



# A review on bariatric surgery

Dr Behrouz Kelidari



# Outline



- Introduction of morbid obesity
- Bariatric surgery
- Comparisons of different surgical procedures
- Benefits of surgery
- Complications of surgeries

# + Obesity

- Abnormal or excessive fat accumulation that impair health
- Defined by body mass index (BMI) in kg/m<sup>2</sup>

	<b>International</b>	<b>Asia-Pacific</b>
Normal	18.5-24.9	18.5-22.9
Overweight	25-29.9	23-24.9
Class I obesity	30-34.9	25-29.9
Class II obesity	35-39.9	≥30
Class III obesity	≥40	

World Health Organization  
Asian-Pacific Bariatric Surgery Society 2010

# + Morbid obesity



International	Asia-Pacific
BMI $\geq$ 40	BMI $\geq$ 37
BMI $\geq$ 35 with severe obesity-related morbidities	BMI $\geq$ 32 plus <b>Type 2 Diabetes</b> or two obesity-related co-morbidities

World Health Organization



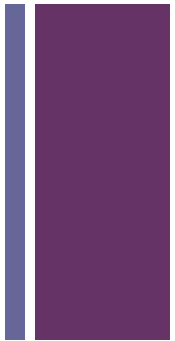
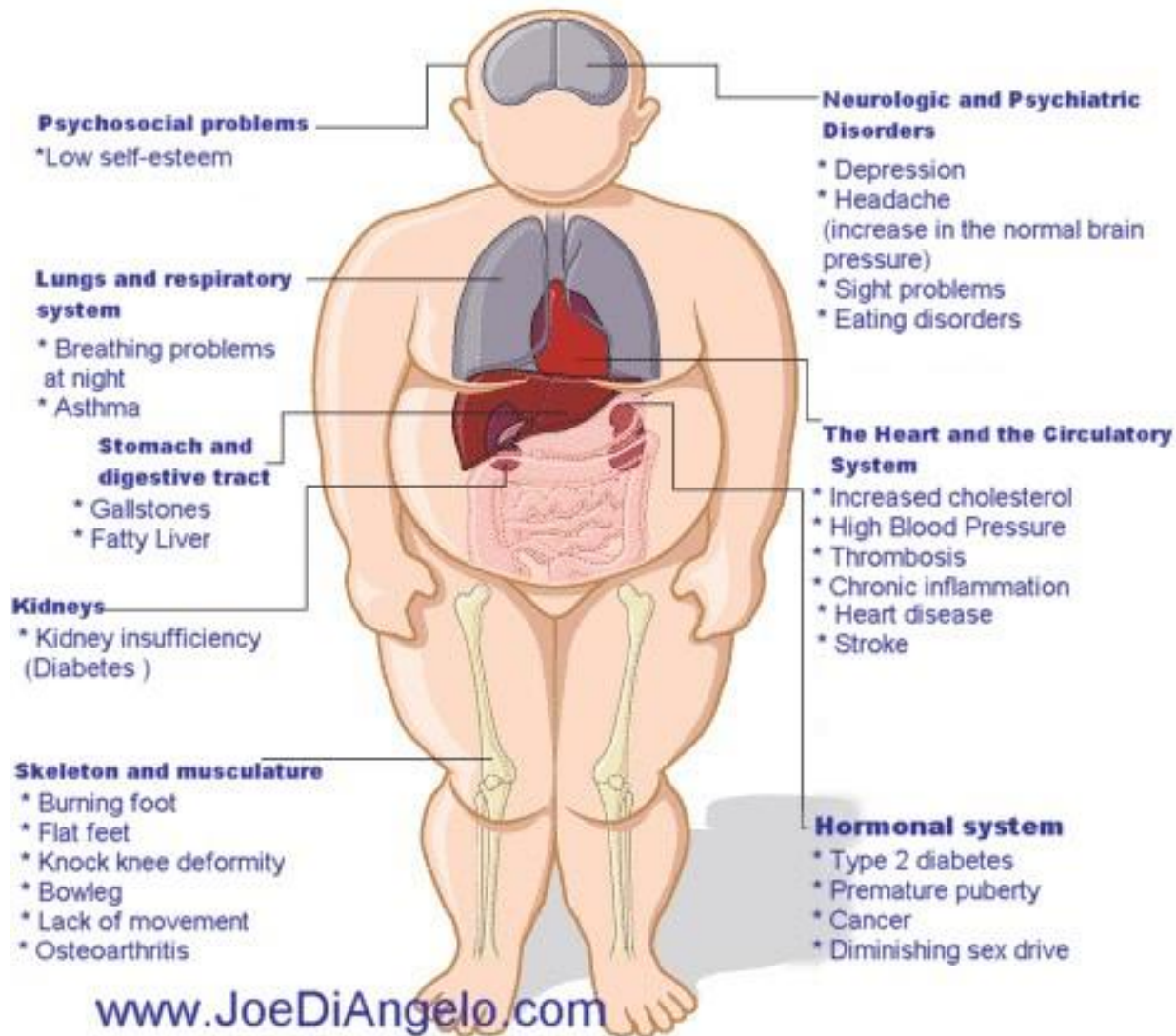
# Obesity is a BIG problem...



