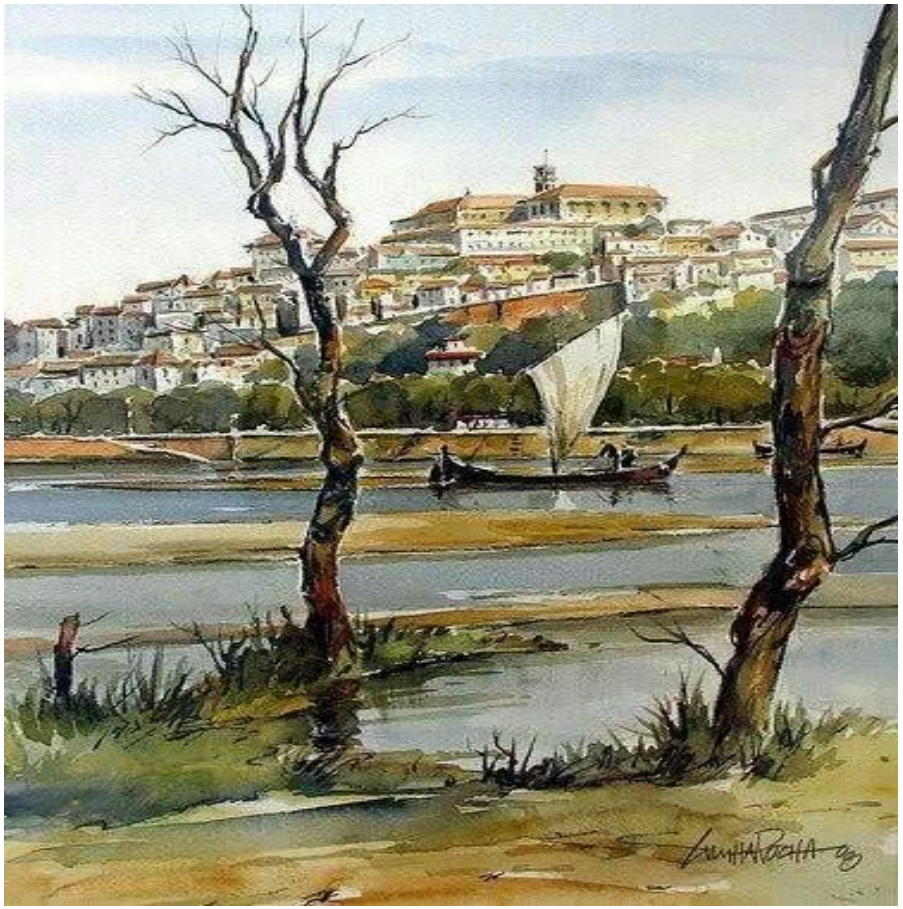
Complications in Bariatric Surgery

EASC EMERGENCY ABDOMINAL SURGERY COURSE 14.11.2015



Centro Hospitalar e Universitário de Coimbra

Unidade de Tratamento Cirúrgico da Obesidade, Polo HUC

António Milheiro

INTRODUCTION

- WHO: Obesity is the 21st century epidemic with both physical and psychological morbidity
- Responsible for more than 2,5 million death/year all over the world
- USA: 5% of population is morbidly obese(>15 million of people)
- USA: increasing prevalence
  - 1986: 1/200
  - 2000:1/50
  - 2011: 1/20

Introdution

- In Portugal (Direcção-Geral de Saúde, 2005):
- Prevalence of overweight and obesity in children from 7 to 9 years old is about 31.56%, being female children more affected than male children.
- In adult female population mean prevalence is 34% for overweight and 12% for obesity.
- The direct cost of obesity in Portugal corresponds to 3.5% of total health expenses.

Introduction

- Obesity is classified into three categories:

- Class I obesity 30 ≥ BMI < 35 kg/m^2
- Class II obesity 35 ≥ BMI < 40 kg/m^2
- **Class III obesity BMI ≥ 40 kg/m^2**

Comorbidities

- Hypertension
- Diabetes mellitus
- Psychiatric disorders
- Dyslipidemia
- Osteoarticular diseases
- Chronic obstructive pulmonary disease
- Obstructive sleep apnea

Comorbidities

- HTA
- Diabe
- Pat
- Pat
- Doer
- Apnei obst

But also...

- Congestive heart failure
- Coronaropathy
- Respiratory insufficiency
- Gastroesophageal reflux disease
- Lower limbs venous insufficiency
- Hyperuricaemia
- Increased risk of cancer
- Erectile dysfunction
- Infertility
- Menstrual changes
- Urinary incontinence

Nonsurgical treatment

- Diet
- Physical exercise
- Behavioral therapy
- Pharmacological

Failure up to almost 100% of cases in medium/long term!

BARIATRIC SURGERY

- **Bariatric Surgery has proven to be the most effective method of treating severe obesity**
- **Positive effects have been demonstrated in clinical studies with longterm follow-ups regarding:**
  - **Excess weight loss**
  - **Control of comorbidities**
  - **Decrease in mortalities associated with obesity**
  - **Improvement in the quality of life**

Surgical treatment

Indications

Age between 18 and 65 years old

- BMI≥40 Kg/m^2
- BMI>35 Kg/m^2 + comorbidities
- BMI criterion may be current or documented in the past
  - Weight loss by intensification of treatment before surgery – reaching a BMI below the required for surgery do not constitute a contraindication to the planned intervention
  - Indicated for patients exhibiting significant weight loss with conservative treatment but regain weight
- Commitment maintaining regular follow-up visits

