Bariatric Medicine Essentials

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Disclosures

• I will be discussing off label use of medications
Objectives

- Review obesity statistics and multifactorial causes of obesity
- Discuss obesity phenotypes
- Review medical complications of obesity
- Discuss effective medical and surgical treatments
- Surgical procedures and outcomes
- Pre and Post operative considerations
- Outcomes related to diabetes resolution
Obesity
AMA declares disease June 2013

• Disease
  – an impairment of the normal state of the living animal that interrupts or modifies the performance of the vital functions

• Obesity
  – a disease in which excess body fat has accumulated to a level that may have an adverse effect on health.
**Intensive multicomponent behavioral interventions:**

12-26 sessions: RD, PT, OT, behaviorist

Behavioral management activities, such as setting weight-loss goals

Improving diet or nutrition and increasing physical activity

Addressing barriers to change

Self-monitoring

Strategizing how to maintain lifestyle changes

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**Screening for and Management of Obesity in Adults**

**Clinical Summary of U.S. Preventive Services Task Force Recommendation**

<table>
<thead>
<tr>
<th>Population</th>
<th>Adults aged 18 years or older</th>
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</thead>
<tbody>
<tr>
<td>Recommendation</td>
<td>Screen for obesity. Patients with a body mass index (BMI) of 30 kg/m² or higher should be offered or referred to intensive, multicomponent behavioral interventions.</td>
</tr>
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<td>Grade: B</td>
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</table>

*June 2012*
The numbers

- 1/3 of US adults obese 1/3 overweight – Default state
- 18% children obese
- 29 million US adults with diabetes (9.3%)
- Racial and socioeconomic disparities
- Losing weight is hard and not normal
- Driven to eat sweets and fat
Mortality increases with BMI
More about fat...not weight

- BMI 28 with 45% body fat, metabolic syndrome, diabetes
- BMI 32 with 30% body fat, athletic build, healthy
## Body Fat Ranges for Standard Adults

<table>
<thead>
<tr>
<th></th>
<th>Underfat</th>
<th>Healthy</th>
<th>Overfat</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female 20–39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 40–59</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>60–79</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male 20–39</td>
<td></td>
<td></td>
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<td></td>
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<td>Age 40–59</td>
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<tr>
<td>60–79</td>
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</tbody>
</table>

1. Based on NIH/WHO BMI Guidelines.
2. As reported by Gallagher, et al, at NY Obesity Research Center.

To determine the percentage of body fat that is appropriate for your body, consult your physician.
Medical Complications of Obesity

- Pulmonary disease
  - abnormal function
  - obstructive sleep apnea
  - hypoventilation syndrome

- Idiopathic intracranial hypertension

- Stroke

- Cataracts

- Coronary heart disease
  - Diabetes
  - Dyslipidemia
  - Hypertension

- Severe pancreatitis

- Nonalcoholic fatty liver disease
  - steatosis
  - steatohepatitis
  - cirrhosis

- Gall bladder disease

- Gynecologic abnormalities
  - abnormal menses
  - infertility
  - polycystic ovarian syndrome

- Osteoarthritis

- Skin

- Gout

- Phlebitis
  - venous stasis

- Cancer
  - breast, uterus, cervix
  - colon, esophagus, pancreas
  - kidney, prostate
Insulin resistance

- Genetic
- Dietary
- PCOS
- Can drive eating behavior
- Treated with metformin, diet, exercise, sleep

Acanthosis nigricans
Multi-factorial Chronic Disease

Medical
- Genetic (over 100 sites now)
  - Prader Willi, Bardet Biedl, Leptin deficiency, FTO gene, couch potato gene, FXR receptor
- Sleep apnea, inflammation, insulin resistance, vitamin D deficiency, diabetes

Mental/Behavioral
- Food addiction, eating disorders, compulsive eating, ADHD

Mechanical/functional
- Arthritis, fibromyalgia, poor exercise tolerance
Obesity Phenotypes

- **Behavioral**
  - Depressed emotional eater
  - Binge eater/all or nothing thinker
  - ADHD self stimulator
  - Addictive eater
  - Too busy chaotic eater
  - Anxious/PTSD comfort eater

- **Medical**
  - Diabetes
  - Insulin resistance
  - Testosterone deficient
  - Insomnia/OSA
  - Medication side effects

- **Societal**
  - Low income
  - Lack of knowledge
Societal and Environmental

- Increased energy density of food
- Decreased movement
  - Poor sleep
- Microbiome-probiotics
Regulation of hunger and appetite
Binge Eating Disorder

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by the following:
   (1) eating, during a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most people would eat during a similar period of time under similar circumstances.
   (2) a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).