- 1.7 billion worldwide are overweight or obese
- Approximately 2/3 of the United States population is overweight.
- Of those, almost 50% are obese.
- In total, approximately 5% of the US population is morbidly obese
- Between 1986 and 2000.....
  - Obesity doubled
  - Morbid obesity quadrupled
  - Super obesity (BMI  $\geq 50$  kg/m<sup>2</sup>) increased five-fold



# Health problems





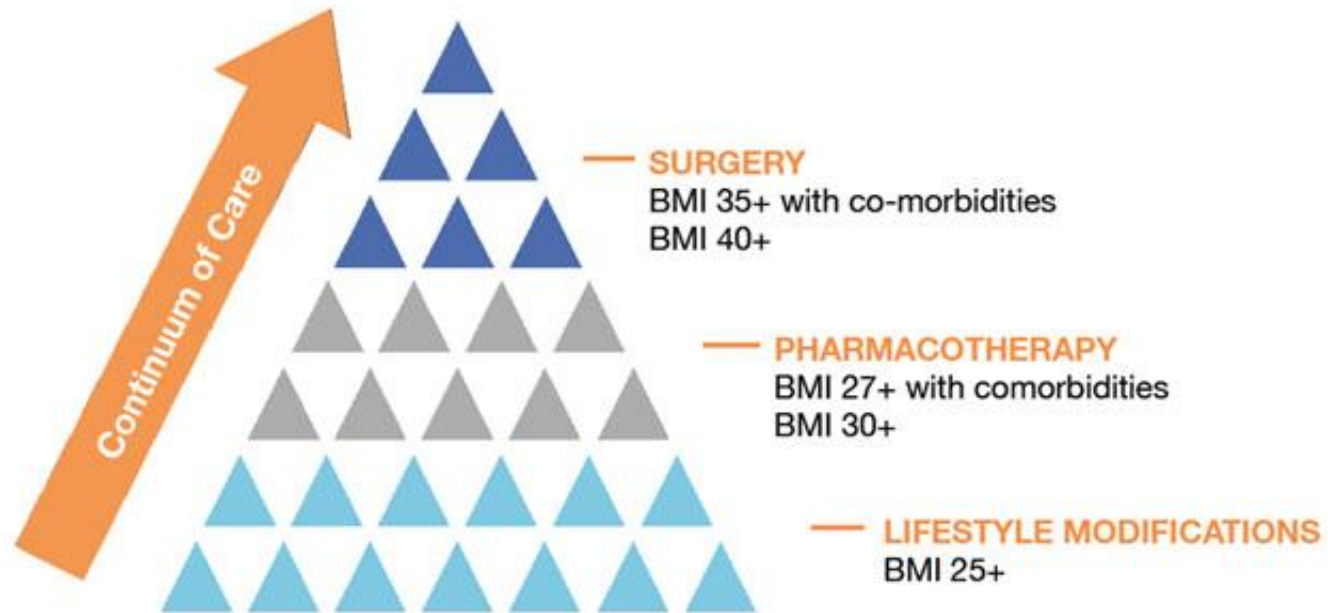
# Impact of Obesity



- These comorbid conditions are together responsible for more than 2.5 million deaths per year worldwide.
- Some statistics:
  - Men > 50% overweight = 2x mortality
  - Men > 50% overweight + DM = 5x mortality
  - Women > 50% overweight = 2x mortality
  - Women > 50% overweight + DM = 8x mortality
- This is in addition to billions of dollars in healthcare costs and lost productivity.

# + Management of obesity

## Obesity Treatment Pyramid





# + Weight Loss Strategies



- Diet therapy
- Increased Physical Activity
- Behavioral Therapy
- Hypnosis
- Any combination of the above
- Pharmacotherapy (e.g., Orlistat, Meridia)



# Surgery versus non-surgical interventions



# Surgery versus non-surgical interventions



- Surgery results in greater weight loss than conventional treatment in severe obesity
- Reductions in co-morbidities also occurred
- Improvements in health-related quality of life occurred
- Surgery is associated with complications and mortalities



# Indication of bariatric surgery



<b>International</b>	<b>Asia-pacific</b>
BMI >40	BMI >35
BMI >35 with co-morbidities	BMI > 32 with co-morbidities
Failed less invasive methods and at high risk for obesity-associated morbidity and mortality	BMI > 30 and central obesity with at least two criteria for metabolic syndrome

Co-morbidities: HT, IGT, DM, hyperlipidemia, OSA

Metabolic syndrome: HT, DM, raised TG, reduced HDL cholesterol



# Classification of bariatric surgery





## Restrictive Procedures

- Creation of a small gastric pouch
- To produce early satiety
- To reduce oral intake

## Mal-absorptive Procedures

- Re-construct the small intestine so that the food bypass it
- To prevent nutrient from being absorbed effectively before mixing with digestive juice



Restrictive procedure	Intra-gastric balloon
	Adjustable gastric banding
	Sleeve gastrectomy
Mal-absorptive procedure	Bilio-pancreatic diversion
	Duodenal switch
Mixed procedure	Roux-en-Y gastric bypass
	Single-anastomosis gastric bypass



