General and Bariatric Surgery in the Obese Patient

Andrew M. Posselt, M.D., Ph.D.
Dept. of Surgery
University of California, San Francisco

General Surgery in Morbidly Obese Patients

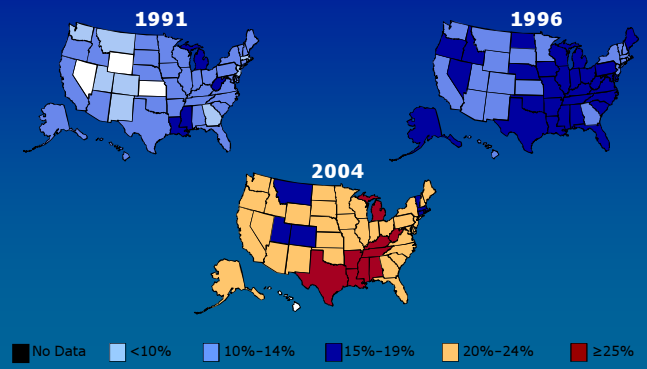
- Obesity Associated Comorbidities
- Obesity Associated Complications

Bariatric Surgery in Morbidly Obese Patients

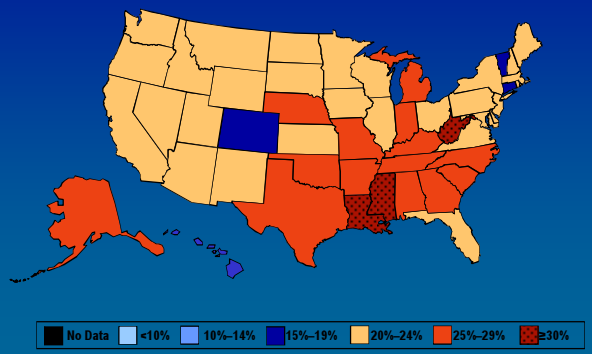
- Patient Selection
- Laparoscopic Gastric Bypass or Band
- Outcomes

Obesity Trends* Among U.S. Adults

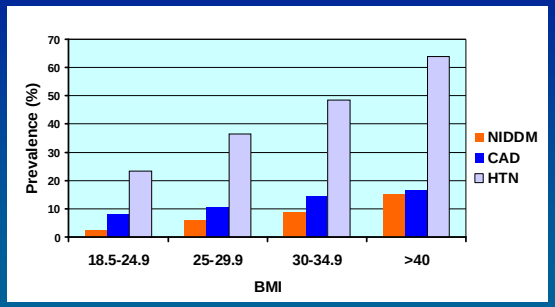
(*BMI ≥30, or about 30 lbs overweight for 5'4" person)



Obesity Trends Among U.S. Adults 2005



Prevalence of Comorbidities



NHANES III, 1988 - 1994

National Institute of Diabetes & Digestive & Kidney Diseases

Obesity Associated Comorbidities

Osteoarthritis
Rheumatoid Arthritis
Birth Defects
Breast Cancer
Cancers of Esophagus and Stomach
Colorectal Cancer
Endometrial Cancer
Renal Cell Cancer
Cardiovascular Disease
Carpal Tunnel Syndrome
Chronic Venous Insufficiency
Daytime Sleepiness
Deep Vein Thrombosis
Diabetes (Type 2)
End Stage Renal Disease
Gallbladder Disease
Gastroesophageal Reflux Disease
Heat Disorders
Hypertension
Impaired Immune Response
Infertility
Liver Disease
Ob&Gyn Complications
Pancreatitis
Sleep Apnea
Stroke
Surgical Complications
Urinary Stress Incontinence

United States National Institute of Diabetes & Digestive & Kidney Diseases of the National Institutes of Health

NHANES III, 1988 - 1994

Obesity Increases Mortality

"Obesity is one of the most common medical problems in the United Sates and a risk factor for illnesses such as hypertension, diabetes, degenerative arthritis and myocardial infarction. It is a cause of significant morbidity and mortality and generates great social and financial costs."

