Total Parenteral Nutrition is . . .

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CardCow.com

Totally AWESOME!!!

Objectives

- History of TPN
- Dichotomies of Perception
- Pitfalls of TPN Studies
- Canadian Clinical Practice Guidelines
- The Surgical Patient
- Preoperative TPN
- Malnourishment
- Summary and Future Directions

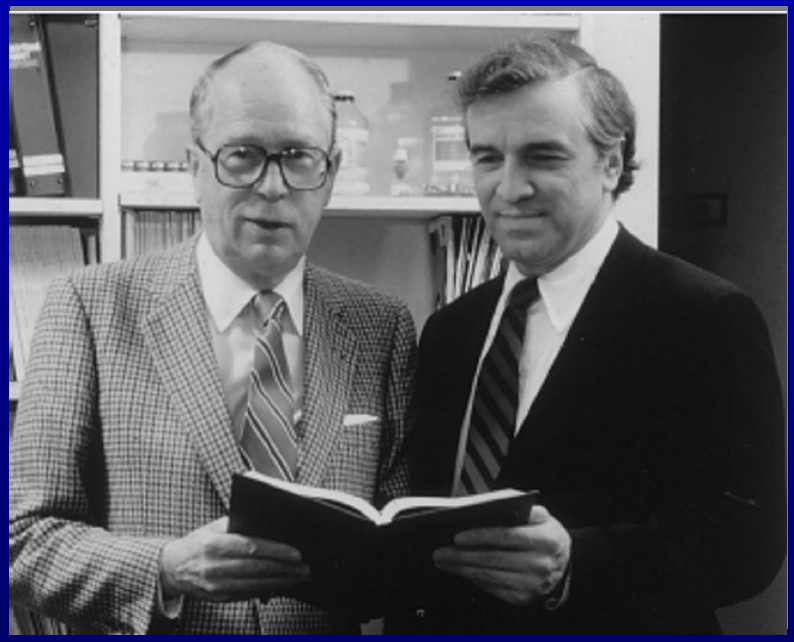
History of TPN

- William Harvey 1628 – Circulation
- Sir Christopher Wren 1665 – Wine, ale, opiates
- William Courten 1712 – Olive oil
- T. Latta 1831 – Water and salts during cholera
- Claude Bernard 1859 – Glucose and metabolism
- Edward Hodder 1873 – Milk
- Paul Friedrich 1904 – Subcutaneous nutrients

Vinnars E and Wilmore Dl. Journal of Parenteral and Enteral Nutrition 2003; 27(3): 225-231

History of TPN continued

- Whipple, Holman, Madden 1930's – protein
- Robert Elman 1937 – IV infusion of AA's
- Wretlind 1961 – Lipid emulsion
- Dudrick 1968 – SVC catheter delivery of "glucose system"



Vinnars E and Wilmore Dl. Journal of Parenteral and Enteral Nutrition 2003; 27(3): 225-231

General Indications

- Patients who can't eat
- Patients who won't eat
- Patients who shouldn't eat

"If the gut works, use it."

http://pharmacy.umkc.edu/New/pharm/Pharm377/Pharm377F06/TOTAL%20PARENTERAL%20NUTRITION.ppt

Dichotomies of Perception

TPN as a Therapy

- Chemical agent which affects living processes is a drug
- MDs and medical societies view TPN as therapy
- TPN is medical therapy for ill people

TPN as a Support

- Nutrition “natural” affects living processes (intrauterine PN)
- Nourishment is viewed by relatives as an act of love and care
- Nutrition is essential to both the ill and the healthy

What about tube feeds?