# Restrictive procedures

Intra-gastric balloon

Adjustable gastric banding

Sleeve gastrectomy



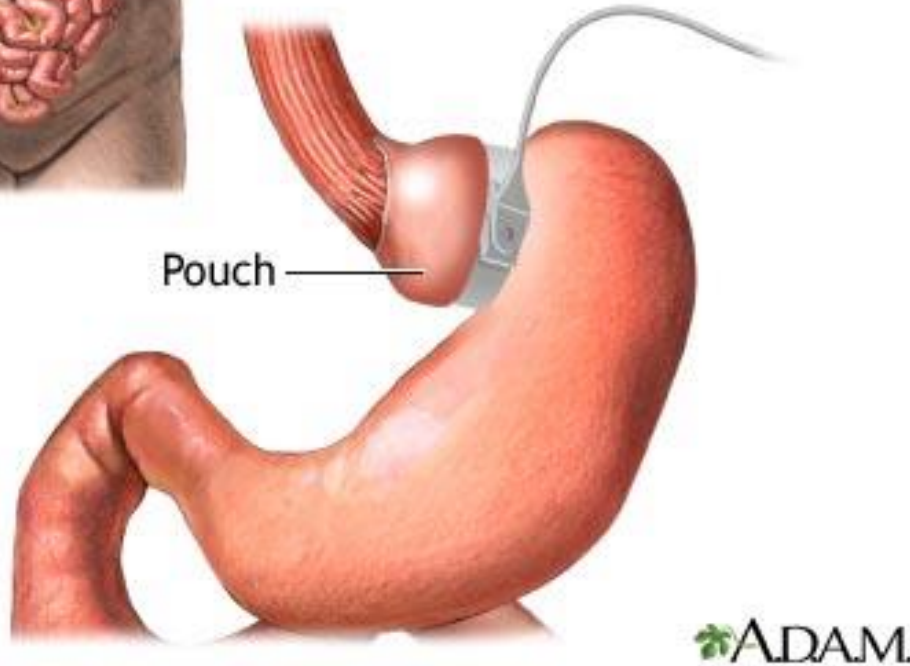


## + Intra-gastric balloon

- Endoscopic method
- Placing a balloon into the stomach to decrease the gastric space
- Create a sense of fullness
- Can be left for a maximum of 6 months
- May be used prior to another bariatric surgery

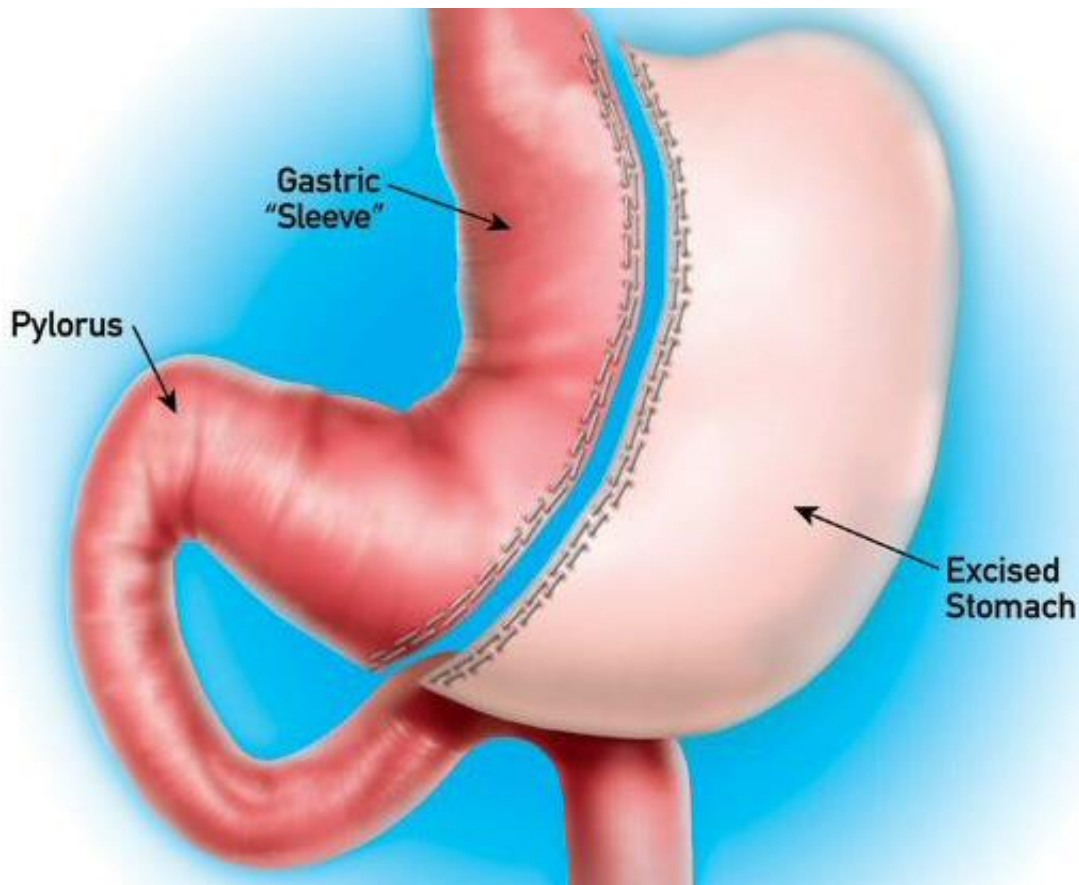


Stomach opening can be tightened or loosened over time to change the size of the passage



