Management of the post-bariatric surgery patient: She’s in my office. Now what do I do?

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Learning Objectives

• Become familiar with the basic principles of bariatric surgery
• Learn a clinical approach to the post-bariatric surgery patient
• Recognize the most common presenting complaints
• Become familiar with recommended treatment options to effectively address common complaints
• Be able to prioritize treatment plans based on clinical suspicion and laboratory findings
Our learning case

• 56 year old woman “Mary Ellen” who underwent ‘bypass’ surgery for obesity in 2010
  – Has lost 156 pounds, has gained back 40#
    • BMI: 36
  – Persistent fatigue, foul-smelling diarrhea with urgency, nausea with some foods and vomits ‘easily’, ‘Low blood sugars’ at times, loss of strength, with muscle pain, bone pains and tingling in her legs
  – No special diet, takes chewable kid’s vitamins and ‘some other supplements’
BARIATRIC SURGERY BASICS
Review of common bariatric surgeries

• Gastric band: creates a small stomach pouch
  – Restrictive procedure
• Gastric sleeve:
  – Removes part of the stomach
  – Leaves a ‘sleeve’ or tube-shaped stomach
  – Restrictive procedure
• Roux-en-Y Gastric bypass (RNYGB):
  – Creates a small stomach pouch
  – Bypasses some absorptive surface of the small intestine
  – Both a restrictive and malabsorptive procedure
Anatomical Changes

Adjustable Gastric band

Sleeve Gastrectomy

Roux-en-Y gastric bypass

Biliopancreatic diversion
Anatomical Changes
Normal Absorption

The 'fat-soluble' vitamins including vitamin D
Same as jejunum, but distal ileum is specific for vitamin B12 and bile salts

Beginning of food breakdown

Carbohydrates, fats, proteins, calcium, magnesium, trace elements and vitamins

Water, electrolytes, and short chain fatty acids
Post-Bariatric Surgery Dietary Recommendations

1. **Clear liquids** – stay well hydrated
   - Calorie-free, no carbonation, no caffeine
   - In-between meals

2. **Lean Protein**
   - Goal: 1.2 – 1.5 grams/Kg adjusted body weight

3. **Vegetables**
   - Without added fats

4. **Carbs in all forms** are to be very limited
Typical Post-Surgical Supplements

- Chewable adult multivitamin with minerals
  - Taken twice daily
- Calcium citrate – chewable or liquid
  - Up to 1800 mg daily in divided doses
- Vitamin D3 (cholecalciferol)
  - 5000 IU up to 200,000 IU daily
- Sometimes: additional iron, B12, Vitamin A, Copper, thiamine
APPROACH TO THE PATIENT
Physical Exam

• **H & P:** Complete this as your normally would

• **ROS**
  – Eyes: change in night vision?
  – GI: frequency, color, consistency of stools
  – GU: kidney stones since the surgery?
  – Musculoskeletal: ‘fibromyalgia’ or fractures since the surgery
  – Extremities: change in sensation – feet and hands
  – Neuro: new onset balance problem?; ‘Brain fog’?
Brief Nutrition History

• How you ask the question is as important as what you ask
  – Start with ‘beverages consumed on a typical day’
    • Be sure to ask about juices, sports drinks, energy drinks and alcoholic beverages
  – Ask: “when do you first eat?”
    • And what do you typically choose?
  – “When do you eat next?”
    • And what do you have then . . .
  – Then ask about snacking
Medication Review

• Be attentive to
  – NSAIDS
  – Anti-hypertensives
  – Medications used to treat diabetes
  – Prokinetics such as metoclopramide
  – Medications used to treat osteoporosis
  – The presence of a proton pump inhibitor
  – Bile acid sequestrants used to treat diarrhea
  – Supplements of dubious benefit / potential harm
Baseline Studies

Labs:
• CMP / Chem 21
• Mg, PO4
• HGBA1c
• CBC + platelets + Iron
• 25-hydroxyvitamin D
  - iPTH
• Retinol
• B12, Folate
• Copper, Zinc
• Prealbumin and CRP

If Appropriate:
• Bone densitometry (DXA) at baseline
  - Repeat every 1-2 years as indicated
THE CLINICAL PRESENTATION
Most Common Presenting Problems

