



# Contraindications for Early Enteral Nutrition in critical illness

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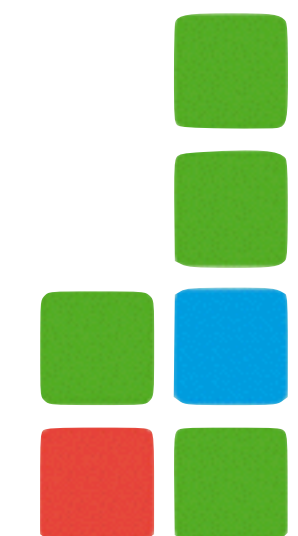
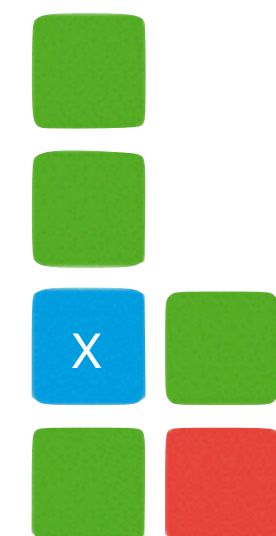
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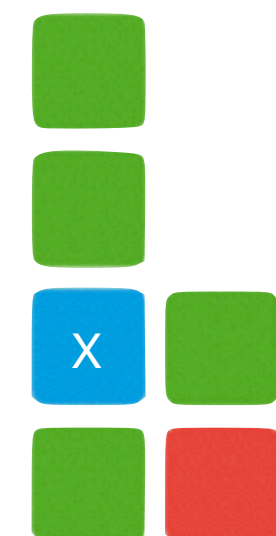
**E-mail: [zantena@zgv.nl](mailto:zantena@zgv.nl)**

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# What are contraindications for early enteral nutrition?

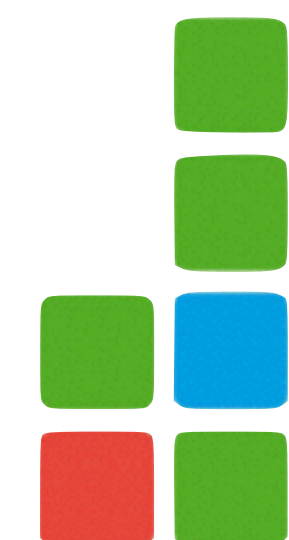
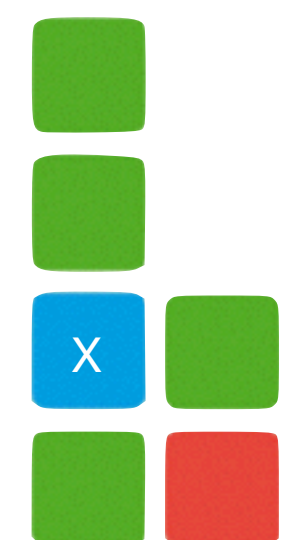




# Myths and Misconceptions

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- EN is contraindicated with vasopressors
- EN is contraindicated with MV
- EN is contraindicated in patients without bowel sounds
- EN is contraindicated following gastrointestinal surgery
- EN is contraindicated in patients with ileus
- EN is contraindicated in patients with open abdomen
- EN is contraindicated in high gastric residual volume
- EN is contraindicated in patients with pancreatitis



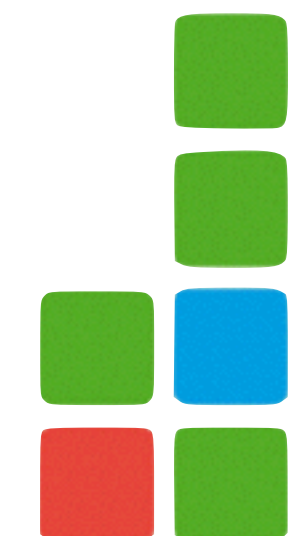
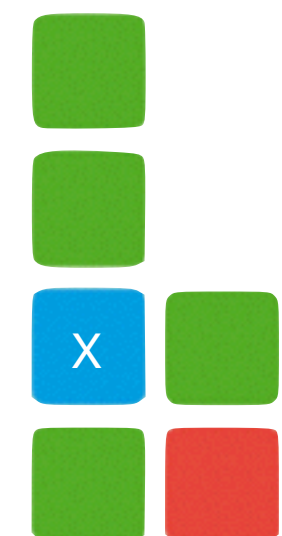