## + Adjustable gastric banding

- Placing a constricting ring around the fundus
- Adjust the size of the pouch through a subcutaneous access port
- Least invasive, reversible, adjustable
- Slower weight loss, less effective in super-obese patient
- Risk of gastric erosion and band displacement



## + Sleeve gastrectomy

- Division of the stomach vertically to reduce its size to about 25%
- Leave pyloric valve intact
- Risk of staple line leakage and bleeding
- Single procedure or as first part of a staged procedure
- Lack of long term data



# Mal-absorptive procedures

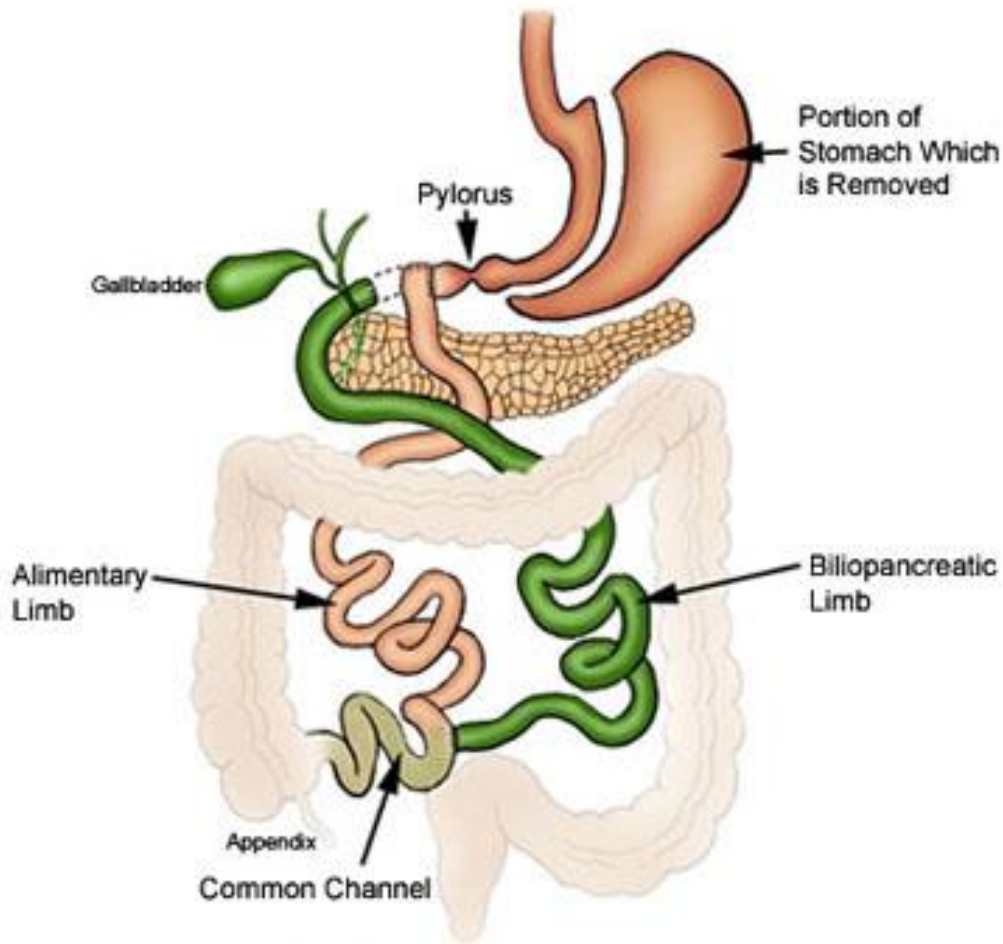
Bilio-pancreatic diversion

Duodenal switch



## + Bilio-pancreatic diversion

- Limited horizontal subtotal gastrectomy to reduce oral intake
- The gastric pouch is larger
- Part of the small bowel is bypassed by construction of a long limb Roux-en-Y anastomosis with short common alimentary channel
- Risk of anastomotic leak and nutritional deficiency



