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Webinar Series

Nutrition Support for the Bariatric Surgery Patient: When and Why Nutrition Support is Needed

May 6, 2015

Presenters:

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Moderator:
James M. Rippe, MD – Leading cardiologist, Founder and Director,
Rippe Lifestyle Institute

Approved for 1 CPE (Level 2) by the Commission on Dietetic Registration, credentialing agency for the Academy of Nutrition and Dietetics.

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Today's Faculty

- Kellene A. Isom, MS, RD, LDN
  Bariatric Program Manager and Senior Bariatric Dietitian
  Center for Metabolic Health and Bariatric Surgery
  Brigham and Women's Hospital - Boston, MA

- Kris M. Mogensen, MS, RD, LDN, CNSC
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Nutrition Support for the Bariatric Surgery Patient

Learning Objectives

- Outline the four types of bariatric surgery and the mechanisms by which they affect nutritional status.
- List indications for initiation of nutrition support therapy in the bariatric patient and determine appropriate mode of nutrition support therapy (enteral vs. parenteral nutrition).
- Illustrate nutrition care considerations necessary when working with bariatric patients on nutrition support therapy.
- Apply nutrition support therapy across the spectrum of care for bariatric surgery patients and identify resources available to registered dietitian nutritionists working with bariatric patients on nutrition support therapy.

Nutrition Support in the Bariatric Patient: When and Why Nutrition Support is Needed

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Center for Metabolic and Bariatric
Brigham and Women's Hospital

Kris M. Mogensen, MS, RD, LDN, CNSC
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Outline

- Bariatric procedures have nutritional concerns
- Indications for nutrition support therapy
- Nutrition care considerations
- Application of nutrition support therapy (case study)

What is Weight Loss Surgery?

A group of *'bariatric and metabolic'* surgical operations that impact the *physiological regulation of body weight and improve morbidity and mortality* rates.

Types of Bariatric/Metabolic Procedures

- **Gastric/Restrictive**
  - Restricts total amount of food that can be eaten at one time; no alteration of food pathway
    - Laparoscopic gastric banding
- **Combination**
  - Gastric manipulation
  - Neural/hormonal changes
    - Roux-en-Y gastric bypass (RYGB)
    - Sleeve gastrectomy (SG)
- **Malabsorptive**
  - Malabsorbtion of calories and micronutrients
    - Biliopancreatic Diversion (BPD) w/ or w/o Duodenal Switch (BPD/DS)

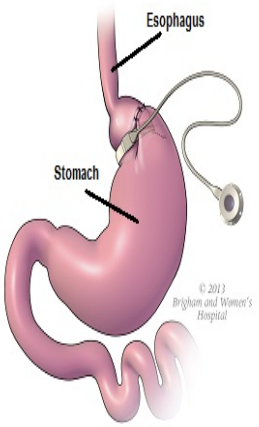
Summary of Mechanisms

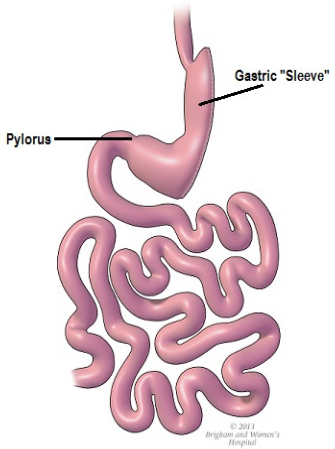
Mechanism	LAGB	LSG	RYGB	BPD
Gastric restriction	+	+	+	+
Modulation of GI hormones	-	+	+	+
Macronutrient Malabsorption	-	-	-	+
Micronutrient Malabsorption	-	+	+	+
% Excess Weight Loss	**40-45%**	**50-60%**	**60-70%**	**60-80%**

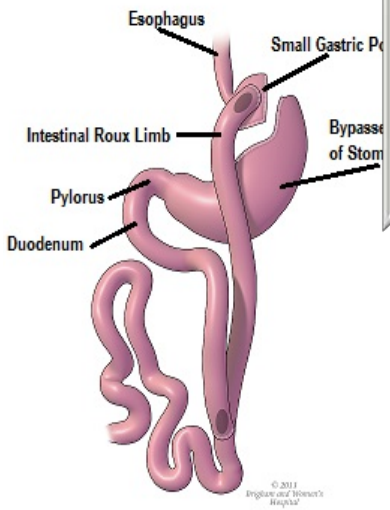
Post-operative Micronutrient Supplementation

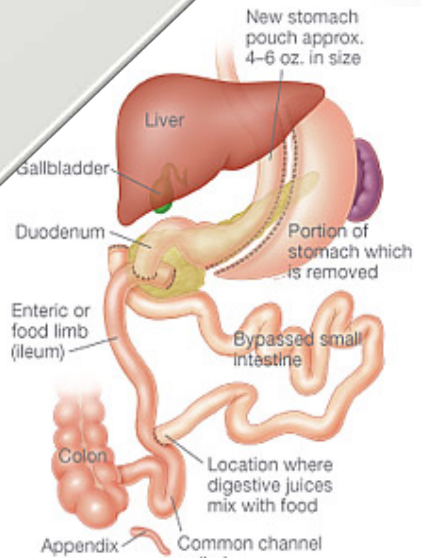
Lower Risk → **Higher Risk**

- Adjustable Gastric Banding
- Vertical Sleeve Gastrectomy
- Roux-en-Y Gastric Bypass
- Biliopancreatic Diversion/Duodenal Switch









Altered Absorption of Micronutrients

Vitamin/Mineral	Lab Monitoring	BPD/DS	RYGB	SG	LAGB
Calcium	Bone Density*	✓	✓	✓	✓
Iron	Fe panel, Ferritin, TIBC	✓	✓	✓	✓
Vitamin B12	Vitamin B_{12}, MMA	✓	✓	✓	
Folate	RBC Folate	✓	✓		
Thiamin	Serum Thiamin	✓	✓		
Vitamin D**	25-OH-Vitamin D & Serum PTH	✓	✓	✓	✓
Zinc	Serum or Plasma Zinc	✓	✓		
Copper	Serum Copper and Ceruloplasmin	✓	✓		
Vitamin A, E, and K	Plasma Retinol, Plasma Alpha Tocopherol, and Prothrombin Time (PT)	✓			

*In peri- or post-menopausal women

**Often low in obese patients and should be assessed and repleted prior to surgery

Aarts et al. Obes Surg. 2011; Aills, et al. SOARD, 2008; Gehrer, et al. Obes Surg. 2010; Mechanik, et al. SOARD. 2013; Moize, et al. JAND, 2013.