# Myths and Misconceptions

- EN is contraindicated with vasopressors
- EN is contraindicated with MV
- EN is contraindicated in patients without bowel sounds

**NOT TRUE**

- EN is contraindicated following
- EN is contraindicated in patients with
- EN is contraindicated in patients with open abdomen
- EN is contraindicated in high gastric residual volume
- EN is contraindicated in patients with pancreatitis





# Recent guidelines Open Access

*Intensive Care Med* (2017) 43:380–398  
DOI 10.1007/s00134-016-4665-0

## CONFERENCE REPORTS AND EXPERT PANEL



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

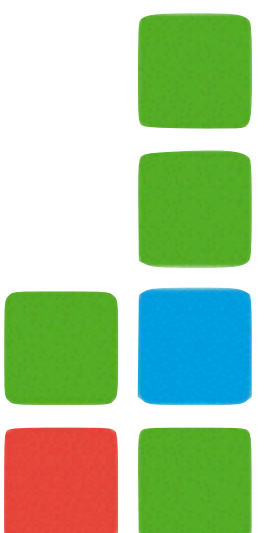
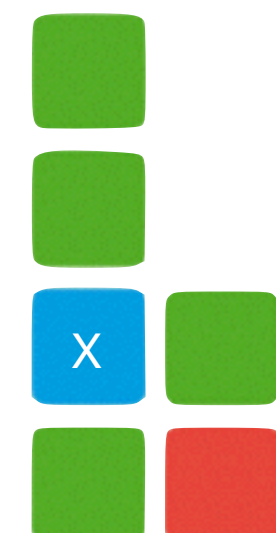
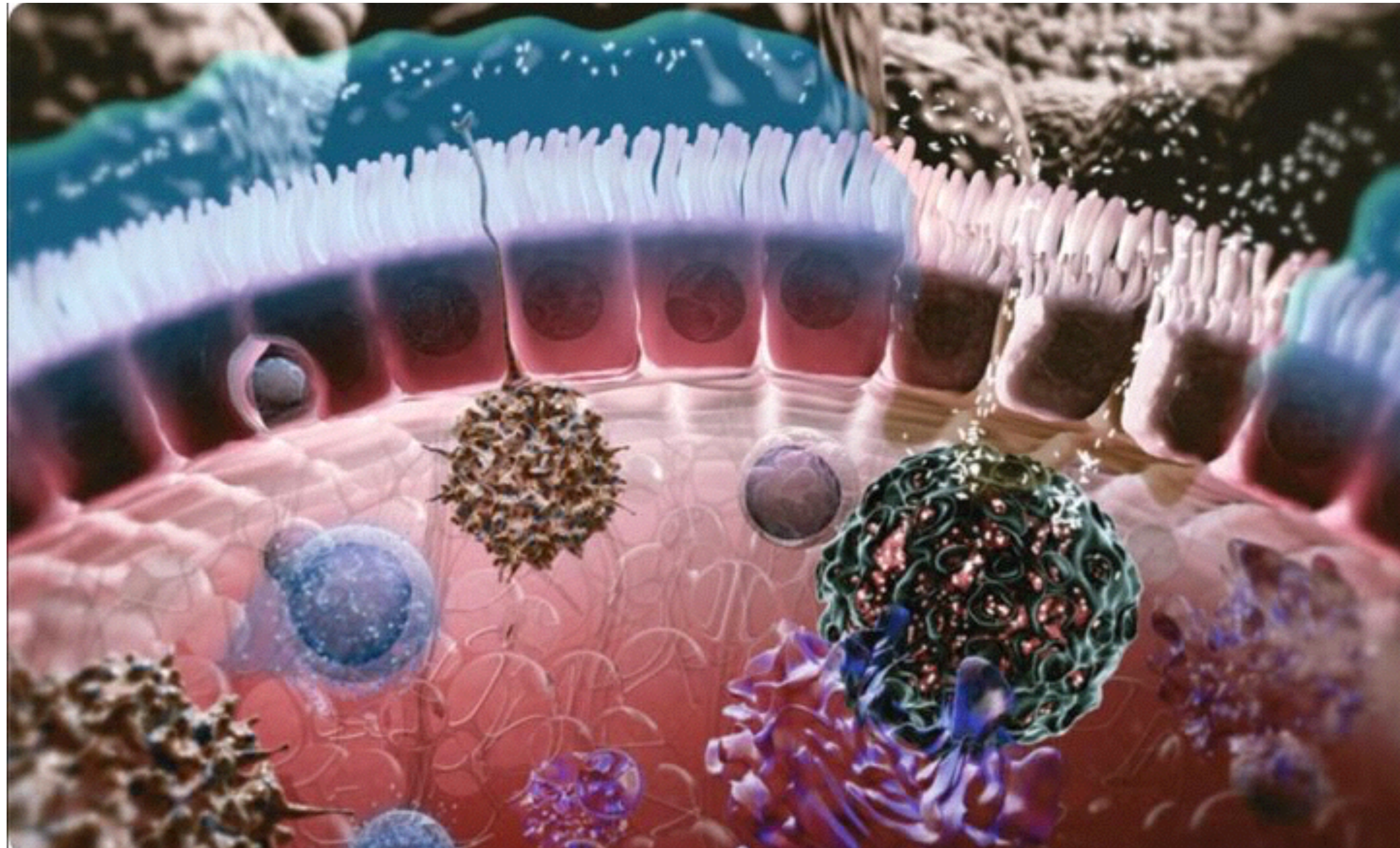
Annika Reintam Blaser<sup>1,2\*</sup>, Joel Starkopf<sup>1,3</sup>, Waleed Alhazzani<sup>4,5</sup>, Mette M. Berger<sup>6</sup>, Michael P. Casaer<sup>7</sup>, Adam M. Deane<sup>8</sup>, Sonja Fruhwald<sup>9</sup>, Michael Hiesmayr<sup>10</sup>, Carole Ichai<sup>11</sup>, Stephan M. Jakob<sup>12</sup>, Cecilia I. Loudet<sup>13</sup>, Manu L. N. G. Malbrain<sup>14</sup>, Juan C. Montejo González<sup>15</sup>, Catherine Paugam-Burtz<sup>16</sup>, Martijn Poeze<sup>17</sup>, Jean-Charles Preiser<sup>18</sup>, Pierre Singer<sup>19,20</sup>, Arthur R.H. van Zanten<sup>21</sup>, Jan De Waele<sup>22</sup>, Julia Wendon<sup>23</sup>, Jan Wernerman<sup>24</sup>, Tony Whitehouse<sup>25</sup>, Alexander Wilmer<sup>26</sup>, Heleen M. Oudemans-van Straaten<sup>27</sup> and ESICM Working Group on Gastrointestinal Function

