Bariatric Surgery: Advanced Bariatric Nutrition

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Bariatric Surgery Webinar Part III
February 1, 2016

Webinar Series Objectives

Webinar #3
Advanced Bariatric Nutrition

Webinar #2
Common Post-op Complications

Webinar #1
Understanding Bariatric Surgery Process
Objectives

- Brief review of surgical procedures
- Post-op complications
  - Weight regain
  - Reactive hypoglycemia
  - Pregnancy after bariatric surgery
  - Rare vitamin/mineral deficiencies
  - Special considerations
- Questions and discussions
Bariatric Surgery Interventions

- Bariatric Surgery (RYGB, SG, BPD-DS)
- Pharmacotherapy (Orlistat or Liraglutide 3mg)
- Healthy Eating
- Physical Activity
- Stress Management
- Sleep Hygiene

Adjustable Gastric Band (AGB)

Sleeve Gastrectomy (SG)

Roux-en-Y Gastric Bypass (RYGB)

Biliopancreatic Diversion w/ Duodenal Switch (BPD/DS)
Complications – Vertical Banded Gastroplasty

- Conducted mostly in the 1980’s to early 2000’s.

Patients present with:
- Chronic vomiting
- Multiple food intolerances (healthier foods)
- Tolerate sugary (unhealthier foods) well
- Weight regain
- Poor quality of life
- Multiple nutrient deficiencies
Nutrition Assessment & Counselling

VBG’s need to be revised

Dietitians/Health Care Providers:

- Provide empathy (avoid blame)
- Explain the physiology of the surgery:
  - Food intolerances - why “healthier” (fibre foods) don’t work vs “unhealthier” (junk food) works fine
  - Food reward pathway (mesolimbic dopamine pathway) – effects on learned behaviours

![Image of brain and food](image-url)

Tasty food

Dopamine

Increased dopamine release

Eat more

Insufficient dopamine receptors

Adapted from Michalakis & le Roux. 2012 Obes Surg. 22:1648-1957
Weight Regain

- Accompanied by shame, guilt, low-self efficacy and binge-type eating behaviours
- Assess ROOT CAUSES
  - Nutritional
  - Psychological
  - Physiological
  - Medical

- Excessive intake of high sugar/fat foods
- Physiological and psychological responses to stress
- External stressors (work, life, poor sleep, depression, etc)

Weight Regain

- Nutrition-related
  - Lack of carbohydrates, low fibre-rich foods (aim for >120g/day)
  - Poorly distributed protein intake (aim for 20-30g/meal + 5-15g/snack)
  - Increased portion sizes
  - Inadequate dietary habits (i.e. drinking with meals, eating quickly)
  - Food and beverage choices

"Do not assume a patient is “non-compliant”. They may not have received appropriate and current evidence-based information.”

Weight Trajectories after RYGB (Swedish Obesity Study)


Weight Trajectories after RYGB (Longitudinal Assessment of Bariatric Surgery (LABS) Consortium)

Weight Expectations – Educating Patients

Years after weight loss

Body Weight Change (%)
Tanya

- 3 years post-RYGB
- c/o: dizziness, sweating, fatigue, shakiness and few episodes of syncope
- BS: ~ 2.2 mmol/L (different times of the day/night)
- No history of diabetes, no current medications
- Dietary assessment:
  - Eating 3 meals per day – low carbohydrates
  - Protein intake adequate: averaging 70g/day
  - 2.5 L fluids per day (water, coffee, pop, juice, wine: 2-3 glasses per week)
  - Activity: Zumba, personal trainer 3x/week, averaging 12,000 steps/day

Polling Question

4) What is likely causing her low blood sugars?
   a) Dumping syndrome
   b) Inadequate fluid choices
   c) Meal timing
   d) Exercise output
   e) All the above
Reactive Hypoglycemia

- Typically presents after 1-2 yrs post-op
- Occurs 1-3 hours after meal/food ingestion
- Postprandial blood glucose <3.8 mmol/L

### Symptoms

<table>
<thead>
<tr>
<th>Perspiration</th>
<th>Palpitations</th>
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<tbody>
<tr>
<td>Hunger</td>
<td>Weakness</td>
</tr>
<tr>
<td>Confusion</td>
<td>Tremors</td>
</tr>
<tr>
<td>Dizziness</td>
<td>Syncope</td>
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Reactive Hypoglycemia AKA:
- Late dumping syndrome
- Hypo-reactive glycemia
- Postprandial hypoglycemia
- Non-insulinoma pancreatogenous hypoglycemia syndrome (NIPHS)