Surgical treatment

Contraindications

- Absence of surgical/anesthetic conditions
- Absence of prior conservative treatment
- Inability to comply in prolonged follow up
- Not stabilized psychotic disorders, severe depression and personality disorders, unless advised by psychiatrist with obesity experience
- Acohol abuse and/or drug addiction
- Diseases with impared survival in the short term
- Patients who are unable to take care of themselves and who do not have family or social support in the long term

Surgical treatment
Preoperative preparation

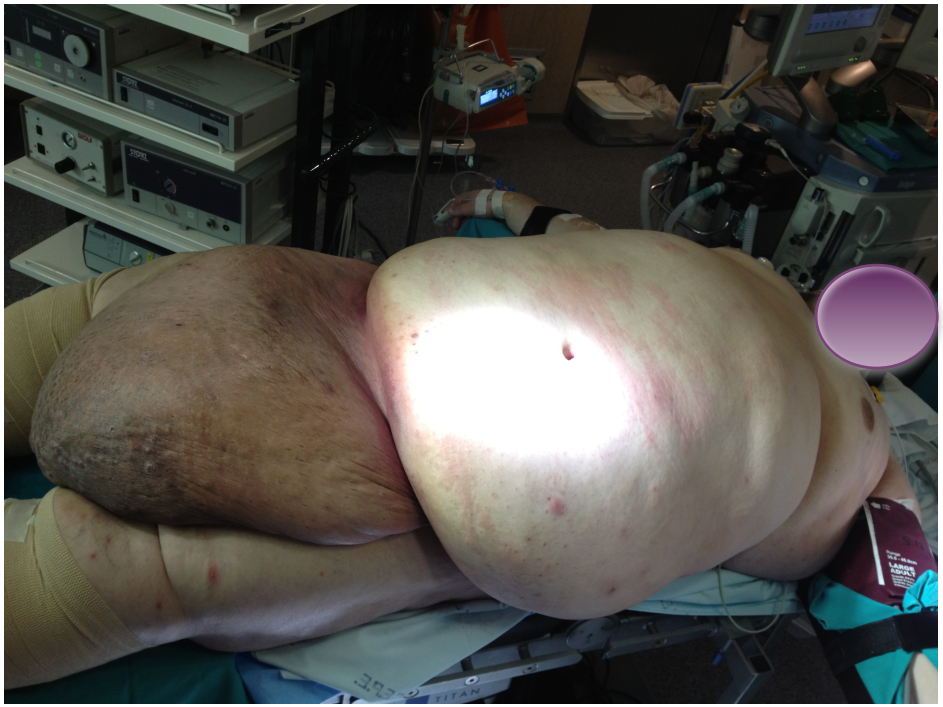
- Prophylactic antibiotic therapy
- Low molecular weight heparin
- Bandaging of lower limbs / Intermittent compression device
- Fiber-free diet
- Cleansing enemas
- Urinary catheterisation

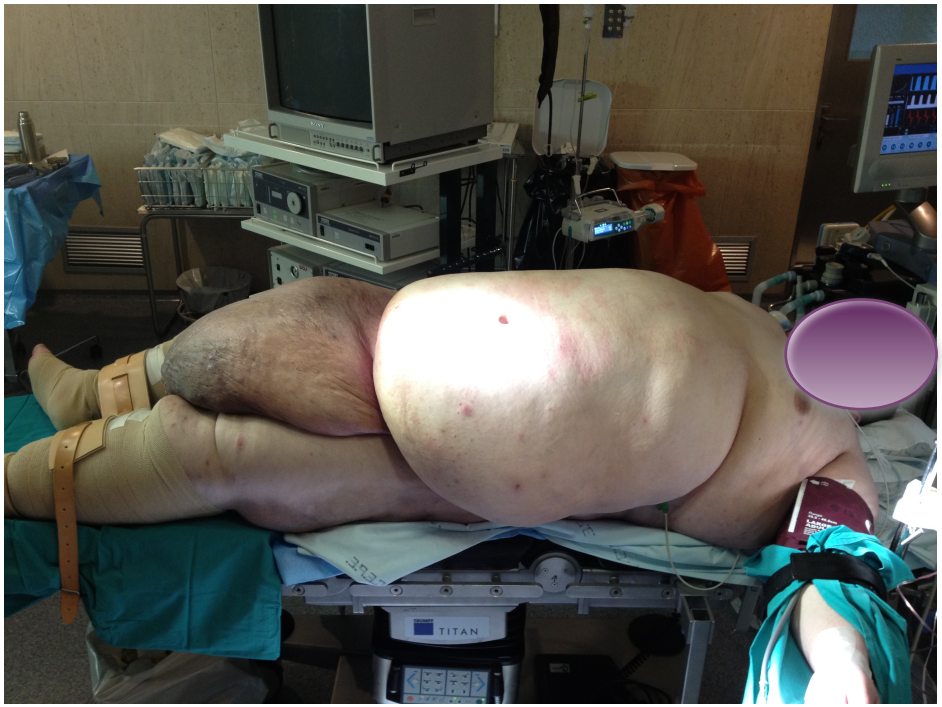
Surgial Treatment

Types of surgery

- Restrictive
  - Adjustable Gastric Banding
  - Vertical Gastrectomy / “Gastric Sleeve”
- Malabsorptive
  - Duodenal Switch
- Combined (restrictive and malabsorptive)
  - Gastric Bypass