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# Early Enteral Nutrition is superior





# Question 1:

## Which is not a reason to delay enteral nutrition?

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- A. Bowel obstruction**
- B. Intra-abdominal hypertension**
- C. Uncontrolled shock**
- D. Overt bowel ischemia**

# Early Enteral Nutrition is safe and recommended:

- In controlled shock
- When using NMBA
- Targeted Temperature Management
- ECMO
- Prone position
- TBI, stroke, spinal cord injury
- Severe acute Pancreatitis
- GI surgery
- Abdominal aortic surgery
- Abdominal trauma
- Open abdomen
- Intra-abdominal Hypertension without compartment syndrome
- Liver failure (independent of grade of encephalopathy)
- Absent bowel sounds
- Diarrhea

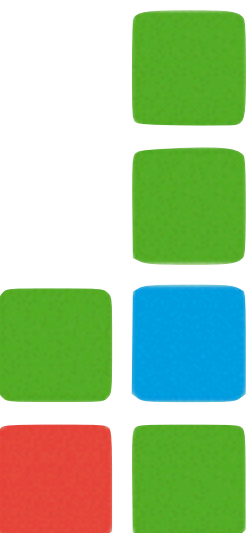
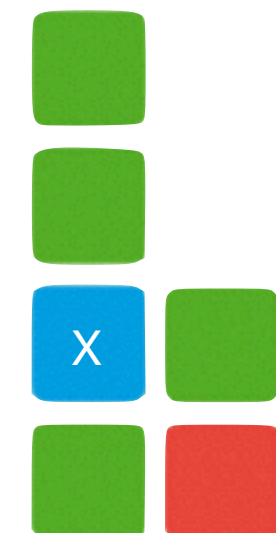