Reported Micronutrient Deficiencies in Recipients of Bariatric Surgery

Nutrient deficiency	Reported symptoms associated with the deficiency
Calcium	Usually asymptomatic unless severe deficiency has occurred, which can cause altered mental status, tetanus, generalized weekness,
Cobalamin	General weakness, anemia, especially megaloblastic anemia unless iron deficiency is also present
Copper	Fatigue, unexplained bleeding under the skin, anemia, cardiomegaly.
Folate	General weakness, anemia, especially megaloblastic anemia unless iron deficiency is also present, GI discomfort
Iron	Tiredness, short of breath, general malaise, anemia, especially microcytic
Thiamin	Numbness sensation in fingers and/or toes, neuropathy, irritation, beri-beri, Wernicke encephalopathy in severe cases
Vitamin A	Night blindness
Vitamin D	Usually asymptomatic, possibly bone and joint pain, depression, laboratory test may reveal hyperparathyroidism
Zinc	Non-specific symptoms, skin disorder, hair loss, dysguesia, anemia unexplained by iron, folate, or cobalamin deficiency

Data extracted from reports involving Roux-en-Y gastric bypass, adjustable gastric banding, and biliopancreatic diversion

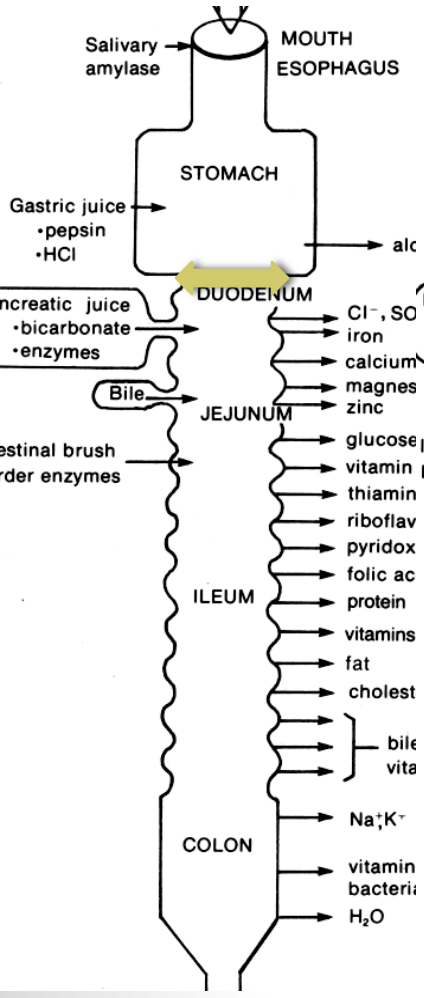
Nutrient Concerns

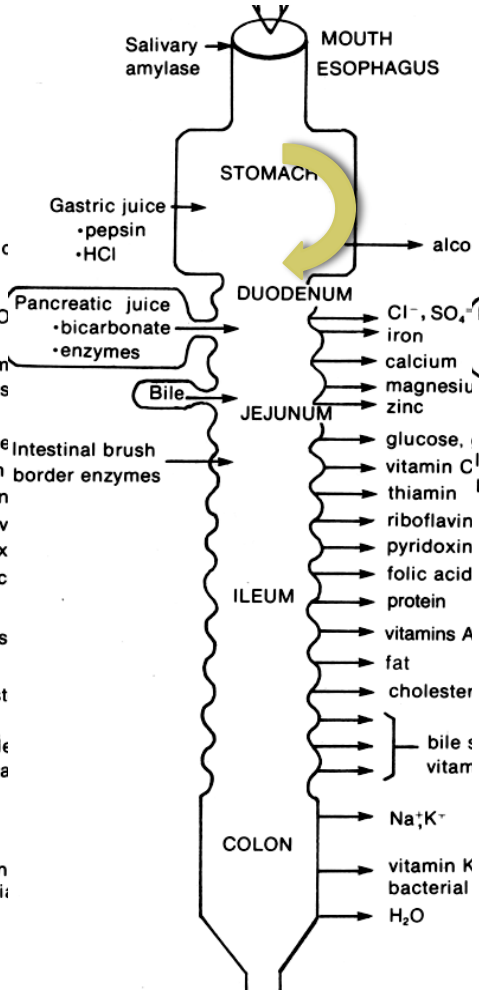
Adjustable Gastric Banding

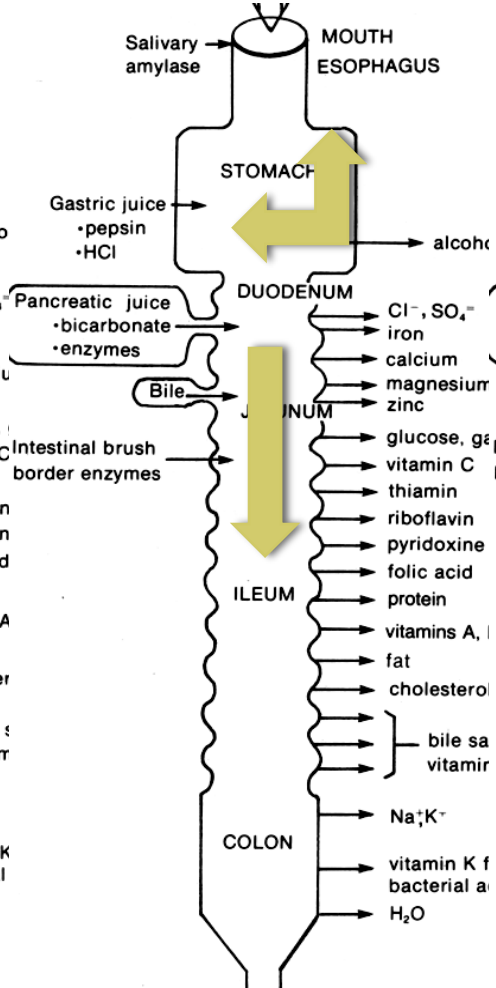
Vertical Sleeve Gastrectomy

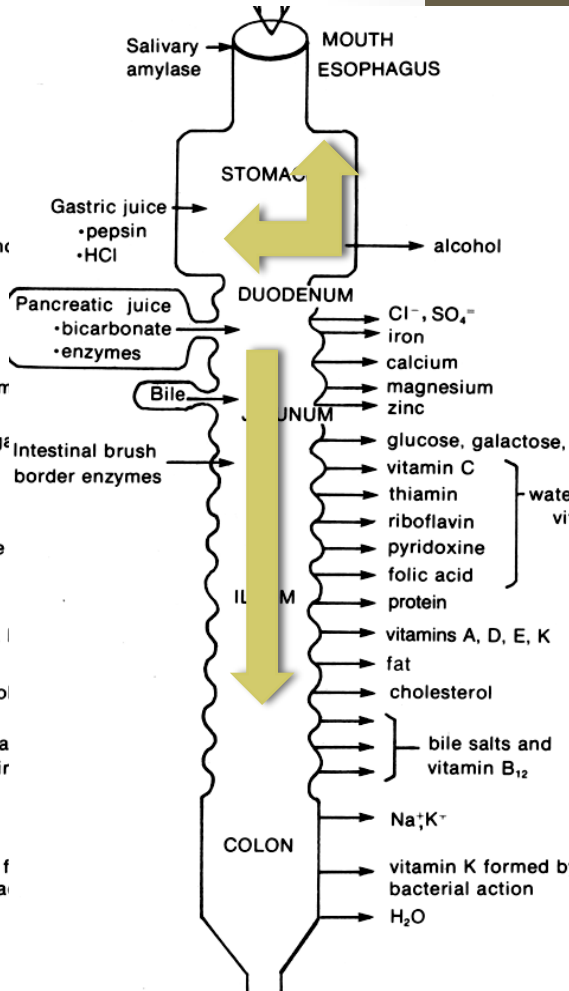
Roux-en Y Gastric Bypass

Biliopancreatic Diversion/Duodenal Switch









Standard Vitamin and Mineral Supplementation

Supplement	Dosage (RYGB, SG, AGB, BPD/DS)
Multivitamin with minerals (complete**)	100-200% DV
Calcium Citrate X 2-3/day Divided doses 500-600 mg max dose Vitamin D	1,200-1,500 mg/day (up to 2000 mg/day) 1800-2400 mg/day (BPD/DS) 400-800 to 3000 IU/day
Elemental iron not to be taken with calcium	18-27 mg/day elemental (can be provided in MVI) 45-60 mg/day menstruating females
Vitamin B_{12}	350-500 mcg/day orally/sublingual/nasal (can be provided in MVI) or 1,000 mcg/month intramuscularly
Zinc Copper	8 to 15 mg/day elemental*** 1-2 mg/day elemental***
Vitamin A Vitamin K	10,000 IU/day (BPD/DS) 300 mcg/day (BPD/DS)