Bozzetti F. Clinical Nutrition 2009; xxx 1-6 (article in press)

Problems with TPN Studies

- No placebo controlled trials
- Those who truly need it cannot be randomized
- Diverse patient populations
- Hyperalimented patients
- Carbohydrates only as nutrition source
- Lack of proper glucose control
- Formulation changes

Braga M et al. Clinical Nutrition 2009; xxx 1-9 article in press

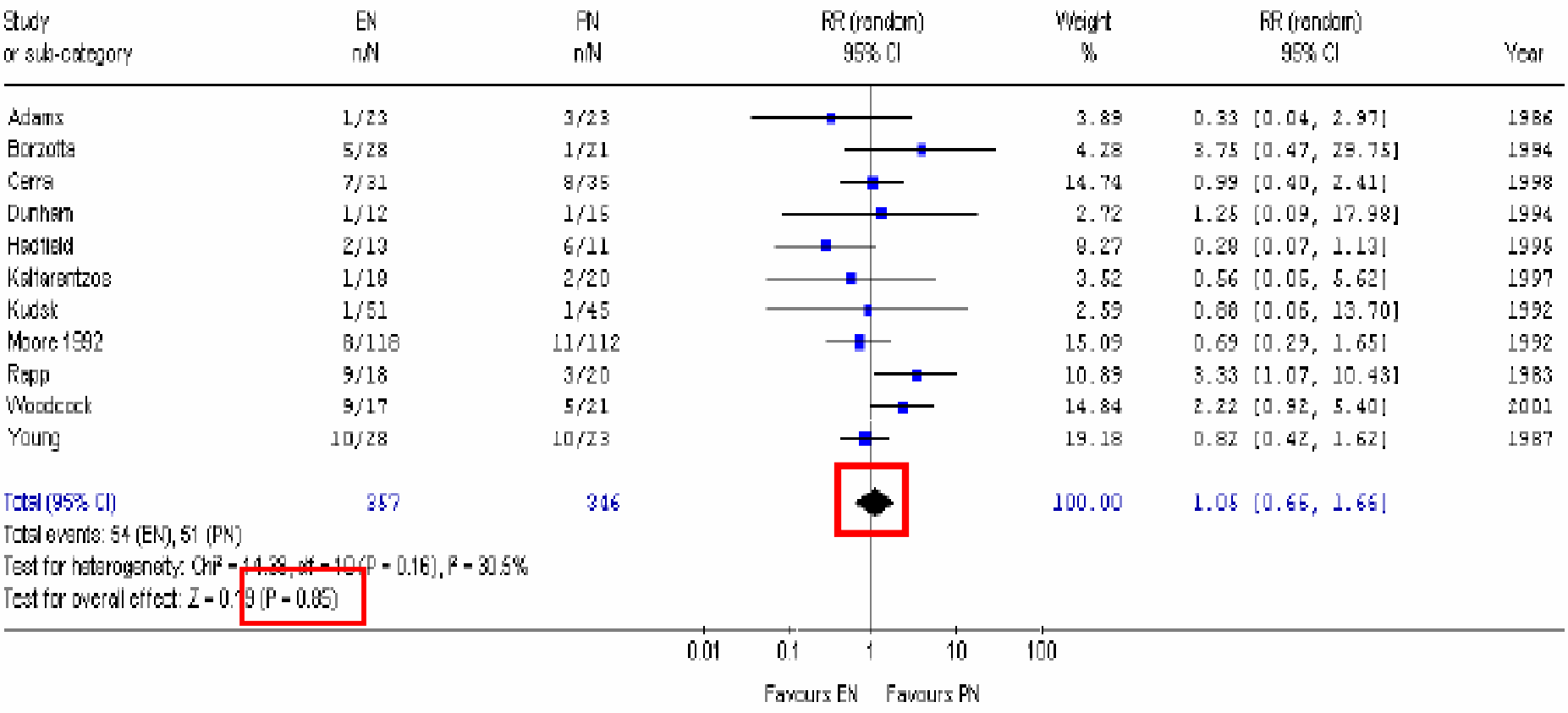
Canadian Clinical Practice Guidelines for Nutrition Support in the Mechanically Ventilated, Critically Ill Adult Patients

- Meta-analysis
- 12 level 2, one level 1 study
- EN vs PN is **NOT** associated with a reduction in mortality
- EN vs PN associated with fewer infectious complications
- No difference in LOS or ventilator days

