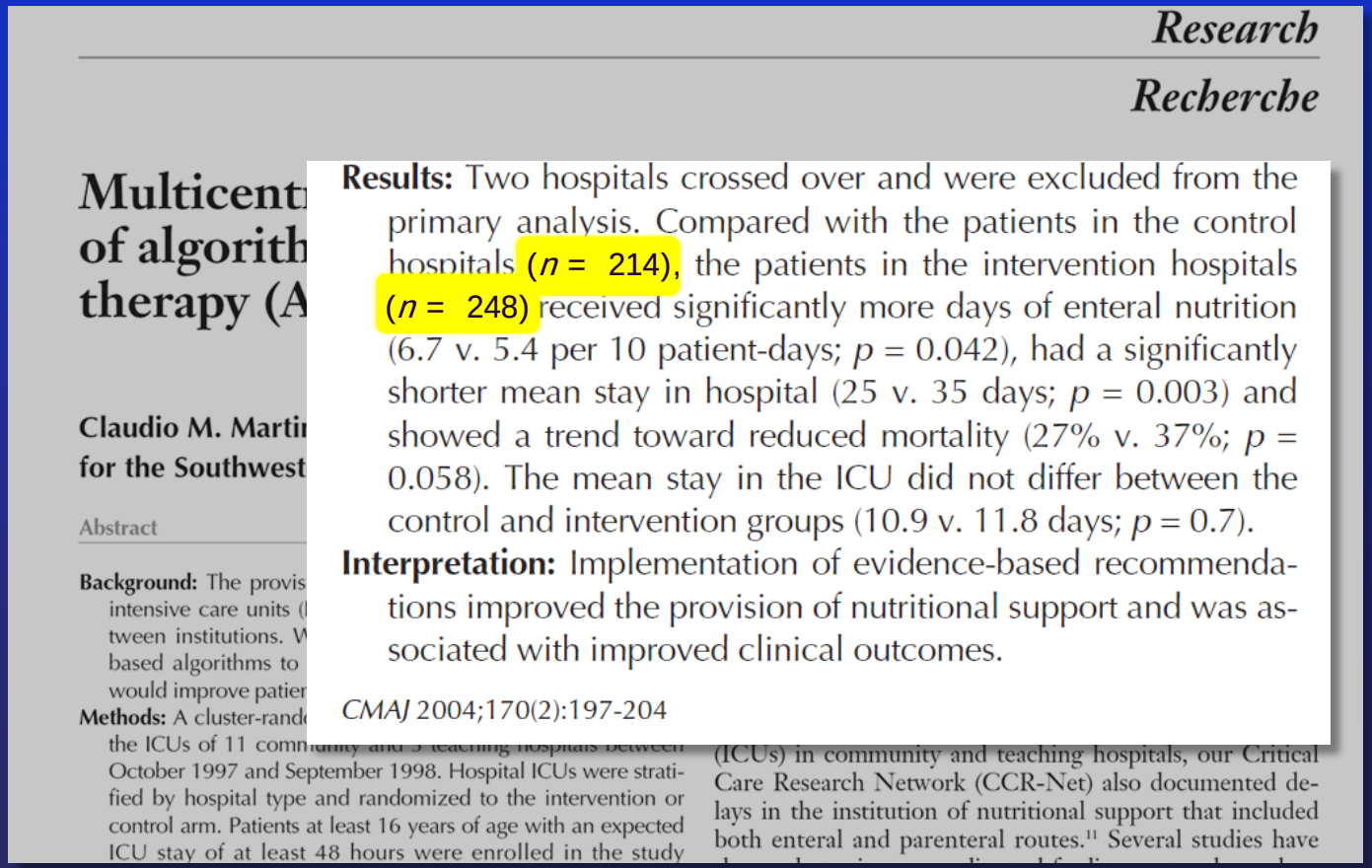

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Results: Two hospitals crossed over and were excluded from the primary analysis. Compared with the patients in the control hospitals (n = 214), the patients in the intervention hospitals (n = 248) received significantly more days of enteral nutrition (6.7 v. 5.4 per 10 patient-days; $p = 0.042$), had a significantly shorter mean stay in hospital (25 v. 35 days; $p = 0.003$) and showed a trend toward reduced mortality (27% v. 37%; $p = 0.058$). The mean stay in the ICU did not differ between the control and intervention groups (10.9 v. 11.8 days; $p = 0.7$).