Tratamento cirúrgico

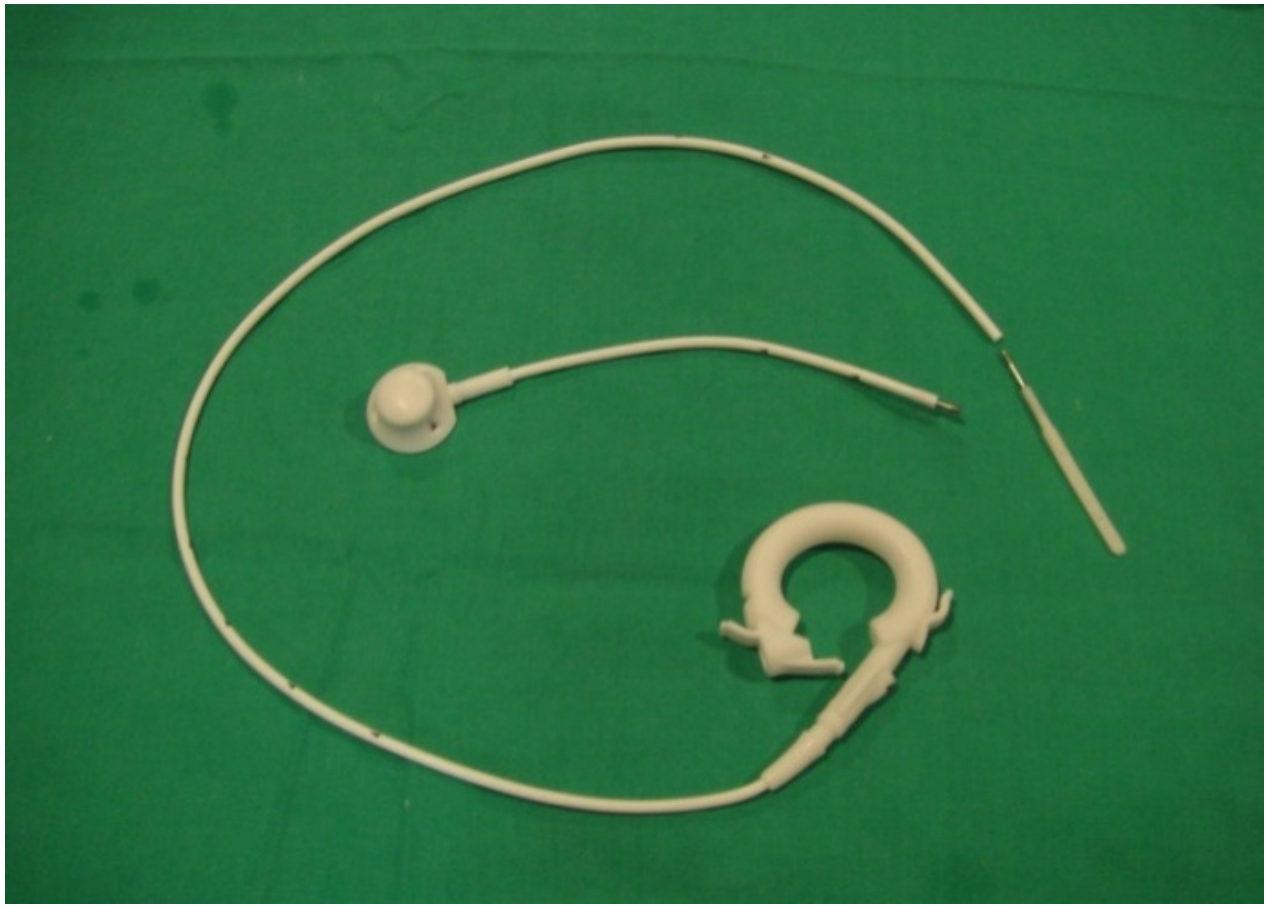




W=251 Kg; H= 1,75; BMI=82 Kg/m^2

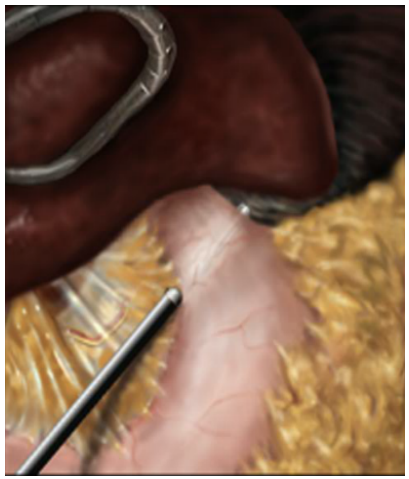
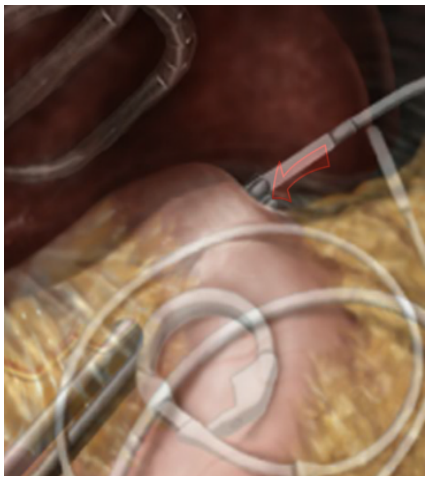
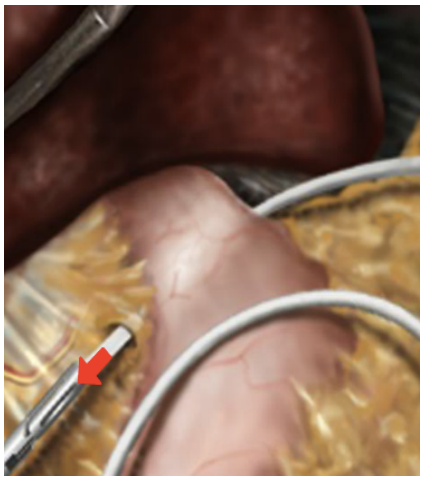
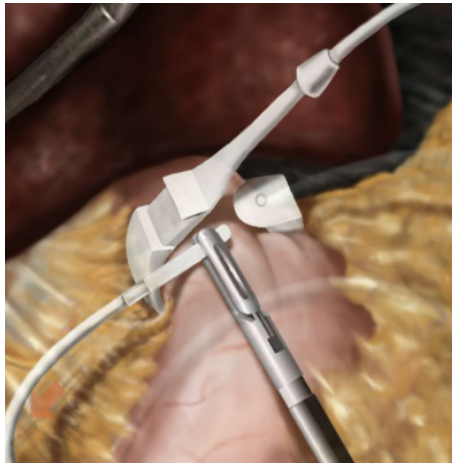
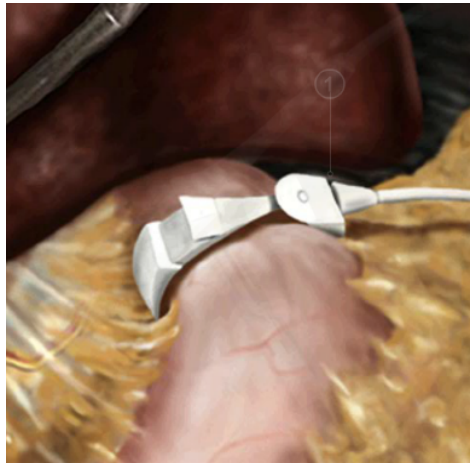
Tratamento cirúrgico