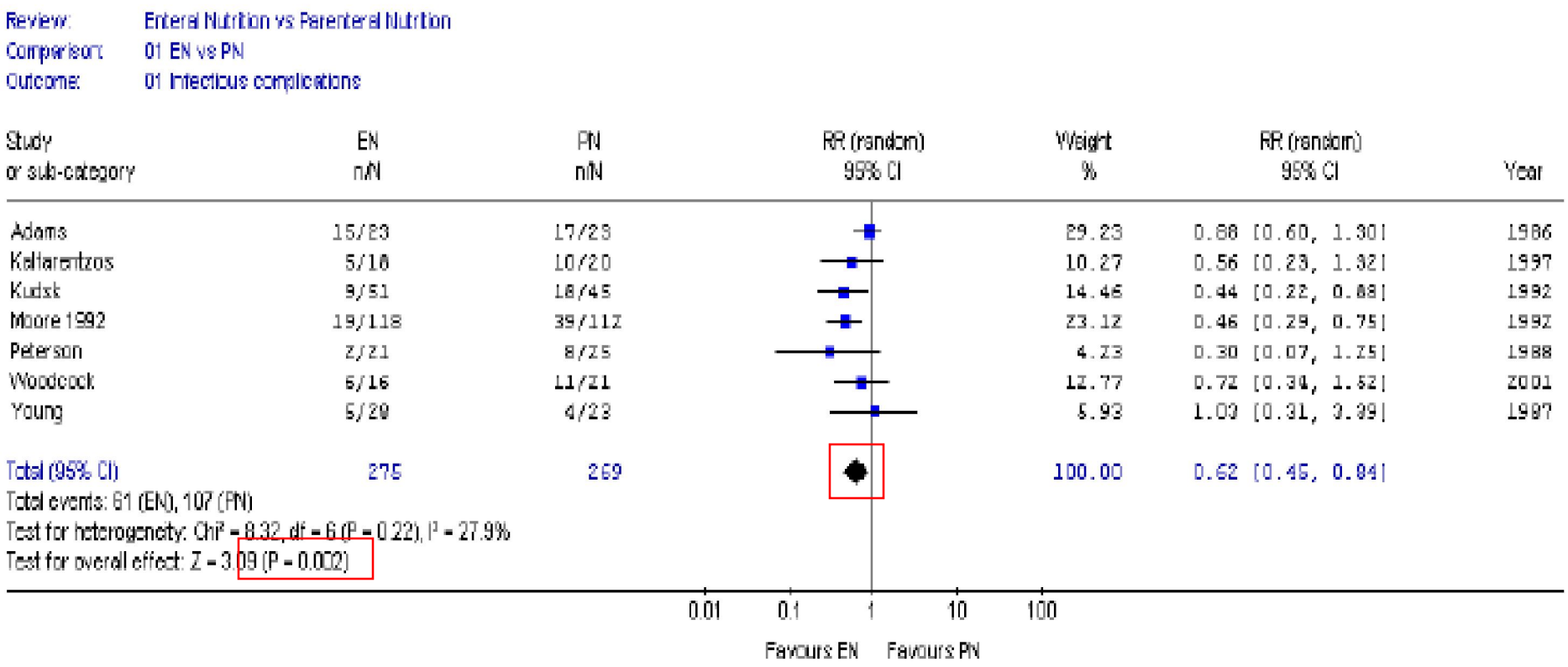
Heyland D. Journal of Parenteral and Enteral Nutrition 2003; 27 (5) 355-372
www.criticalcarenutrition.com

Mortality

Review: Enteral Nutrition vs Parenteral Nutrition
Comparison: 01 EN vs PN
Outcome: 02 Mortality