Interpretation: Implementation of evidence-based recommendations improved the provision of nutritional support and was associated with improved clinical outcomes.

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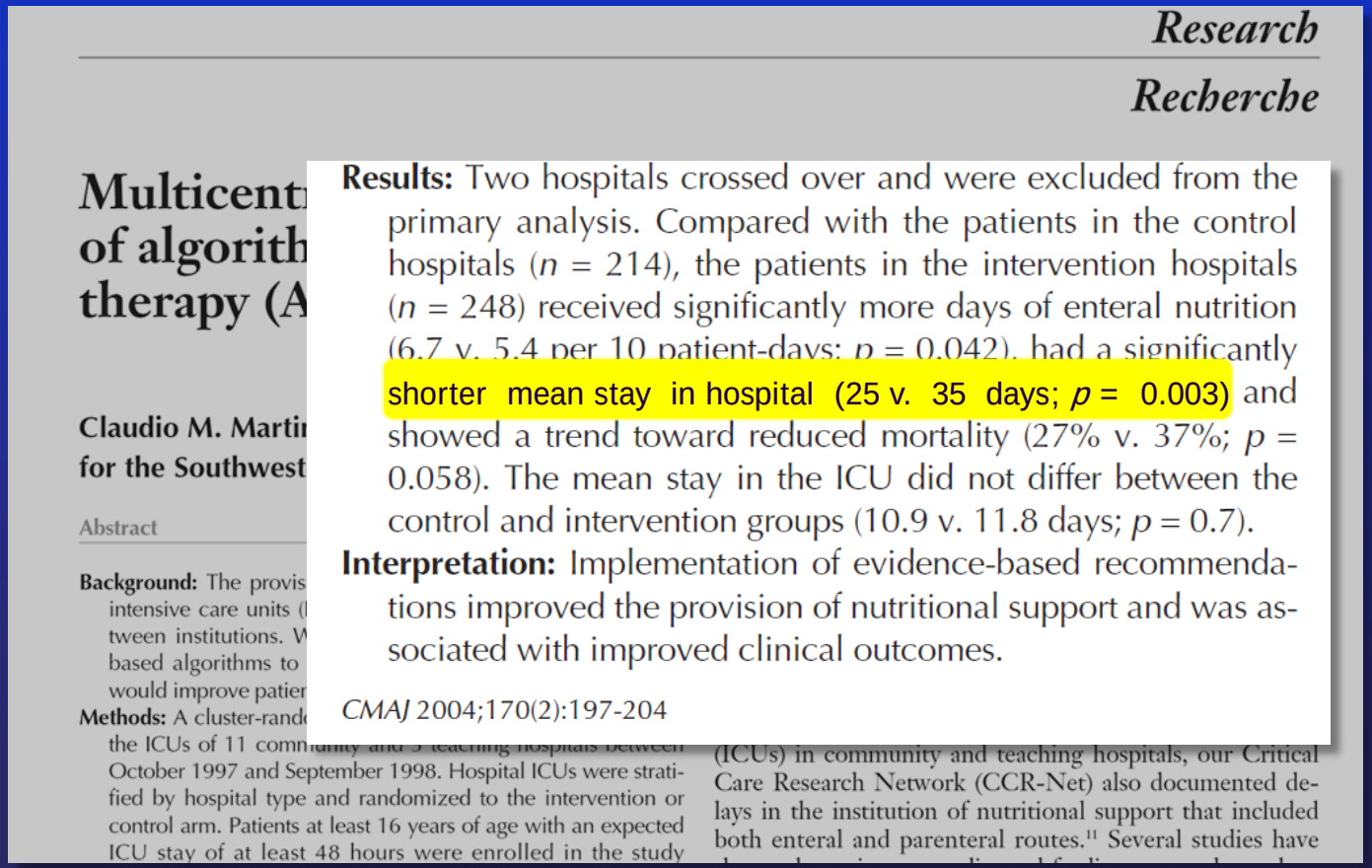

