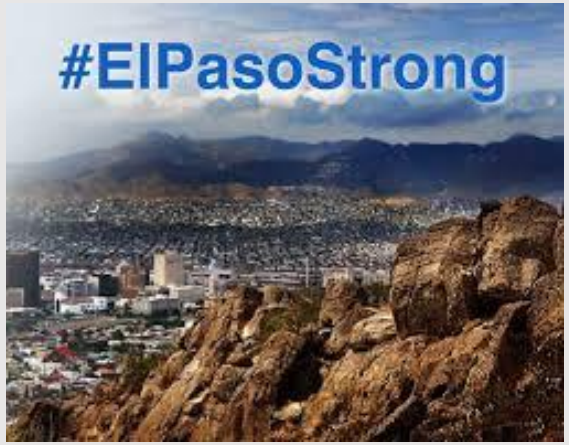
NUTRITIONAL SUPPORT OF THE TRAUMA PATIENT



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Trauma Medical Director

TEXAS TECH UNIVERSITY
HEALTH SCIENCES CENTER™
at El Paso

UNIVERSITY
MEDICAL CENTER
OF EL PASO

KEY POINTS

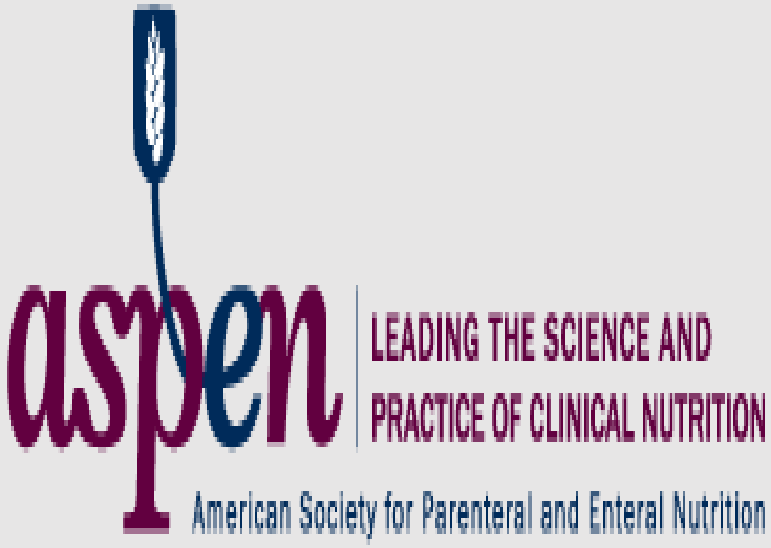
- Nutritional assessment on ICU admission
  - Energy requirements
  - Protein requirements
- Initiate enteral nutrition (EN) 24-48 hours after admission.
  - Reach goal < a week from admission (preferably much sooner)
- Take steps to reduce aspiration risk and improve tolerance to feeding.
- Do NOT us gastric residual volumes to monitor patients on EN.

FEED the GUT!

FEED the GUT!

FEED the GUT!

(I hate TPN!)

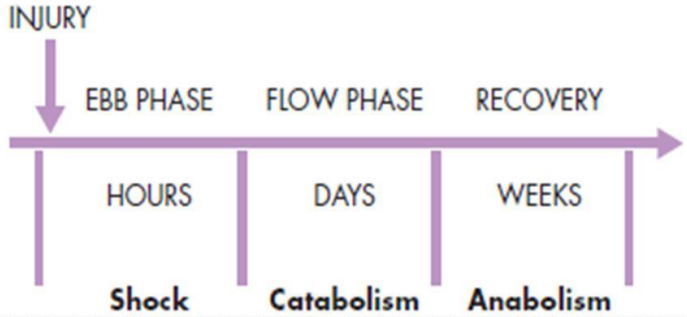

aspen
LEADING THE SCIENCE AND
PRACTICE OF CLINICAL NUTRITION
American Society for Parenteral and Enteral Nutrition

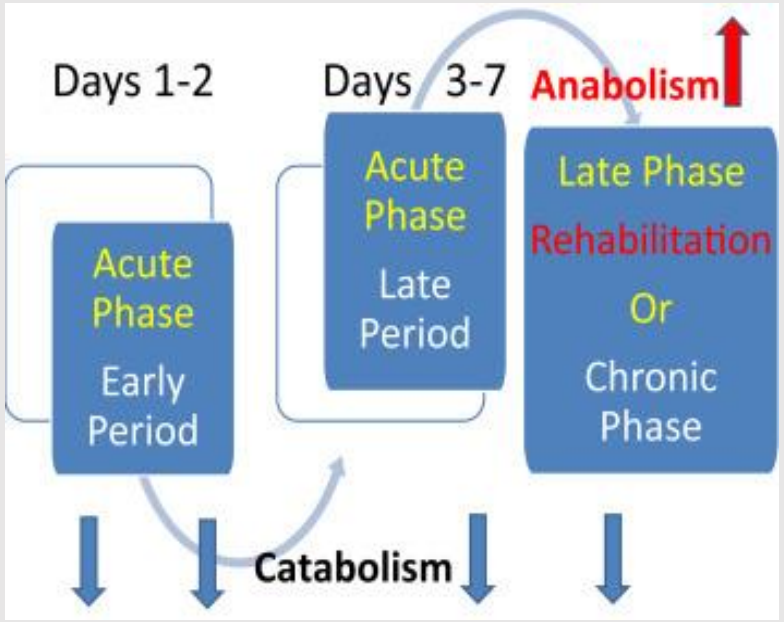

Society of
Critical Care Medicine
The Intensive Care Professionals

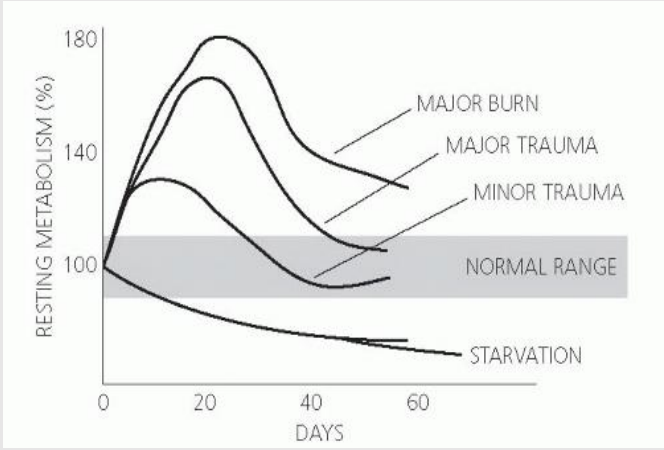

ESPEN
The European Society for
Clinical Nutrition and Metabolism

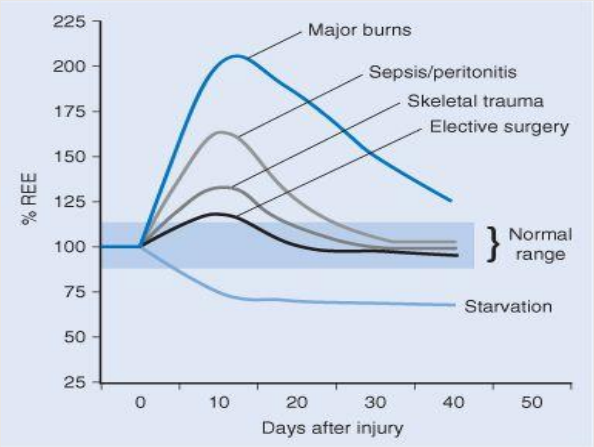
METABOLIC RESPONSE

In 1930, Sir David Cuthbertson divided the metabolic response to injury in humans into 'ebb' and 'flow' phases :