B. The binge eating episodes are associated with three or more of the following:
   (1) eating much more rapidly than normal.
   (2) eating until feeling uncomfortably full.
   (3) eating large amounts of food when not feeling physically hungry.
   (4) eating alone because of being embarrassed by how much one is eating.
   (5) feeling disgusted, depressed, or very guilty after overeating.

C. Marked distress regarding binge eating is present.

One day/week for past 3 months
Night Eating Syndrome

- Evening hyperphagia with consumption of > 25% of daily calories after evening meal and/or
- Awakening 3 times a week to eat also
- Morning anorexia
- Insomnia
- Carbohydrate to protein ratio 7:1

Sim LA Mayo Clin Proc 2010
Obesity Treatment Pyramid

- **Surgery**
  - BMI 35+ with comorbidities
  - BMI 40+

- **Pharmacotherapy**
  - BMI 27+ with comorbidities
  - BMI 30+

- **Lifestyle Modifications**
  - BMI 25+

*Used with permission by Ethicon Endo-Surgery*
Medications & weight gain

Beta blockers
Sulfonylureas
Insulin-try to get to lowest dose with adequate control
Atypical antipsychotics (even new ones)
Tricyclics
Depakote
Depo-provera (consider IUD)
Pioglitazone
Gabapentin
Lithium
mirtazapine
SSRI’s (sertraline most neutral, paroxetine worst)
Medications

• FDA approved
  – Phentermine
  – Diethylpropion hydrochloride
  – Orlistat (Alli™)
  – Qsymia™ (topiramate/phentermine)
  – Belviq™ (lorcaserin)
  – Contrave™ (bupropion/naltrexone)
  – Liraglutide GLP-1

• Used off label to aide in weight loss in certain circumstances
  – Metformin for insulin resistance
  – Topiramate
  – Bupropion
Qsymia™
(phenetermine/topiramate)

- Age 18 and older
- Insomnia, fatigue, dizziness, dry mouth, constipation, memory
- Avoid with glaucoma
- Metabolic acidosis
- Decreased sweating in summer
- Kidney stones
- 2 forms of contraception
- Long term weight loss
Qsymia™
(phentermine/topiramate)

- Topiramate alters taste of soda and sweets/carbohydrates
- Anxiety/impulse control
- Phentermine decreases appetite and increases metabolic rate
- Monitor for tachycardia and mood changes

Dosing titration
- 3.75/23 mg 14 days
  Then increase to
- 7.5/46 mg daily
  After 12 weeks if weight loss less than 3% then d/c or increase
- 11.25/69 mg for 14 days
- then 15/92 mg daily
Controlled-Release Phentermine/Topiramate in Severely Obese Adults: A Randomized Controlled Trial (EQUIP)

David B. Allison, Kishore M. Gadde, William Timothy Garvey, Craig A. Peterson, Michael L. Schwiers, Thomas Najarian, Peter Y. Tam, Barbara Troupin and Wesley W. Day

Belviq™ (lorcaserin)

- Age 18 and above
- Serotonin 2C receptor agonist
- Headache, dizziness, fatigue, nausea, mood changes, dry mouth, constipation, memory
- Hypoglycemia in patients with diabetes

Dosing
- 10 mg twice a day
- Discontinue if 5% weight loss not achieved after 12 weeks
Contrave™

- Bupropion 90mg/naltrexone 8mg
- Increase dose each week by 1 tab to 2 tabs BID
Metformin

• Decreases insulin resistance
• Diarrhea, nausea, decreased appetite and decreased carbohydrate craving
• Particularly useful in pre-diabetes, antipsychotic weight gain.
• DPP study showed that patients under 50 benefit

500 mg tabs BID
500 mg XR tabs for once daily dosing
1500-2000mg/day

Diabetes 2011 Feb; 60(2):477-85
GLP-1 agonists

- Liraglutide
  - Once a day

- Exenatide
  - Twice a day
  - Once a week

- Likely soon approved for weight loss at 3mg dose

- Decrease appetite and decrease gastric emptying for increase in satiety

- Caution in renal insufficiency

- ? Increase in pancreatitis

- Thyroid cancer black box warning
5 As of Obesity Management™
Canadian Obesity Network
How people do it with SUCCESS!

