STRATEGIES TO IMPROVE ENTERAL FEEDING TOLERANCE. IS IT WORTH IT?

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DEFINITION OF ENTERAL FEEDING INTOXERANCE

Gastrointestinal feeding intolerance are usually defined as:

- High gastric residual volume (> 250ml - 500ml)
- Vomiting
- Abdominal distention
- Complaints of discomfort
- Diarrhoea
- Reduced passage of flatus and stools
- Abnormal abdominal x-rays

(3 or more GIT symptoms, including high GRV)

Van Zanten, 2016 (Critical Care 20:294)
INCIDENCE AND COMPLICATIONS OF FEEDING INTOLERANCE

IDEAL:
Initiate early enteral nutrition within 24 – 48 hrs of onset of critical illness and admission to ICU.

REALITY:
30 – 70 % of Critical Ill patients develop enteral feeding intolerance.

COMPLICATIONS OF FEEDING INTOLERANCE (FI):
• Decreased protein and energy delivery
• Increased infectious complications
• Increased morbidity and mortality

NOW WHAT?
There are a few strategies available to assist with feeding intolerances. But are they worth it?

**Risk vs. Benefit**
ULTIMATE BENEFIT

• Successful enteral nutrition:
  • Optimal nutrition – Prevention of Hospital acquired malnutrition
  • Maintaining functional and structural GIT integrity
    • Preventing intestinal permeability
  • Supporting humoral immunity

RECOMMENDED STRATEGIES

• High GRV’s with GIT symptoms
  • Prokinetics
  • Bolus vs. Continuous EN

• High GRV’s – Persistent Delayed gastric emptying / Gastroparesis
  • Post-Pyloric small bowel feeding

• Diarrhoea
  • Changing of enteral feed
ARE GRV’S STILL APPLICABLE?

ASPEN (2016)

• Gastric residual volume (GRV’s) should not be use routinely to monitor enteral nutrition (EN) tolerance.

• Patients on EN should rather be assessed for risk of aspiration.

• Patients determined to be a high risk, steps should be taken proactively to reduce the risk.
  • Prokinetic agents
  • Divert the level of feeding to lower in the GI tract
  • Switch from bolus to continuous infusion of EN

McClave et al, 2016 (Am J Gastroenterology)
The efficacy and safety of prokinetic agents in critically ill patients receiving enteral nutrition: a systematic review and meta-analysis of randomized trials

Kim Lewis¹, Zuhoor Alqahtani², Lauralyn McIntyre³, Saleh Almenawer²,⁴, Fayez Alshamsi⁵, Andrew Rhodes⁶, Laura Evans⁷, Derek C. Angus⁸ and Waleed Alhazzani¹,²,⁹
HIGH GRV’S WITH GIT SYMPTOMS: PROKINETICS

• 13 RCTs were included in the systemic review and meta-analysis
• Prokinetic agents – **Significantly reduced feeding intolerance**
• 17.3% of an absolute reduction in feeding intolerance

Lewis et al, 2016 (Critical Care 20:259)
PROKINETIC AGENTS

• Metoclopramide
  • Selective D2 (Dopamine) receptor antagonist
  • Enhance peristalsis in the upper GI tract

• Erythromycin
  • Enhance the release of motilin from enterochromaffin cells of the duodenum
  • Motilin cause contractions of the duodenum and gastric antrum

• Domperidone
  • D2 receptor antagonist
  • Increase oesophageal motor function
  • Increase duodenal contractions
  • Coordinate peristalsis across pylorus to accelerate gastric emptying

Lewis et al, 2016 (Critical Care 20:259)
PROKINETIC AGENTS: CAUTION

• Prokinetic agents have shown to prolong the QT interval, and may cause serious arrhythmias.

• Tachyphylaxis can develop with Erythromycin and Metoclopramide.

• Potential microbial resistance to antibiotics can develop with Erythromycin use – Not proven yet

Lewis et al, 2016 (Critical Care 20:259)
PROKINETICS – ACCORDING TO THE GUIDELINES

• ASPEN (2016):
  • Suggest using either Metoclopramide or Erythromycin in patients at high risk of aspiration.

• CCPG (2013):
  • Recommend Metoclopramide as the first-line prokinetic agent in the ICU

• ESPEN (2006):
  • Consider administration of Metoclopramide or Erythromycin in patients with intolerance to enteral feeding.

• Lewis et al suggest that prokinetics should not be used prophylactically, but only be used to treat patients with feeding intolerance.

Lewis et al, 2016 (Critical Care 20:259)
Suggested dosage:

- Erythromycin: 3–7 mg/kg/d IV
- Metoclopramide: 10 mg given 4 times a day IV

Boullata et al, 2017 (JPEN 41:15-105)
HIGH GRV’S WITH GIT SYMPTOMS: BOLUS VS. CONTINUOUS EN

ASPEN Safe Practices for Enteral Nutrition Therapy

- **Caution:** Aggressive Bolus feeding can potentially cause harm with increased risk of aspiration pneumonia

- MacLeod et al proofed in a RCT a *trend towards decreased mortality* with continuous (7.4%) vs bolus (13.9%) EN in Critically Ill Trauma patients (J Trauma. 2007;63(1):57-61)

- **Recommend:** Change from Bolus to Continuous EN if feeding intolerances occur

Boullata et al, 2017 (JPEN 41:15-105)
DELAYED GaSTRIC EMPTYING / GASTROPARESIS

Delayed gastric emptying is common in critically ill patients as a result of many factors:

- Medication e.g. narcotics (opioids), catecholamines, sedatives
- Uncontrolled Diabetes Mellitus / Hyperglycaemia
- Electrolyte abnormalities
- Renal dysfunction
- Mechanical ventilation
- Sepsis / Critical Illness etc.

