BARIATRIC SURGERY
FOR INTERNISTS

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EPIDEMIC OF OBESITY

- 66% of US population is overweight or obese
- 4.4% are Morbidly obese
- High cost to society
- Increased risk of death
- Multiple co-morbidities related to obesity
OFTEN OBESITY BEGINS IN CHILDHOOD

OBESE BABY TAKING HIS FIRST STEPS
OBESITY TRENDS IN THE US

1985

CDC

No Data  <10%  10%-14%  15%-19%  20%-24%  25%-29%  ≥30%
OBESITY TRENDS IN THE US

1988

CDC

No Data  <10%  10%-14%  15%-19%  20%-24%  25%-29%  ≥30%

[Map showing obesity trends in the US in 1988]
OBESITY TRENDS (CONTINUED)
OBESITY TRENDS (CONTINUED)

1997

[Map showing obesity trends across the United States]

Legend:
- No Data
- <10%
- 10%–14%
- 15%–19%
- 20%–24%
- 25%–29%
- ≥30%
OBESITY TRENDS (CONTINUED)
OBESITY TRENDS (CONTINUED)
OBESITY TRENDS (CONTINUED)
PRIVATE BUSINESS COST IN TEXAS ATTRIBUTABLE TO OBESITY

Exhibit 25 Costs to Private Businesses and Insurers Attributable to Obesity (in millions)

- Disability
- Presenteeism
- Absenteeism
- Health Care

Source: Texas Comptroller of Public Accounts and U.S. Centers for Disease Control and Prevention.
Increased mortality

Overweight and Obesity Increase the Risk of Cardiovascular Disease Mortality and All-Cause Mortality

Relative Risk of Cardiovascular Disease Mortality

- Normal weight
- Overweight
- Obese

BMI (kg/m²)

CVD mortality

Relative Risk of All-Cause Mortality

- Normal weight
- Overweight
- Obese

BMI (kg/m²)

All-cause mortality

Data are from 1 million men and women followed for 16 years with an average age of 57 who never smoked and had no history of disease at enrollment.

INCIDENCE OF COPRODUCTS
UNFORTUNATELY MEDICAL WEIGHT LOSS PROGRAMS ARE NEITHER SUFFICIENT OR SUSTAINABLE
Today Bariatric Surgery, as part of a comprehensive program, represents the only sustainable way to lose weight.

- With a 80% (average) reduction in the co-morbidities
- And a 40% reduction on overall mortality
- And may be the only cure for DMII
• Bariatric surgery should only be done with the support of a multidisciplinary team

• This includes a bariatrician, dietitian, psychologist, surgeon, exercise specialist, and organized support groups

• Also required is a carefully designed pre operative program and life long post operative care
NIH CRITERIA FOR BARIATRIC SURGERY

- BMI > 40
  
or
- BMI > 35 (<40) with 2 co-morbidities
  
or
- 100 lbs over ideal body weight
• Favorable psychiatric evaluation
• No EtOH abuse
• 6 month tobacco free
• Demonstrate willingness and ability to make life changes necessary to be successful
Surgical Options

- **Restrictive:** Lap Adjustable gastric Band
  Lap Vertical Sleeve Gastrectomy
- **Malabsorptive:** Duodenal Switch
  Biliopancreatic Diversion
- **Restrictive and Malabsorptive:** Lap Roux- en-Y gastric Bypass
LAPRASCOPIC ADJUSTABLE BAND

- Lowest operative morbidity and mortality
- 20% reoperative rate
- 50 % EBW loss @ 3 years
- Requires frequent adjustments
- Not a good choice for sweet eaters
LAPRASCOPIC SLEEVE GASTRECTOY

- Moderate morbidity and mortality
- 1% leak rate
- 65% EBW loss
- No good long term studies as a stand alone procedure
- May be as good as RNY for DMII based on early studies
LAPRASCOPIC ROUX-EN-Y GASTRIC BYPASS

- Higher morbidity and mortality
- 2% leak rate
- 0.3% mortality
- 80% EBW loss
- Risk for malabsorption
- Risk for internal hernia
- Best metabolic procedure
<table>
<thead>
<tr>
<th>WHICH PROCEDURE?</th>
<th>Band</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Laprascopic adjustable gastric band</td>
</tr>
<tr>
<td></td>
<td>Useful in motivated patients who simply need help with portion control.</td>
</tr>
<tr>
<td></td>
<td>Non sweet eaters</td>
</tr>
<tr>
<td></td>
<td>Willing to return for multiple visits for band adjustments</td>
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<tr>
<td></td>
<td>Willing to tolerate slower weight loss (1-2 lbs per week when adjusted properly.)</td>
</tr>
</tbody>
</table>
WHICH PROCEDURE?

Sleeve

• Laparoscopic vertical sleeve gastrectomy

Similar to band, but useful for patients that cannot or will not return for frequent visits (no adjustments)

Safer as a first stage of a 2 stage procedure for super morbidly obese patients.