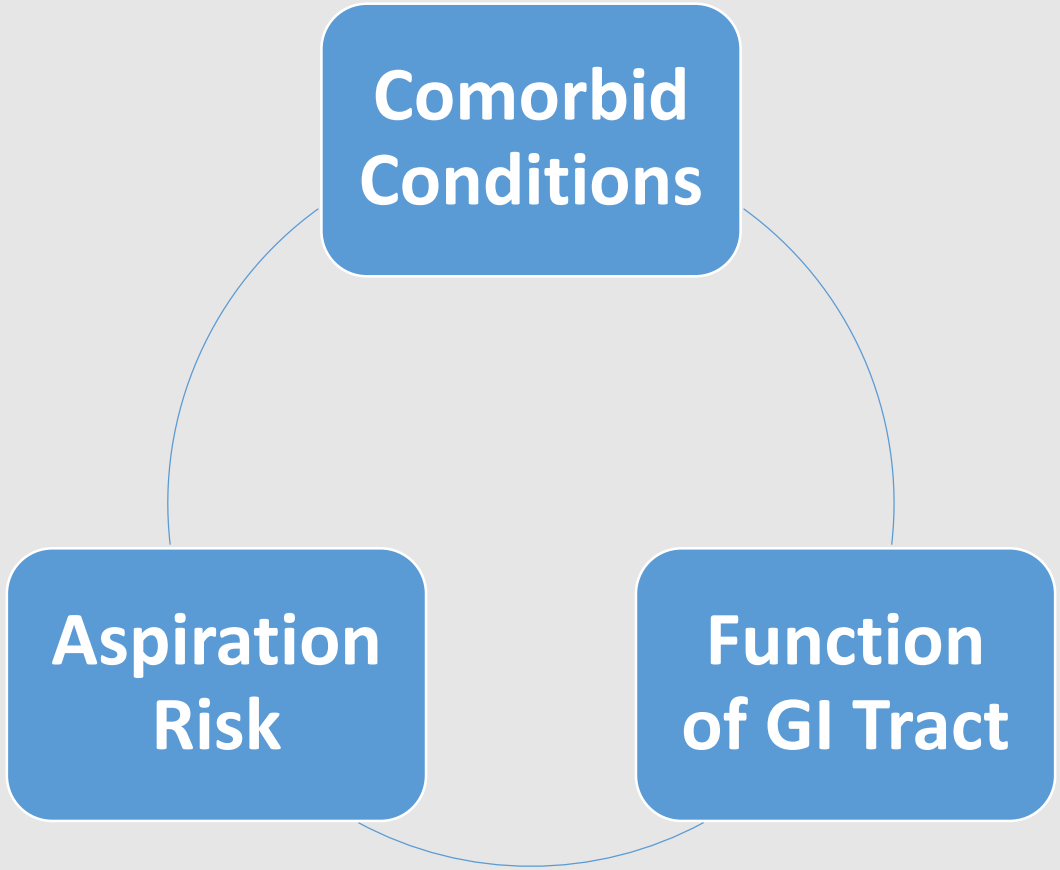








NUTRITIONAL ASSESSMENT



DO NOT USE

Traditional Serum Markers

24-hour Urine Urea Nitrogen

BEST TEST

Indirect Calorimetry

POTENTIAL

CT Scan

Ultrasound

PATIENT ASSESSMENT

- Patient history
- Physical exam
- Anthropometrics
  - Height
  - Weight (ideal & dry)
  - BMI
- Usual labs

Critical Care Nutrition
www.criticalcarenutrition.com

NUTRIC Score[1]

The NUTRIC Score is designed to quantify the risk of critically ill patients developing adverse events that may be modified by aggressive nutrition therapy. The score, of 1-10, is based on 6 variables that are explained below in Table 1. The scoring system is shown in Tables 2 and 3.

Table 1: NUTRIC Score variables

Variable	Range	Points
Age	<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
Number of Co-morbidities	0-1	0
	≥2	1
Days from hospital to ICU admission	0 - <1	0
	≥1	1
IL-6	0 - <400	0
	≥ 400	1

Table 2: NUTRIC Score scoring system: if IL-6 available

Sum of points	Category	Explanation
6-10	High Score	➢ Associated with worse clinical outcomes (mortality, ventilation). ➢ These patients are the most likely to benefit from aggressive nutrition therapy.
0-5	Low Score	➢ These patients have a low malnutrition risk.

Table 3. NUTRIC Score scoring system: If no IL-6 available*

Sum of points	Category	Explanation
5-9	High Score	➢ Associated with worse clinical outcomes (mortality, ventilation). ➢ These patients are the most likely to benefit from aggressive nutrition therapy.
0-4	Low Score	➢ These patients have a low malnutrition risk.

*It is acceptable to not include IL-6 data when it is not routinely available; it was shown to contribute very little to the overall prediction of the NUTRIC score.[2]

[1] Heyland DK, Dhaliwal R, Jiang X, Day AG. Identifying critically ill patients who benefit the most from nutrition therapy: the development and initial validation of a novel risk assessment tool. Critical Care. 2011;15(6):R268.
[2] Rahman A, Hasan RM, Agarwala R, Martin C, Day AG, Heyland DK. Identifying critically-ill patients who will benefit most from nutritional therapy: Further validation of the "modified NUTRIC" nutritional risk assessment tool. Clin Nutr. 2015. [Epub ahead of print]

December 16th 2015

	Nutritional status	Disease/surgery severity	Age
0	Normal	Normal	<70
1	Weight loss >5%/3 months **or** Food intake <75%	Includes chronic disease, hip fracture, cancer, minor surgery	≥70
2	Weight loss >5%/2 months **or** Food intake <50% **or** BMI 18.5-20.5	Includes major surgery, myocardial infarction, pneumonia, lymphoma, leukemia	
3	Weight loss >5%/1 month (or >15%/3 months) **or** Food intake <25% **or** BMI <18.5	Includes head trauma, transplantation, intensive care patients	