Lewis et al, 2016 (Critical Care 20:259)
DELAYED GASTRIC EMPTYING / GASTROPARESIS

During Critical Illness delayed gastric emptying are a result of:

- Decreased availability of acetylcholine for stimulation of gastric smooth muscle due to
  - Modulation of the vagal tone
  - Reduced levels of serotonin, motilin and ghrelin

Van Zanten, 2016 (Critical Care 20:294)
DELAYED GASTRIC EMPTYING: RECOMMENDED STRATEGIES

• Prokinetic Agents

• Conversion from **gastric feeding tube to a post-pyloric feeding tube** when:
  • **Prolonged poor tolerance** of gastric feeds where prokinetics shown to be ineffective
  • In patients that is at **high risk for aspiration**

• Post-pyloric feeding tube placements:
  • Endoscopic jejunal feeding tube
  • Open procedure jejunostomy tube

McClave et al, 2016 (Am J Gastroenterology)
DELAYED GASTRIC EMPTYING: RECOMMENDED STRATEGIES

- Recommended the simultaneous aspiration/decompression of the stomach with jejunal feeding. This may be accomplished by using:
  - a dual lumen aspirate/feed nasoenteric tube,
  - a combined percutaneous transgastic jejunostomy (GJ) tube,
  - or the use of both gastrostomy and jejunostomy tubes

- A percutaneous gastrostomy (PEG) should be placed preferentially in the gastric antrum, to facilitate conversion to a GJ tube, in the event that the patient is intolerant to gastric feeding.

McClave et al, 2016 (Am J Gastroenterology)
DELAYED GASTRIC EMPTYING: CAUTION

• Endoscopic jejunal feeding tube:
  • Brake down of anastomosis in event of previous surgery

• Open procedure jejunostomy:
  • Anaesthesia
  • Surgical site infections

• Transgastric jejunostomy tube:
  • PEG not previously placed in antrum
  • Dislodgement of feeding tube
  • Stoma infections

• Jejunal feeding tubes:
  • Migration of tip of feeding tube back into the stomach
Definition:

- ≥3 liquid stools per day or >250 g of liquid stool per day.

McClave et al, 2016 (JPEN 40:159-211)
DIARRHOEA

For the patient receiving EN who develops diarrhoea, an evaluation should be initiated to identify the etiology of the diarrhoea.

- **EN related**
  - Type and amount of fibre
  - Osmolality of the formula
  - Delivery mode
- **Medication**
  - Antibiotics, Proton Pump Inhibitors, Prokinetics, Laxatives, Sorbitol containing preparations etc.
- **Infectious**
  - Clostridium Difficile

McClave et al, 2016 (Am J Gastroenterology)
DIARRHOEA: STRATEGIES

• Polymeric EN formula containing fermentable soluble fibre
• Polymeric EN formula containing a mixed fibre blend (soluble and insoluble fibre): 15 - 30g/day
• Low FODMAP EN formula
• Partially hydrolysed peptide / MCT oil containing EN formula
  • persistent diarrhoea,
  • suspected malabsorption
  • lack of response to fibre

McClave et al, 2016 (Am J Gastroenterology) McClave et al, 2016 (JPEN 40:159-211)
DIARRHOEA: CAUTION

• Avoid both soluble and insoluble fibre:
  • High risk for bowel ischemia
  • Severe dysmotility
  • Haemodynamic unstable patient - Vasopressors

McClave et al, 2016 (JPEN 40:159-211)
WHAT DOES THE GUIDELINES SAY ON FI
WHAT DOES THE GUIDELINES SAY

ESPEN (2006)

“IV administration of metoclopramide or erythromycin should be considered in patients with intolerance to enteral feeding e.g. with high gastric residuals (C).”

CCPG (2013)

“In critically ill patients who experience feed intolerance (high gastric residuals, emesis), we recommend the use of a promotility agent. Given the safety concerns associated with erythromycin, the recommendation is made for metoclopramide. There are insufficient data to make a recommendation about the use of combined use of metoclopramide and erythromycin.”
WHAT DOES THE GUIDELINES SAY

ASPEN (2016)

“We suggest that, in patients at high risk of aspiration, agents to promote motility, such as prokinetic medications (metoclopramide or erythromycin), be initiated where clinically feasible.”

“We recommend diverting the level of feeding by postpyloric enteral access device placement in patients deemed to be at high risk for aspiration.”

“Based on expert consensus, we suggest that for high-risk patients or those shown to be intolerant to bolus gastric EN, delivery of EN should be switched to continuous infusion."

“Based on expert consensus, we suggest that EN not be automatically interrupted for diarrhoea but rather that feeds be continued while evaluating the etiology of diarrhoea in an ICU patient to determine appropriate treatment.”
ESICM guideline (2017)

“We suggest using EEN in the majority of critically ill under certain precautions. In the absence of evidence, we suggest delaying EN in critically ill patients with uncontrolled shock, uncontrolled hypoxaemia and acidosis, uncontrolled upper GI bleeding, gastric aspirate >500 ml/6 h, bowel ischaemia, bowel obstruction, abdominal compartment syndrome, and high-output fistula without distal feeding access.”

“In case of gastric retention without other new abdominal symptoms use prokinetics and/or postpyloric feeding in a protocolised way.”

IS IT WORTH IT?

Although all the strategies to improve enteral feeding tolerance come with cautions (some more severe than other),
The literature still strongly recommend EEN for improved patient outcome.
In cases where these strategies either fail or are contra-indicated early TPN or SPN should be considered.
KEEP CALM AND ASK ME A QUESTION
THANK YOU