Metabolic and Weight Management Procedures

Jeffrey Rosen, MD, FACS
Obesity is a Metabolic Disease

Obesity increases the chances of developing one or more of these diseases.

- Liver disease
- Gallbladder disease
- Type 2 diabetes
- Menstrual/Infertility problems
- Gout
- Sleep apnea
- Asthma
- Heart disease
- High blood pressure
- GERD
- Osteoarthritis
- Gout
Types of Procedures

• Restrictive
  – Food intake is limited by decreasing the effective stomach size or decreasing the amount of food going entering the small bowel

• Malabsorptive
  – A procedure that creates a physiological condition of decrease absorption of nutrients

• Mixed
  – Combination of the above

• Metabolic
  – Treats metabolic diseases (Insulin resistance, DM, Dyslipidemia)
Who can **POTENTIALLY QUALIFY** for Metabolic Weight Loss Surgery

- Age
- Previous Weight History
- History and Physical
- Psychological Assessment
- Goal/Achievements
- Team Evaluation and Approval
- Patient Approval
Post-Operative Immediate Risks

General Procedures
- Bleeding
- Infection/MSOD/MSOF
- DVT/PE
- MI
- ARI
- SBO
- Death

Stapling Procedures
- Leaks
- Edema
Nutritional Deficiencies

- Albumin
- B12 – Cyanocobalamine
  - Anemia
  - Neurological late with early emesis
- B9 – Folate
  - Anemia, Apathy, Fatigue, HA, diarrhea
- B1 – Thiamine
  - Neuro, ataxia, lethargy
- A, D, E, K - fat soluble
  - Vit A night blindness
- Calcium
- Iron and anemia
Long Term Post-Operative Risks

**General**
- Malnutrition
- Vitamin Deficiencies
- Anemia
- Ulcers
- Band Complications
- SBO
- Strictures
- Failure to lose Weight
- Weight Regain
  - Mechanic
  - Psychological
- Hernias
- Hair Loss

**Stapled**
- Fistula
- Internal Hernias
- Stomal Stenosis
- Marginal Ulcers
- Dumping Syndrome
- Cholelithiasis
RESTRICTIVE PROCEDURES
Surgical Treatment For Morbid Obesity

Lap-BAND®

- One weight loss component:
  - Reduces the size of the stomach

*Picture provided by AllReferHealth.com
Gastric Banding Slippage
Gastric Banding Slippage
BAND EROSION
Band late complications

• Tube issues: Breakage, Disconnection
• Port site infection, Port rotation, Port skin erosion
• Tube kinking
• SBO due to tubing
• Prolapse or pouch dilation
Surgical Treatment
Morbid Obesity

SLEEVE GASTRECTOMY

- Procedure that removes 2/3’s of the stomach
- Two weight loss components:
  - Restrictive – reduces size of the stomach
  - Hormonal changes
Sleeve Complitations

• Nausea
• GERD
• Hiatal hernia
• Stricture
• Leak
Stent Placement after leak

Intraluminal stent
Evolution of Minimally Invasive Surgery

Open

Endoscopic

Laparoscopic
Endoluminal & Transgastric Benefits for Obesity Treatment

• Fewer complications and side effects
• Less invasive treatments delivered in an outpatient setting
• Lower cost procedures
• Improved access to treatment
• Procedures to prevent progression to morbid obesity
Endoscopic Sleeve Gastroplasty
Endoluminal Suturing Gastroplasty

- 64 patients were treated with EndoCinch at single center
- Pre-procedure BMI 28-44
- No intra-operative complications
- Outpatient procedure

Fogel et al. Gastrointestinal Endoscopy 61: AB106
Figure 11. Schematic representation of the Transoral Gastroplasty: a. the TOGa system is deployed over the endoscope with the scope retroflexed for viewing the procedure, b. the TOGa device gathering anterior and posterior gastric mucosa into the suction chamber prior to stapling, c. restrictive outlet is stapled along the lesser curvature with overlapping staple lines.
Endoluminal Stapling Gastroplasty

• 21 patients were treated with TOGa system at 2 centers
• BMI 35-53
• Complications
  – 1 Temporo-mandibular dysfunction
• Discharge at 48 hours
• Median Weight Loss
  – 1 month : 16%
  – 3 months : 21%

Deviere J. et al. Presented at (UEGW), 2006
Intragastric Balloon: 2 Types

Type 1: Single Balloon
- Esophagus
- Gastric Balloon
- Stomach
- Small Intestine

Type 2: Dual-Balloon

Copyright: BariatricSurgerySource.com
Diets can be successful in the short-term, but have a failure rate of approx 87-95% at 10 years.