# When to delay enteral nutrition?

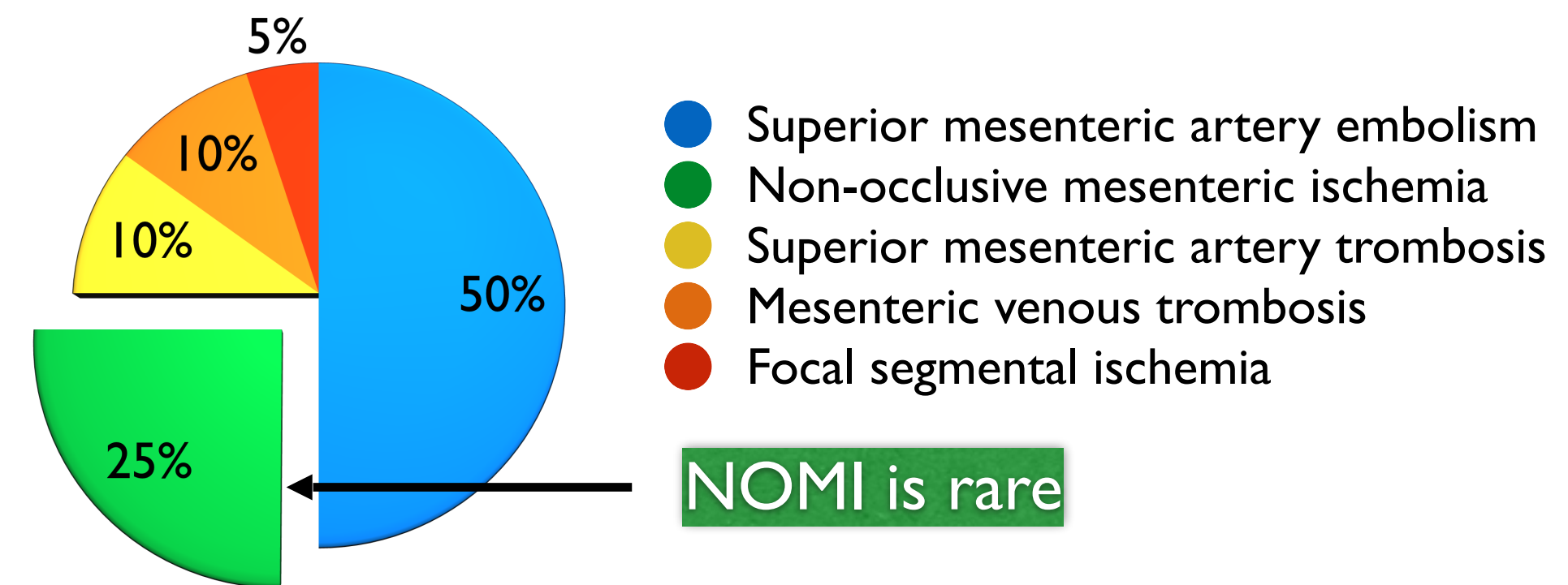
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- **In bowel obstruction (not post-operative ileus)**
- **In uncontrolled shock**
- **Overt bowel ischemia**
- **High-output fistula that cannot be bypassed**
- **In abdominal compartment syndrome, when during IAH and EEN abdominal pressure increases**
- **Active GI-bleeding**
- **GRV > 500 mL/6h**