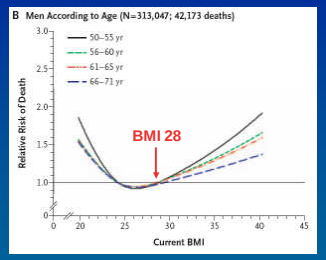
Ethan M. Berke, MD and Nancy E. Morden, MD, Medical Management of Obesity,
American Family Physician, American Academy of Family Physicians website.

"Taken together, the diseases associated with morbid obesity markedly reduce the odds of attaining an average life span and raise annual mortality tenfold or more."

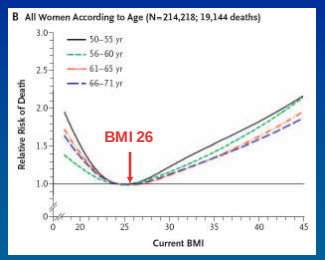
American College of Surgeons, Recommendations for facilities performing bariatric surgery, ST-34, Bull Am Col Surg, 2000;85:

BMI and Risk of Death

Men



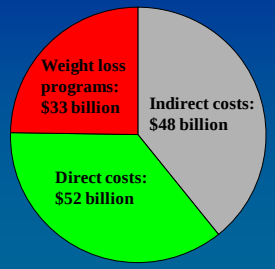
Women



Adams, KF, et al. NEJM 2006

Economic Costs of Morbid Obesity

US Citizens with BMI >30
Total Cost: 133 Billion Dollars



Wolf, Obesity Research, 1998

Surgery In the Obese Patient

Multidisciplinary Team Approach

- Anesthesia
- Gastroenterology
- Endocrinology
- Cardiology – ICU
- Radiology
- Nursing

Surgery In the Obese Patient

Important Concerns

- OSA
- Diabetes
- DVT/PE
- Gerd
- Surgical Complications
- CVASD

Surgery In the Obese Patient

Obstructive Sleep Apnea

- 3% prevalence in general population
- 91% prevalence in morbidly obese (sleep study)
- Associated with:
  - CHF, arrhythmias, pulm HTN, MI
  - Hypercoagulability
  - Increased post-op respiratory distress, prolonged hosp stay

Hallowell PT et al. Am J Surg.193(3):364-7, 2007
O'Keeffe T, Patterson EJ. Obesity Surgery. 14, 23-26, 2004

Obesity, OSA and Anesthesia

- Pre-op polysomnography to r/o OSA
- Induction/Intubation
  - 2 experienced personnel
  - Consider wake fiberoptic (oral or nasal) intubation
- Intraoperative
  - Poor tolerance of pneumoperitoneum
  - Increased need for relaxation
- Emergence/post-op
  - Overnight intubation, ICU stay

Hallowell PT et al. Am J Surg.193(3):364-7, 2007
O'Keeffe T, Patterson EJ. Obesity Surgery. 14, 23-26, 2004

Diabetes Mellitus

- 35% prevalence in patients with BMI >40
- 90% type II, therefore insulin resistant
- Post-operative Management
  - liberal use of insulin gtt
  - early resumption of preop OHA or long-acting insulin
  - may need high doses of insulin (>60-100U/day) once taking po's

Hypercoagulability

- Obesity strong risk factor for DVT/PE
- Increased risk with prolonged surgery
- Reverse Trelendenberg, pneumoperitoneum increase venous stasis
- SCD's, SQ heparin or enoxaparin (better) recommended
- Consider removable IVC filter in high risk pts

Surgical Complications

Rhabdomyolysis

Few studies:

Bostanjian (UCLA)

- 6 pts with severe rhabdo due to gluteal muscle ischemia
- 5/6 male, median BMI 67 (BMI 55 in controls)
- Median operative time 5.7 hrs (4 hrs in controls)
- Peak CPK 26,000-29,000 (controls 450-9,000)
- 3/6 developed ARF – all died