Reactive Hypoglycemia – Possible Etiologies

- Dumping syndrome → dietary/habits
- Beta cell hyperfunction
- Excessive secretion of GLP-1
- Increased delivery of nutrients to intestines (lack of pylorus)
- Underlying genetic hyperinsulinism syndrome
1) Dietary Modification
2) Endocrinology Testing
3) Medication Therapy
4) Surgical reversal or partial/full pancreatectomy

Reactive Hypoglycemia – Nutrition Assessment

- Ask for food/symptom records
  - Meal timing
  - Food/fluid intake
  - Food choices
  - Symptoms and frequency
  - Blood sugars (if possible)
Managing Reactive Hypoglycemia - Dietary

- 6-8 small, frequent meals (eat every 2-3 hours)
- Protein + fibre at all meals and snacks
  - Bran/psyllium, barley, oatmeal, beans
- Add fibre supplements with meals
- Avoid simple/refined carbohydrates
- Avoid drinking with meals and ~30 minutes after solid meals
- Avoid alcohol, caffeine, carbonation and sugar-sweetened beverages

Tanya

- Dietary assessment:
  - Eating 3 meals per day – low carbohydrates
  - Protein intake adequate: averaging 70g/day
  - 2.5 L fluids per day (water, coffee, pop, juice, wine; 2-3 glasses per week)
  - Activity: Zumba, personal trainer 3x/week, averaging 12,000 steps/day
Reactive Hypoglycemia

- If dietary changes unsuccessful → refer to endocrinologist
- Other measures:
  - C-peptide
  - Post-prandial insulin levels
  - MRI/CT of pancreas (r/o insulinoma, nesidioblastosis)

- Addition of Acarbose (Glucobay) to reduce insulin production
- Small subset of patients with severe life-threatening hypoglycemia require partial pancreatectomy

Patti et al Diabetologia 2005; Service et al, NEJM 2005

Sandra

- 5 years post-sleeve gastrectomy
- 13 weeks gestational
- Referred to FHT RD for nutrition guidance during pregnancy
Polling Question

5) Women who become pregnant after bariatric surgery (RYGB/SG/LAGB) have fewer obesity-related complications than pregnant women with obesity?

a) True
b) False
c) Not sure

Pregnancy after Bariatric Surgery

- Research is suggesting pregnancy AFTER bariatric surgery reduces obesity-related complications
- Siblings born after mother had surgery had lower birth weights, maintained lower weight over time, less obesity-related conditions as adults (then their siblings before mother had surgery)

- Gestational hypertension
- Pre-eclampsia
- Gestational diabetes mellitus
- Preterm delivery
- Delivery complications

Pregnancy after Bariatric Surgery

- Recommended women wait 12-18 months after surgery
- Referral to high-risk pregnancy
- Referral to a dietitian (collaboration with bariatric dietitians)
  - Poor oral intake
  - Risk of vitamin/mineral deficiencies (mom)
  - Inadequate weight gain during pregnancy

Pregnancy Post-Bariatric Surgery

- Weight gain to promote fetal growth
  - Pre-pregnancy (BMI 25-29) = 15-25 lbs total
    0.6 lbs/week in 2\textsuperscript{nd}/3\textsuperscript{rd} trimester
  - Pre-pregnancy (BMI >30) = 11-18 lbs total
    0.5 lbs/week in 2\textsuperscript{nd}/3\textsuperscript{rd} trimester
- Energy requirements: (lack of evidence)
  - Indirect calorimeter (Met cart)
  - Individualize (increase meal frequency and caloric density)
**Pregnancy Post-Bariatric Surgery - Protein**

- 1.2 g/IBW
- Protein supplements if weight targets not achieved (especially in pts <12 months post-op)
- Monitor protein intake and quality
- Nutrition-related physical findings:
  - Changes in hair, skin, nails
  - Muscle mass


**Pregnancy Post-Bariatric Surgery**

**Vitamin/Minerals**

*Inconsistent recommendations*

- 1 prenatal MVI + 1 adult MVI (do not exceed 5000 IU vitamin A from retinol)
- Add single-dose supplements
  - Folic acid: 5 mg/d (2 months pre-pregnancy + 1st trimester) – decrease to 1 mg/d for 2nd/3rd trimester until post-breastfeeding
  - Calcium: 1200 mg calcium citrate
  - Vitamin D: 3000-4000 IU (treat to sustain levels 75-200 nmol/L)
  - Iron & B12 required (monitor blood work)
  - Omega-3 fatty acids: DHA supplements or 2 servings low mercury fish


Joan

Joan is 10 years post-RYGB complaining of following problems:

- Food intolerance (worsening over the past 2 years)
- Muscle weakness
- Tingling in extremities
- Unsteady gait resulting in falls (tripping over her own feet)
- Carpal tunnel syndrome
- Hair loss and frequently gets sick in the winter.
- Taking 1 multivitamin, calcium, vitamin D