# Always resuscitate patient before starting EEN

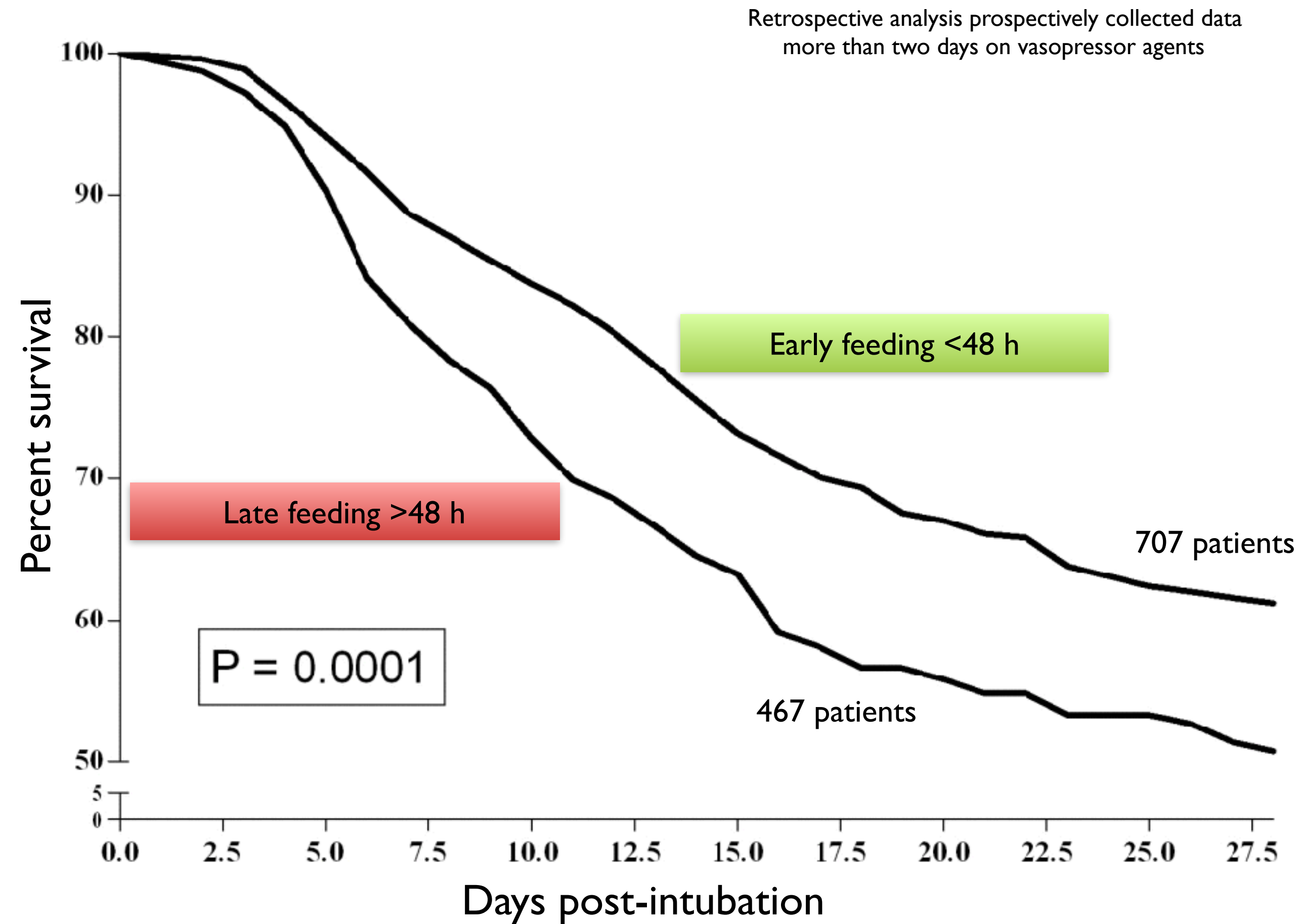
- **Fluid therapy**
- **Vasopressor start**
- **Stable MAP (>65 mmHg)**
- **Acceptable ScVO<sub>2</sub> (65-70%)**
- **Acceptable lactate < 2.5 mmol/l or 50% drop**
- **Most patients are stable within 6-12 hours**
- **Then start EEN (<24h)**



In our ICU we did not encounter  
I single case of non-occlusive  
mesenteric ischemia due to EN in  
more than 1000 ICU patients  
using this checklist