Gastric Banding



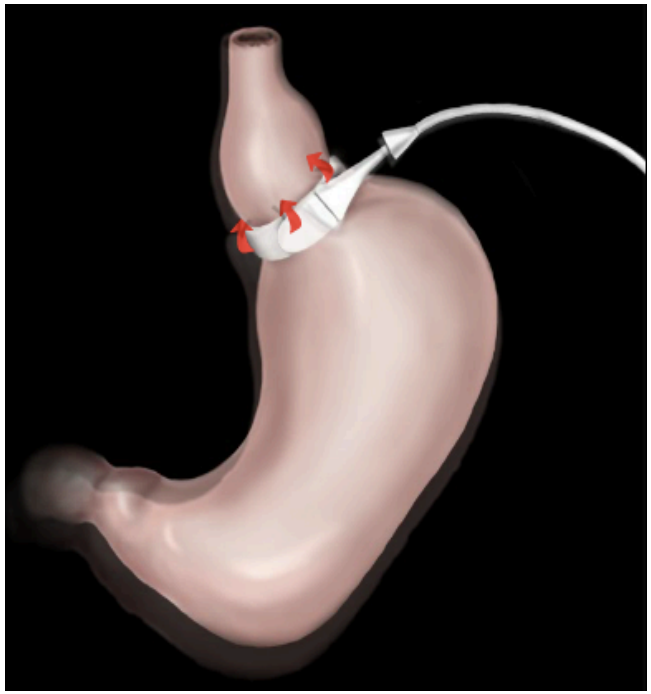
Surgical Treatment

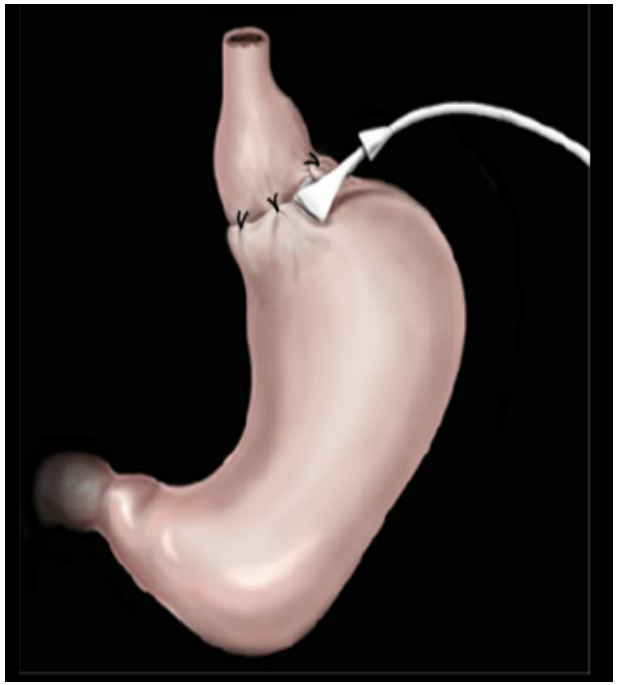
Adjustable gastric band

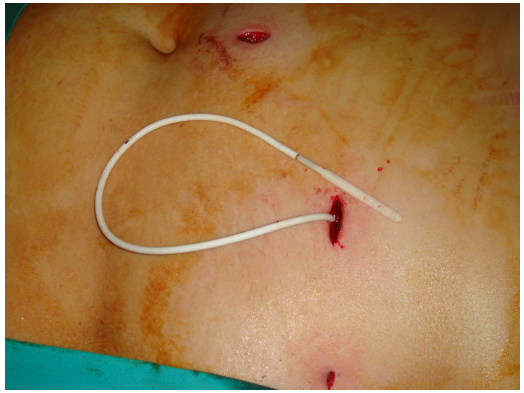
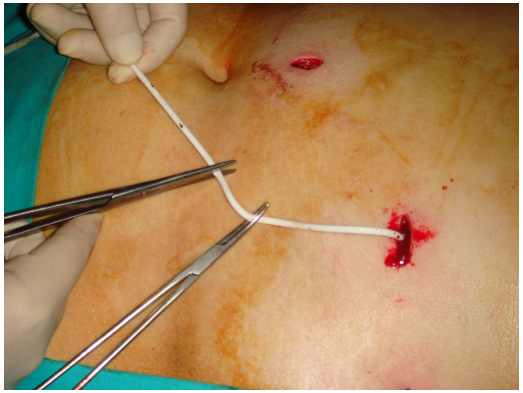
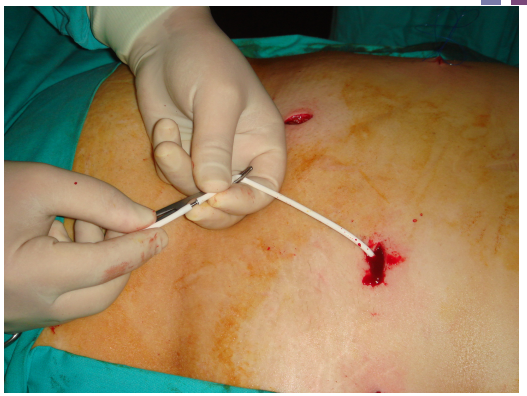
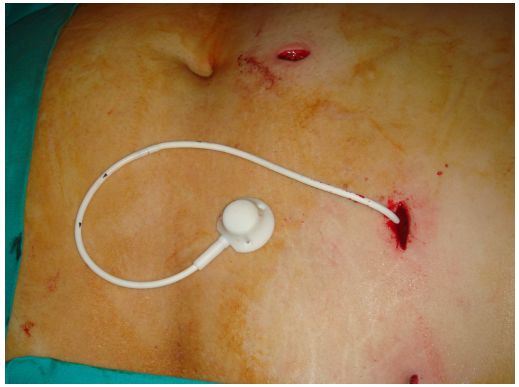
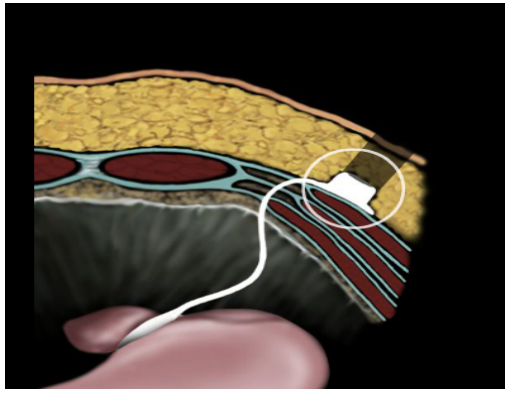
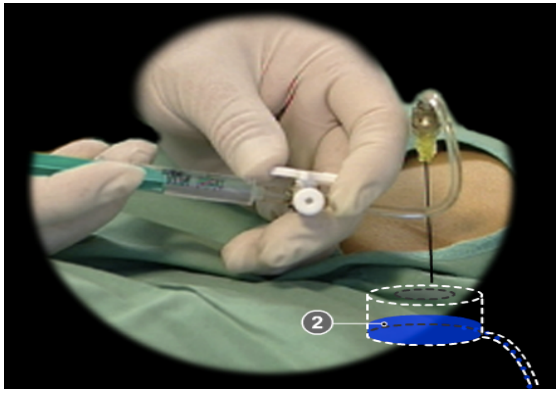
www.websurg.com