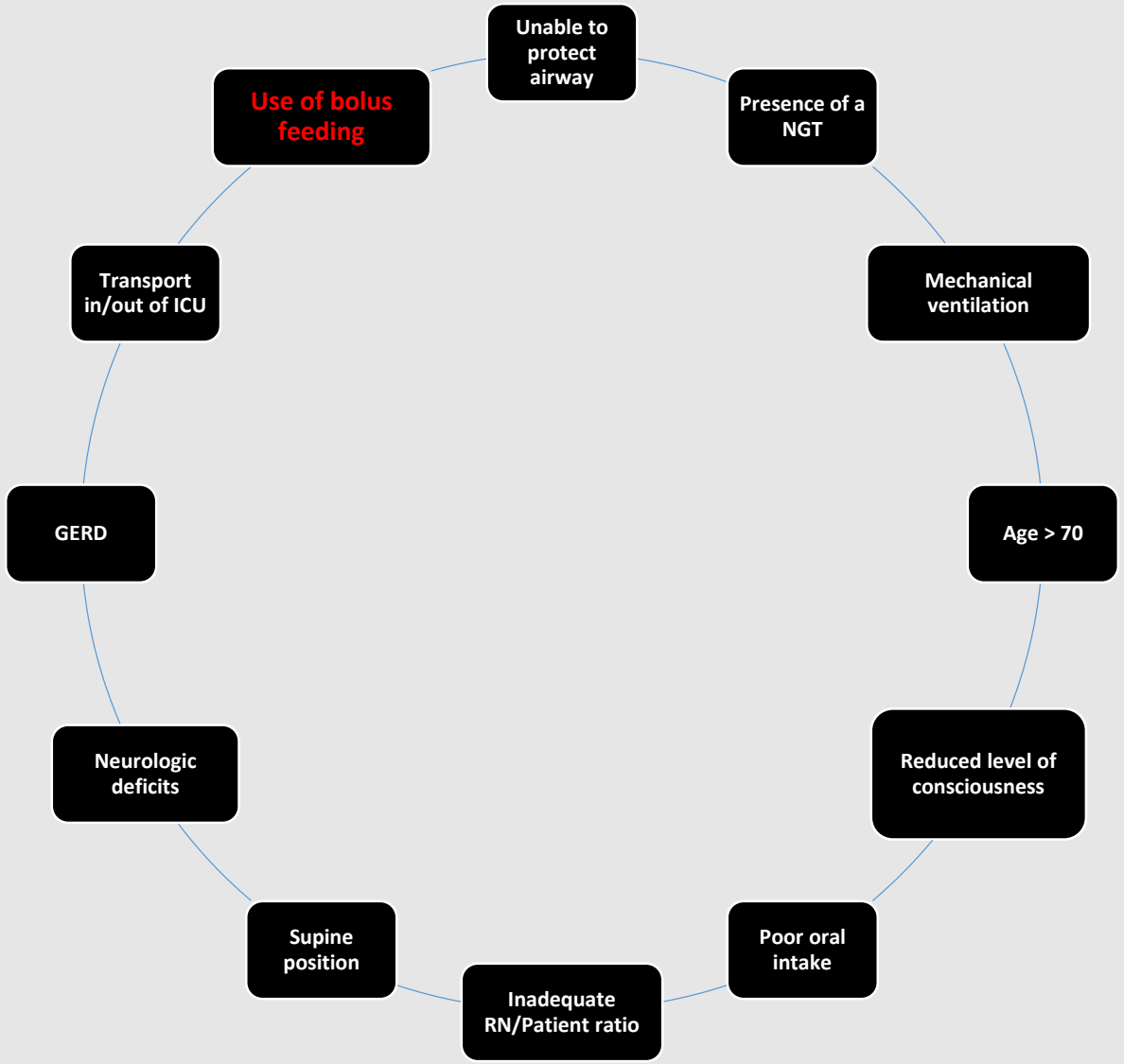
BMI: body mass index. The Nutritional Risk Score (NRS) is calculated by adding 3 different components: nutritional status + disease/surgery severity + age. Only the more severe contribution to the overall score of each of these 3 elements is considered in the overall score.

ESPEN RECOMMENDATIONS

- **Predicted ICU stay > 2 days.**
- **Mechanical ventilation**
- **Active infection**
- **Underfed > 5 days**
- **Presenting with a severe chronic disease**

"Medical nutrition therapy shall be considered for all patients staying in the ICU, mainly for more than 48 hours."

ASPIRATION RISKS



NUTRITIONAL SUPPORT
Inadequacy

- **< 50% of patients reach their target goal of energy intake.**
- **We provide only 60%-80% of energy requirements.**
- **Patients receive ~80% of what is prescribed.**
- **Feeding is held for too long and for inappropriate reasons**

INITIATION OF NUTRITIONAL SUPPORT

- Calculate energy requirements: 25-30 kcal/kg/day
- Protein Provision: 1.2-2.0 g/kg/day (more for major trauma & burns)
  - ESPEN: 1.3 g/kg/day
- Start tube feeds at 20cc/hr and increase by 10cc/hr every 4-6 hours until goal (conservative approach)
- Provide free water at 30cc/kg (NS if TBI)
  - Enteral nutrition is ~85% water

SPECIAL POPULATIONS
Renal Failure

- Standard enteral formula
- Use dry weight for calculation
- Energy provision: 25-30 kcal/kg/day
- Protein provision: 1.2-2 g/kg actual body weight
- Hemodialysis or CRRT:
  - Increase protein to 2.5 g/kg/day

SPECIAL POPULATIONS
Hepatic Failure

- **Use dry weight to determine energy and protein requirements in those with cirrhosis and hepatic failure.**
- **Avoid restricting protein.**
- **Standard enteral formula.**
  - **Branched-chain amino acid formulas had no effect on coma grade**

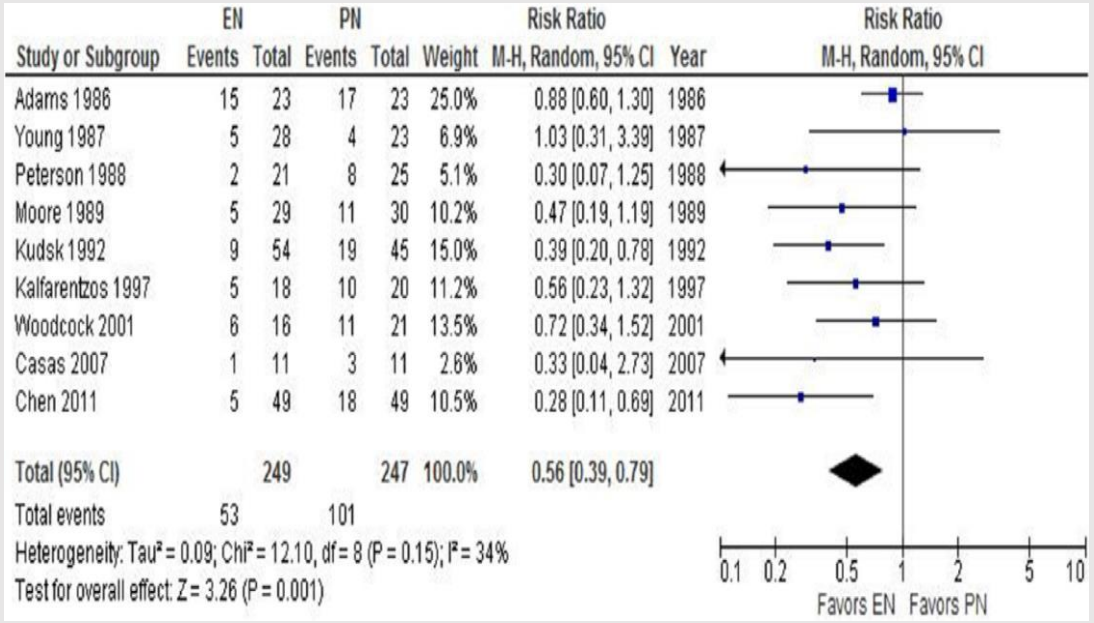
RATIONAL OF ENTERAL VERSUS PARENTERAL NUTRITION

- **Reduction of infectious morbidity:**
  - **Pneumonia**
  - **CAUTI**
  - **Abdominal abscess (trauma)**
- **Reduced ICU LOS.**
- **Minimal impact on mortality.**

