

Bowel Sounds, Bloating and Abdominal Distention

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Disclosures

- No disclosures relevant to the presentation

Goals and Objectives

- Analyze the reasons for holding enteral nutrition
- Resolve the importance of bowel sounds in GI assessment
- Evaluate the effectiveness of bloating and distention as markers of GI function

Enteral Feeding

- Very beneficial in at-risk patients
- Requires an enteral access device
- Requires a functional gut
- Requires a willing clinician to order

Enteral Feeding “Stops”

- Nausea and vomiting
- High gastric residuals
- Diarrhea
- Abdominal pain
- Bowel sounds
- Bloating
- Abdominal distention



Perceived Benefit of Holding EN in GI Surgery Patients

- Prevention of:
 - Anastomotic leakage
 - Dehiscence
 - Wound disruption
 - Vomiting
 - Aspiration

** There are no data supporting these concepts

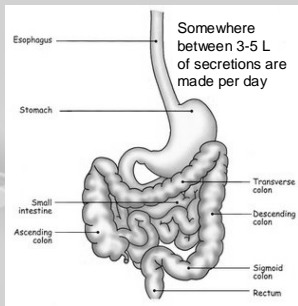
History of Holding Enteral Feeding

- Holdover from days when early anesthetics resulted in frequent nausea and vomiting



Bufo et al; Dis Colon Rec, 1994

Gastrointestinal Gut Secretions



Tube Feeding The Rate "Truth"

- 10 cc/hr = 1 cc every 6 minutes
- 20 cc/hr = 1 cc every 3 minutes
- 30 cc/hr = 1 cc every 2 minutes



Adequate GI Function Based On

- Return of flatus
- Bowel movement
- Bowel sounds
- Ability to take clear liquids
- Avoiding nausea and vomiting
- Avoiding bloating/abdominal distention
- Avoiding abdominal pain

Bowel Sounds



Bowel Sounds

- Changes of GI motility following abdominal surgery first noted on X-ray in the 1890's
- One century ago the practice of listening for bowel sounds was initiated (nurses)
- Belief that bowel sounds correlate with bowel function

Bowel Sounds Questions

- Why do we listen?
- Do they reflect bowel function following surgery?
- Do they help promote early intervention with feeding?

Are Bowel Sounds Reliable

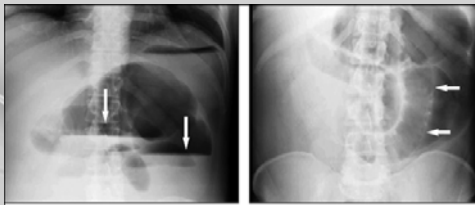


Figure 1 - Upright abdominal radiograph showing dilated loops of bowel with air-fluid levels (A; arrows) and a supine abdominal radiograph showing dilated loops of bowel (B; arrows).

Gut Function Recovery After Abdominal Surgery

- Motor Function
- In the small intestine within 24 hours
- In the stomach in 2-4 days
- In the colon in 3-7 days
- What organ is producing the bowel sounds?



Madsen: AJN, 2005

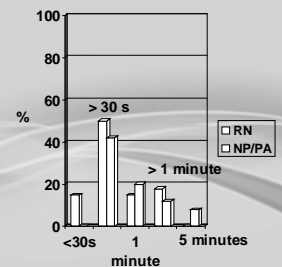
Bowel Sounds

- Early bowel sounds are indicative of uncoordinated muscle contractions in the small intestine

Nachlas et al; Am J Surg 1972

Bowel Sounds Survey Hospital-Based

- RN (19) and (54) NP/PA surveyed
- How long do you listen for bowel sounds?



Madsen et al; Am J Nurs 2005

Important GI Monitoring Methods to Initiate Enteral Feeding

- **Nurses Top 8 in Rank Order**

- Pain
- Distention
- Firm abdomen
- Vomiting
- **Bowel sounds**
- Nausea
- Flatus
- Cramping
- Madsen et al; Am J Nurs 2005

Same Survey Given To Surgeons

- Rank Order

- Return of flatus
- **Bowel movement**
- Appetite
- Nausea and vomiting

- 78% said monitoring bowel sounds not helpful

- Madsen et al; Am J Nurs, 2005

Bowel Sounds

- Very little data investigating its use as a meaningful tool for the clinician



Correlation of Bowel Sounds With Bowel Function

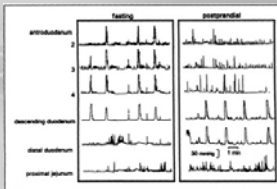
- 38 patients following colon surgery
 - Early fed group – 5.2 day LOS
 - Traditional fed group – 8 day LOS
 - Ileus group – 10.6 day length of stay

- Neither bowel sounds nor flatus production were a good indicator of oral tolerance.

- Bufo et al; Dis Colon Rectum 1994

Manometry

Catheter placed into the GI tract (esophagus, rectum, colon, small bowel) that measures for the presence of, or lack of, coordinated muscle contractions (peristalsis)



Manometry and Motility

- 33 patients underwent a major abdominal operation
- 3 lumen manometry catheter advanced through the nose into the jejunum
- MMC (motility), NJ drainage and bowel sounds were monitored.