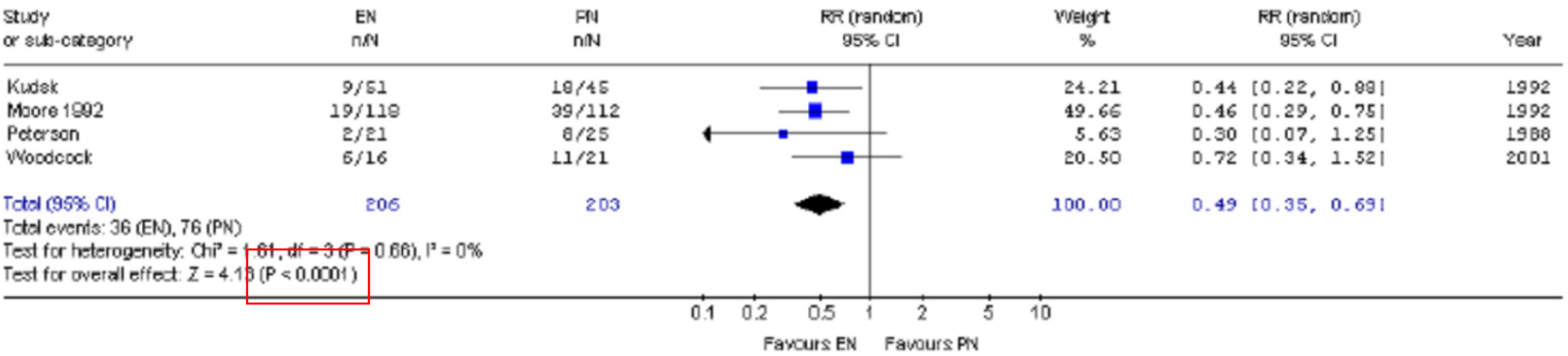
Infectious Complications



but wait a minute…

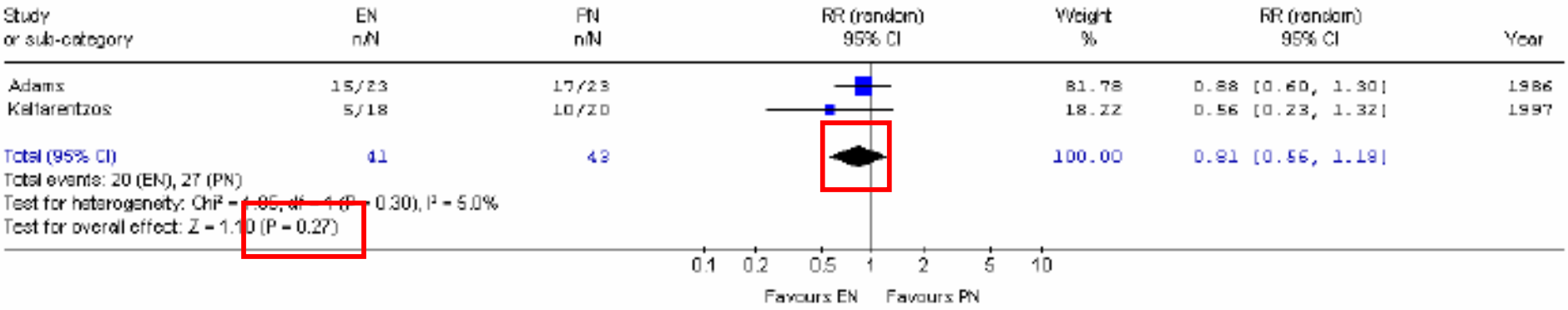
Infections in studies where the PN group received more calories than the EN group

Review: Enteral Nutrition vs Parenteral Nutrition
Comparison: 01 EN vs PN
Outcome: 01 Infectious complications



Infections in studies where the PN group received similar calories to the EN group

Review: Enteral Nutrition vs Parenteral Nutrition
Comparison: 01 EN vs PN
Outcome: 01 Infectious complications



What About the Surgical Patient?