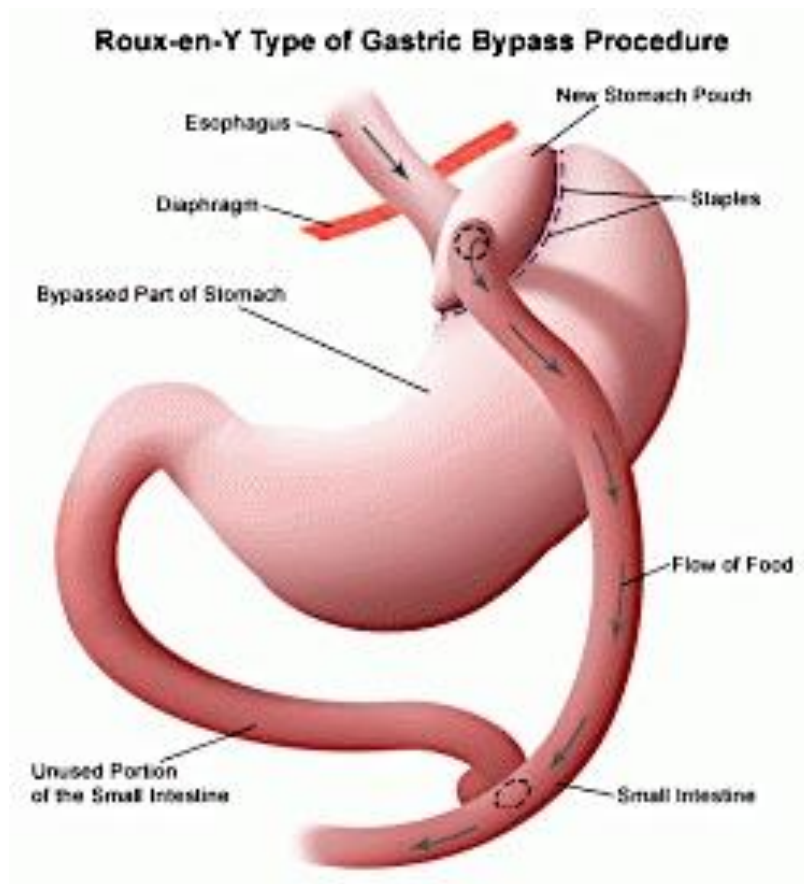
## + Duodenal switch

- Sleeve gastrectomy rather than horizontal gastrectomy
- Can be used as a staged procedure after sleeve gastrectomy