Mognol (France)

- CPK>1,000 in 3/50 LAGB pts, 12/16 Lap GBP pts
- CPK >10,000 in 4/12 Lap GBP pts; all had BMI>60
- Long operative time and high BMI were risk factors

Recommendations:

- team effort to minimize anesthesia and operative time
- better padding
- routine CPK monitoring in high risk pts, treat CPK's >5000

Surgical Complications

Incisional Hernias

Sugerman AJS 1996

- Open GBP vs. Total abdominal colectomy in IBD pts on chronic steroids
- 20% incisional hernia rate in obese
- 4% hernia rate in pts on steroids
- diabetes, wound infection, sleep apnea independent risks
- 20-30% recurrence rates after repair

Recommendations:

- weight loss BEFORE elective surgery
- broad spectrum abx
- nonabsorbable suture +/- internal retentions
- binder
- use mesh for hernia repair

Surgical Complications

Wound Infections

Smith AnnSurg 2004

- Wound infections after colorectal surgery (176 pts)
- 26% infection rate!
- OR 2.5 for BMI 25-29, OR 3.0 for BMI >30
- OR 2.6 for intraop hypotension
- 20-30% recurrence rates after repair

Recommendations:

- weight loss BEFORE elective surgery
- broad spectrum abx, consider sq drains
- multilayer closure
- good glucose control in diabetics
- supplemental oxygen
- laparoscopic approach when possible

Non-Surgical Treatment

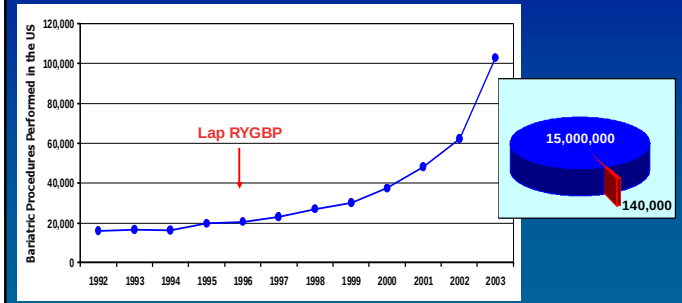
Diet Therapy

- 48 RCT's
- Avg weight loss 8-12% after 3-12 mos.
- Most weight regained within 2-5 yrs.

Physical Activity

- Minimal weight loss if primary treatment modality
- Useful as adjunctive therapy

Bariatric Procedures Performed Annually in the U.S.



Steinbrook R. Surgery for Severe Obesity
N Eng J Med 2004; 350: 1075-79

Criteria for Surgery

- Body Mass Index of 40 kg/m² or greater
- BMI between 35 and 40 kg/m² with significant comorbidities
- Has failed other medically managed weight-loss programs

Preop evaluation:

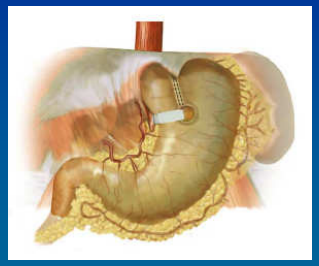
Cardiac, Pulmonary
HCM
r/o Endocrine causes of obesity
Psychiatric and Nutritionist assessment
Mandatory weight loss and attendance at group sessions

Types of Surgery

- **Restrictive**
  - Vertical Banded Gastroplasty (VGB)
  - Adjustable Gastric Banding
  - Sleeve (Vertical) Gastrectomy
- **Malabsorptive**
  - Jejunoileal Bypass (JIB)
  - Biliopancreatic Diversion (BPD)
  - Duodenal Switch
  - Long Limb Gastric Bypass
- **Restrictive with Malabsorptive Component**
  - Roux-en-Y Gastric Bypass (RYGPB)