ESPN

ESPEN

(European Society for Clinical Nutrition and Metabolism)

ESPEN Guidelines on Parenteral Nutrition: Surgery

- Preoperative TPN is indicated in severely undernourished patients who cannot be adequately orally or enterally fed
- Postoperative TPN is beneficial in undernourished patients in whom enteral nutrition is not feasible or tolerated
- Postoperative TPN is beneficial in patients with postoperative complications impairing GI function for at least 7 days

Braga M et al. Clinical Nutrition 2009; xxx 1-9 article in press

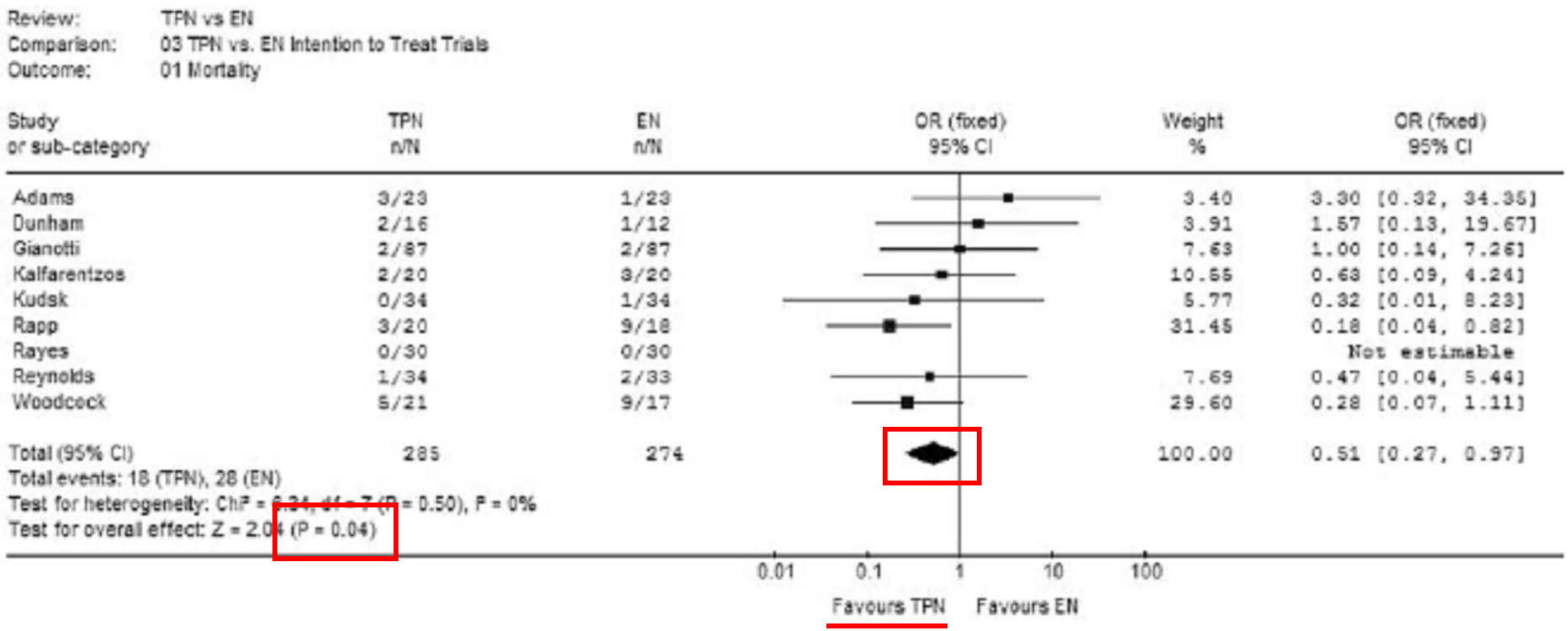
Parenteral vs Enteral Nutrition in the Critically Ill Patient: A Metaanalysis of Trials Using the Intention to Treat Principle

- 465 papers reviewed, 11 accepted
- 9 out of 11 trials had surgical patients
- PN vs early EN – NO Mortality difference (p=0.89)
- PN vs late EN – **Favored PN** (p=0.006)
- PN associated with more infectious complications (p<0.05)