Growing number of pharmaceutical options with modest weight loss approx 10%

Most effective approach for long-term weight loss¹

Perceived to be “too invasive” for many patients

ORBERA is a medical incision-less, non-surgical option that can be used in treatment of fertility, joint pain and high risk cardiac patients in need of weight loss.
Placement of ORBERA™

- Simple non surgical procedure under mild sedative
- Procedure takes 20–30 minutes—home same day
- Help you eat smaller meals and proper portion control
- Two-part program, starting with balloon placed temporarily in stomach for six months and continuing with diet and exercise support
- Learn long term eating habits that help sustain weight loss
After six months

Non-surgical procedure under mild sedative
Indicated for use as an adjunct to weight reduction for patients obesity and a **body mass index (BMI) of ≥30 or ≤40 kg/m^2**

To be used in conjunction with a long-term supervised diet and **behavior modification** program designed to increase the possibility of significant weight loss and the maintenance of that weight loss.

Intended for adults who have attempted more conservative weight reduction alternatives, such as supervised diet, exercise, and behavior modification programs.

**Note:** Indication does not require an obesity related co-morbidity and the presence of co-morbidities is not a contraindication.
Apollo Oberra Intragastric Balloon

• Essentially non surgical weight loss
• Temporary placement of intragastric balloon with approx 500cc of saline
• Placed for a period of 6 months
• Patient works intensely with diet and exercise program for 12 months
• Followed long term
• Currently not approved by insurance is done as a self pay procedure.
US Pivotal Study

- 255 total US patients (125 treatment/130 control)
- Balloon group achieved a mean 38.4% excess weight loss statistically significant to control at 6 months and 1 year.
- The Orbera Balloon group lost 3.1X as much weight as the control group over the course of the study and was able to maintain significant weight loss through month 12
Attiva™
Figure 1. GLP-1 actions in peripheral tissues

GLP-1 acts directly on the endocrine pancreas, heart, stomach, and brain, whereas actions on liver and muscle are indirect.
Surgical Treatment
Morbid Obesity

GASTRIC BYPASS

Three weight loss components:

• Reduces the size of the stomach
• Reduces calorie absorption
• Hormonal changes

*Picture provided by AllReferHealth.com*
Roux-en-Y Gastric Bypass

• Advantages
  – Excellent excess weight loss (60-75%)
  – Very good long-term results
  – Solid food well tolerated

• Disadvantages
  – Perioperative complications
  – Potential nutrient deficiencies
Anastomotic Leak
Anastomotic Stricture
Marginal Ulcer
Internal Hernia
Procedures
Single-Anastomosis Duodenal Switch

- Inner less stretchable stomach preserved (Approx. 120 mL or 3-4 oz)
- Ghrelin (hunger/appetite hormone)
- Outer more stretchable stomach removed ~ 85%
- Pump (antrum) preserved
- Valve (Pylorus preserved)
- Gallbladder is removed
- Duodenum is divided
- Intestine is attached to the duodenal stump about 8-10 ft or 250-300 cm from the colon

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Sleeve with ileal interposition
Treatments for obesity

Endoscopic Balloon & Endoscopic Sleeve Gastrectomy

Diet & Exercise
Exclusion of the proximal small bowel from the flow of nutrients is the primary mediator of diabetes resolution after DJB

*Annals of Surgery Nov 2006*
Controls: Fenestrated Duodenal Sleeve

Mucosa isolated from nutrients

Mucosa exposed to nutrients
Endoluminal Restriction/Conduit/Absorption

Food limitation

Decreases absorption
Apollo Overstitch

- Endoscopic reduction of stomach pouch
- Endoscopic reduction of gastrojejunal anastomosis
- Non surgical revision of previous roux en Y gastric bypass patient
- Outpatient procedure
Technique

