Advances in the Treatment of Obesity

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“For every complex problem, there is a solution that is simple, neat, and wrong”

H.L. Mencken

disease
noun dis-ease \diz-\(\ddot{a}\)-z\%

Medical Definition of DISEASE

: an impairment of the normal state of the living animal or plant body or one of its parts that interrupts or modifies the performance of the vital functions, is typically manifested by distinguishing signs and symptoms, and is a response to environmental factors (as malnutrition, industrial hazards, or climate), to specific infective agents (as worms, bacteria, or viruses), to inherent defects of the organism (as genetic anomalies), or to combinations of these factors

Degrees of Obesity

18.5-24.9  25 to 29.9  30 to 34.9  35-39.9  40 or more
All Cause Mortality

Obesity effects on the individual

- Depression/anxiety
- Self-esteem
- Lower educational attainment
- Lower employment status
- Lower salary
- Less likely to marry
- More likely to divorce
- Higher suicide rate

National Estimated Costs of Obesity

- Medical care costs $147 billion
- Including overweight, higher than $600 billion
- Obesity-related absenteeism
  - range between $3.38 billion ($79 per obese individual) and $6.38 billion ($132 per obese individual)
- Military – 27% of applicants denied
  - 12% of eligible males
  - 35% of eligible females
- All told, close to 5% of our GDP

Why should we treat obesity as a disease?

- Lifestyle issues
- Choice
- Poor eating habits
- Lack of exercise

Addressing these factors is the first step for many of the diseases we treat.
Environmental Drivers to Obesity

(1) Altered food supply
(signaling more than calories)

(2) Decreased physical activity
(effects on muscle more than calories)

(3) Stress and distress
(direct impact on relevant brain areas)

(4) Drugs
(accounts for up to 10%)

Insurance Coverage

• Carriers offer coverage
• Not all plans have coverage
• Employers pick the plans
• The Exchange plan in TN does not cover
  ▫ In fact, it has treated obesity surgery as a pre-existing condition
  ▫ There are mandates for counseling but not prescription or surgical treatment.

What would expanded coverage do?

• Prices for those without coverage may go up
• May increase interest in research
  ▫ New meds
  ▫ New devices
• May see more hurdles for surgery patients
  ▫ Stepwise approach
  ▫ Short-term returns outweigh long-term returns

Expanded Medications

• Phentermine – sympathomimetic
• Topiramate/Phentermine – antiepileptic/migraine med and sympathomimetic
• Lorcaserin – serotonin agonist (selective 2C)
• Bupropion/Naltrexone – antidepressant (NE) and opioid antagonist
• Liraglutide – GLP-1 agonist
• Orlistat – pancreatic lipase inhibitor

Advances in Medications

• Medications are meant for long-term
• Overall effectiveness, avg. 5-10% total body weight
• Need to hit 5% total body weight loss
• What is the starting weight???
• Above all else, set REALISTIC goals and a REALISTIC time table
• Expectations are everything

Advances in Surgery

• Landscape of traditional surgeries
  ▫ RNY gastric bypass
  ▫ Gastric sleeve resection
  ▫ Duodenal switch
  ▫ Gastric band
• How we’re doing the surgeries
  ▫ Laparoscopic
  ▫ Robotic (Laparoscopic)
Mechanisms of action of Bariatric/Metabolic surgery

- Restriction
- Malabsorption
- Altered gut hormones
- Neural mechanisms – vagal
- Gut microbiota changes
- Altered thermogenesis, energy expenditure
- Increased circulating bile acids

Laparoscopic Surgery

RNY Gastric Bypass

Gastric Sleeve Resection

Duodenal Switch

Adjustable Gastric Band
Rise of the Robots?

Aesculaptor Mark III

Modern Robot

Robot

Robot Setup

Robotic Laparoscopic Surgery
Robotic Surgery Advantages

- 3D View
- Wristed instruments
- Precision and accuracy
- Shorter hospital stay
- Less pain
- Less blood loss
- Few complications
- Ergonomics

Robotic Surgery Disadvantages

- Lack of haptic feedback
- Away from patient
- Footprint
- Communication
- Compatibility
- Increased time of procedure
- COST

Surgery Times

![Robot RNY Graph](image1)

![Robot Sleeve Graph](image2)
Surgery Times

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Average Time (hh:mm:ss)</th>
</tr>
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<tr>
<td>Lap RNY</td>
<td>2:14:58</td>
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<tr>
<td>Robot RNY</td>
<td>2:07:10</td>
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<tr>
<td>Lap Sleeve</td>
<td>1:28:04</td>
</tr>
<tr>
<td>Robot Sleeve</td>
<td>1:27:46</td>
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</tbody>
</table>