(Easily converted to RNY)
Roux-en-Y Gastric bypass
“gold standard”
Best metabolic operation
More useful in patients who are sweet eaters. (Causes dumping)
Better in patients who may be less compliant.
(Assuming they are willing to take micronutrient supplements)
POST OPERATIVE

• Watch for sustained tachycardia > 100 this is a sign for:
• Leak (return to OR and drain)
• Pulmonary embolism (most common cause of post operative death) So prevention is the key.
• Bleeding (gi or intraabdominal)
WHAT TO WATCH FOR WITH A LAP BAND

• No nutritional deficiencies except possible protein deficiency if patients fill up on carbohydrates

• A band that is too tight causes dysphagia and emesis, or REFLUX. Treatment is not PPI’s, rather loosen the band.

• If a band is left too tight, the patient will resort to liquid calories such as milkshakes, and will ultimately cause esophageal dilation and dysfunction
SLEEVE GASTRECTOMY, WATCH FOR:

• B12 and iron deficiency
• As with all, watch for protein deficiency
• Sleeve dilation or elongation and torsion
RNY, WATCH FOR:

- Stricture of gastrojejunostomy
- Indicator: pt. with progressive dysphagia and emesis of solids.
- Treated with EGJ and dilatation 15 to 18 mm with TTS balloon
Also with RNY, watch for:

- Abdominal pain, +/-nausea: Must R/O internal hernia
- Get CT of Abd.
- If suggestive of internal hernia then emergency OR
- All the small bowel can die in 4 hours.
- If bilious emesis, then probable obstruction of biliopancreatic limb, this also needs surgery
MICRONUTRIENT SUPPLEMENTS

- **Routine:** Multivitamin with minerals: 1 chewable tablet, twice a day

- **As indicated:** vitamin B12 1000 ug IM, or sublingual B12 500 ug, or nasal
  
  **Iron:** iron and/or vit C complex daily, or parenteral
  thiamine: 100 mg po bid, or 100-250 mg IM monthly
  Zinc sulfate: 220 mg tablet, daily or qod
• As indicated

copper gluconate: 2 mg po daily to every other day

Vit D 50,000 IU with a meal, once weekly (for up to 12 weeks) followed by vitamin D3 (cholecalciferol): 1,000 IU with a meal, twice daily

Folic acid: 1 mg tab daily in women of child-bearing age
**Table 2** Routine and as indicated laboratory testing after Roux-en-Y gastric bypass surgery

<table>
<thead>
<tr>
<th>Timing</th>
<th>Laboratory test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Routine</strong></td>
<td></td>
</tr>
<tr>
<td>3 months postoperatively</td>
<td>Complete blood count, glucose, glycosylated hemoglobin*, lipids</td>
</tr>
<tr>
<td>At 6-month intervals during the first 3 years, then once yearly</td>
<td>Chemistry group, complete blood count, lipids, ferritin, zinc, copper, magnesium, total 25-hydroxyvitamin D, folate, whole blood thiamine, vitamin B12, 24 h urinary calcium, serum alkaline phosphatase (with fractionation if levels are above normal)</td>
</tr>
<tr>
<td><strong>As Indicated</strong></td>
<td></td>
</tr>
<tr>
<td>Visual symptoms</td>
<td>Vitamin A, vitamin E, whole blood thiamine</td>
</tr>
<tr>
<td>Bleeding disorder</td>
<td>Complete blood count, prothrombin time and/or INR</td>
</tr>
<tr>
<td>Refractory vitamin D deficient</td>
<td>Parathyroid hormone</td>
</tr>
<tr>
<td>Neurologic symptoms</td>
<td>Vitamin B12, vitamin E, copper, whole blood thiamine, plasma niacin</td>
</tr>
<tr>
<td>Anemia</td>
<td>Ferritin, vitamin B12, folate, zinc, copper, vitamin A, vitamin E</td>
</tr>
</tbody>
</table>

*If indicated by preoperative disease. Abbreviation: INR, international normalized ratio.

<table>
<thead>
<tr>
<th>Type of beriberi</th>
<th>Common symptoms/findings</th>
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<tbody>
<tr>
<td>Neuropsychiatric</td>
<td>Hallucinations, aggressive behavior, confusion, nystagmus, ataxia, ophthalmoplegia</td>
</tr>
<tr>
<td>Neurologic/neuropathies (dry beriberi)</td>
<td>Numbness, muscle weakness, pain in the lower &gt; upper extremities, convulsions, exaggerated tendon reflexes</td>
</tr>
<tr>
<td>High output cardiovascular disease (wet beriberi)</td>
<td>Tachycardia, respiratory distress, leg edema, right ventricular dilation, lactic acidosis</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>Nausea, emesis, megajejunum, constipation, megacolon</td>
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CONCLUSIONS

• Bariatric surgery provides the best chance for sustainable weight loss as treatment for morbid obesity.

• Bariatric surgery results in a 80% reduction in co-morbidities associated with morbid obesity. (including DMII)

• Bariatric surgery results in a 40% reduction in mortality associated with morbid obesity.
CONCLUSIONS

As bariatric surgery becomes more commonplace, all practitioners should be familiar with potential complications and how to treat or at least recognize these problems. This is especially true in caring for women who become pregnant after bariatric surgery.
• ASMBS web site

• www.nature.com/nrgastro