Success consists of going from failure to failure without loss of enthusiasm.  Winston Churchill

| National Weight Control Registry (over 10,000 pts) | Structured lower calories
| www.nwcr.ws | – 1400/day |
| People who have lost over 30 lbs and kept it off for over a year. | 60-90 minutes of activity |
| – Average loss of 60 lbs over 6 years | Eat breakfast daily |
| – 90% of people report unsuccessful past attempts | < 3 hrs/week TV |
| – 45% on own, 55% with weight loss program | Eat out < 3 times/week |
| | Self monitoring |
| | – Weigh weekly |
| | – Record food intake or eat the same thing daily |
| | – Physical activity |
Supplement to Session 3: Using Glucerna

1200-Calorie Plan

<table>
<thead>
<tr>
<th>Meal</th>
<th>Foods</th>
<th>Average Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>1 Glucerna shake</td>
<td>220</td>
</tr>
<tr>
<td>Lunch</td>
<td>1 Glucerna shake</td>
<td>220</td>
</tr>
<tr>
<td>Dinner</td>
<td>Meal plan (attached)</td>
<td>500-600</td>
</tr>
<tr>
<td>Snack</td>
<td>1 Glucerna bar</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>1 piece of fresh fruit of ½ cup canned in juice</td>
<td>60</td>
</tr>
</tbody>
</table>

Total Calories: 1140-1240

1500-Calorie Plan

<table>
<thead>
<tr>
<th>Meal</th>
<th>Foods</th>
<th>Average Calories</th>
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</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>1 Glucerna shake</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>1 piece fresh fruit or ½ cup canned in juice</td>
<td>60</td>
</tr>
<tr>
<td>Lunch</td>
<td>1 Glucerna shake</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>1 piece fresh fruit or ½ cup canned in juice</td>
<td>60</td>
</tr>
<tr>
<td>Dinner</td>
<td>Meal plan (attached)</td>
<td>500-600</td>
</tr>
<tr>
<td>Snacks</td>
<td>1 Glucerna shake and 1 Glucerna bar</td>
<td>360</td>
</tr>
<tr>
<td></td>
<td>*Vegetables</td>
<td>25</td>
</tr>
</tbody>
</table>

Total Calories: 1445-1545

1800-Calorie Plan

<table>
<thead>
<tr>
<th>Meal</th>
<th>Foods</th>
<th>Average Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>1 Glucerna shake</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>1 piece fresh fruit or ½ cup canned in juice</td>
<td>60</td>
</tr>
<tr>
<td>Lunch</td>
<td>1 Glucerna shake</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>1 piece fresh fruit or ½ cup canned in juice</td>
<td>60</td>
</tr>
<tr>
<td>Dinner</td>
<td>Meal plan (attached)</td>
<td>500-600</td>
</tr>
<tr>
<td></td>
<td>1 roll (2½” x 2½” x 2½”, plain)</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td>2 teaspoons low-calorie margarine</td>
<td>34</td>
</tr>
<tr>
<td>Snacks</td>
<td>1 Glucerna shake and 1 Glucerna bar</td>
<td>360</td>
</tr>
<tr>
<td></td>
<td>2 pieces fresh fruit or 1 cup canned in juice</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>*Choice of fruits and vegetables</td>
<td>170</td>
</tr>
</tbody>
</table>

Total Calories: 1732-1832

* Can be added to meals or used as a snack

LCD = LookAHEAD

- www.lookaheadtrial.org
- Lifestyle weight loss study in DM
- 40% of pts maintained a 10% weight loss
Apps

- Mindful eating apps
- Tracking apps
  - Myfitnesspal
- Pedometer apps
  - Moves
- 7 min workout app
5 P’s

• **Planned portions**
  eat planned meals and snacks

• **Plants**
  whole food plant based diet

• **Protein** (1.5-1.8 g/kg IBW/day)
  with each meal and snack

• **Power**
  increase activity and include resistance

• **Pillow**
  get good sleep
Obesity Treatment Pyramid

Surgery
BMI 35+ with comorbidities
BMI 40+

Pharmacotherapy
BMI 27+ with comorbidities
BMI 30+

Lifestyle Modifications
BMI 25+

Continuum of Care

Used with permission by Ethicon Endo-Surgery
Bariatric Surgery

- Motivated psychologically stable patient committed to lifestyle efforts
- BMI greater than or equal to 40
- BMI greater than or equal to 35 with co-morbidities
- Possibly BMI 30-35 with diabetes? still under investigation
Weight Loss Surgery Tools

LAGB  RNY gastric bypass  Sleeve gastrectomy  BPD/DS
HOW MANY BARIATRIC SURGERIES ARE TAKING PLACE?
The fast growth in weight-loss surgeries has ended. Though numbers are not available beyond 2009, most in the field believe the number of procedures is going down.