# Mixed procedures

Roux-en-Y gastric bypass

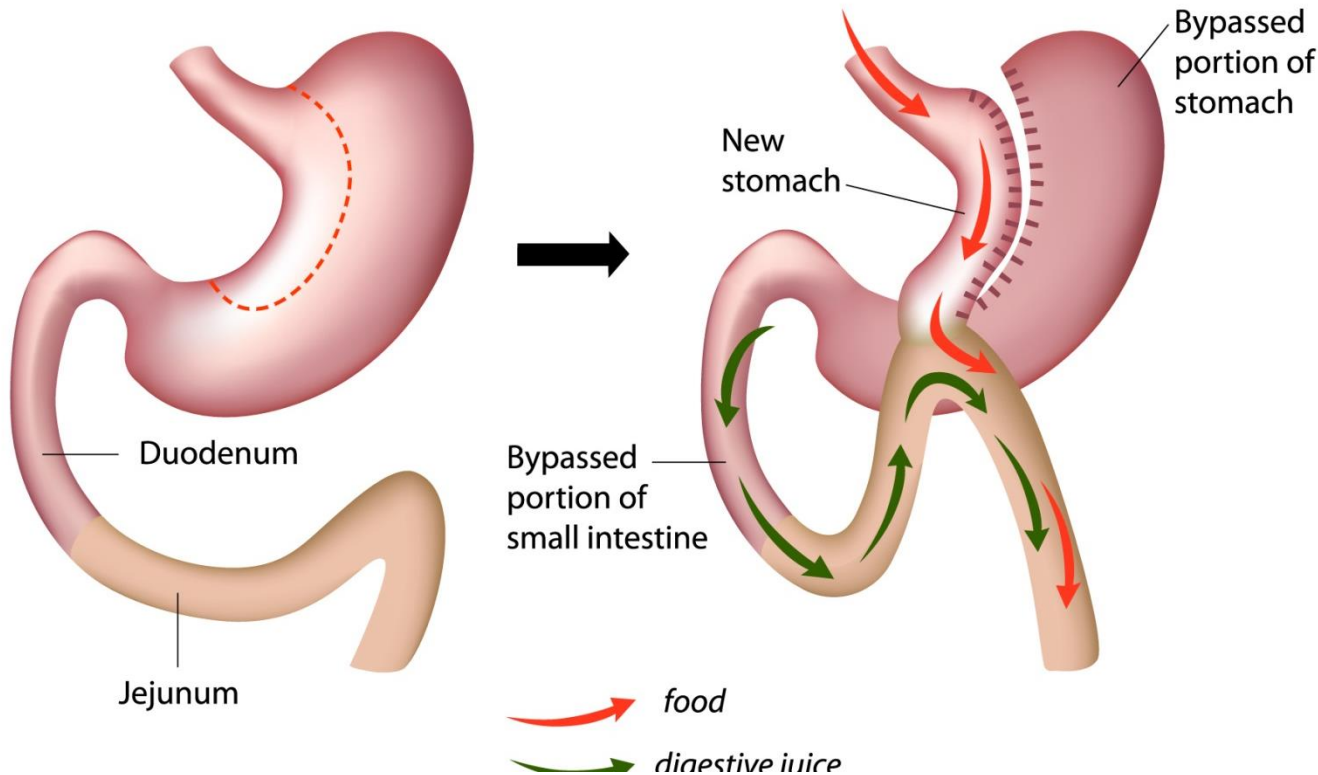


## + Roux-en-Y gastric bypass

- A hybrid procedure combining gastric partition (restrictive) and foregut bypass (mal-absorptive)
- Creation of a small gastric pouch with a bypass that prevent nutrient from absorption
- Risk of anastomotic leak, nutritional deficiency, dumping syndrome



## Mini-Gastric Bypass



## + Single-anastomosis gastric bypass

- A hybrid procedure combining gastric partition (restrictive) and foregut bypass (mal-absorptive)
- Creation of a long gastric pouch with a bypass that prevent nutrient from absorption
- Risk of anastomotic leak, nutritional deficiency, dumping syndrome



Benefits of surgery



# Efficacy of Bariatric Surgery for Weight Loss



- Mean percentage excess weight loss:
  - 61.2% - All Patients
  - 47.5% - Gastric Banding
  - 61.6% - Gastric Bypass
  - 70.1% - BPD or duodenal switch



# Comparisons of different surgical procedures



		<b>Excessive weight loss</b>	<b>Diabetes remission</b>	<b>Mortality</b>
Restrictive	Adjustable gastric banding	49.4%	62%	0.05%
	Sleeve gastrectomy	55.4%	70%	0.17%
Mal-absorptive	Bilio-pancreatic diversion	70-80%	98%	1.9%
Mixed	Roux-en-Y Gastric bypass	62.6%	83%	0.5%



# Improvements of Co-morbidities



- Type 2 diabetes mellitus
- Hypertension
- Hyperlipidemia
- Degenerative joint disease
- Sleep apnea
- GERD



# Improvements of Co-morbidities



- 5% to 10% weight reduction is associated with significant decrease in risk
- Weight loss from surgery reduces or eliminates medications
- Improves severity or resolves co-morbid disease



# Psychological and Psychosocial Improvements



- Depression
- Low self-esteem and self-appraisal
- Poor interpersonal relationships
- Feelings of failure and dissatisfaction with life
  
- Subject to prejudice and discrimination



# Psychological and Psychosocial Improvements



- Significant improvement in QOL with all types of surgery
- New vocational and social activities
- Improved interpersonal relationships
- Better moods, self-esteem
- More employable, get paid more, work more and take less sick days.