Surgical Treatment
Adjustable gastric band



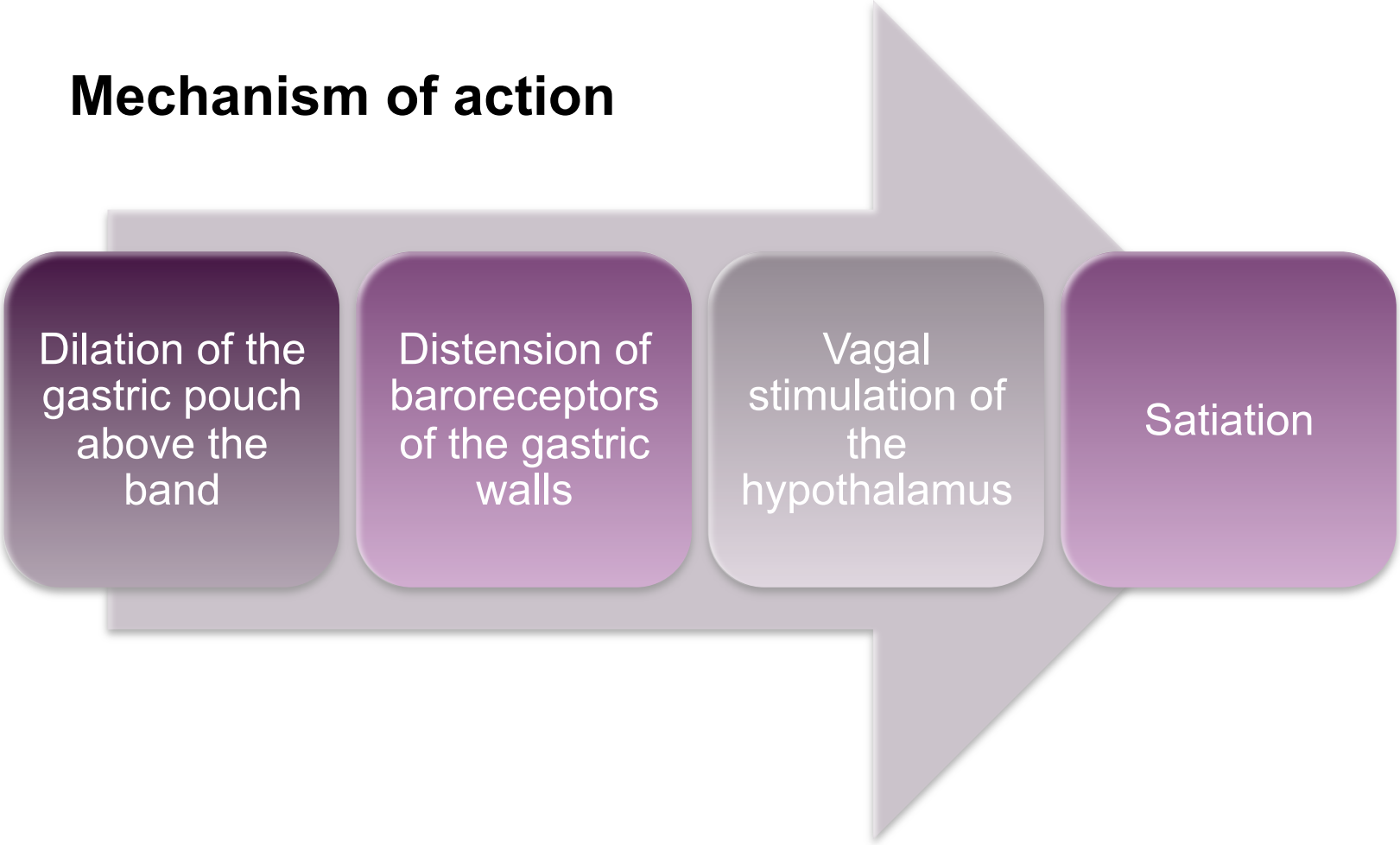


Surgical Treatment
Adjustable gastric band

Surgical Treatment
Adjustable gastric band

Mechanism of action

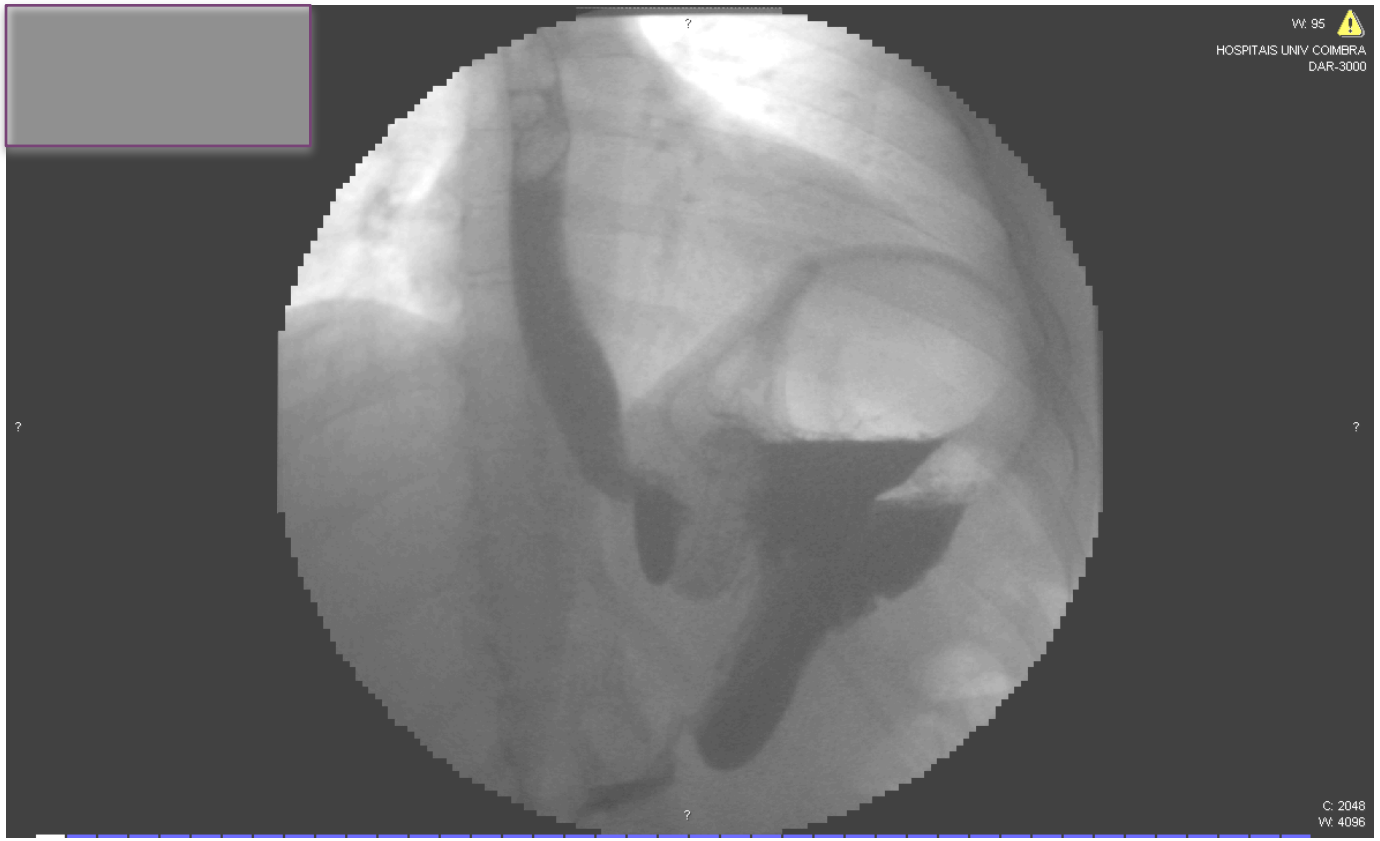


GASTRIC BANDING

- **Advantages**:
  - Rapid, few dissection
  - Completely reversivel
  - Rapid recovering
  - Few early complications
- **Disadvantages**:
  - High rate of late complications
    - Dilation of gastric pouch/ band slippage
    - Band erosion
    - Migration of band
    - Oesophageal dilation
    - Catheter related
  - Less effective than other techniques