Restrictive Surgery

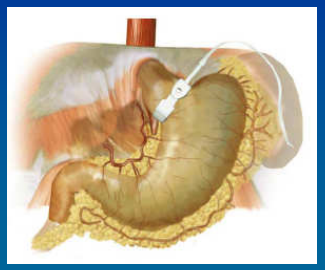
Vertical Banded Gastroplasty (VGB)



- Original restrictive procedure
- 40-50% EBW loss
- Staple disruptions
- Band erosions
- Uncommon today

Restrictive Surgery

Laparoscopic Adjustable Gastric Band (LAGB)



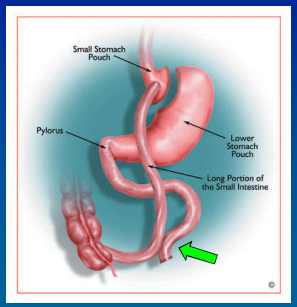
- FDA approved 2001
- Weight Loss Similar to VBG
- 30% Surgical Revision Rate
- Fewer serious complications
- Frequent post-op adjustments

Restrictive Surgery

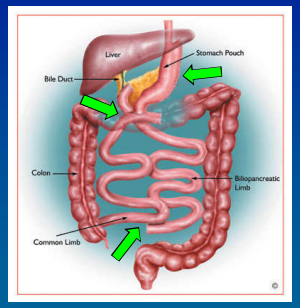
Pro
- Relatively easy
- No protein-calorie malabsorption
- No vitamin or mineral deficiencies

Con
- Less weight loss
- More late failures due to dilation
- Less effective with sweet eaters
- Significant dietary non-compliance

Malabsorptive Surgery



Long Limb Gastric Bypass

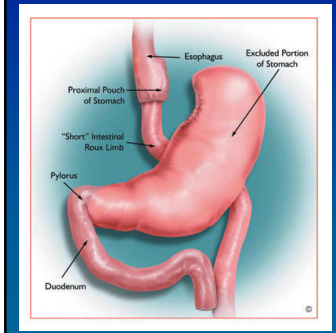


Biliopancreatic Diversion with Duodenal Switch

Malabsorptive Surgery

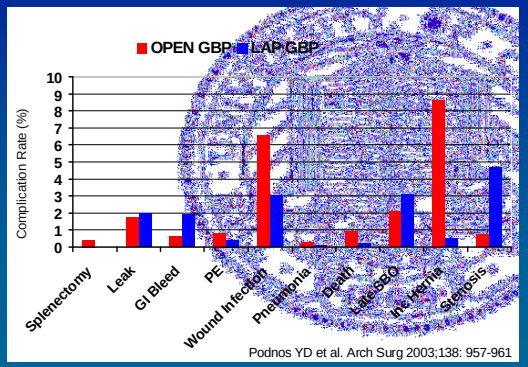
- Greater sustained weight loss with less dietary compliance
- Increased risk of malnutrition and vitamin deficiency
- Constant follow–up to monitor increased risk
- Chronic diarrhea

Roux-en-Y Gastric Bypass



- Most commonly performed bariatric procedure
- Long-term sustained weight loss
- No protein-calorie malnutrition
- Few vitamin or mineral deficiencies
- Technically difficult

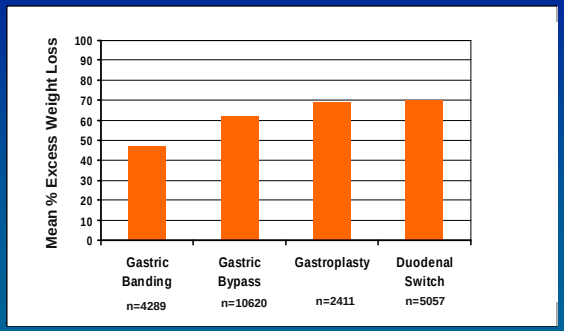
Laparoscopic vs. Open RYGBP Complications