SOURCE: AMERICAN SOCIETY FOR METABOLIC & BARIATRIC SURGERY

PUBLISHED APRIL 23, 2012, IN AMERICAN MEDICAL NEWS. WWW.AMEDNEWS.COM
Relative Use of Common Bariatric Procedures in Michigan Between June 2006 and December 2013
Gastric Bypass Cost

- **Very High**: Washington $30,000
- **High**: Idaho $34,500, Montana $36,000, North Dakota $28,500, Minnesota $29,000, South Dakota $29,000, Wisconsin $30,000, Wyoming $31,000, New York $35,000, Pennsylvania $35,000, New Jersey $32,000, Washington DC $31,000
- **Medium**: Nevada $20,000, Utah $21,000, Arizona $26,000, New Mexico $31,000, Colorado $24,500, Nebraska $24,000, Kansas $24,500, Missouri $28,000, Illinois $21,000, Indiana $20,050, Ohio $20,000, West Virginia $25,300, Virginia $28,800, North Carolina $25,000, South Carolina $24,500, Tennessee $24,500, Mississippi $24,500, Alabama $23,500, Georgia $19,900, Florida $21,000, Texas $20,900, Louisiana $20,019
- **Low**: Oregon $29,500, California $27,500

2014 Survey
Insurance Coverage

• Not covered by all but covered by many
• Mandated coverage in 2015 for all federal insurance plans
• Medicare and Medicaid
• Usually require a 2 to 5 year history of severe obesity and a 3 to 24 month PCP supervised lifestyle change
% excess weight loss = EWL

300 lb patient

ideal weight 200 lbs

= > 100 lbs of excess weight

If gastric bypass produces 75% EWL then patient is expected to lose 75 lbs overall.
Weight Loss Outcomes

- RNY Gastric Bypass = 65-75% EWL
- Sleeve Gastrectomy = 60-75% EWL
- LAGB = 45-50% EWL
- Duodenal switch = 75-85% EWL
Gastric Bypass

Pre-op Considerations

- **Sleep apnea**
  - Neck > 17
  - STOPBANG/Epworth
- **GERD**
  - > 5 years consider EGD for Barrett’s
  - Sleeve might not be best?
  - RNY is reflux surgery
- **Diabetes control**
- **Cardio/pulmonary**
  - CHF, Unstable Angina
- **Psychosocial issues**
  - Binge Eating Disorder
  - Night eating syndrome
  - Able to adhere to pre and post op meal plan
  - Transfer addiction
  - Substance abuse
- **Socioeconomic**
  - Able to pay for supplements and protein shakes/powder
Diabetes resolution and surgery

<table>
<thead>
<tr>
<th>Procedure</th>
<th>% diabetes resolution &lt; 2 years</th>
<th>% resolution &gt; 2 years</th>
<th>% EWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duodenal Switch</td>
<td>95 %</td>
<td>95.9 %</td>
<td>63.6 %</td>
</tr>
<tr>
<td>RNY gastric bypass</td>
<td>80.3 %</td>
<td>70.9 %</td>
<td>59.7 %</td>
</tr>
<tr>
<td>Sleeve gastrectomy</td>
<td>79.7 %</td>
<td>77.5 %</td>
<td>55.5 %</td>
</tr>
<tr>
<td>LAGB</td>
<td>56.7 %</td>
<td>58.6 %</td>
<td>46.2 %</td>
</tr>
</tbody>
</table>

March 2009 American Journal of Medicine
Stampede Trial

Swedish Obese Subjects


HR = 0.76
(0.59, 0.99)
Gastric Bypass Abdominal Pain (acute)

• Associated with nausea and vomiting
  – Administer thiamine 100 mg IM
    » ICSI expert opinion

• Epigastric pain
  – DDX: ulcer, get EGD+PPI

• Epigastric pain and RUQ pain
  – DDX: cholelithiasis/cholecystitis, get RUQ u/s

• Crampy abdominal pain
  – DDX: internal hernia/constipation, get CT abd
Band Abdominal Pain (acute)

• Associated with nausea and vomiting
  – Administer thiamine 100 mg IM

• With emesis
  – DDX: slippage, get upright CXR to evaluate angle of band, horizontal indicates slippage

• Without emesis
  – DDX: erosion, port infection, get EGD/surgical referral
Post-op considerations

- Ongoing commitment to lifestyle change
- Planned portions of plants and protein
- GERD symptoms
  - UGI to evaluate anatomy
- Wear CPAP until OSA resolved
- Long term vitamin supplementation
- Avoid NSAIDS
- Yearly lab monitoring
  - B12
  - Ferritin
  - Vitamin D
  - Copper, zinc, PTH, prealbumin in RNY
Summary

• Obesity is a complex chronic disease with multiple etiologies
• We have good guidelines to treat and we need to work on systems of delivery
• Planned portions of plants and protein seem to work with surgery or medication as a tool.
• Losing weight is hard and requires great effort, surgery combined with medication and lifestyle is key to long term disease prevention and chronic disease resolution