ENTERAL VERSUS PARENTERAL NUTRITION

Infectious Complications

ASPEN

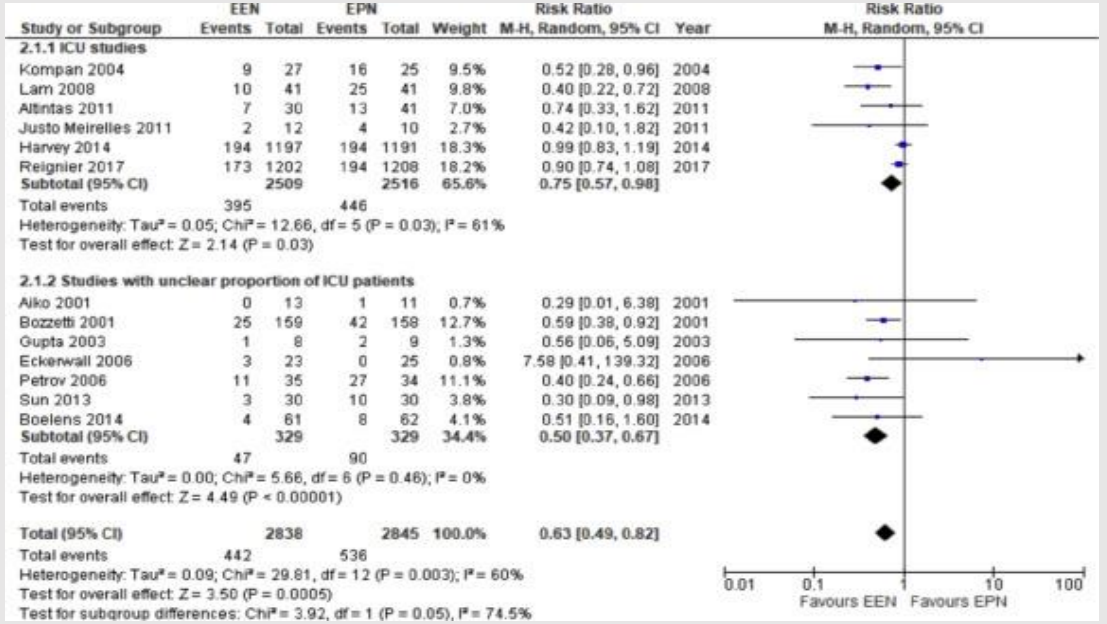


Study or Subgroup	EN Events	EN Total	PN Events	PN Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Adams 1986	15	23	17	23	25.0%	0.88 [0.60, 1.30]	1986
Young 1987	5	28	4	23	6.9%	1.03 [0.31, 3.39]	1987
Peterson 1988	2	21	8	25	5.1%	0.30 [0.07, 1.25]	1988
Moore 1989	5	29	11	30	10.2%	0.47 [0.19, 1.19]	1989
Kudsk 1992	9	54	19	45	15.0%	0.39 [0.20, 0.78]	1992
Kalfarentzos 1997	5	18	10	20	11.2%	0.56 [0.23, 1.32]	1997
Woodcock 2001	6	16	11	21	13.5%	0.72 [0.34, 1.52]	2001
Casas 2007	1	11	3	11	2.6%	0.33 [0.04, 2.73]	2007
Chen 2011	5	49	18	49	10.5%	0.28 [0.11, 0.69]	2011
Total (95% CI)		249		247	100.0%	0.56 [0.39, 0.79]	
Total events	53		101				

Heterogeneity: Tau² = 0.09; Chi² = 12.10, df = 8 (P = 0.15); I² = 34%
Test for overall effect: Z = 3.26 (P = 0.001)

Risk Ratio M-H, Random, 95% CI
0.1 0.2 0.5 1 2 5 10
Favors EN Favors PN

ESPEN



Study or Subgroup	EEN Events	EEN Total	EPN Events	EPN Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
2.1.1 ICU studies							
Kompan 2004	9	27	16	25	9.5%	0.52 [0.28, 0.96]	2004
Lam 2008	10	41	25	41	9.8%	0.40 [0.22, 0.72]	2008
Altintas 2011	7	30	13	41	7.0%	0.74 [0.33, 1.62]	2011
Justo Meirelles 2011	2	12	4	10	2.7%	0.42 [0.10, 1.82]	2011
Harvey 2014	194	1197	194	1191	18.3%	0.99 [0.83, 1.19]	2014
Reignier 2017	173	1202	194	1208	18.2%	0.90 [0.74, 1.08]	2017
Subtotal (95% CI)		**2509**		**2516**	**65.6%**	**0.75 [0.57, 0.98]**	
Total events	395		446				
Heterogeneity: Tau² = 0.05; Chi² = 12.66, df = 5 (P = 0.03); I² = 61%							
Test for overall effect: Z = 2.14 (P = 0.03)							
2.1.2 Studies with unclear proportion of ICU patients							
Aiko 2001	0	13	1	11	0.7%	0.29 [0.01, 6.38]	2001
Bozzetti 2001	25	159	42	158	12.7%	0.59 [0.38, 0.92]	2001
Gupta 2003	1	8	2	9	1.3%	0.56 [0.06, 5.09]	2003
Eckerwall 2006	3	23	0	25	0.8%	7.58 [0.41, 139.32]	2006
Petrov 2006	11	35	27	34	11.1%	0.40 [0.24, 0.66]	2006
Sun 2013	3	30	10	30	3.8%	0.30 [0.09, 0.98]	2013
Boelens 2014	4	61	8	62	4.1%	0.51 [0.16, 1.60]	2014
Subtotal (95% CI)		**329**		**329**	**34.4%**	**0.50 [0.37, 0.67]**	
Total events	47		90				
Heterogeneity: Tau² = 0.00; Chi² = 5.66, df = 6 (P = 0.46); I² = 0%							
Test for overall effect: Z = 4.49 (P < 0.00001)							
Total (95% CI)		**2838**		**2845**	**100.0%**	**0.63 [0.49, 0.82]**	
Total events	442		536				
Heterogeneity: Tau² = 0.09; Chi² = 29.81, df = 12 (P = 0.003); I² = 60%							
Test for overall effect: Z = 3.50 (P = 0.0005)							
Test for subgroup differences: Chi² = 3.92, df = 1 (P = 0.05), I² = 74.5%							

Risk Ratio M-H, Random, 95% CI
0.01 0.1 1 10 100
Favours EEN Favours EPN

INITIATION OF ENTERAL NUTRITION
(24 - 48 Hours)

RATIONALE

- Supports intestinal integrity.
- Stimulates intestinal blood flow.
- Induces release of trophic agents.
- Supports immunocytes.

KEY POINTS

- Presence of bowel sounds is NOT required.
- Do NOT wait for flatus or bowel movement.