# Safe on vasopressors?



Both in I and > I vasopressors significant better survival in early feeding

ORIGINAL ARTICLE

# Early versus On-Demand Nasoenteric Tube Feeding in Acute Pancreatitis

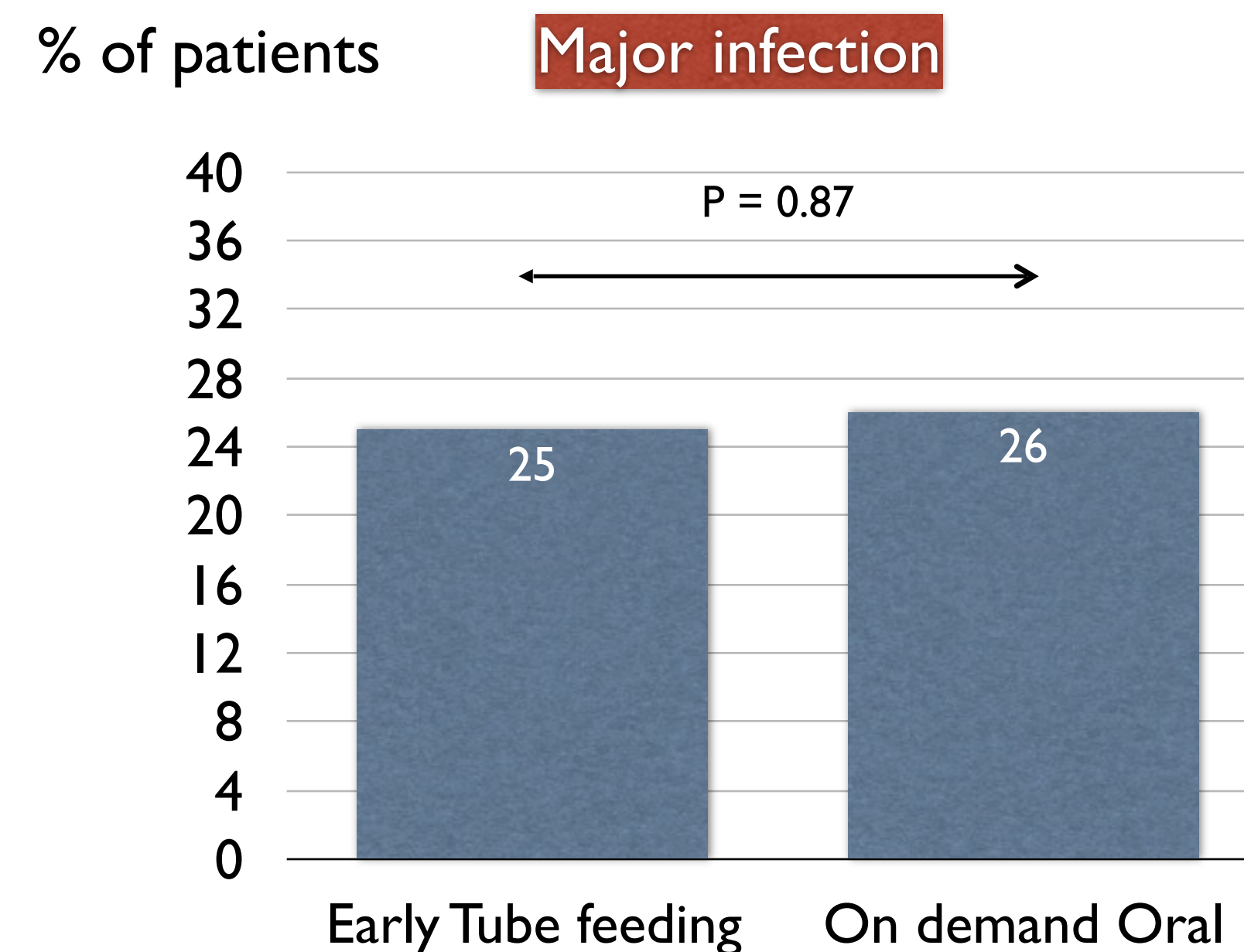
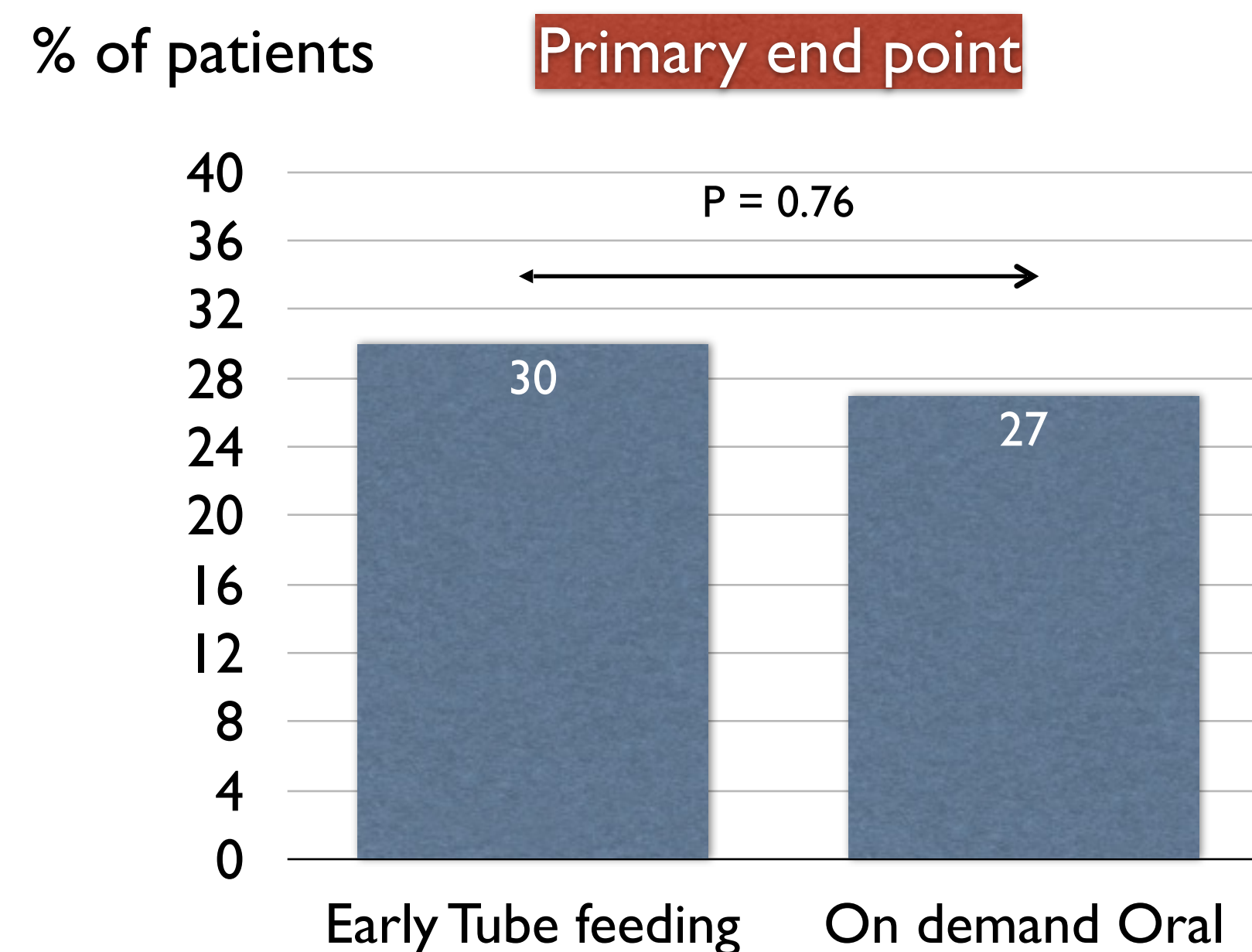
O.J. Bakker, S. van Brunschot, H.C. van Santvoort, M.G. Besselink, T.L. Bollen, M.A. Boermeester, C.H. Dejong, H. van Goor, K. Bosscha, U. Ahmed Ali, S. Bouwense, W.M. van Grevenstein, J. Heisterkamp, A.P. Houdijk, J.M. Jansen, T.M. Karsten, E.R. Manusama, V.B. Nieuwenhuijs, A.F. Schaapherder, G.P. van der Schelling, M.P. Schwartz, B.W.M. Spanier, A. Tan, J. Vecht, B.L. Weusten, B.J. Witteman, L.M. Akkermans, M.J. Bruno, M.G. Dijkgraaf, B. van Ramshorst, and H.G. Gooszen, for the Dutch Pancreatitis Study Group