*Patients with pre-operative or post-operative biochemical deficiency states are treated beyond these recommendations

**Must include B vitamins, folic acid, thiamin, zinc, copper, selenium, ADEK

***1 mg copper is recommended for every 8-15 mg elemental zinc

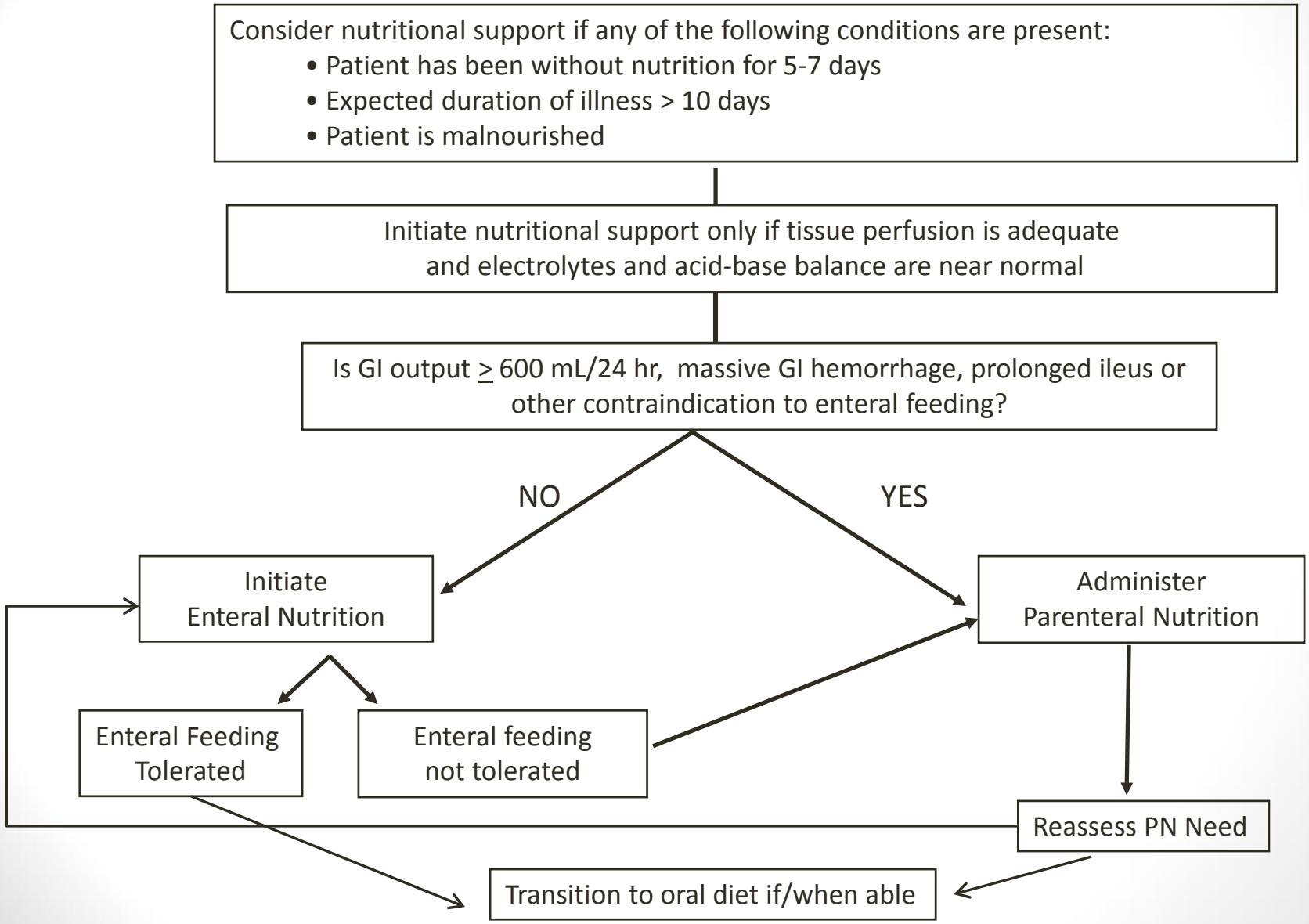
Aills, et al. SOARD, 2008; Mechanik, et al. SOARD, 2013

Post-operative Diet

	RYGB/SG/BPD/DS		AGB	
	Food	**Duration**	**Food**	**Duration**
Stage 1	Clear Liquid: low calorie, low sugar	1-2 days	Clear Liquid: low calorie, low sugar	1 day
Stage 2	Full Liquid: Five 8 oz servings of high protein, low sugar beverages	2 weeks	Full Liquid: Five 8 oz servings of high protein, low sugar beverages	2 weeks
Stage 3	Soft Foods: Advance as tolerated to smooth, soft foods after stage 2	3 weeks to 4 months	Soft Foods: Advance as tolerated to smooth, soft foods after stage 2	2 to 3 weeks
Stage 4	Solid Foods: Advance as tolerated after stage 3; healthy eating for life	Lifetime Maintenance	Solid Foods: Advance as tolerated after stage 3; healthy eating for life	Lifetime Maintenance
			Post Fill Protocol Every 6 weeks post-op	3-6 days following Fill

Indications for Nutrition Support Therapy

Brigham & Women's Hospital
Algorithm for Determining Route of Nutrition Support



Practical EN Indications

- Impaired ingestion (can't eat by mouth)
- Inability to consume adequate oral nutrition (can't eat enough by mouth)
- Impaired digestion, absorption, metabolism
- Severe wasting or depressed growth

Enteral Nutrition Indications: Bariatric Surgery Focus

- Inability to take oral nutrition for 7-10 days
  - 5-7 days in the ICU
  - Must have functional GI tract
- Enterocutaneous fistula where the enteral feeding tube can be inserted distal to the fistula
- Inadequate oral intake to meet metabolic demands
  - Trauma, burn, critical illness
- Significant malnutrition

General PN Indications

- Intestinal dysfunction
  - Intestinal ischemia
  - Intestinal obstruction
  - Paralytic ileus
  - Severe diarrhea (> 1 liter/day)
  - Severe malabsorption
  - Diffuse peritonitis
  - Intestinal failure

A.S.P.E.N. Board of Directors and The Clinical Guidelines Task Force. Guidelines for the use of parenteral and enteral nutrition in adult and pediatric patients. JPEN 2002

Parenteral Nutrition Indications: Bariatric Surgery Focus

- Inability to take oral or enteral nutrition for 7-10 days (5-7 days in the ICU)
- ECF where the where the feeding tube cannot be inserted distal to the fistula
- Ileus
- Intestinal obstruction/stricture
- Intractable vomiting and/or diarrhea
- Severe GI bleeding
- Severe malabsorption
- Severe malnutrition with inability to use the enteral route

Assessment of Nutritional Needs

Energy Requirements

- Questions to consider:
  - How far out is your patient from surgery?
  - What are your goals?
    - Weight loss, maintenance, or gain?
  - Is the patient hypermetabolic (and/or hypercatabolic)?
  - Is the patient in the ICU or on the floor?
  - Do you have access to a metabolic cart to measure your patient's energy expenditure?
  - If not, which equation to use?