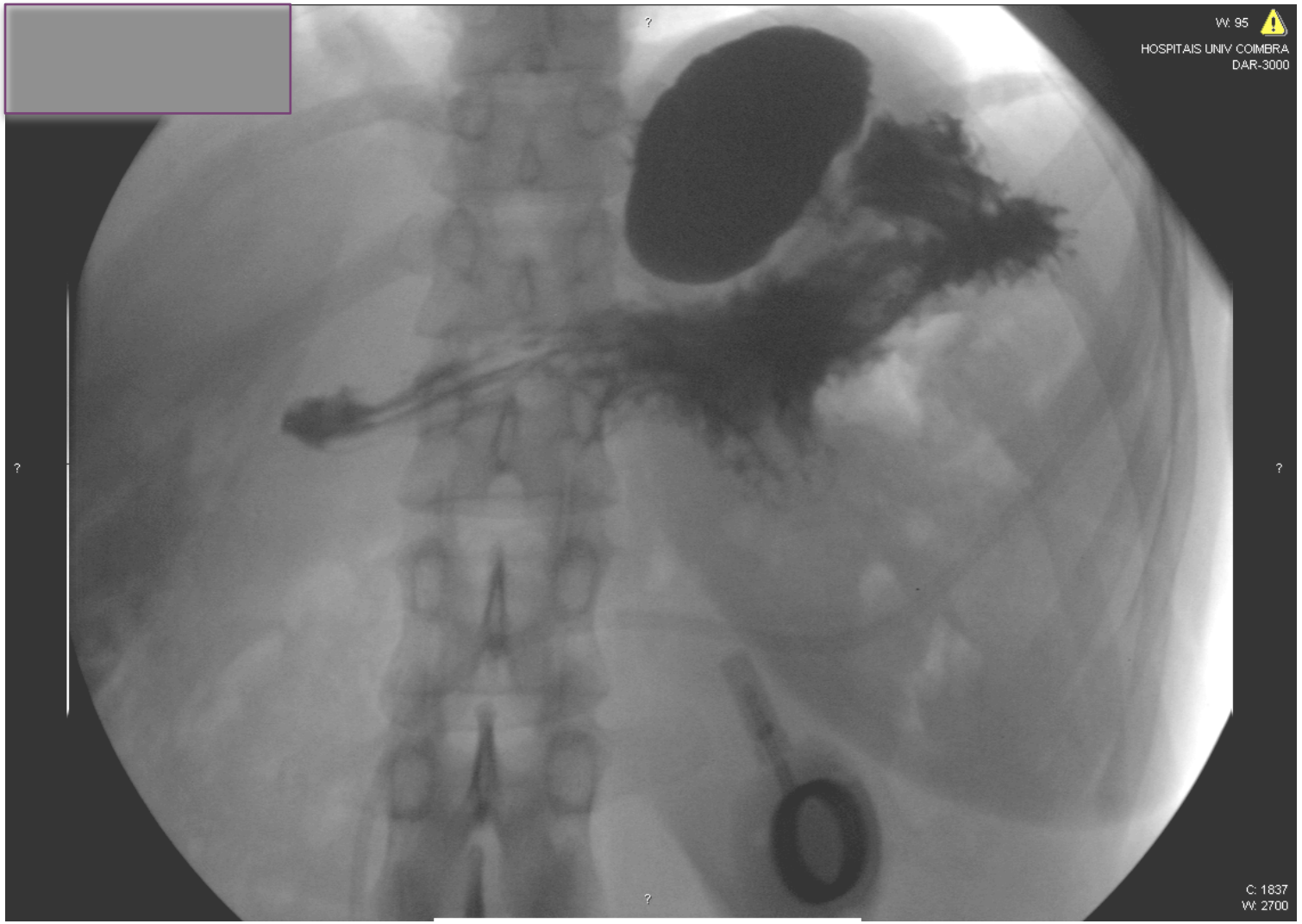
Surgical Treatment

Adjustable gastric band

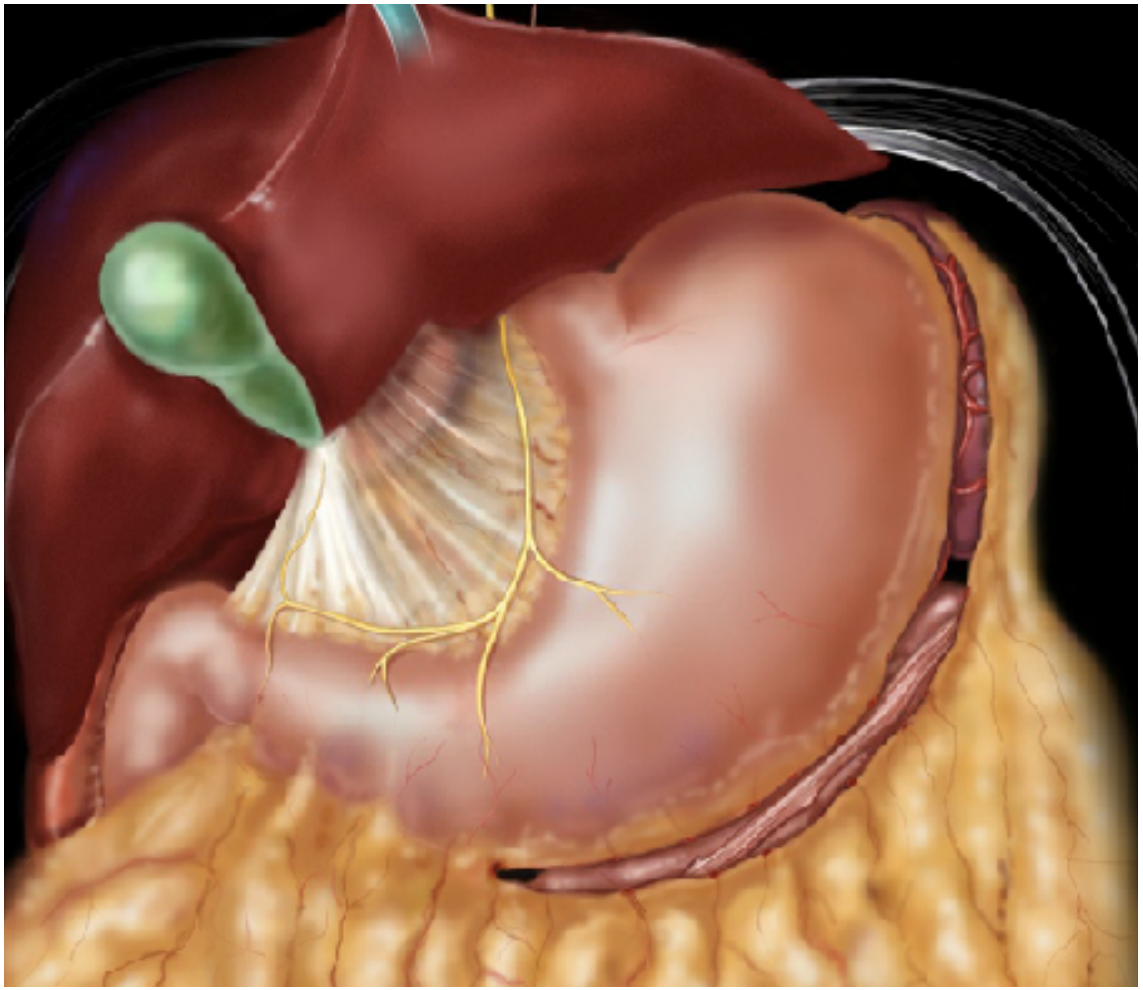