multicenter, randomized trial comparing early nasoenteric tube feeding with an oral diet at 72 hours after presentation to the emergency department in patients with acute pancreatitis

The primary end point was a composite of major infection (infected pancreatic necrosis, bacteremia, or pneumonia) or death during 6 months of follow-up



# Oral feeding or Tube feeding in pancreatitis patients



A total of 208 patients were enrolled at 19 Dutch hospitals



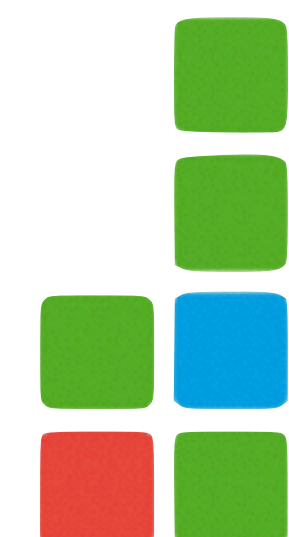
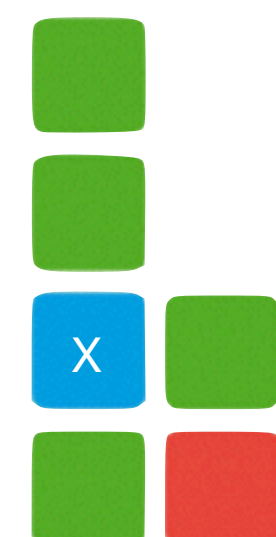
# Oral feeding or Tube feeding in pancreatitis patients