A.S.P.E.N. Clinical Guidelines: Nutrition Support of Hospitalized Adult Patients with Obesity

Question 2: How Should Energy Requirements Be Determined in Obese Critically Ill or Hospitalized Non-ICU Patients? (Table 4)

Recommendation

2a. In the critically ill obese patient, if indirect calorimetry is unavailable, energy requirements should be based on the Penn State University 2010 predictive equation or the modified Penn State University equation if the patient is over the age of 60 years (strong).

Evidence Grade: High.

2b. In the hospitalized obese patient, if indirect calorimetry is unavailable and the Penn State University equations cannot be used, energy requirements may be based on the Mifflin–St Jeor equation using actual body weight (weak).

Evidence Grade: Moderate.

Choban et al, JPEN 2013

Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.).

C5. In the critically ill obese patient, permissive underfeeding or hypocaloric feeding with EN is recommended. For all classes of obesity where BMI is >30, the goal of the EN regimen should not exceed 60%-70% of target energy requirements or 11-14 kcal/kg actual body weight per day (or 22-25 kcal/kg ideal body weight per day). Protein should be provided in a range ≥2.0 g/kg ideal body weight per day for Class I and II patients (BMI 30-40), ≥2.5 g/kg ideal body weight per day for Class III (BMI ≥ 40). Determining energy requirements is discussed in guideline C1. (Grade: D)

McClave SA et al. JPEN 2009

Special Considerations for Critically Ill Obese Patients

- "Hypocaloric Feeding"
  - BMI > 30 kg/m^2:
    - 11-14 kcal/kg actual weight, or
    - 22-25 kcal/kg ideal body weight
    - Research done at BWH:
      - BMI 30-50, use 11-14 kcal/kg actual weight
      - BMI > 50, use 22-25 kcal/kg IBW
- Some recommend a trial of hypocaloric feeding for all obese patients, critically ill or not
- Remember, indirect calorimetry is best, if you have it available to you

McClave et al JPEN 2009
Choban et al JPEN 2013
Mogensen KM et al JPEN Epub April 20, 2015

Additional Energy Delivery Considerations

- Consider energy restriction carefully
- Consider the clinical situation:
  - Ambulatory, non-hypermetabolic
    - Consider providing what you'd normally provide if your patient was eating to promote healthy weight loss
  - Other complications may not be appropriate for energy restriction
    - Large wounds
    - Signs of wasting, malnutrition

Protein Requirements

- Various recommendations:
  - ICU setting
    - Class I and II Obesity: at least 2 g/kg IBW
    - Class III Obesity: at least 2.5 g/kg IBW
  - Non-ICU setting
    - AACE/TOS/ASMBS Guidelines:
      - 60g/day minimum
      - 1.5-2.1 g/kg IBW based on individual clinical situation
    - A.S.P.E.N. Guidelines:
      - At least 1.2 g/kg actual weight or 2-2.5 g/kg ideal body weight
- Monitoring is essential to be sure you are providing enough protein

McClave et al JPEN 2009
Mechanick JJ et al. Surg Obes Rel Dis 2013
Choban et al JPEN 2013

Fluid Requirements

- Consider use oral diet recommendations as a starting point:
  - >1500 mL/day
- Other options:
  - Age 18-50: 1500 mL for 1st 20 kg +20 mL/kg for each additional kg
  - Age >50: 1500 mL for the first 20 kg +15 mL/kg for each additional kg
  - Age 18-65: 35 mL/kg
  - Age >65: 30 mL/kg
  - 1500 mL/m^2 (need to calculate body surface area)
  - 1 mL/kcal

Unanswered question:
Which weight to use for weight-based calculations??

Fluid

Remember! Too much or too little fluid may harm your patient!

- Risk of dehydration:
  - Severe diarrhea
  - Fistula
  - Gastrostomy tube for obstructed patients
  - Vomiting

May need to replace losses!

- Risk of volume overload
  - CHF
  - ESRD
  - ESLD/ascites
  - Anasarca

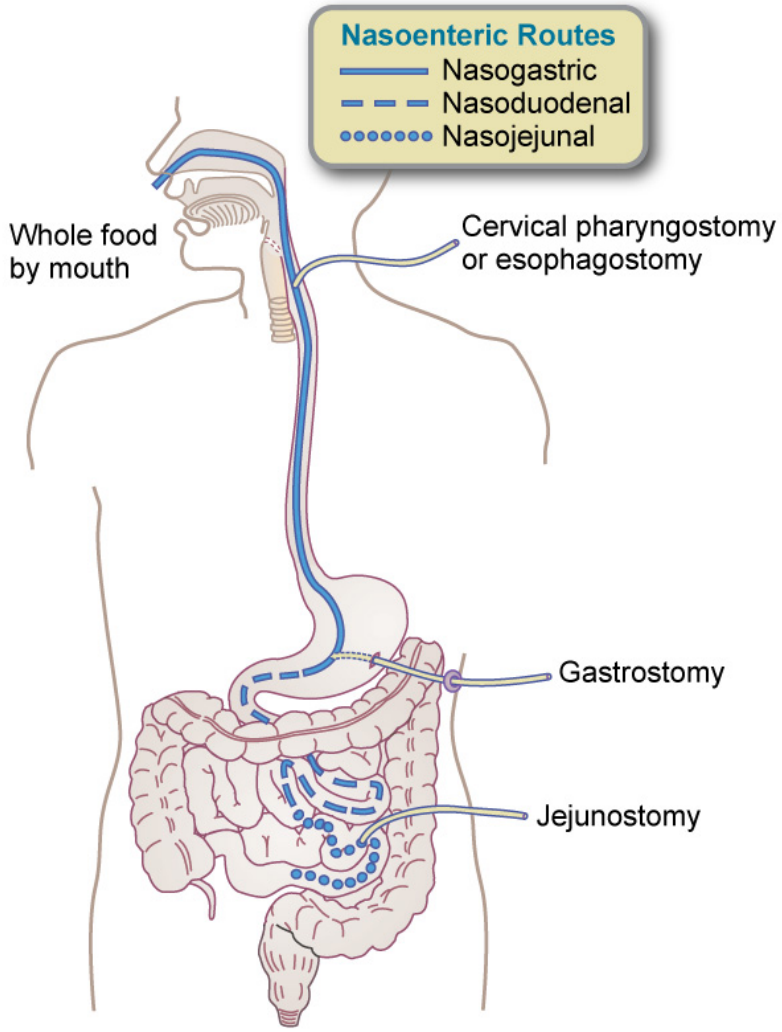
May need to restrict fluid!