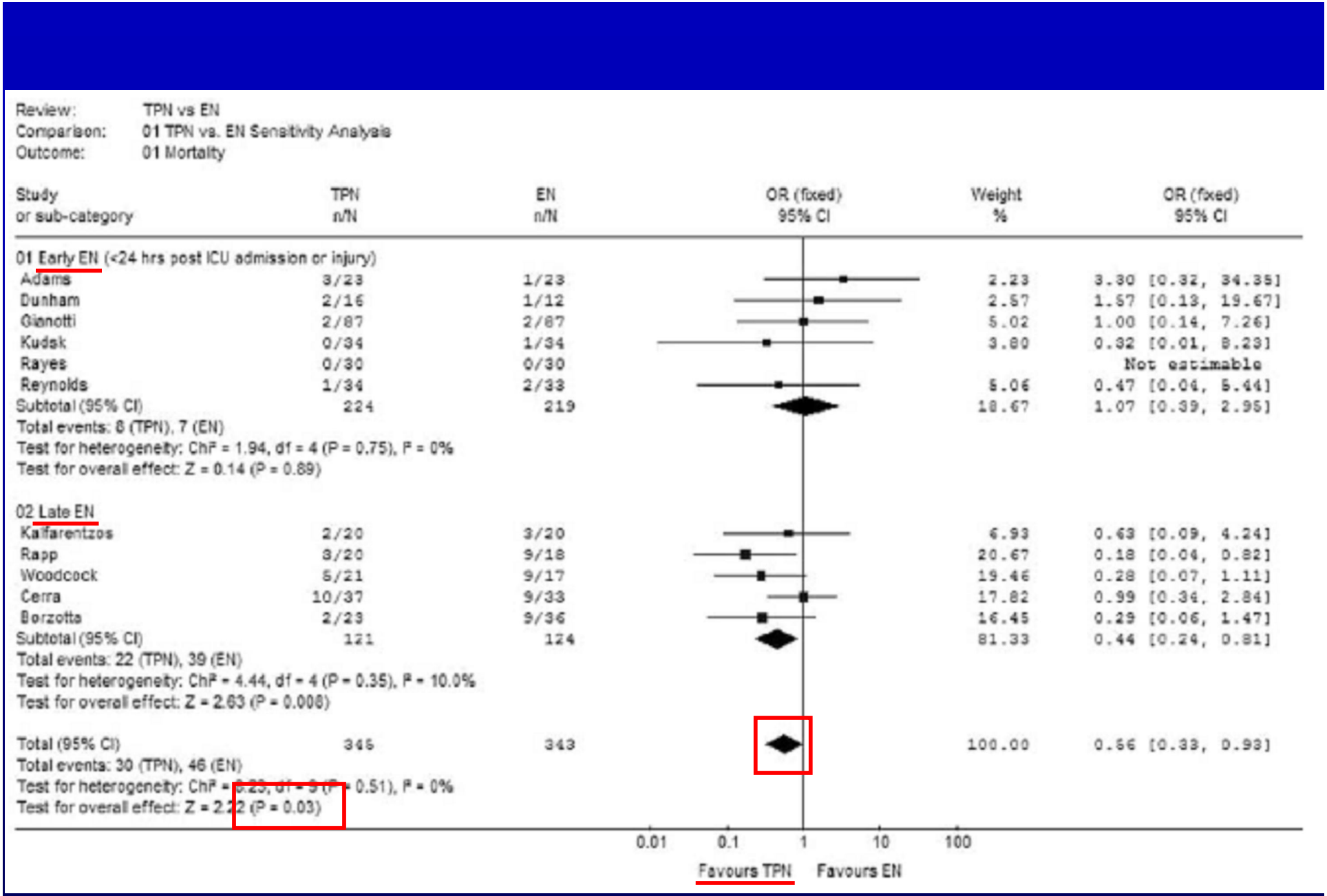
"Clinical importance of this finding is open to interpretation"