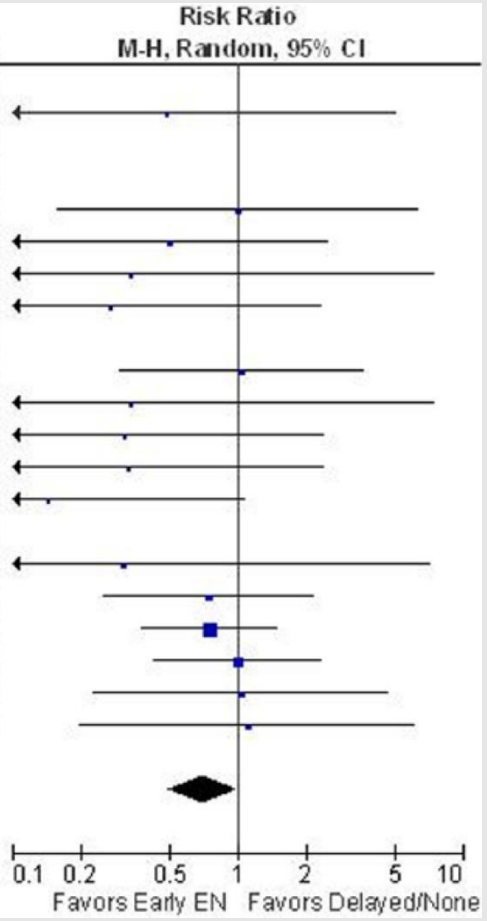
EARLY VERSUS DELAYED ENTERAL NUTRITIONAL SUPPORT

Mortality

Study or Subgroup	Early EN Events	Early EN Total	Delayed/None Events	Delayed/None Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Sagar 1979	0	15	0	15		Not estimable	1979
Moore 1986	1	32	2	31	2.3%	0.48 [0.05, 5.07]	1986
Chiarelli 1990	0	10	0	10		Not estimable	1990
Schroeder 1991	0	16	0	16		Not estimable	1991
Eyer 1993	2	19	2	19	3.7%	1.00 [0.16, 6.38]	1993
Beier-Holgersen 1996	2	30	4	30	4.9%	0.50 [0.10, 2.53]	1996
Carr 1996	0	14	1	14	1.3%	0.33 [0.01, 7.55]	1996
Chuntrasakul 1996	1	21	3	17	2.7%	0.27 [0.03, 2.37]	1996
Watters 1997	0	14	0	14		Not estimable	1997
Singh 1998	4	21	4	22	8.2%	1.05 [0.30, 3.66]	1998
Kompan 1999	0	14	1	14	1.3%	0.33 [0.01, 7.55]	1999
Minard 2000	1	12	4	15	3.0%	0.31 [0.04, 2.44]	2000
Pupelis 2000	1	11	5	18	3.2%	0.33 [0.04, 2.45]	2000
Pupelis 2001	1	30	7	30	3.1%	0.14 [0.02, 1.09]	2001
Dvorak 2004	0	7	0	10		Not estimable	2004
Kompan 2004	0	27	1	25	1.3%	0.31 [0.01, 7.26]	2004
Peck 2004	4	14	5	13	11.0%	0.74 [0.25, 2.18]	2004
Malhotra 2004	12	100	16	100	26.5%	0.75 [0.37, 1.50]	2004
Nguyen 2008	6	14	6	14	17.5%	1.00 [0.43, 2.35]	2008
Moses 2009	3	29	3	30	5.6%	1.03 [0.23, 4.71]	2009
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				

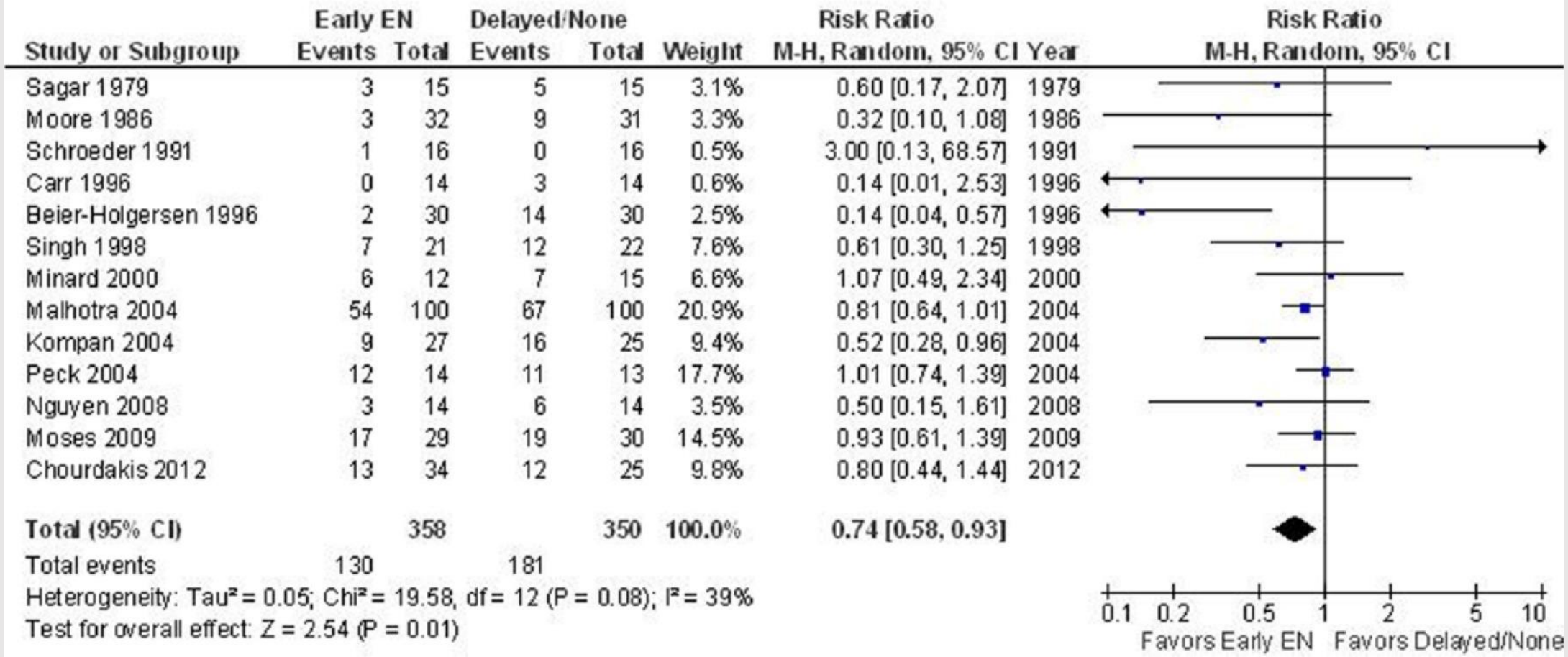
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 7.23$, df = 15 (P = 0.95); $I^2 = 0\%$

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



EARLY VERSUS DELAYED ENTERAL NUTRITIONAL SUPPORT

Infectious Complications



Study or Subgroup	Early EN Events	Early EN Total	Delayed/None Events	Delayed/None Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Sagar 1979	3	15	5	15	3.1%	0.60 [0.17, 2.07]	1979
Moore 1986	3	32	9	31	3.3%	0.32 [0.10, 1.08]	1986
Schroeder 1991	1	16	0	16	0.5%	3.00 [0.13, 68.57]	1991
Carr 1996	0	14	3	14	0.6%	0.14 [0.01, 2.53]	1996
Beier-Holgersen 1996	2	30	14	30	2.5%	0.14 [0.04, 0.57]	1996
Singh 1998	7	21	12	22	7.6%	0.61 [0.30, 1.25]	1998
Minard 2000	6	12	7	15	6.6%	1.07 [0.49, 2.34]	2000
Malhotra 2004	54	100	67	100	20.9%	0.81 [0.64, 1.01]	2004
Kompan 2004	9	27	16	25	9.4%	0.52 [0.28, 0.96]	2004
Peck 2004	12	14	11	13	17.7%	1.01 [0.74, 1.39]	2004
Nguyen 2008	3	14	6	14	3.5%	0.50 [0.15, 1.61]	2008
Moses 2009	17	29	19	30	14.5%	0.93 [0.61, 1.39]	2009
Chourdakis 2012	13	34	12	25	9.8%	0.80 [0.44, 1.44]	2012
Total (95% CI)		**358**		**350**	**100.0%**	**0.74 [0.58, 0.93]**	
Total events	130		181				

Heterogeneity: $Tau^2 = 0.05$; $Chi^2 = 19.58$, df = 12 (P = 0.08); $I^2 = 39\%$

Test for overall effect: Z = 2.54 (P = 0.01)