Back to nutrition support options…

Enteral Nutrition Challenges in the Bariatric Surgery Patient

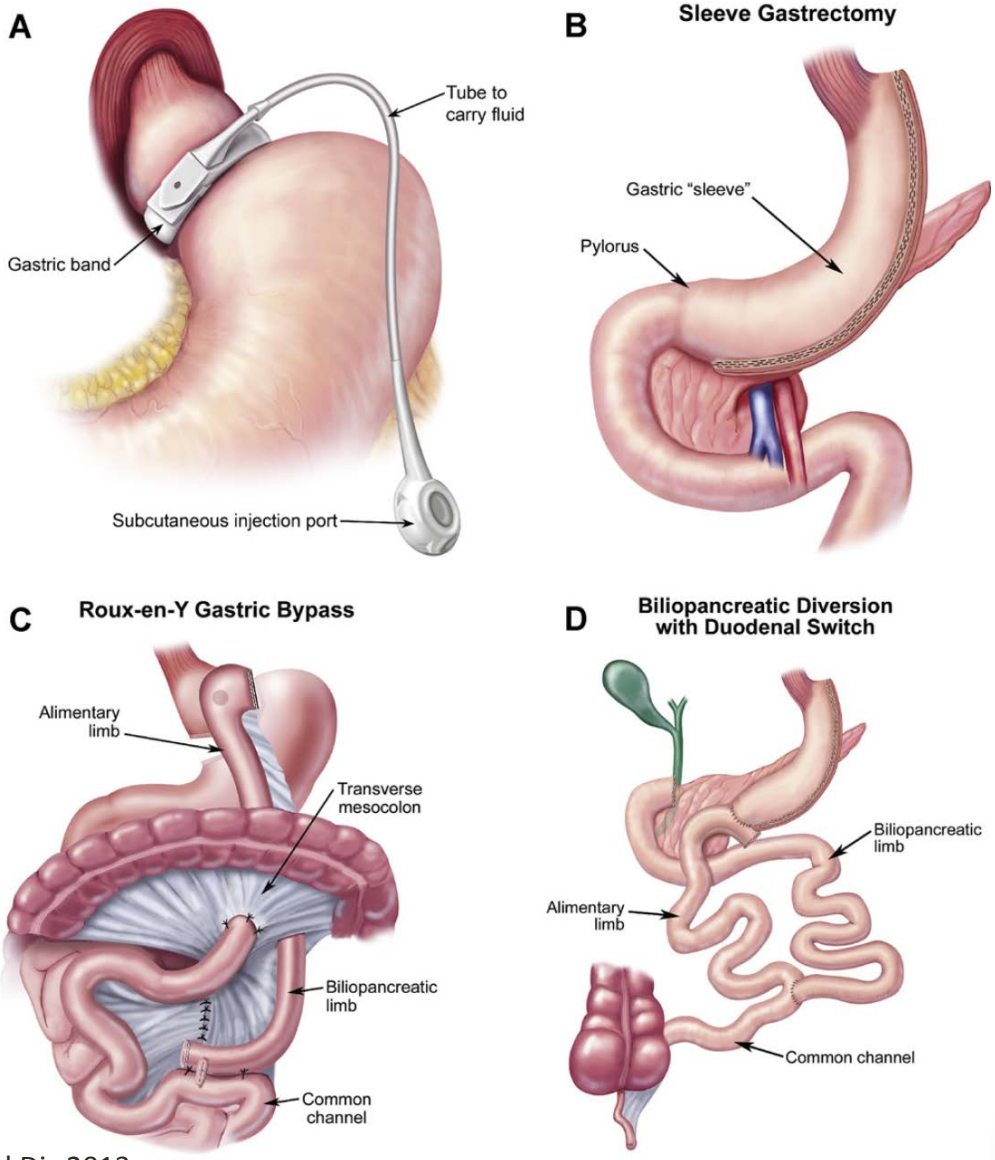
- Enteral access is probably the greatest challenge
  - Knowledge of the patient's actual procedure
  - Any complications that led to anatomical changes that would make enteral access difficult
- Need to work closely with the surgeon to determine if enteral access is feasible

Enteral Tube Placement



From Krause's Food and Nutrition Therapy, 12th edition.

Now, navigate a tube here!



Mechanick JJ et al. Surg Obes Rel Dis 2013

Enteral Nutrition Access

- What type of tube should be inserted into the patient?
- Depends on:
  - Anticipated length of time of enteral feeding
  - Risk for aspiration and/or tube displacement
  - Planned surgical intervention

Enteral Nutrition Access
(continued)

- Nasoenteric tubes
  - Short-term: up to 6-8 weeks
  - Need to work with the surgeon regarding optimal location
  - Considerations for nasogastric tubes:
    - Can the pt be safely fed into the pouch?
    - Is there concern for motility issues, vomiting, reflux, severe nausea?
  - Considerations for nasojejunal tubes
    - Direct visualization may be necessary

Enteral Nutrition Access
(continued)

- For longer term access:
- Percutaneous endoscopic gastrostomy (PEG)
  - Not really an option for RYGB
  - ?? for sleeve gastrectomy?
- Percutaneous endoscopic jejunostomy (PEJ)
  - Technically challenging
- Surgically placed enterostomies
  - If the pt is going to the OR, can the surgeon insert a gastrostomy tube into the excluded stomach?
  - Is a surgically-placed jejunostomy a better choice?

Formula Selection

- The tube is in place, so now what do you feed?
- Base your selection on:
  - Functional status of GI tract
  - Digestion and absorption capability of patient
  - Energy and nutrient content
  - Clinical considerations, such as fluid and electrolyte status and organ system function

Enteral Formulas

Formula Type	Characteristics
Standard Polymeric	• Intact protein, carbohydrate, fat • Some formulas have fiber • Generally for patients who have no problems with digestion or absorption
Semi-elemental	• Protein as peptides, carbohydrate and fat may be somewhat broken down
Elemental	• Macronutrients are essentially all “predigested”
Disease specific	• Designed for specific organ dysfunction

Basic EN Infusion Methods

Feeding method	Selected Indications
Continuous via pump	Critically ill ICU patient Jejunal feeding
Night cycle via pump	Jejunal feeding
Intermittent gravity drip	Gastric feeding Unable to tolerate rapid bolus
Bolus	Gastric feeding Ambulatory patient Ability to tolerate rapid infusion of formula

EN Infusion Methods: Bariatric Surgery Considerations

Feeding method	Consideration
Continuous via pump	Allow for controlled infusion into the pouch or small intestine May optimize enteral tolerance
Night cycle via pump	Allow for nutrition support over night and oral diet during the day
Intermittent gravity drip	Appropriate for feeding the excluded stomach for RYGB Not for small bowel feedings May not tolerate large volume into the pouch
Bolus	Appropriate for feeding the excluded stomach for RYGB Not appropriate for feeding the pouch or small intestine