- Nausea / vomiting
- Diarrhea/steatorrhea/hyperdefecation
- Pre-Syncope
- Dumping Syndrome
- Hypoglycemia
- New onset peripheral neuropathy
- Nutrient Deficiencies – known and unknown
- Low blood calcium / Bone pain / Kidney stones
OUR PATIENT – STEP BY STEP
Mary Ellen

**H & P:** remarkable for proximal weakness, bone pain to deep palpation; decreased sensation in her feet

**ROS:** remarkable for

Eyes: stopped driving at night (she thinks its her age)

GI: 6-8 tan-colored, oily stools, incontinent at times

GU: kidney stones 2 episodes in the past 2 years

Musculoskeletal: being worked up by Rheumatology

Extremities: tingling and ‘fire’ in her feet that is new
Brief Nutrition History

• Beverages:
  – juice most mornings (8 oz), coffee with cream throughout the day (3-4+ cups); popular sports drink 1-2 bottles; and some water

• Meals & Snacks
  – Noon: cold cut sandwich and diet pop
  – 4:30: protein bar before she goes to the gym
  – 6:30: chicken or other meat, potato, salad
  – HS: peanut butter crackers or chips or cookies
PROBLEMS & INTERVENTIONS
Problems & Recommended Interventions

• Nausea & Vomiting
  – Smaller meals (snacks)
  – Dry meals, fluids in between meals
  – Ondansetron (Zofran) +/- Lansopropazole (Prevacid)
  – Oral Rehydration: 2C Gatorade + 2C H2O + 1 tsp NaCl

• Diarrhea, Steatorrhea, Hyperdefecation
  – Avoid caffeine and other stimulants; no tobacco products
  – Loperamide (Imodium), Soluble fiber (Benefiber) with meals
  – Avoid bile acid sequestrants – interferes with A,D,B12 uptake
  – Pancreatic enzyme replacement
Problems & Recommended Interventions

- **Dumping syndrome**
  - Small, dry meals, water in-between meals
  - Avoid sweets, juices, pastries, pop, ice cream etc.

- **Hypoglycemia**
  - Review / adjust / discontinue diabetes medications
  - Emphasize frequent, small, high-protein meals
  - Limit total carbohydrates
  - Resistant to conservative treatment measures?
    - Low dose alpha-glucosidase inhibitor (acarbose) with meals
    - Check fasting C-peptide, insulin, glucose
    - Noninsulinoma Pancreatogenous Hypoglycemic Syndrome (NIPHS)
Problems & Recommended Interventions

• **Calcium Oxalate Stones**
  - Hydration + calcium in the form of calcium *citrate*
  - decrease dietary fats

• **Nutritional Deficiencies**
  - Many can be addressed by twice-daily chewable adult multivitamin
  - A: 10,000 – 25,000 mg – water-soluble form
  - B12: 1000 – 2500 mcg orally
  - D: 5000 - 50,000 IU D3 daily taken with a meal
  - Iron – FeSo4: 325mg bid
  - Copper: Pancytopenia with normal platelets
    - **Serious.** Can progress to bone marrow failure and death
    - Limit zinc supplementation
    - CuSo4: 2 mg up to three times daily
Myths & Pitfalls

Our patient presents with new onset peripheral neuropathy accompanying her history of nausea and vomiting. Should we be concerned?

1. No, its likely from Type 2 Diabetes
2. No, its niacin deficiency, and easily corrected
3. Yes, its B12 deficiency and she needs injections
4. Yes, its thiamine deficiency and she is at risk for irreversible symptoms
Myths & Pitfalls

• **New peripheral neuropathy = benign finding**
  – Especially associated with persistent nausea / vomiting
  – **Thiamin deficiency until proven otherwise**
    • Draw thiamine level THEN
    • Give 100 mg thiamine IV **BEFORE** IV glucose
    • If deficient: 100 mg thiamine IV x 7 days then suppl po

• **Restrictive procedures ≠ Nutrient deficiencies**
  – Check labs on all bariatric surgery patients
    • Restrictive procedures severely limit intake
    • Tolerance and compliance issues often result in profound deficiencies
Myths & Pitfalls