Simpson F. Intensive Care Medicine 2005; 31:12-23

Mortality



Simpson F. Intensive Care Medicine 2005; 31:12-23



Simpson F. Intensive Care Medicine 2005; 31:12-23

Grade B+ Evidence-Based Recommendation:

Parenteral nutrition use in patients in whom enteral nutrition cannot be initiated within 24-hours of ICU admission or injury

Simpson F. Intensive Care Medicine 2005; 31:12-23

Perioperative Total Parenteral Nutrition in Malnourished, Gastrointestinal Cancer Patients

- Randomized control trial
- 90 patients with gastric or colorectal carcinoma
- >10% wt loss in past 6 months, elective operation
- 2 groups:
  - 1- TPN (10 days pre op + 9 days post op)
  - 2- Standard diet with parenteral solution (940 kcal nonprotein, 85 g AA)
- Equally matched in demographics

Bozzeti F et al. Journal of Parenteral and Enteral Nutrition 2000; 24 (1): 7-14

Results

	TPN	Control	Statistics
Overall Complications	**37%**	**57%**	**p = 0.03**
Infectious Complications	33%	45%	p = 0.22
Mortality	**0%**	**10%**	**p = 0.05**

- No line infections
- Length of post-operative hospital stay same (p=0.98)

Bozzeti F et al. Journal of Parenteral and Enteral Nutrition 2000; 24 (1): 7-14

Degree of Undernourishment?

- Von Meyenfeldt et al. 1992[1]

  Decrease in septic complications from 18.8% to 5.5% ($p < 0.05$) in 29 patients with weight loss >10%

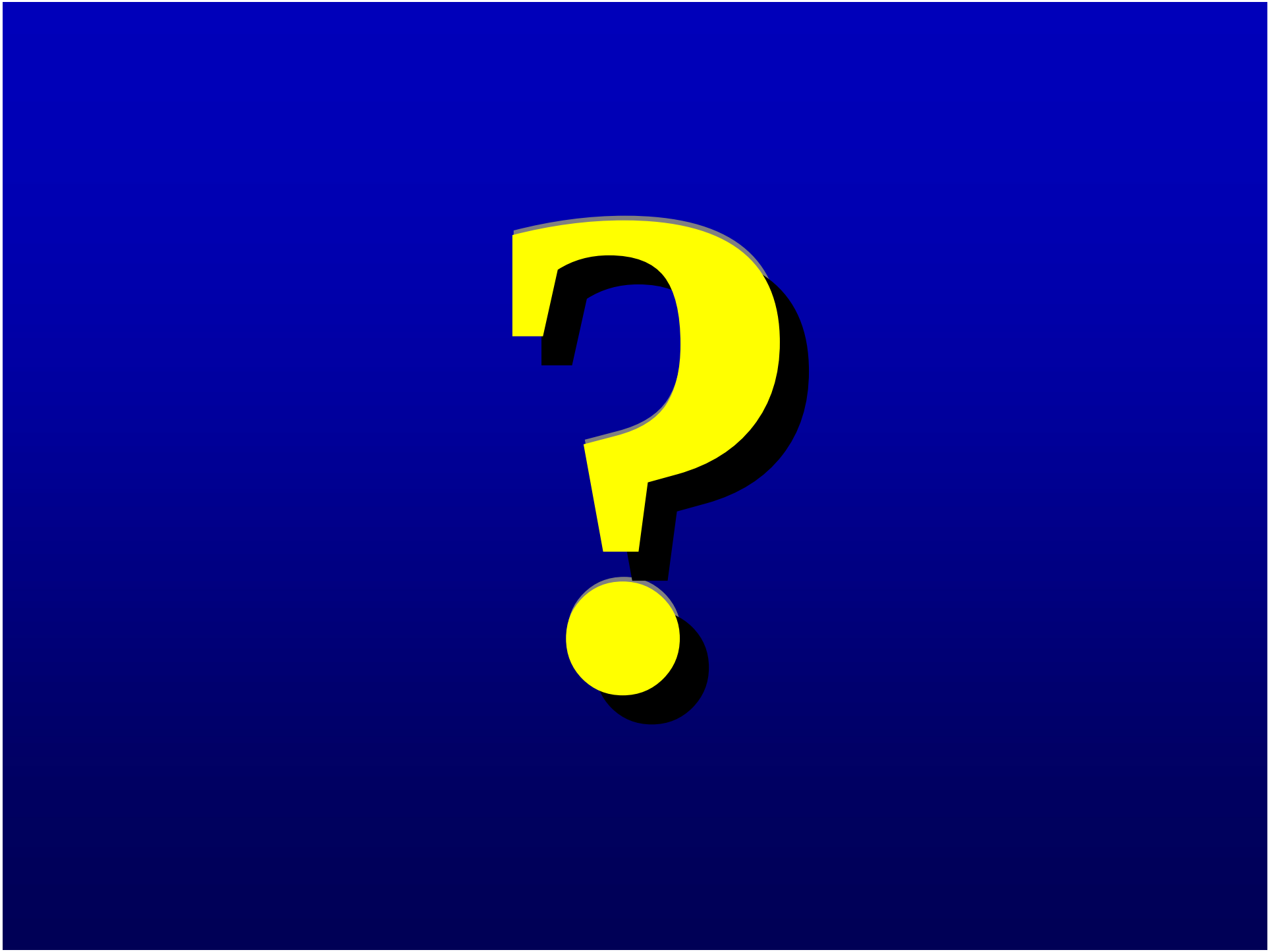
- Veterans Affairs TPN Cooperative Study[2]