Cost

- RNY and Sleeve about $900-1200
- Major culprit is instrumentation
- OR time at startup

Ergonomics

- Repetitive motion injury reduction
- Posture
- Fresh for last case
- More cases in a
  - Day
  - Week
  - Career

Mortality Comparison

- Hysterectomy 1-6/1000 = 0.1-0.6 %
- Laparoscopic Cholecystectomy 0.2-0.4%
- Elective CABG 0.8-3%
- Bariatric Surgery 0.1-0.3%

Major Morbidity

- Hysterectomy – 5%
- Laparoscopic Cholecystectomy - 5%
- Elective CABG – 15%
- Bariatric Surgery - 3%

Early Complications

- SMV Thrombosis
- PE
- Leak
- Bleeding
- Obstruction
- Dehydration/vomiting
- C diff colitis
Late Complications

- Obstruction (internal hernias)
- GERD
- Ulcer/stricture
  - Bleeding
  - Perforation
- Dehydration/Vomiting (check me about thiamine)
- Dumping / reactive hypoglycemia

Postoperative Follow-up

- 1 wk
- 6 wks
- 3, 6, 9, 12, 18, 24, months
- Yearly
- At least for 5 years, for life is optimal
- Weekly Support Group offered

Vitamin Supplements

- MVI
- Calcium citrate 500mg tid
- Vit D 3000 units/day
- B12 500 to 1000 micrograms daily
- +/- Iron

Postop labs

- CBC
- CMP
- Lipids
- TSH
- PTH
- HbA1c
- Ferritin
- Folate
- B12
- B1
- 25-OH-Vit D

New Procedures

- Single anastomosis surgeries
  - Single anastomosis duodenal switch a.k.a. Stomach Intestinal Pylorus Sparing Surgery (SIPS)
  - Single anastomosis RNY gastric bypass a.k.a. Omega-loop or mini-gastric bypass
- Vagus nerve blocking
- Gastric balloon
- Endoluminal sleeves, expandable stents, bypass stents, duodenal resurfacing*

Vagal Blocking Therapy
Vagal Blocking Therapy

- Similar technology as gastric stimulation for gastroparesis applied differently
- Vagus nerves blocked at the trunks just above the gastroesophageal junction
- Lower risk due to no division of GI tract and no anastomoses
  - Risks are mainly with device misplacement, malfunction, infection
- Neural mechanism – inhibits receptive relaxation of stomach and gastric emptying.
  - May be some direct feedback through vagus nerves to decrease hunger
- Indicated for BMI 35-45

Gastric Balloon

- Endoscopically placed
- Endoscopically retrieved at 6 mo
- Multidisciplinary team

Gastric balloon

- Restrictive
  - Maybe some hormone
  - Maybe neural feedback
- Nausea is most common complaint
- Removed device for symptoms in about 10%
- Most of the weight-loss is in first month
- Spherical – no sharp edges
- Erosions, deflation, migration is rare
- 20 years of experience (Europe)
Gastric Aspiration

Weight Loss Outcomes *

- RNY Gastric Bypass
- Gastric Sleeve
- Duodenal Switch
- Gastric Band
- Vagal Blocking
- Gastric Aspiration
- Intragastric Balloon

*65-70% EBWL
*55-60% EBWL
*65-70% EBWL
*30-40% EBWL
*28% EBWL
*30% EBWL
*25-30% EBWL

*pooled data

Effectiveness of Obesity Treatments

RNY Gastric Bypass Results

“Sandwich Therapy”?

- Growing data to support the use of weight-loss medications following surgery
  - Maintain weight loss
  - Improve weight loss
- We also use medications for those who need to lose weight prior to surgery

Postoperative Medication
Quality Improvement in Bariatric Surgery

- MBSAQIP accreditation
- MBSAQIP, NSQIP, Tennessee Collaborative databases
- Local QI initiatives

Patient Selection for Surgery

- NIH Consensus 1991
- BMI 35-40 with co-morbidities
- BMI 40+
  - Exceptions
    - BMI 30-40 balloons
    - BMI 35-40 with co-morbidities or 40-45 for Vagal blocking
    - BMI 35-55 gastric aspiration therapy
- Failed previous attempts
- Good surgical candidate (???)

Patient Selection for Surgery

- Challenges
  - Smokers
  - Patients with specific medication requirements
    - Transplant (pre- and post-)
  - Advanced age – how old is too old?
  - Advanced medical illnesses – there is probably such a thing as End Stage Obesity
  - Risk stratification in current outcomes databases is not strong enough

Quick Summary

- Keep medications and surgery in your armamentarium
- Realistic goals
- Realistic timetable
- Surgery (and most other interventions) are most effective when employed early in the course of a disease.

Treatment Pyramid