Post-Operative Feeding: Time to move on

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April 2013

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OBJECTIVES

• Explain the history of post operative feeding.
• Explain the "Enhanced Recovery After Surgery" pathways and the dietitian's role.
• Briefly address benefits of shortening the duration of pre-operative fasting.
• Discuss research that supports early feeding after surgery.
• Explain evidence supporting swifter advancement to regular diet after surgery.
• Explain a process improvement project that resulted in the design of a new diet for postoperative patients.
EARLY POST-OP TUBE FEEDING

• Since the late 70’s – early 80’s studies have been done that demonstrate early post operative tube feeding is safe.

• In some patient populations early EN has been reported to: reduce septic complications, wound infections, improve wound healing.

• Most benefit seen in burn, trauma, and surgical pts.

• More recently studies have shown the safety and benefit of early postoperative oral intake.
Figure 3. Odds ratio (OR) for complications (nausea and vomiting excluded).

<table>
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<tr>
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<th>Upper</th>
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Osland E et al. JPEN J Parenter Enteral Nutr 2011;35:473-487

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Figure 4. Odds ratios (ORs) for mortality.

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<tr>
<th>Study</th>
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**POOLED**

|                | 5 of 623 | 11 of 617 | 0.71 | 0.32 | 1.56 |

Favor early      Favor traditional

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Figure 5. Odds ratios (ORs) for anastomotic leak.

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<th>OR</th>
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**Figure 7. Days to passing flatus.**

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**POOLED**

| N   |     |       |     |       | -0.42| -1.12 | 0.28 |

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Figure 8. Days to first bowel motion.

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Figure 9. Length of stay (days).

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Osland E et al. JPEN J Parenter Enteral Nutr 2011;35:473-487

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TRADITIONAL POST OP

Fasting

Patient involvement = passive

Bedrest
Fast Track = Enhanced Recovery After Surgery (ERAS)

- Originated in Europe.
- ERAS or modifications of it include up to 20 perioperative interventions\(^1\).
- Mostly in colorectal surgery patients. Also in gastrectomy\(^1\), AAA repair\(^2\), gynecologic, hepatocopancreatic\(^3\), laryngectomy, urology.
- Use of protocols - earlier return of GI function and shorter LOS by 1-4 days.
- Associated with reduction in length of hospital stay, readmissions, reoperations, improved pain control, improved patient satisfaction and less cost.
- Institutions slow to implement ERAS\(^4\).

Length of Hospital Stay in Elective Colorectal Surgery - RCTs

- Traditional
- Enhanced

Adamina et al. Meta analysis

- Anderson et al UK, TC/14 ERP
- Delaney et al USA, TC/31 ERP
- Gatt et al UK TC/19 ERP
- Khoo et al TC/35 ERP
- Serclova et al TC/51 ERP
- Muller et al TC/76 ERP
Cost Differences between pre ERAS and post ERAS

Figure 1 Main elements of the ERAS protocol.
ENHANCED RECOVERY AFTER SURGERY (ERAS) INCLUDES:

- Preoperative patient education
- Pre-op carb solution
- Immediate removal of NGT
- Early food intake
- Chewing gum and laxatives
- Meds to prevent nausea and vomiting
- Limiting IV fluids given
- Oral nutritional supplements until discharge
- Immediate postoperative mobilization

Fearon et al.  Vlug et al 2011
WHAT ABOUT PREOPERATIVE FASTING?

• Tradition – NPO after midnight.

• Anesthesia increases risk of pulmonary aspiration.

• Anesthesiology associations are recommending more liberal guidelines.¹

• Allow clear liquids up to 2 hrs before surgery. Solids up to 6 hrs before surgery.

• Reduced preop hunger, thirst, anxiety².

¹ American Society of Anesthesiology and Soreide et al. ² Brady et al.
PRE-OP CARB LOADING

- Carbohydrate-containing IV fluids or oral liquids reported to reduce catabolic response to surgery\(^1\).
- Improved glycogen stores and insulin sensitivity postoperatively\(^3\).
- Does reduce thirst and anxiety\(^3\)
- Some studies tested carbohydrate and protein.

- 12.5 g/100 mL carbohydrates  285 mOsm/kg
- 12% monosaccharides
- 12% disaccharides
- 76% polysaccharides (maltodextrins)

HOW THIS THEORETICALLY WORKS

• Patient enters surgery in fasted or catabolic state. Glycogen stores are depleted.
• Fasting AND surgery cause increased stress hormones and cytokines which cause insulin resistance.
• Hyperglycemia - gluconeogenesis
• Protein breakdown increases
• Negative nitrogen balance
• Preoperative carbohydrate reduces period of fasting.
• Reduces loss of glycogen stores – reducing catabolism.
• Reduces postoperative insulin resistance and levels of stress hormones and cytokines.
POST-OPERATIVE NUTRITION

- Traditional approach – NPO until return of “bowel function”
- Possibly leaving in NGT for decompression of the stomach.
- After “bowel function” returns, remove NGT, start ice chips or clear liquid diet and then “advance as tolerated”.