Podnos YD et al. Arch Surg 2003;138: 957-961

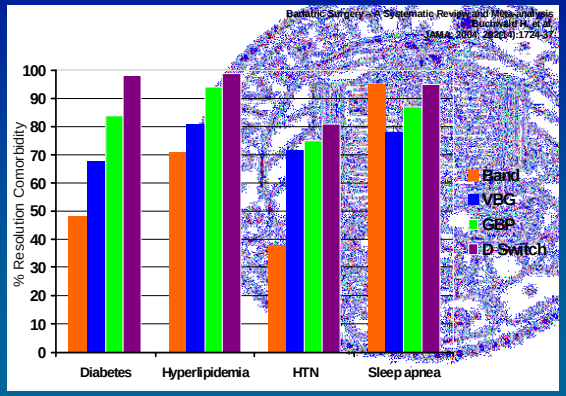
Bariatric Surgical Outcomes

136 Studies – 22094 Patients

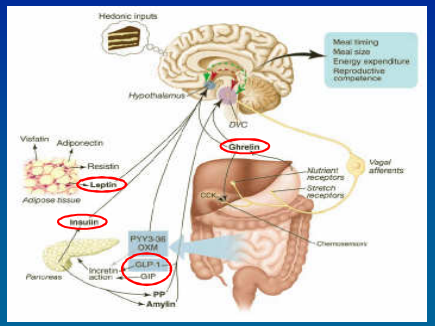


Bariatric Surgery – A Systematic Review and Meta-analysis
Buchwald H. et al.
JAMA. 2004; 292(14):1724-37

Resolution of Comorbidities



Hormonal Regulation of Body Weight and Glucose Metabolism



Appetite
+ Insulin (pancreas)
- Ghrelin (stomach)
- Leptin (adipose tissue)
- CCK (duodenum)
- PYY (small bowel)

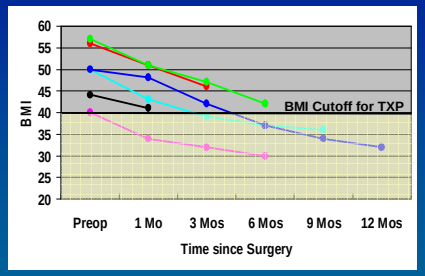
Central Peptides
+ NPY, AgRp
- alpha-MSH, CART

Glucose Metabolism
Insulin (pancreas)
Glucagon (pancreas)
GLP-1 (distal small bowel)
GIP (proximal small bowel)

Weight Loss after GBP

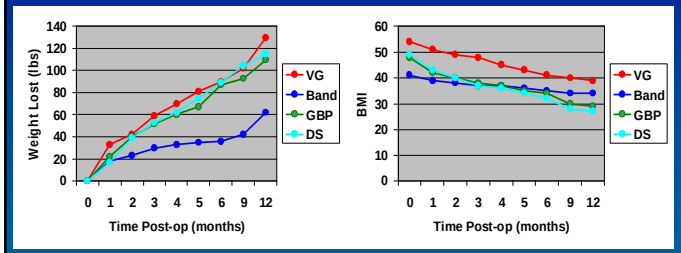
- Reduced caloric intake
- Delayed gastric emptying
- Malabsorption
- Dumping syndrome (?)
- Alterations in gut hormonal milieu
  - ↓ Ghrelin
  - ↔ Leptin
  - ↑ Incretins (GLP-1)
  - ↑ Other centrally-acting satiety peptides (PYY, PP, OXM)

Lap GBP in Patients with ESRD



Mean BMI: 50 (40-56)
Mean Operative Time: 189min
Mean LOS: 3d
Mean EBL: 75cc
Complications: 0

Post-operative Weight Loss



Lee, C., et al. ASBS Mtg 2005

Conclusions

- Obesity greatly increases anesthetic and surgical risks
- Obesity prolongs postoperative recovery
- Non-surgical weight loss methods ineffective in morbidly obese patients
- Bariatric surgery best option; may be combined with other procedures