Polling Question

6) What micronutrient deficiency are you MOST concerned about?

a) Iron deficiency
b) Vitamin B12
c) Vitamin B1 (thiamine)
d) Vitamin E
e) Not sure
Joan is 10 years post-RYGB complaining of following problems:

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Joan’s Case Continues

- Starts on a multivitamin BID
- Provided with 100 mg vitamin B1 (thiamine) BID x 6 months
- Vitamin B12 IM injections monthly

- Referred to the dietitian – but doesn’t attend appointment
Joan returns after 4 years (now 14 yrs post-RYGB) complaining of following problems:

- Using a walker (complains she falls regularly)
- Tingling in extremities worsening
- Incontinence

**Dietitian’s Nutrition-Focused Physical Findings:**

- Dry, brittle and dull-coloured hair
- Pale conjunctiva (eyes)
- Joan reports she feels like something is on her hands and feet
- Coordination/balance difficulties (assessed via Romberg’s test)

**Polling Question**

7) What is Joan likely experiencing?

- a) Psychological conditions
- b) Old age
- c) Wernicke’s encephalopathy (severe thiamine deficiency)
- d) Vitamin E, copper or zinc deficiency
- e) Not sure
Musculoskeletal/lower extremity

Peripheral neuropathies $\rightarrow$ nerve damage

- Cold feet/burning fingers
- Pts reporting they feel like they wearing gloves/stockings
- Difficulty walking/fastening buttons
- Unable to balance with eyes closed
- Muscle weakness
- Inability to tolerate food/digest food

Check:
- Vitamin E
- Vitamin B1
- Vitamin B12
- Vitamin B6
- Niacin
- Copper

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Musculoskeletal/lower extremity

myelopathy $\rightarrow$ pathology of the spinal cord

- Ataxic gait
- Sensory deficits
- Bowel/bladder symptoms

Check:
- Vitamin B12
- Copper
- Folate
- Vitamin E
Joan is 10 years post-RYGB complaining of following problems:

- Food intolerance (worsening over the past 2 years)
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Copper Deficiency – Screening

- Screen for s/s in pts >2-5 yrs post-op
- Poor wound healing, hair loss, carpal tunnel syndrome, and muscle and joint pain
- Ask about difficulties walking, tingling/numbness in hands (stockings on hands/feet)
- Not easy to detect – blood tests do not represent body’s status (low serum copper = severe deficiency → use ceruloplasmin)
- Can lead to irreversible paralysis

Copper Deficiency

- If treating B12/B1 deficiency with no resolutions – consider treating for copper
- Mimics iron/vitamin B12/B1 deficiency
- Ensure MV has 1mg Cu: 8-15mg zinc

- Treatment:
  - Mild-mod deficiency: 4-8 mg/d oral copper sulfate or gluconate (until s/s resolve)
  - Severe deficiency: 2-4 mg/d IV x 6 days then 4-8 mg/d orally.


Nutrition-Focused Physical Assessment

- General inspection
- Vitals
- Skin/nails
- Head/hair
- Eyes/nose/mouth
- Neck/chest
- Abdomen
- Musculoskeletal
While everyone is looking for horses……

Look beyond the hoof beats……
Find the zebra’s
Chronic Kidney Disease & ESRD

Nutrition requirements pre/post surgery for patients:
- CKD (stage 1-4)
- ESRD on Dialysis
- Renal transplantation
- Kidney stones

Resources:
Post-op nutrition complications
Resources – Post-op Nutrition Complications

- Mechanick, JI., et al. SORD. 2013; 159-191
**Professional Resources**

**Dietitians of Canada:**
- DC – Learning on Demand
- DOC Network
  - Bariatric surgery subgroup
  - PEN – Bariatric Pathway

**Academy of Nutrition & Dietetics:**
- Weight Management Dietetic Practice Group  
  www.wmdpg.org

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**Resources for Providers**

www.worldobesity.org
www.asmbs.org
www.obesity.org
www.cabsp.ca
www.obesitynetwork.ca
www.ontariobariatricnetwork.com
Bariatric Care:

- eConsult (Amir Afkham: amir.afkham@lhins.on.ca)
  - Bariatric Medicine: Dr. Judy Shiau, MD
  - Bariatric Surgery: Aspen Viets, NP
  - Bariatric Nutrition: Jennifer Brown, MSc., RD

Only available for PCPs

Take Home Messages
Key Messages

Bariatric surgery is only a TOOL

Familiarize yourself with nutrition complications

Use nutrition focused physical assessment

Looking beyond the horses…Find the zebras

Stay connected & collaborate

Thank You Questions?

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