THIS IS WHY

• Concern about:
  • Anastomotic breakdown and then fistulas or wound dehiscence due to distended bowel from increased volume from enteral nutrition and/or GI secretions.
  • Or aspiration due to ileus and subsequent pneumonia.
ILEUS

- Greek – *eileos* – intestinal colic from *eilo* = to roll tight
- Paralytic or adynamic ileus vs mechanical
- Characterized by:
  - abdominal pain, distention
  - No stool or flatus
  - Emesis
POST-OP ILEUS (POI)$^1$

- “Transient cessation of coordinated bowel motility after surgical intervention, which prevents effective transit of intestinal contents or tolerance of oral intake” $^2$

- Primary POI – not due to complications of surgery$^1$.

- Secondary POI – due to infection, anastomotic leak, obstruction$^1$.

1. Carroll et al. 2. Kehlet et al
After surgery and without feeding, motility usually returns within:

- 6-12 hours in the small bowel
- 12-24 hours in the stomach
- 48-72 hours in the colon

Prolonged POI > 3-5 days

http://www.medscape.com/content/2004/00/48/28/482837/482837_fig.html
RETURN OF BOWEL FUNCTION

- Presumed resolution of ileus often based on:
  - Presence of bowel sounds
  - Passage of flatus
  - Bowel movements

- However, lack of bowel sounds, flatus or stool are not diagnostic for ileus.

- “Neither the presence nor absence of bowel sounds and evidence of passing flatus or stool is needed prior to the initiation of EN”. ASPEN guidelines.

Behrens et al; Binderow et al; Bufo et al, Feo et al; Seven et al.
Problems with relying on “return of bowel function”

- No good marker for measuring the return of bowel function.

- Patients have been successfully fed prior to the return of bowel sounds, flatus and bowel movements.

- Initiating feeding could stimulate the return of bowel function.

- The classic time frames for return of bowel function after surgery based on not feeding.
**NASOGASTRIC TUBES (NGT)**

- Postop use of NGT does not reduce postop nausea or vomiting \(^1\); anastomotic leaks \(^2\).
- Reducing use of NGT postoperatively shortens postop ileus, reduces pneumonia \(^3\).
- Enhanced Recovery After Surgery Protocol - avoid NGT.

1. Cheatham et al and Kerger et al.
2. Cheatham et al.
3. Nelson et al.
COLONIC MOTILITY ¹

- 23 patients average age 59

- All had laparotomy for colon surgery. Same anesthesia and bowel prep the day prior to surgery.

- Motility measured with barostat and manometry.

- Study group: Post op day 1 and 2 – liquid meal

- Increased bowel sounds and colonic motility after meals in study group.

¹ Kasparek et al.
## GI EFFECTS OF OPIOIDS

### Pharmacologic
- Reduced gastric emptying
- Inhibition SB propulsion
- Inhibition of LB propulsion.
- Increased anal sphincter tone, impaired reflex relaxation with rectal distention
- Diminished GI secretions, increased water absorption

### Clinical
- Increased gastroesophageal reflux
- Delayed absorption
- Incomplete evacuation, bloating, abd distention
- Impaired ability to evacuate bowel
- Hard, dry stool

*Goodman and Gilman’s The Pharmacologic Basis of Therapeutics*
MEDICATIONS

- Post-op nausea, vomiting, ileus more prevalent in the past \(^1\).
- Use of low amounts of local anesthetics + epidural opiates reduces ileus \(^2\).
- Conflicting, unimpressive results with pro-kinetics (IV metoclopramide, IV erythromycin).
- No RCT using laxatives alone.
- Avoiding opioids like morphine recommended.
- Alvimopan (Entereg), a mu-opioid receptor antagonist, can reduce POI by 28 hrs.\(^3\)

DO WE NEED TO BE SO CAUTIOUS?

- After laparoscopic surgery, diets are advanced within 24-48 hours regardless of bowel function.
- Quicker return of colonic function.
- Laparoscopic surgery – 30% reduction in length of POI and hospital stay.

- Clinical trials have assessed early postoperative feeding following open procedures.

1. Gervaz et al.
EARLY POST-OP FEEDING STUDIES

- Most studies done in elective colorectal surgery pts. ¹
- The majority of trials have shown:
  - Early removal of NG tubes
  - Earlier initiation of oral diet
  - Quicker progression to regular diet
  - No more serious complications
  - In some trials also shorter LOS
  - Some increased nausea

¹ Behrns et al; Bufo et al; Difronzo et al; Lewis et al; Petrelli et al
NOT FOR EVERYONE

Studies have shown ERAS or early feeding is not for everyone:

  COPD, elderly?