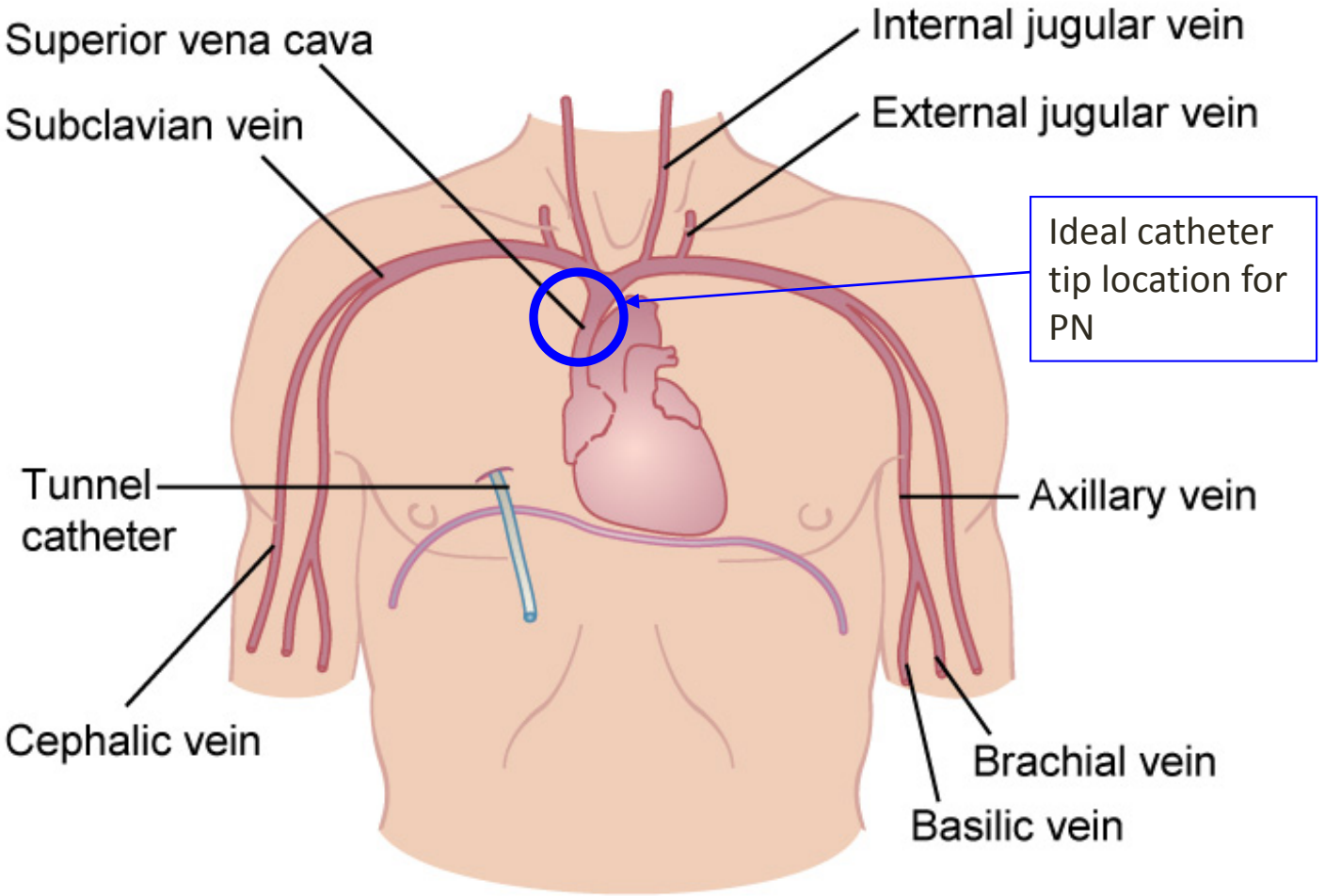
Monitoring

- GI symptoms:
  - Abdominal pain/distention
  - Nausea, vomiting
  - Constipation, cramps
  - Diarrhea
  - Esophageal reflux
- Pulmonary complications
  - Respiratory distress
  - Aspiration
- Hydration status
  - Urine output
  - Weight change
  - Input/output records
- Labs
  - Laboratory signs of dehydration
  - Electrolyte imbalances
  - Hyper/hypoglycemia
- Enteral access problems
  - Clog
  - Infection
- Response to nutritional therapy
  - Lab indicators
  - Strength, functional status
  - Wound healing
  - Correction of nutrient deficiencies

Parenteral Nutrition Challenges in the Bariatric Surgery Patient

- In some ways, not as much of a challenge compared to enteral nutrition
- Major issue is central venous access
  - If the patient has “good veins” may be easy to get access and start PN

Venous Sites from Which the Superior Vena Cava May Be Accessed



From Krause's Food and Nutrition Therapy, 12th edition

Venous Access Decisions

- Depends on duration of therapy
  - Short term therapy:
    - Peripheral vein for peripheral PN only
    - Peripherally inserted central catheter (PICC)
      - Appropriate for in hospital or home therapy
      - Appropriate for central PN
    - Percutaneously placed central venous catheter for patients with very poor peripheral access
      - Generally in hospital use only
  - Longer term therapy:
    - Tunneled catheter
    - Port

Two Types of PN

- Peripheral vs. central PN
- Decision process
  - Duration of therapy
  - Type of venous access
  - Status of peripheral veins
  - Energy and protein needs
  - Volume required

Peripheral PN (PPN)

- Must keep osmolarity ≤ 900 mOsm/L
  - Generally ≤ 4% amino acid concentration
  - ≤ 5% dextrose concentration
  - Upwards of 60% kcals from fat!
  - May need 3L of PPN to come close to just basal energy requirements
- High risk of thrombophlebitis
- Patient must have good peripheral venous access

Boullata JI et al. A.S.P.E.N. clinical guidelines: parenteral nutrition ordering, order review, compounding, labeling, and dispensing. JPEN 2014

Central PN

- Hyperosmolar solution, > 900 mOsm/L
- Can meet energy and protein needs in a concentrated volume
- Typically 20-30% kcals from fat
- Requires central venous access
  - Tip of the catheter must be in the superior vena cava

Mirtallo J et al. Safe practices for parenteral nutrition. JPEN. 2004

The PN Prescription

- Depends on the individual patient:
  - Type of venous access (central vs. peripheral)
  - Calculated calorie, protein, carbohydrate, fat, and fluid requirements
  - Individualize electrolytes
  - Daily multivitamins, trace elements

Electrolytes in PN

TABLE II
*Daily electrolyte additions to adult PN formulations**

Electrolyte	Standard Requirement
Calcium	10–15 mEq
Magnesium	8–20 mEq
Phosphorus	20–40 mmol
Sodium	1–2 mEq/kg
Potassium	1–2 mEq/kg
Acetate	As needed to maintain acid-base balance
Chloride	As needed to maintain acid-base balance

*Standard intake ranges based on generally healthy people with normal losses.

Mirtallo J et al. Safe practices for parenteral nutrition. JPEN. 2004

Parenteral Vitamins

TABLE III
*Daily requirements for adult parenteral vitamins**

Vitamin	Requirement
Thiamin (B_1)	6 mg
Riboflavin (B_2)	3.6 mg
Niacin (B_3)	40 mg
Folic acid	600 mcg
Pantothenic acid	15 mg
Pyridoxine (B_6)	6 mg
Cyanocobalamin (B_{12})	5 mcg
Biotin	60 mcg
Ascorbic Acid (C)	200 mg
Vitamin A	3300 IU
Vitamin D	200 IU
Vitamin E	10 IU
Vitamin K	150 mcg

*FDA requirements for marketing an effective adult parenteral vitamin product.[13]

Mirtallo J et al. Safe practices for parenteral nutrition. JPEN. 2004

Parenteral Trace Elements

TABLE IV
*Daily trace element supplementation to adult PN formulations**

Trace Element	Standard Intake[14,15]
Chromium	10–15 mcg
Copper	0.3–0.5 mg
Iron	Not routinely added
Manganese	60–100 mcg†
Selenium	20–60 mcg
Zinc	2.5–5 mg

*Standard intake ranges based on generally healthy people with normal losses.
†The contamination level in various components of the PN formulation can significantly contribute to total intake. Serum concentrations should be monitored with long-term use.