- Outlet reduction:
  - Tissue ablation (APC)
  - Interrupted stitches at the anastomosis margin
  - Goal reduction to < 1cm

- Pouch reduction:
  - Interrupted stitches in the pouch to reduce its volume
Gastrojejunostomy Reduction
Electro-stimulation
Vagal Stimulator
Transgastric Procedures
Transendoluminal Gastric Bypass
Recent Transgastric Tools
NOTES Applications

Transgastric Gastrojejunostomy

Kantsevoy SV et al, Gastrointestinal Endoscopy, 2005
## Comparative Mortality

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craniotomy</td>
<td>10.7%</td>
</tr>
<tr>
<td>Esophagectomy</td>
<td>9.1%</td>
</tr>
<tr>
<td>Pancreatectomy</td>
<td>8.3%</td>
</tr>
<tr>
<td>Pediatric Heart Surgery</td>
<td>5.4%</td>
</tr>
<tr>
<td>Aortic Aneurysm</td>
<td>3.9%</td>
</tr>
<tr>
<td>CABG</td>
<td>3.5%</td>
</tr>
<tr>
<td>Hip Replacement</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Bariatric Surgery</strong></td>
<td>0.28%</td>
</tr>
</tbody>
</table>

Obesity Treatment Pyramid

BMI

Diet  Physical Activity

Lifestyle Modification

Pharmacotherapy

Surgery
## Resolution or improvement of comorbidities

- Only surgery has resulted in weight maintenance for the long-term for severe obesity

<table>
<thead>
<tr>
<th>Condition</th>
<th>Resolution Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migraines</td>
<td>57% resolved</td>
</tr>
<tr>
<td>Pseudotumor cerebri</td>
<td>96% resolved</td>
</tr>
<tr>
<td>Dyslipidemia, hypercholesterolemia</td>
<td>63% resolved</td>
</tr>
<tr>
<td>Non-alcoholic fatty liver disease</td>
<td>90% improved</td>
</tr>
<tr>
<td>Metabolic syndrome</td>
<td>80% resolved</td>
</tr>
<tr>
<td>Type II diabetes mellitus</td>
<td>83% resolved</td>
</tr>
<tr>
<td>Polycystic ovarian syndrome</td>
<td>79% resolution of hirsutism, 100% resolution of menstrual dysfunction</td>
</tr>
<tr>
<td>Venous stasis disease</td>
<td>95% resolved</td>
</tr>
<tr>
<td>Depression</td>
<td>55% resolved</td>
</tr>
<tr>
<td>Obstructive sleep apnea</td>
<td>74-98% resolved</td>
</tr>
<tr>
<td>Asthma</td>
<td>82% improved or resolved</td>
</tr>
<tr>
<td>Cardiovascular disease*</td>
<td>82% risk reduction</td>
</tr>
<tr>
<td>Hypertension</td>
<td>52-92% resolved</td>
</tr>
<tr>
<td>GERD</td>
<td>72-98% resolved</td>
</tr>
<tr>
<td>Stress urinary incontinence</td>
<td>44-88% resolved</td>
</tr>
<tr>
<td>Degenerative joint disease</td>
<td>41-76% resolved</td>
</tr>
</tbody>
</table>

- Quality of life improved in 95% of patients
- Mortality 89% reduction in 5-year mortality
Algorithm for management of obesity
Summary:
Endoscopic Bariatric Surgery

• Concepts mimic conventional bariatric surgery
• Nerve stimulation/ablation new strategy
• Instrumentation - limited
• Minimal outcome data available
• Promising field of development
The LifeWeigh Bariatrics Team

- Patient
- Therapist
- Exercise Instruction
- Registered Dietitians
- Nurse Practitioner and Surgeons

Some parts of the team may be offsite and you will be referred to them.
References

- http://asmbs.org/patients/bariatric-surgery-procedures
- Gut 2014 Apr;63(4);687-695
- https://www.youtube.com/watch?v=Ho43hPwecnE Aspireassist
- Obesity and bariatrics for the endoscopist: New techniques
- https://www.researchgate.net/publication/51760537_Obesity_and_bariatrics_for_the_endoscopist_New_techniques