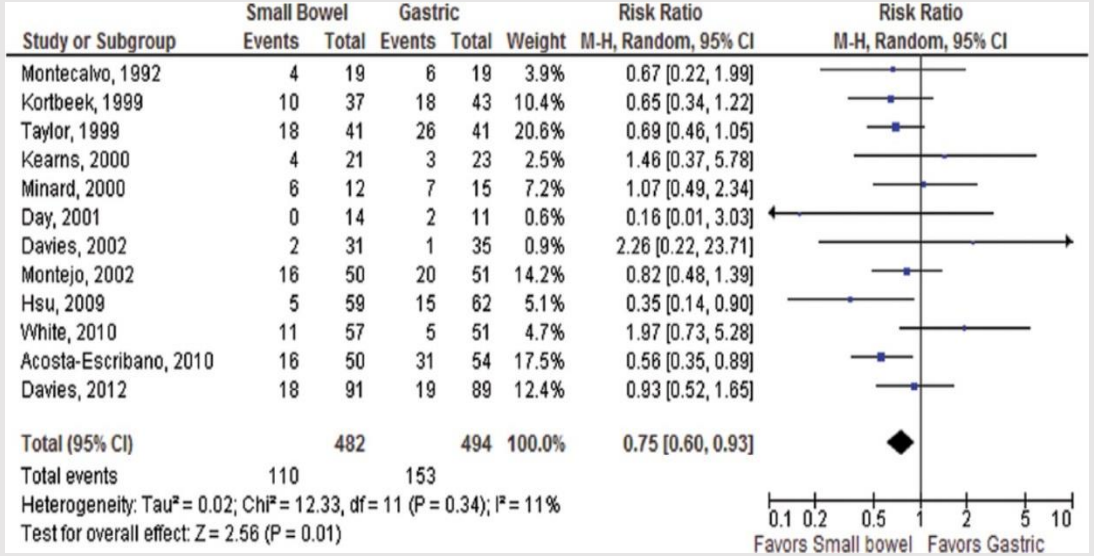
SMALL BOWEL VERSUS GASTRIC FEEDINGS

- **Acceptable to initiate enteral nutrition in the stomach.**
  - **ASPEN: Yes**
  - **ESPEN: Yes**

- **No difference, to include:**
  - **LOS**
  - **Mortality**
  - **Nutrient delivery**
  - **Pneumonia**

SMALL BOWEL VERSUS GASTRIC FEEDINGS
Nutritional Efficiency

ASPEN

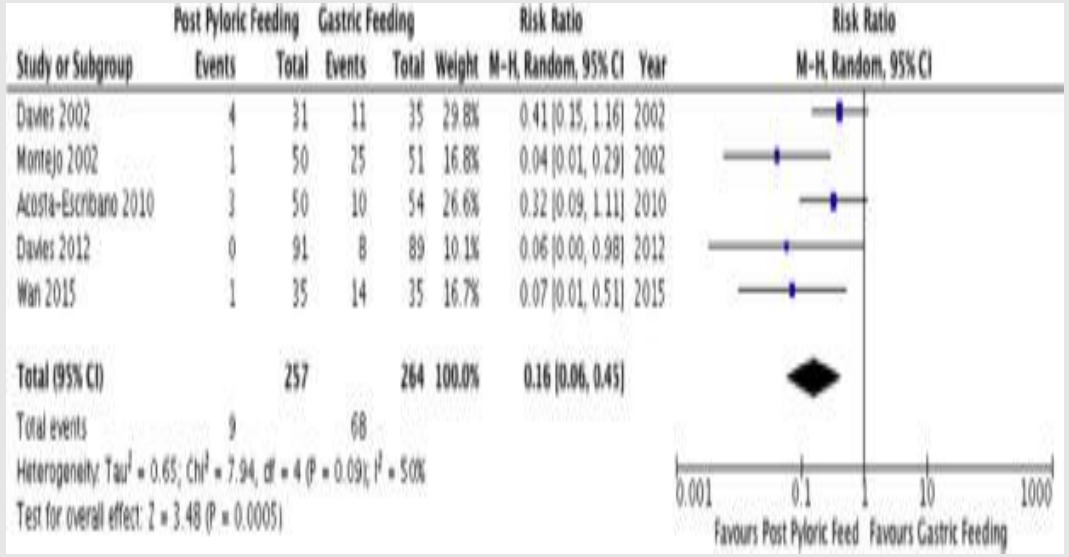


Study or Subgroup	Small Bowel Events	Small Bowel Total	Gastric Events	Gastric Total	Weight	Risk Ratio M-H, Random, 95% CI
Montecalvo, 1992	4	19	6	19	3.9%	0.67 [0.22, 1.99]
Kortbeek, 1999	10	37	18	43	10.4%	0.65 [0.34, 1.22]
Taylor, 1999	18	41	26	41	20.6%	0.69 [0.46, 1.05]
Kearns, 2000	4	21	3	23	2.5%	1.46 [0.37, 5.78]
Minard, 2000	6	12	7	15	7.2%	1.07 [0.49, 2.34]
Day, 2001	0	14	2	11	0.6%	0.16 [0.01, 3.03]
Davies, 2002	2	31	1	35	0.9%	2.26 [0.22, 23.71]
Montejo, 2002	16	50	20	51	14.2%	0.82 [0.48, 1.39]
Hsu, 2009	5	59	15	62	5.1%	0.35 [0.14, 0.90]
White, 2010	11	57	5	51	4.7%	1.97 [0.73, 5.28]
Acosta-Escribano, 2010	16	50	31	54	17.5%	0.56 [0.35, 0.89]
Davies, 2012	18	91	19	89	12.4%	0.93 [0.52, 1.65]
Total (95% CI)		482		494	100.0%	0.75 [0.60, 0.93]
Total events	110		153			

Heterogeneity: Tau² = 0.02; Chi² = 12.33, df = 11 (P = 0.34); I² = 11%
Test for overall effect: Z = 2.56 (P = 0.01)

Risk Ratio M-H, Random, 95% CI
0.1 0.2 0.5 1 2 5 10
Favors Small bowel Favors Gastric

ESPEN



Study or Subgroup	Post Pyloric Feeding Events	Post Pyloric Feeding Total	Gastric Feeding Events	Gastric Feeding Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Davies 2002	4	31	11	35	29.8%	0.41 [0.15, 1.16]	2002
Montejo 2002	1	50	25	51	16.8%	0.04 [0.01, 0.29]	2002
Acosta-Escribano 2010	3	50	10	54	26.6%	0.32 [0.09, 1.11]	2010
Davies 2012	0	91	8	89	10.1%	0.06 [0.00, 0.98]	2012
Wan 2015	1	35	14	35	16.7%	0.07 [0.01, 0.51]	2015
Total (95% CI)		257		264	100.0%	0.16 [0.06, 0.45]	
Total events	9		68				

Heterogeneity: Tau² = 0.65; Chi² = 7.94, df = 4 (P = 0.09); I² = 50%
Test for overall effect: Z = 3.48 (P = 0.0005)

Risk Ratio M-H, Random, 95% CI
0.001 0.1 1 10 1000
Favours Post Pyloric Feed Favours Gastric Feeding