  Decrease in noninfectious complications from 42.9% to 5.3% ($p = 0.03$) in 33 severely undernourished patients

1-Von Meyenfeldt et al. Clinical Nutrition. 1992; 11: 180-186
2-The Veteran Affairs Total Parenteral Nutrition Cooperative Study Group. The New England Journal of Medicine. 1991; 325(8): 525-532

Is there an ideal BMI/nutrition status for TPN?

Which Patient is Malnourished?



Future Directions

- "Optimal candidate"
- Glutamine
- Omega-3 fatty acids
- Zinc
- Selenium
- Lipid Delivery
- Insulin and glucose control

Summary

- TPN plays a critical role in surgical patients
- When the gut does not work…
- No mortality difference
- How significant are the infections?
- Undernourished benefit the most
- Nutrition is NOT an after thought

References

1. The Veteran Affairs Total Parenteral Nutrition Cooperative Study Group. *The New England Journal of Medicine* 1991; 325(8): 525-532.
2. Bozzetti, F, Gavazzi, C, Miceli, R, et al. Perioperative Total Parenteral Nutrition in Malnourished, Gastrointestinal Cancer Patients: A Randomized, Clinical Trial. *Journal of Parenteral and Enteral Nutrition* 2000; 24(1):7-14.
3. Bozzetti, F, Forbes, A. The ESPEN clinical practice guidelines on Parenteral Nutrition: Present status and perspectives for future research. *Clinical Nutrition* 2009; xxx 1-6.
4. Braga, M, Ljungqvist, O, Soeters, P, et al. ESPEN Guidelines on Parenteral Nutrition: Surgery. *Clinical Nutrition* 2009; xxx 1-9.
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6. Simpson, F, Doig, G. Parenteral vs. enteral nutrition in the critically ill patient: a meta-analysis of trials using the intention to treat principle. *Intensive Care Medicine* 2005; 31:12-23.
7. Vinnars, E, Wilmore, D. History of Parenteral Nutrition. *Journal of Parenteral and Enteral Nutrition* 2003; 27(3):225-231.
8. Von Meyenfeldt, M,Meijerink, J, Rouflart, M, et al. Perioperative nutritional support: a randomised clinical trial. *Clinical Nutrition* 1992; 11:180-186.