Mirtallo J et al. Safe practices for parenteral nutrition. JPEN. 2004

PN Monitoring & Complications

- Metabolic
  - Electrolyte imbalance
  - Hyper/hypoglycemia
  - Dehydration/overhydration
  - Metabolic bone disease
- Gastrointestinal
  - Cholestasis
  - Fatty liver
  - GI atrophy
- Infectious
  - Line sepsis
- Mechanical
  - Associated with the venous catheter itself
- Response to nutritional therapy
  - Lab indicators
  - Strength, functional status
  - Wound healing
  - Correction of nutrient deficiencies
  - Risk of nutrient excess

Case Study

Clinical Presentation

- 60 year old woman
- RYGB 10 years ago
- Found unresponsive at home, EMTs called
- Found to be hypotensive, febrile to 103.7 degrees F
- Admitted to the medical ICU
- Pt was in septic shock
- She had elevated liver function tests, concerning for a biliary source of sepsis
- CT scan was concerning for choledocholithiasis and possible cholangitis; gallbladder was surgically absent
- Ultrasound revealed a gallstone in the distal common bile duct

Clinical Data

Height	163 cm
Admission weight	85 kg
Pre RYGB weight	110 kg (10 years ago)
IBW range	55-61 kg (1959 Met Life tables)
% IBW	139%
BMI	32 kg/m^2
Diet history	Recent poor appetite Recent inability to consistently take vitamin/mineral supplements

Biochemical Data

Lab	Result	Normal range
Vitamin A	27.8	32.5-78 mcg/dL
Vitamin C	< 0.1	0.6-2.0 mg/dL
Vitamin D (25-OH-D)	6	20-80 ng/mL
Vitamin E	11	5.5-17 mg/L
B_{12}	1060	250-900 pg/mL
Folate	5.5	5.3-99 ng/mL
Copper	1.09	0.75-1.45 mcg/mL
Ceruloplasmin	29	26-60 mg/dL
Selenium	72	70-150 ng/mL
Zinc	0.5	0.66-1.1 mcg/mL

Nutrition Plan

- Use hypocaloric feeding guidelines:
  - Calories: 14 kcal/kg actual weight
  - Protein: 2 g/kg IBW
- Team inserted what they thought was an NGT
  - KUB showed tube was positioned in the jejunum
- Pt received tube feeding with a high-protein, low calorie enteral formula
- Micronutrient deficiencies corrected
- Pt needed additional free water
  - Team initially ordered large volume water boluses
  - Not appropriate to bolus into the jejunum!
- Eventually extubated, transferred out of the ICU, able to transition back to an oral diet

Practical Applications

- Screen patients for nutritional risk
- Consider nutrition support if unable to take an oral diet
  - Always consider EN first if the patient has a functional GI tract and able to insert a feeding tube
  - Consider PN if the patient has intestinal dysfunction or absolute contraindication to insertion of feeding tube
- Consult the bariatric surgery with any questions about GI anatomy
- Be aware of risks of micronutrient deficiencies
- Work with the bariatric dietitian for transition from nutrition support to an oral diet

Nutrition Support Resources

- Ayers P et al. A.S.P.E.N. Parenteral Nutrition Safety Consensus Recommendations. JPEN J Parenter Enteral Nutr. 2014;38:296-333
- Boullata JI et al. A.S.P.E.N. Clinical Guidelines: Parenteral Nutrition Ordering, Order Review, Compounding, Labeling, and Dispensing. JPEN J Parenter Enteral Nutr. 2014;38:334-377
- Mirtallo J et al. Safe Practices for Parenteral Nutrition. JPEN J Parenter Enteral Nutr. 2004;28:S39-S70. Errata JPEN 2006;30:177
- Bankhead R et al. Enteral Nutrition Practice Recommendations. JPEN J Parenter Enteral Nutr. 2009;33:122-167
- A.S.P.E.N. Board of Directors and the Clinical Guidelines Task Force. Guidelines for the use of parenteral and enteral nutrition in adult and pediatric patients. JPEN J Parenter Enteral Nutr. 2002;26(Suppl):1SA-138SA. Errata 2002;26:144.

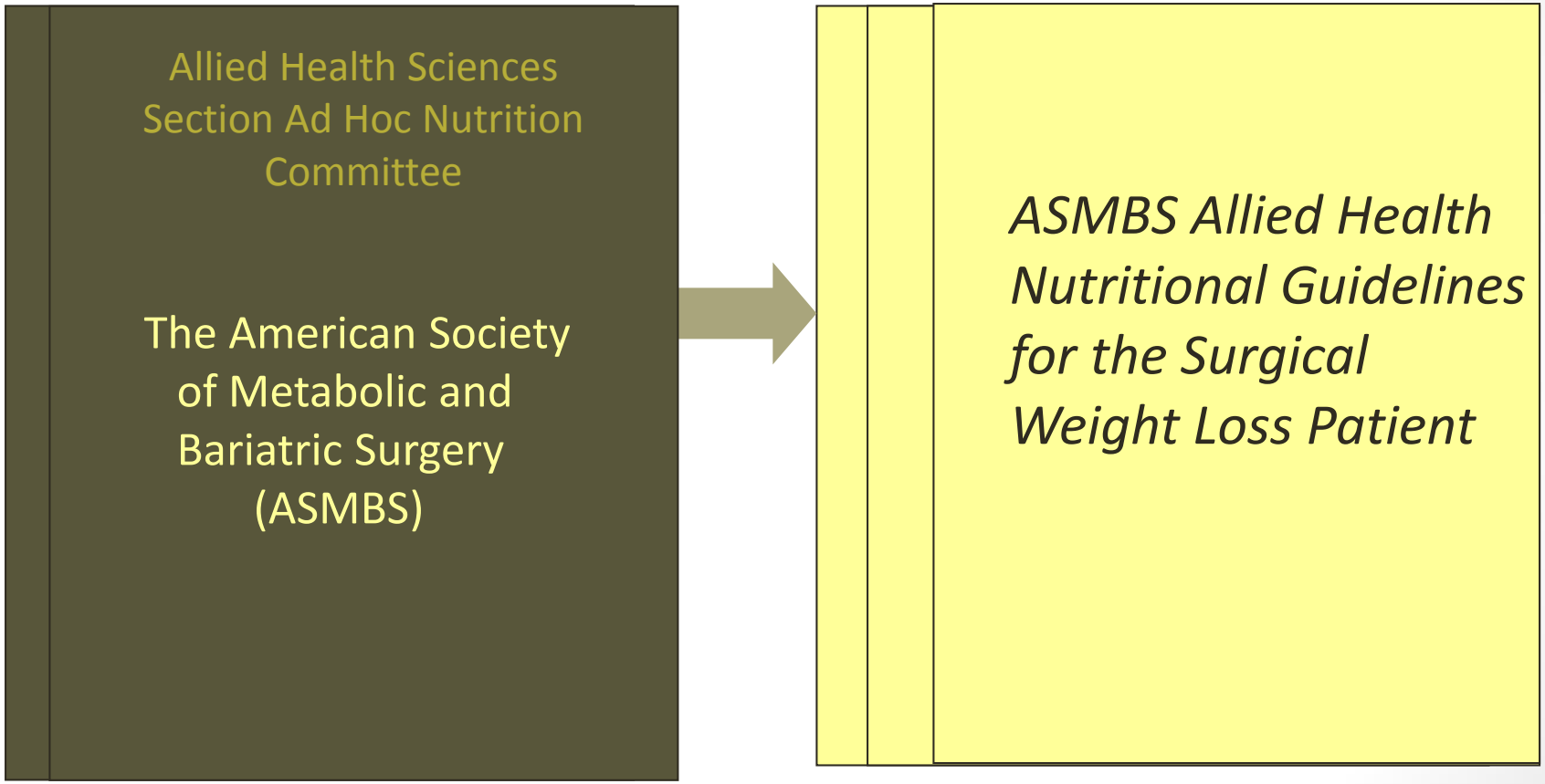
Nutrition Support Resources: Obesity/Bariatric Focus