# Post-surgical Complications



# Post-surgical Complications



- Anastomosis leaks or staple line leaks
- PE or DVT
- Cholelithiasis
- Stomal ulceration
- Dumping syndrome
- Constipation
- Nutritional Consequences

# + Anastomosis Leaks



- Up to 7-10 days after surgery
- Most common at gastrojejunostomy, enteroenterostomy, Roux limb stump, staple line
- Can lead to peritonitis, sepsis, possible death
- Presentation
  - Tachycardia, tachypnea
  - Fever
  - Abdominal pain/back pain
  - Pelvic pressure or rebound tenderness

# + Pulmonary Embolism



- Sudden cause of death up to one month after surgery
- 20%-30% mortality rate
- Prophylaxis with compression stockings and anti-coagulant
- Early ambulation is necessary



# Cholelithiasis



- Up to 36% of patients within 6 months post-op
- Bile stasis leads to increased sludge and gallstones
- Prophylactic cholecystectomy at the time of surgery if evidence of existing sludge or stones
- Prophylactic use of ursobil



# Stomal Ulceration



- 12%-15% within 2-4 months. Post-surgery
- Etiology
  - Overabundant acid in pouch leads to excessive acid passing through stoma
  - Pouch tension and staple line breakdown
  - NSAID use
- Presentation
  - Dyspepsia, vomiting
  - Epigastric or retrosternal pain

# + Dumping Syndrome



- More than 15% patients
- Hypotention
- Tachycardia
- Lightheadedness, syncope
- Flushing
- Abdominal cramping and diarrhea
- Nausea and vomiting

# + Dumping Syndrome



- Occurs with high dose simple sugar ingestion
- Sugar in small intestine causes osmotic overload and fluid shift from blood to intestine
- Increased intestinal volume leads to watery diarrhea
- Decreased blood volume leads to systemic changes
- Patient education
  - Eat slowly
  - Avoid drinking before, during and not until 30 minutes after meals.





# Constipation



- Most common complaint
- Causes
  - Dehydration and decreased fluid intake post-operatively
  - Increased metabolic water needs
  - Calcium and iron supplement use following surgery
- Treat with increased fluids and stool softeners



# Nutritional Consequences



- Iron deficiency anemia
- B12 deficiency
- Folate deficiency
- Calcium and Vitamin D deficiency



# Iron deficiency and anemia



- Common following RYGB
- As high as 49% of patients
- Multifactorial cause
  - Low gastric acid levels prohibit iron cleavage from food
  - Absorption inhibited because no nutrient exposure to duodenum or proximal jejunum
  - Decrease in iron-rich food consumption due to intolerance
- Treat with oral supplementation of ferrous sulfate or ferrous gluconate

# + Vitamin B12 deficiency



- Up to 70% of patients
- Lack of hydrochloric acid and pepsin in stomach
  - Prevents B12 cleavage from food
  - Affects secretion of intrinsic factor, thus B12 absorption
- Intolerance to meat and milk
- Oral supplementation usually adequate, otherwise, IM injections used



# Folate Deficiency



- 40% of gastric bypass patients
- Complete absorption requires B12
- Absorption dependent on HCl and upper 1/3 stomach
- Deficiency generally caused by decreased consumption
  
- Oral supplementation



# Vitamin D and Calcium Deficiency



- Vitamin D deficiency is common among obese people
- Calcium absorption decreased because duodenum is bypassed
- Intolerance to dairy, foods high in calcium
- Vitamin D is required for  $\text{Ca}^{++}$  absorption
- Prolonged deficiencies lead to
  - Bone resorption, osteomalacia, osteoporosis
- Treat with calcium citrate supplementation and 2 weekly doses of Vitamin D



+

Conclusion



# Conclusion



- Management of patient with morbid obesity required a multi-disciplinary approach
- Surgery is more effective than conventional management
- It is important to match the appropriate surgery to the appropriate patient
- Surgery have lots of benefits and of course some possible complications





**The end**

Thanks for your attention