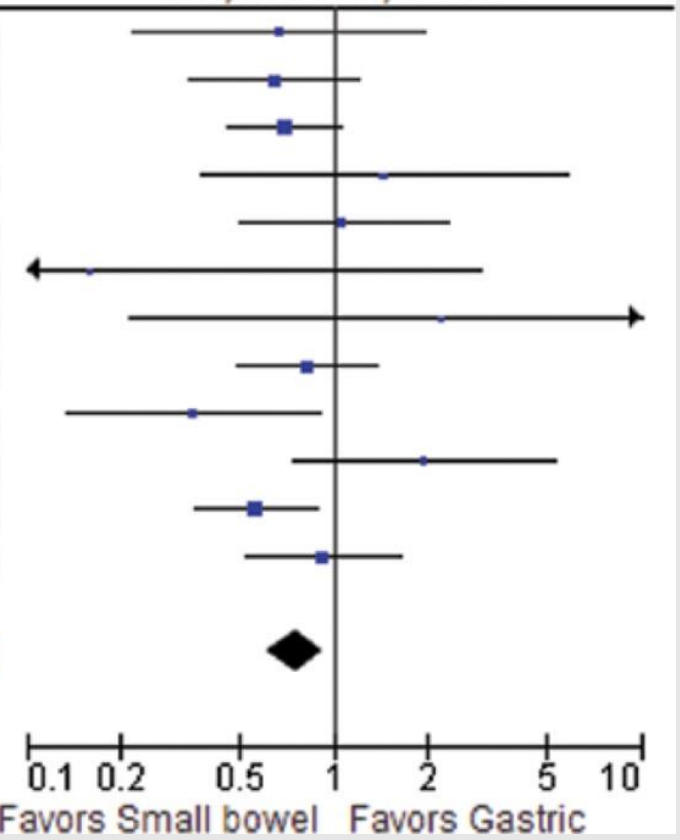
SMALL BOWEL VERSUS GASTRIC FEEDINGS

Pneumonia

Study or Subgroup	Small Bowel Events	Small Bowel Total	Gastric Events	Gastric Total	Weight	Risk Ratio M-H, Random, 95% CI
Montecalvo, 1992	4	19	6	19	3.9%	0.67 [0.22, 1.99]
Kortbeek, 1999	10	37	18	43	10.4%	0.65 [0.34, 1.22]
Taylor, 1999	18	41	26	41	20.6%	0.69 [0.46, 1.05]
Kearns, 2000	4	21	3	23	2.5%	1.46 [0.37, 5.78]
Minard, 2000	6	12	7	15	7.2%	1.07 [0.49, 2.34]
Day, 2001	0	14	2	11	0.6%	0.16 [0.01, 3.03]
Davies, 2002	2	31	1	35	0.9%	2.26 [0.22, 23.71]
Montejo, 2002	16	50	20	51	14.2%	0.82 [0.48, 1.39]
Hsu, 2009	5	59	15	62	5.1%	0.35 [0.14, 0.90]
White, 2010	11	57	5	51	4.7%	1.97 [0.73, 5.28]
Acosta-Escribano, 2010	16	50	31	54	17.5%	0.56 [0.35, 0.89]
Davies, 2012	18	91	19	89	12.4%	0.93 [0.52, 1.65]
Total (95% CI)		**482**		**494**	**100.0%**	**0.75 [0.60, 0.93]**
Total events	110		153			

Heterogeneity: $Tau^2 = 0.02$; $Chi^2 = 12.33$, df = 11 (P = 0.34); $I^2 = 11\%$

Test for overall effect: Z = 2.56 (P = 0.01)



IS ENTERAL NUTRITION SAFE WITH HEMODYNAMIC INSTABILITY?

ASPEN

Do not start in the setting of hemodynamic compromise or instability.

- **Hypotensive (MAP < 50mm Hg)**
- **Vasopresors are being initiated**
- **Escalating doses of vasopressors are required for hemodynamic instability**

EN may be started if vasopressor support is being withdrawn, but watch for abdominal distention, increased residuals or worsening metabolic acidosis or rising base deficit.

IS ENTERAL NUTRITION SAFE WITH HEMODYNAMIC INSTABILITY?
ESPEN

- Uncontrolled shock
- Uncontrolled hypoxemia and acidosis
- Uncontrolled UGI hemorrhage
- Gastric aspirate > 500cc/6hr
- Intestinal ischemia
- Intestinal obstruction
- Abdominal compartment syndrome
- High-output fistula without distal feeding access

GASTRIC RESIDUALS

- **Gastric residuals should NOT be used as part of routine care.**

- **Residuals do NOT correlate with:**
  - **Pneumonia**
  - **Regurgitation**
  - **Aspiration**

- **If you must check, hold EN if gastric residual is > 500cc in the absence of other signs of intolerance.**

ASPEN: Do not check residuals.

ESPEN: Suggest hold EN if > 500cc/6hrs.

DAILY VOLUME GOAL
Nurse-Driven

- **Use volume-based feeding protocols in which 24-hour daily volumes are targeted instead of simply hourly rates.**

- **This allows the RN to increase feeding rates to make up for lost volume.**

EMPOWER THE NURSES!

UMC PREOPERATIVE ENTERAL NUTRITION GUIDELINE

Continue enteral nutrition until one hour prior to surgery on ventilated patients except for the following procedures (hold for 8 hours):

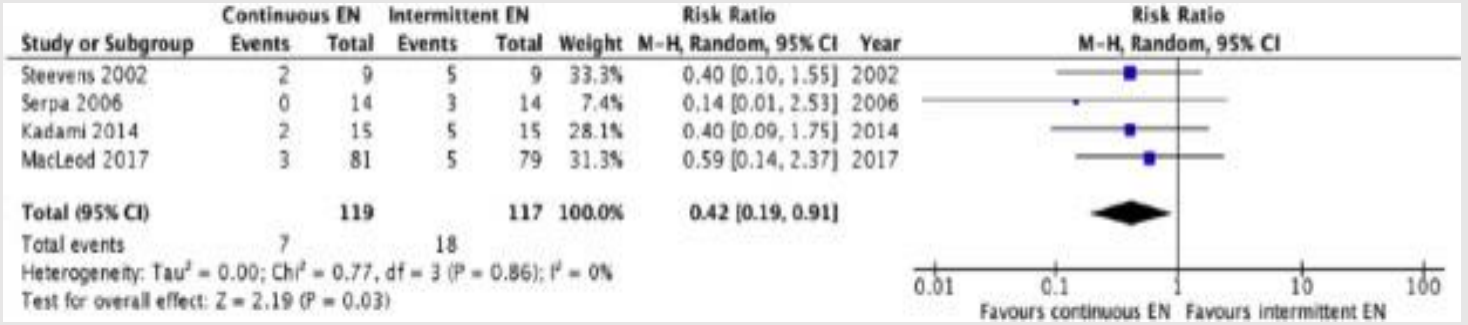
- **Tracheostomy**
- **Laparotomy**
- **Spine surgery**
- **Oral maxillofacial procedures**
- **If patient will be placed in prone position**
- **Thoracotomy, especially if patient is to be placed in lateral position or if there is need to change to a double-lumen tube.**

TUBE PLACEMENT

- CXR is the gold standard
- Capnometry is an adjunct
- Auscultation is of <u>minimal</u> value (dangerous)

DIARRHEA

- Do NOT stop enteral feeds.
  - If necessary, reduce rate.
- Review medication list (most likely source), including IV antibiotics.
- Rule-out infectious etiology (*C.diff*).
- Significant reduction in diarrhea with continuous vs. bolus feeding.