- Shibata et al; World J Surg 1997

Manometry and Motility

- MMC in small intestine - 15 hours
- Bowel sounds present – 39 hours
- Peak volume of NJ fluid – 30 hours
- Flatus – 70 hour
- Shibata et al; World J Surg 1997

Jejunal Manometry Readings and Feeding Tolerance

- 29 major abdominal surgery patients
- Jejunostomy for manometry catheter
- Jejunal manometry readings day 1, 3, 5
- Tube feeding within 24 hours
- Goal at day 3
- Tolerance determined by surgeon (when to shut off or hold the tube feeding)

Jejunal Manometry and Feeding Tolerance

- Intolerant Group (52%)
 - Not to goal by day 3
 - Poor initial jejunal manometry readings
 - Greater bowel sounds
 - Greater abdominal distention

- Miedema et al, Dig Dis Sci 2001

Abdominal Distention and Bloating



Enteral Feeding Stop Signs

- 400 patients receiving enteral feeding
- Mean time to start of EN in ICU – 3.1 days
- 91% delivered via nasogastric tube
- **Stop Signs**
 - Gastric residual – 39%
 - Constipation - 15.7%
 - Diarrhea – 14.7%
 - **Abdominal distention – 13.2%**
 - Vomiting - 12.2%
 - Regurgitation – 5.5%

- Montejo et al; Crit Care Med 1999

Abdominal Distention and Bloating

- Often used as bedside tools to decide if enteral feedings should be initiated, reduced in volume or stopped

Abdominal Distention and Bloating

- 30% of people in a US survey had a regular feeling of bloating
- 75% of these people quantified their bloating as severe

• Thompson et al; Functional Intestinal Disorders, 2000

Pathophysiology of Bloating Four Factors

- Subjective sensation
- Objective girth changes
- Volume of intra-abdominal contents
- Abdominal wall muscular activity

Does Bloating Equal Abdominal Distention?

<u>Study</u>	<u>Device</u>	<u>Y/N</u>
• Ponyard et al	Tape measure	No
• Maxton et al	Tape measure	Yes
• Sullivan et al	CT scan	Yes
• Lea et al	Plethysmography	Yes

Subjective Sensation

- Visceral hypersensitivity – a defect on the enteric and central nervous system resulting in increased sensations from the GI tract. Commonly seen in the IBS patient population

Abdominal Wall Activity

- Shape of abdominal wall influenced by the vertebral column, anterolateral muscles, diaphragm and pelvis.
- Even without volume changes in the gut, subtle changes in body position can create new abdominal distention.

Intraluminal Gas

- Total volume at any one time is 100 – 200 ml
- Complicated process of gas input and output
- Gas in GI tract
 - Swallowing
 - Chemical reactions
 - Fermentation
 - Diffusion (from blood)

Do Patients With Bloating Have More Intestinal Gas?

<u>Study</u>	<u>Method</u>	<u>Y/N</u>
Lasser et al	Washout	N
Serra et al	Washout	N
Calderella et al	Washout	N
Chami et al	X-ray	Y
Koide et al	X-ray	Y
Poynard et al	X-ray	Y
Maxton et al	CT scan	N

Can Intestinal Gas be Treated

- Simethicone
- Charco-caps
- Digestive enzymes
- Probiotics
- Dietary change

- Very little data with no definitive value

IBS and Intraluminal Gas

- 28 patients with IBS and 14 volunteers
- Infusion of gas into jejunum 12ml/min for 2 hours
- IBS
 - 420 ml gas left
 - Pain score 2.7 (0-6)
 - **Girth increased 8 mm**
- Controls
 - 46 ml gas
 - Pain score 0.4
 - Girth increased 2 mm

Calderella et al, Gastro 2002

30 Minutes Post-Neostigmine Injection (Saline Placebo)

- IBS patients
- Gas retention reduced 380 ml
- Abdominal girth reduced 6 mm
- Pain score reduced 1.1 point

Calderella et al, Gastro 2002

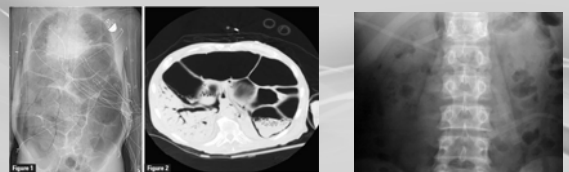
IBS and Bloating

- 20 IBS constipation
- 20 IBS diarrhea
- 10 alternators
- 20 healthy controls
- Abdominal girth measured over 24 hours
- IBS patients had more bloating ($p < .0001$)
- Bloating only correlated with distention in IBS constipation patients
- Maximal girth change – 12 cm

Houghton et al; Gastro, 2003

Abdominal Distention as a Marker of GI Intolerance

- No studies exist



Conclusion

- Enteral tolerance is usually under the microscope
- We have more reasons to stop EN than we do to initiate it
- Bowel sounds are a poor indicator of bowel function
- There is no data validating the importance of abdominal distention as a maker of GI intolerance
- Better tolerance markers need to be defined

Question #1

- GI Secretions on average total per day?
 1. 1 - 2 L/day
 2. 3 - 5 L/day
 3. 5 - 7 L/day
 4. There is no average

Question #2

- Nurses consider which of the following the most important factor of GI tolerance?
 1. Nausea
 2. Bowel sounds
 3. Flatus
 4. Abdominal pain

Question #3

- Following abdominal surgery, motility returns first to which organ?
 1. Esophagus
 2. Stomach
 3. Small Bowel
 4. Colon