ICU admission after randomization — no. (%)	18 (18)	20 (19)	0.95 (0.66–1.38)	0.86
Mechanical ventilation — no. (%)	12 (12)	14 (13)	0.93 (0.60–1.44)	0.84
New-onset organ failure — no./total no. at risk (%)¶				
Single organ failure	26/67 (39)	31/73 (42)	0.92 (0.65–1.32)	0.73
Persistent single organ failure	10/67 (15)	10/73 (14)	1.05 (0.65–1.70)	1.00
Multiple organ failure	7/67 (10)	6/73 (8)	1.14 (0.67–1.95)	0.77
Persistent multiple organ failure	4/67 (6)	4/73 (5)	1.05 (0.51–2.14)	1.00

> 80% non-ICU patients, only 12% mechanical ventilation, only 5% persistent organ failure:

NO ICU Study

Do not stop using tube feeding in ICU patients with severe acute pancreatitis





# Enteral vs Parenteral nutrition in ventilated shock patients: NUTRIREA-2

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

**In critically ill adults with shock, early isocaloric enteral nutrition did not reduce mortality or the risk of secondary infections but was associated with a greater risk of digestive complications compared with early isocaloric parenteral nutrition.**

## Comment on Nutrirea II study

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- **Patients in severe shock**
- **High vasopressor dosages**
- **Early aggressive build-up of enteral feeding to target within 24-28 hours**
- **ESICM guidelines 2018:**

Recommendation 2. We suggest delaying EN if shock is uncontrolled and haemodynamic and tissue perfusion goals are not reached, but start low dose EN as soon as shock is controlled with fluids and vasopressors/inotropes (Grade 2D).



# ESPEN ICU guidelines 2018

- **Recommendation 38: EN should be delayed:**
  - If shock is uncontrolled and hemodynamic and tissue perfusion goals are not reached, whereas low dose EN can be started as soon as shock is controlled with fluids and vasopressors/inotropes, while remaining vigilant for signs of bowel ischemia;
  - In case of uncontrolled life-threatening hypoxemia, hypercapnia or acidosis, whereas EN can be started in patients with stable hypoxemia, and compensated or permissive hypercapnia and acidosis;
  - In patients suffering from active upper GI bleeding, whereas EN can be started when the bleeding has stopped and no signs of re-bleeding are observed;
  - In patients with overt bowel ischemia;
  - In patients with high-output intestinal fistula if reliable feeding access distal to the fistula is not achievable;
  - In patients with abdominal compartment syndrome; and
  - If gastric aspirate volume is above 500 ml/6h.

**Grade of recommendation: B – strong consensus (100 % agreement)**

## ESPEN ICU guidelines 2018

### Recommendation 39: Low dose EN should be administered

- In patients receiving therapeutic hypothermia and increasing the dose after rewarming;
  - In patients with intra-abdominal hypertension without abdominal compartment syndrome, whereas temporary reduction or discontinuation of EN should be considered when intra-abdominal pressure values further increase under EN; and
  - In patients with acute liver failure when acute, immediately life-threatening metabolic derangements are controlled with or without liver support strategies, independent on grade of encephalopathy.
- Grade of recommendation: B – strong consensus (95.65 % agreement)



# ESPEN ICU guidelines 2018

## Recommendation 40: Early EN should be performed

- In patients receiving ECMO
- In patients with traumatic brain injury
- In patients with stroke (ischemic or hemorrhagic)
- In patients with spinal cord injury
- In patients with severe acute pancreatitis
- In patients after GI surgery
- In patients after abdominal aortic surgery
- In patients with abdominal trauma when the continuity of the GI tract is confirmed/restored
- In patients receiving neuromuscular blocking agents
- In patients managed in prone position
- In patients with open abdomen
- Regardless of the presence of bowel sounds unless bowel ischemia or obstruction is suspected in patients with diarrhea

Grade of recommendation: B – strong consensus (95.83 % agreement)



# Conclusions

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- **Start EN when hemodynamically stabilized**
- **Start Early**
- **Vasopressors no problem**
- **Many contraindications are myths**
- **Contraindications:**
  - **Proven Bowel ischemia**
  - **High fistula that cannot be bypassed**
  - **Refractory shock**
  - **Bowel obstruction**