Study or Subgroup	Continuous EN Events	Total	Intermittent EN Events	Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Steevens 2002	2	9	5	9	33.3%	0.40 [0.10, 1.55]	2002
Serpa 2006	0	14	3	14	7.4%	0.14 [0.01, 2.53]	2006
Kadami 2014	2	15	5	15	28.1%	0.40 [0.09, 1.75]	2014
MacLeod 2017	3	81	5	79	31.3%	0.59 [0.14, 2.37]	2017
Total (95% CI)		**119**		**117**	**100.0%**	**0.42 [0.19, 0.91]**	
Total events	7		18				

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.77$, df = 3 (P = 0.86); $I^2 = 0\%$

Test for overall effect: Z = 2.19 (P = 0.03)

Help! My tube is clogged!

- Prevention is the best key
- Irrigate with ~25cc of water every 4-6 hrs and before & after Rxs.
- If clogged, do this:
  - Push back and forth with a 60cc syringe containing warm water.
  - If that does not work, let the warm water sit for ~20 minutes
- Sorry! Coke, Pepsi, Gingerale or meat tenderizer really do not work even though many think otherwise. Carbonation may make matters worse.
- Pancrease (Not enteric coated)
  - Viokase

TARGETED GLUCOSE RANGE

- **SCCM: 150-180 mg/dl**
- **ASPEN: 140-180 mg/dl**
- **ESPEN: 150-180 mg/dl**

Glucose > 200 is NOT OK!

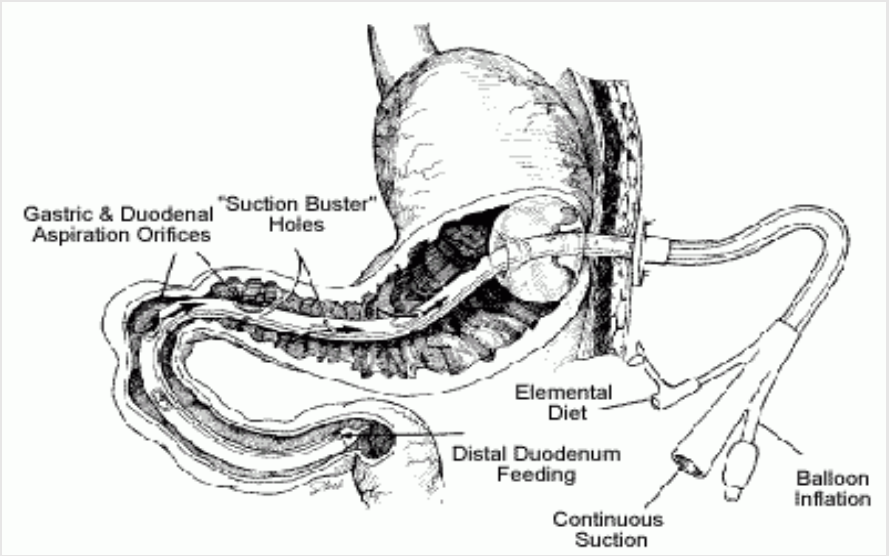
Consider insulin drip

PERCUTANEOUS GASTROSTOMY PEARLS

- **Literature supports use within 4 hours. No joke!**
  - **ASPEN: Yes**
  - **ESPEN: Yes**
- **Restart EN at same rate prior to stopping for procedure.**
- **If concern for patient pulling PEG out, place an abdominal binder.**
- **Don’t place bumper too tight to the skin.**

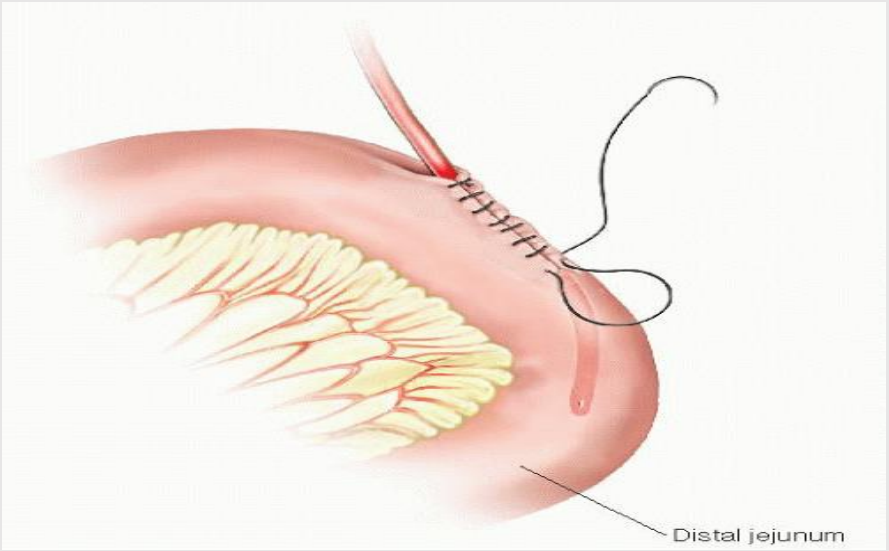
OPEN GASTROSTOMY, G-J & J TUBES

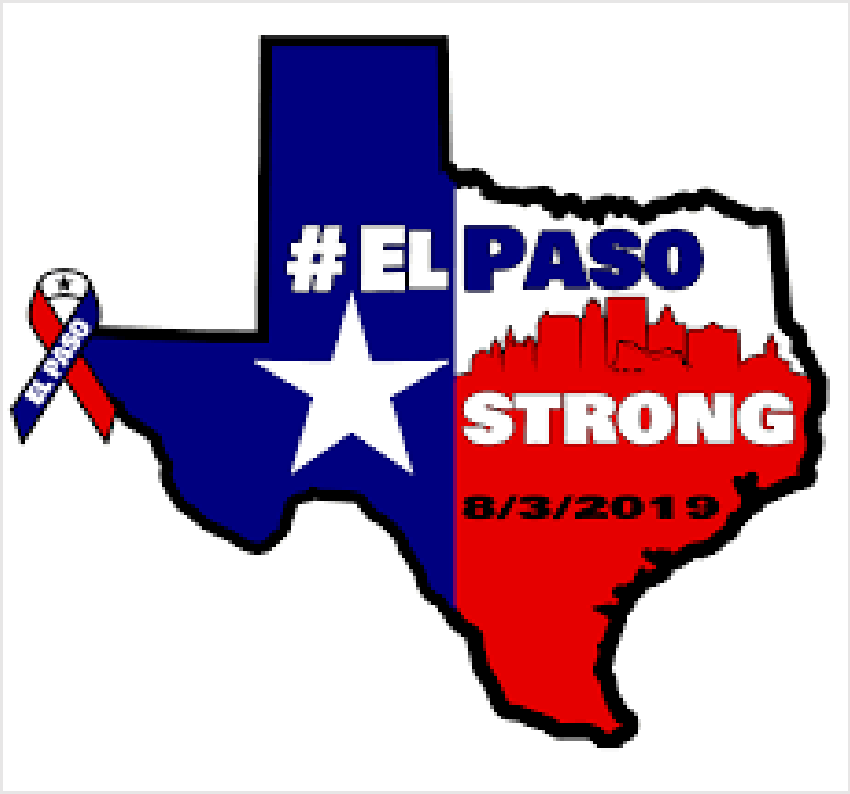
- Moss tube
- MIC tube
- Foley
- Feeding jejunostomy tube



Pearls

- Always use water or saline for the balloon; NEVER use air.
- Can’t check residuals via a J-tube.
- If the tube fall out, immediately replace with a Foley catheter before tract closes.

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STRONG
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