• Malabsorptive surgery = Can’t absorb dietary fat
  – Many patients think there is no need to restrict dietary fats
    • Slows weight loss; promotes weight regain
    • Profound steatorrhea, oily fecal incontinence
    • Vitamin A and D deficiencies
    • Increased risk for calcium oxalate nephrolithiasis

• Multiple, expensive supplements are necessary
  – Multitude available of dubious quality – *not* regulated
    • This is a billion-dollar industry in the US
  – Use vitamins and supplements from reliable sources
  – Emphasize nutritious food choices
Back to Our Patient

• Nausea / Vomiting
  – Diagnosis: volume and/or food intolerances
  – Stay well hydrated – water is still best
  – Smaller meals (snacks)
  – Start acid suppression
  – Add a morning meal to prevent going too long without eating

• Diarrhea / steatorrhea
  – Diagnosis: Fat malabsorption +/- hyperdefecation +/- dumping
  – Decrease dietary fats
  – Avoid stimulants – including caffeine
  – Add soluble fiber at meals
  – Avoid sweets – including juices, cookies; and check the protein bar
  – Stop full-strength sports drinks: hyperosmotic effect
Diagnosing / Addressing the Issues

• Low blood sugar
  – Diagnosis: Hypoglycemia due to meds +/- dumping +/- reactive hypoglycemia. Has she been testing her blood?
  – Stop the Glyburide
  – Avoid sweets including juices and sports beverages
  – More lean protein, less carbs; add a morning meal
    • Something as simple as a boiled egg or other lean protein
  – Her current carb sources include: juice, breads, protein bar, potatoes, crackers, cookies, sports drinks
  – Have her test her blood sugar when she is symptomatic
  – Avoid treating the symptoms with carbs alone
Diagnosing / Addressing the Issues

• Tingling in her legs with decreased sensation in her feet
  – Diagnosis: Possible thiamine deficiency
  – Test first and then presumptively treat
  – Thiamine 100 - 250 mg orally/day until the test results are available
  – Also check B12 and Folate
Diagnosing / Addressing the Issues

• Bone pain, muscle pain, proximal weakness
  - Diagnosis: Bariatric Osteomalacia
    • Secondary hyperparathyroidism
    • D deficiency + inadequate calcium and protein intake
  - But wasn’t the serum calcium normal?
    • Where is the calcium coming from to keep the blood level normal?
  - What would you expect to see on DXA?
    • Perhaps it will be normal
Additional Recommendations

• Labs: CBC + platelets + Iron, Mg, PO4, Retinol, B12, Folate, Copper, Zinc

• Adult chewable multivitamin with minerals bid

• Calcium citrate chewable supplement
  – Up to 1800 mg/day depending on her dietary sources
  – Ok to give despite history of kidney stones

• Vitamin D3, 50,000 IU – may need daily
  – Take with a meal to optimize absorption

• Follow up: 1 month
Published Guidelines

• AACE/TOS/ASMBS Guidelines
  – Endocrine Practice 2013;19(2)
  – www.AACE.com

• Endocrine Society
  – Endocrine and Nutritional Management of the Post-Bariatric Surgery Patient. 2010
  – www.endocrine.org
TAKE-HOME POINTS

• Understanding the surgical (anatomical) changes allows the clinician to maintain a high index of suspicion for nutritional and metabolic problems

• The RNYGB surgery is most common and is both restrictive and malabsorptive

• Most post-bariatric surgery patients require a multivitamin, calcium and vitamin D supplements for life

• Key elements of the diet are Water, Lean protein, and vegetables
TAKE-HOME POINTS

• It is important to include a thorough ROS, Nutritional History, and medication review.

• Key laboratory tests are an essential component of assessing and following this patient population.

• Most of the common clinical problems that occur in the post-bariatric surgery patient can be effectively addressed with:
  – medication adjustments
  – specific changes in food and beverage choices
  – targeted supplementation based on confirmed deficiencies.
Take-Home Points

• Three Do-Not-Miss metabolic complications are
  – Thiamine deficiency
  – Copper deficiency
  – Bariatric Osteomalacia

• Bone densitometry may show abnormally low bone mass, but it is not always indicative of osteoporosis

• Providing care for the post-bariatric surgery patient can be enjoyable and rewarding.
Thank you!