Many studies excluded patients who:

  • had emergent GI surgery.
  • had combined surgeries.
  • Other studies excluded patients with: prior intestinal resection, projected prolonged LOS, perf or abscess, need for parenteral nutrition.
Post Ostomy

- GI studies included patients with new anastomoses and with new ostomies.
- Hartmann’s pouch, abdominoperineal resection always include ostomy.
Elective radical gastrectomy for gastric cancer

ERAS group (n=91) liquids on POD #2. Soft solid food on POD #3.

Conventional group (n=100) liquid diet on POD #4 with slow advancement to soft diet.

The first days of oral intake, oral intake recovery, flatus, and stool were significantly earlier in the ERAS group (n = 91) than in the conventional care group (n = 100).

No difference in aspiration or anastomotic leak.

Yamada et al
OTHER TYPES OF SURGERIES

- Gynecologic
- Cardiac
- Urology
- Otolaryngology

All showed early feeding is safe.

1. Charoenkwan et al; Minig et al; Pearl et al; Steed et al.
2. Miedama et al
3. Pruthi et al
4. Seven et al.
TRADITIONAL DIET ADVANCEMENT

- Ice chips
- Clear liquids
- Full Liquids
- Soft
- Regular
POST-OPERATIVE DIET PROGRESSION: CLEAR LIQUID DIETS

• Why?
• Based on theory that clear liquids are more easily tolerated than full liquids or solids.
• Also to provide hydration and minimize GI secretions.
• Jeffrey et al randomized patients to clear liquids vs. regular diet after open abdominal surgery – no diff in nausea or vomiting.
POST-OP DIET PROGRESSION

- Studies have examined various postoperative diet progressions.

- In all studies, the most progressive study group fared as well, if not better than the traditional diet group.

- No proof that post-op patients benefit from starting with clears, then advancing step-wise to a regular diet.
WHAT IS THE PREFERRED TIMING OF SOLIDS?

• Allowed water, tea immediately after NGT removal after open & lap colon surgery.

• Then fed based on their appetite & preferences.

• Postop Day 1 – 27% requesting & tolerating solids

• Postop Day 2 – 81.3%    Postop Day 3 – 97.1%

• Kawamura 2009
145 patients allowed to eat within 24 hrs of colorectal surgery. Their choice.

Postop Day 1 – toast (80%), juice (75%), broth (73%), fruit (73%), potatoes (73%), egg (70%), coffee/tea (64%), ice cream (64%), crackers (64%).

Postop Day 2 – cooked vegetables, hot cereal, casseroles also chosen.

Yeung et al 2009
AN EVALUATION OF THE POST-OPERATIVE DIET IN ELECTIVE COLORECTAL SURGERY PATIENTS AT THE UNIVERSITY OF VIRGINIA HEALTH SYSTEM (UVAHS)

RACHEL CORNETT, MS, RD
Objective 1: Establish baseline data on UVAHS’s practice for post-operative feeding in elective colorectal surgery patients.

Objective 2: Determine perceived food and beverage tolerances of elective colorectal surgery patients and develop a patient-selective “Post-Surgical” diet to implement for future patients.
RESULTS

• Timing of diet after surgery was evidence-based, starting by POD 1.

• Diet advancement was slow, occurring between POD 2-3 and was not typically advanced to a regular diet.
DISCUSSION

• Our results were similar to other studies:
  • Patients preferred more advanced diets than clear liquids after surgery.

• An appropriate self-select diet immediately following surgery includes: coffee/tea, fruit juice, regular soups, saltines, toast, muffins, graham crackers, vanilla wafers, fresh fruit, canned fruit, applesauce, cooked vegetables, potatoes, eggs, ice cream, pudding, yogurt, jello, and popsicles.
  • Many of the same foods as other studies.
GUM CHEWING

• “Sham feeding”
• To stimulate a cephalic-vagal response and reduce postoperative ileus.
• Multiple RCTs \(^1\) have been done on the effects of gum-chewing on postoperative ileus.
• In elective colorectal surgery patients, gum chewing 3x/day for 5-60 minutes starting on POD #1 significantly shortened time to first flatus, first stool and resulted in shorter LOS \(^2\).

1. Kouba et al; Quah et al; Schuster et al; Choi et al
2. Vasquez et al.
CONCLUSION

• How we feed patients after surgery usually is not based on scientific evidence.
• The "Enhanced Recovery After Surgery" pathways have shown that early feeding is possible and safe.
• Shortening the duration of pre-operative fasting and adding preop carbohydrate-containing clear beverages may improve clinical outcomes and patient satisfaction.
• The traditional diet progression from one level of diet to the next is not supported by evidence.
• Patients often want and tolerate solids after surgery.
• Developing a QI project with this focus can help change practice.
THANK YOU!