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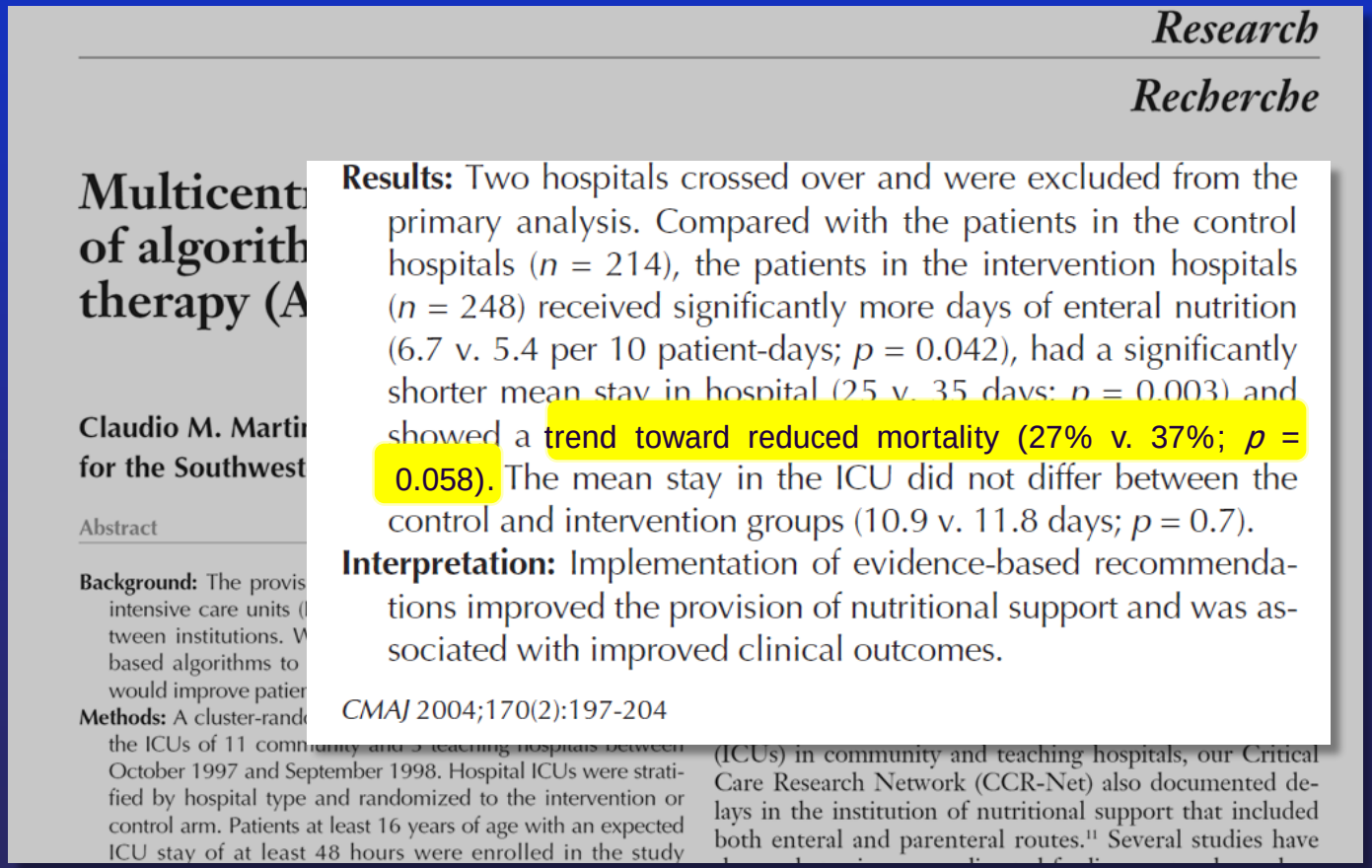

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