- Mogensen KM et al. Validation of the Society of Critical Care Medicine and American Society for Parenteral and Enteral Nutrition Recommendations for Caloric Provision to Critically Ill Obese Patients: A Pilot Study. JPEN J Parenter Enteral Nutr. 2015. Epub April 20, 2015
- Choban P et al. A.S.P.E.N. Clinical Guidelines: Nutrition Support of Hospitalized Adult Patients with Obesity. JPEN J Parenter Enteral Nutr. 2013;37:714-744
- Mogensen KM. Nutrition support therapy for the bariatric surgery patient. Weight Management Matters. 2010;7:8-16
- Kumpf VJ, Slocum K, Binkley J, Jensen G. Complications after bariatric surgery: survey evaluating impact on the practice of specialized nutrition support. Nutr Clin Pract. 2007;22:673-678
- Kushner R. Managing the obese patient after bariatric surgery: a case report of severe malnutrition and review of the literature. JPEN J Parenter Enteral Nutr. 2000;24:126-132
- Pigeyre M, et al. Laparoscopic gastric bypass complicated by portal venous thrombosis and severe neurological complications. Obes Surg. 2008; 18:203-207
- Barbour JR, et al. The practices of pancreatic resection after Roux-ex-Y gastric bypass. Am Surg. 2008;74:729-734

Additional Resources

- The American Society for Parenteral and Enteral Nutrition
  - www.nutritioncare.org
- Dietitians in Nutrition Support Dietetic Practice Group of the Academy of Nutrition and Dietetics
  - http://www.dnsdpg.org/
- Oley Foundation
  - Important support group for patients (consumers) on long-term nutrition support
  - http://www.oley.org/

Bariatric Resources: Practice Guidelines

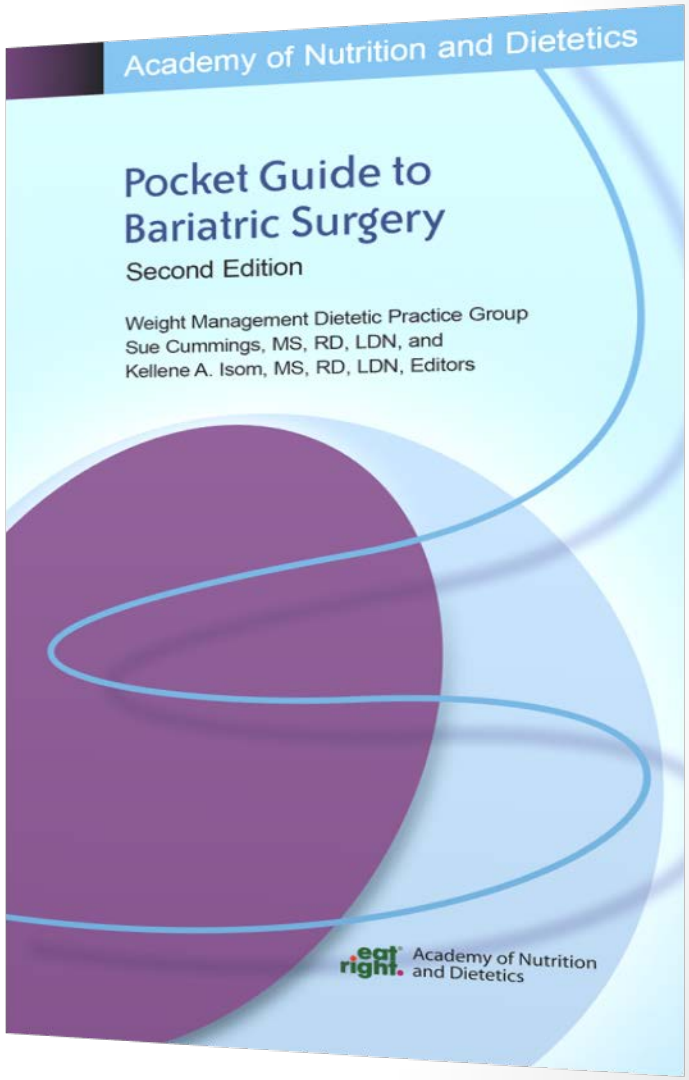


Mechanick JI, Kushner RF., et al. Endocr Pract. 2008
Mechanik JI, Youdim A, et al. SOARD,2013
Aills L, et al. SOARD, 2008

The 2nd Edition of the Academy of Nutrition and Dietetics Pocket Guide to Bariatric Surgery

What's New?

- Nutrition care for Sleeve Gastrectomy procedure
- Pre-operative weight loss and pre-operative nutrition assessment
- Pre- and post-op care of bariatric patients on renal dialysis
- Post-op care of patients with type 1 diabetes
- Weight regain prevention and treatment after bariatric surgery
- Sample outlines of a standardized pre- and post-op Nutrition Care Program



Bariatric Resources

- Aarts EO, Janssen IM, Berends FJ. The gastric sleeve: losing weight as fast as micronutrients? *Obes Surg*. 2011 Feb;21(2):207-11. doi: 10.1007/s11695-010-0316-7.
- Aills L, et al. Surgery for Obesity and Related Disease. (2008);(4)S73-S108.
- American Society for Metabolic and Bariatric Surgery
  - ASMBS.org
- Gehrer S, Kern B, Peters T, Christoffel-Courtin C, Peterli R. Fewer nutrient deficiencies after laparoscopic sleeve gastrectomy (SG) than after laparoscopic Roux-Y-gastric bypass (LRYGB)-a prospective study. Obes Surg 2010; 20:447–453.
- Mechanik J, et al. AACE/TOS/ASMBS Bariatric Surgery Guidelines, Endocr Pract. 2008;14(Suppl 1).

Bariatric Resources

- Mechanik J, Youdim A, Jones DB, Hurley DL, McMahon MM, Heinberg LJ, Kushner R, Adams TD, Shikora S, Dixon JB, Brethauer S. Clinical Practice Guidelines for the Perioperative Nutritional, Metabolic, and Nonsurgical Support of the Bariatric Surgery Patient—2013 Update: Cosponsored by American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic and Bariatric Surgery. Obesity 2013;21(suppl):S1-S21.
- Moize V, Andreu A, Flores L et al. Long-term dietary intake and nutritional deficiencies following sleeve gastrectomy or roux-en-y gastric bypass in a Mediterranean population. Journal of the Academy of Nutrition and Dietetics. 2013;113(3):400-410.
- Weight Management Dietetic Practice Group
  - WMDPG.org

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Questions?

Nutrition Support for the Bariatric Surgery Patient

Based on this webinar the participant should be able to:

- Outline the four types of bariatric surgery and the mechanisms by which they affect nutritional status.
- List indications for initiation of nutrition support therapy in the bariatric patient and determine appropriate mode of nutrition support therapy (enteral vs. parenteral nutrition).
- Illustrate nutrition care considerations necessary when working with bariatric patients on nutrition support therapy.
- Apply nutrition support therapy across the spectrum of care for bariatric surgery patients and identify resources available to RDNs working with bariatric patients on nutrition support therapy.

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Adjunct Professor - Department of Medicine, UCSF
Adjunct Professor - Department of Nutritional Sciences,
University of California, Berkeley

Date: July 8, 2015

2-3 pm EDT/1-2 pm CDT

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How are we doing?

- Stay on the line for a brief survey about today's ConAgra Foods Science Institute Nutri-Bites® webinar:

Nutrition Support for the Bariatric Surgery Patient: When and Why Nutrition Support is Needed

Thank you!

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