Surgical Treatment

Adjustable gastric band

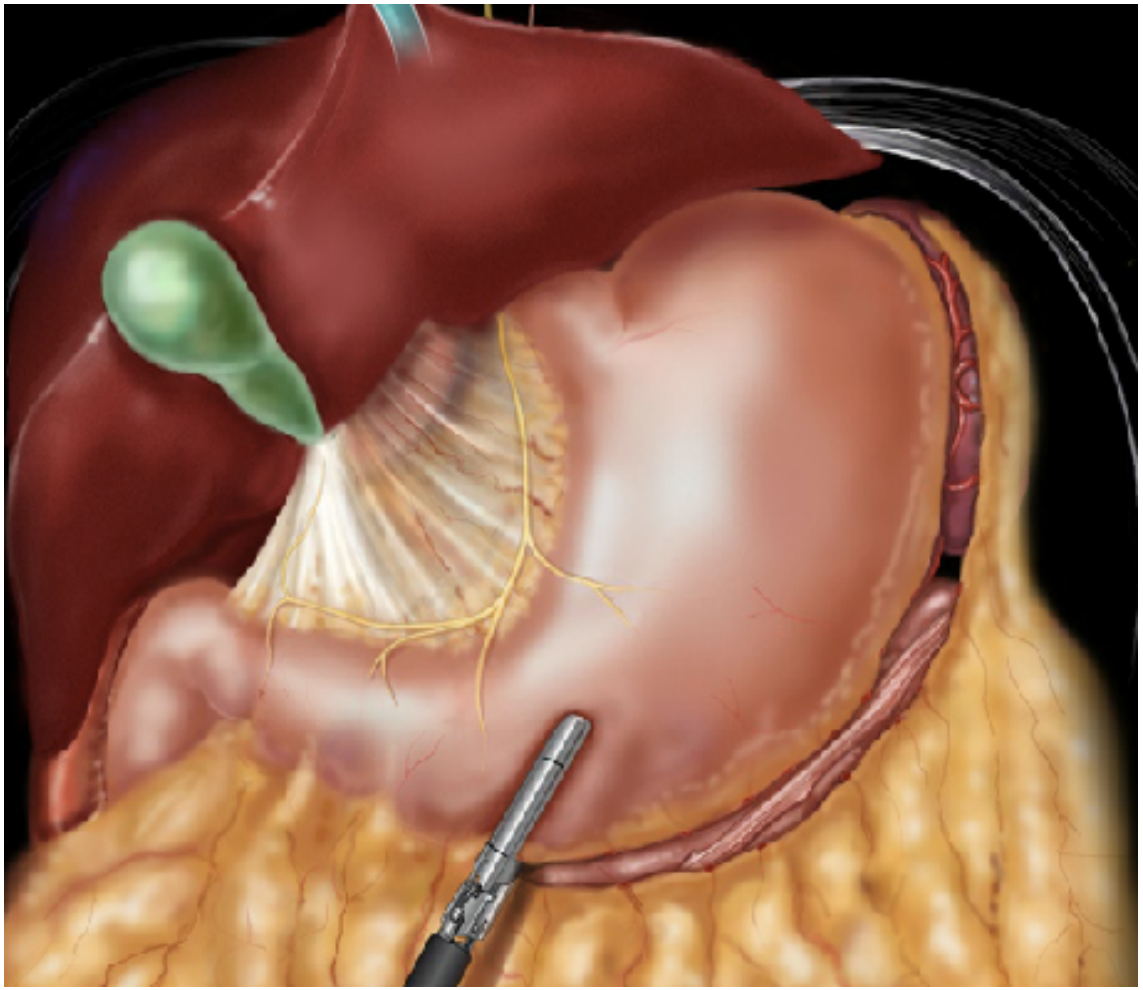


Surgical Treatment
Vertical Gastrectomy (Gastric Sleeve)



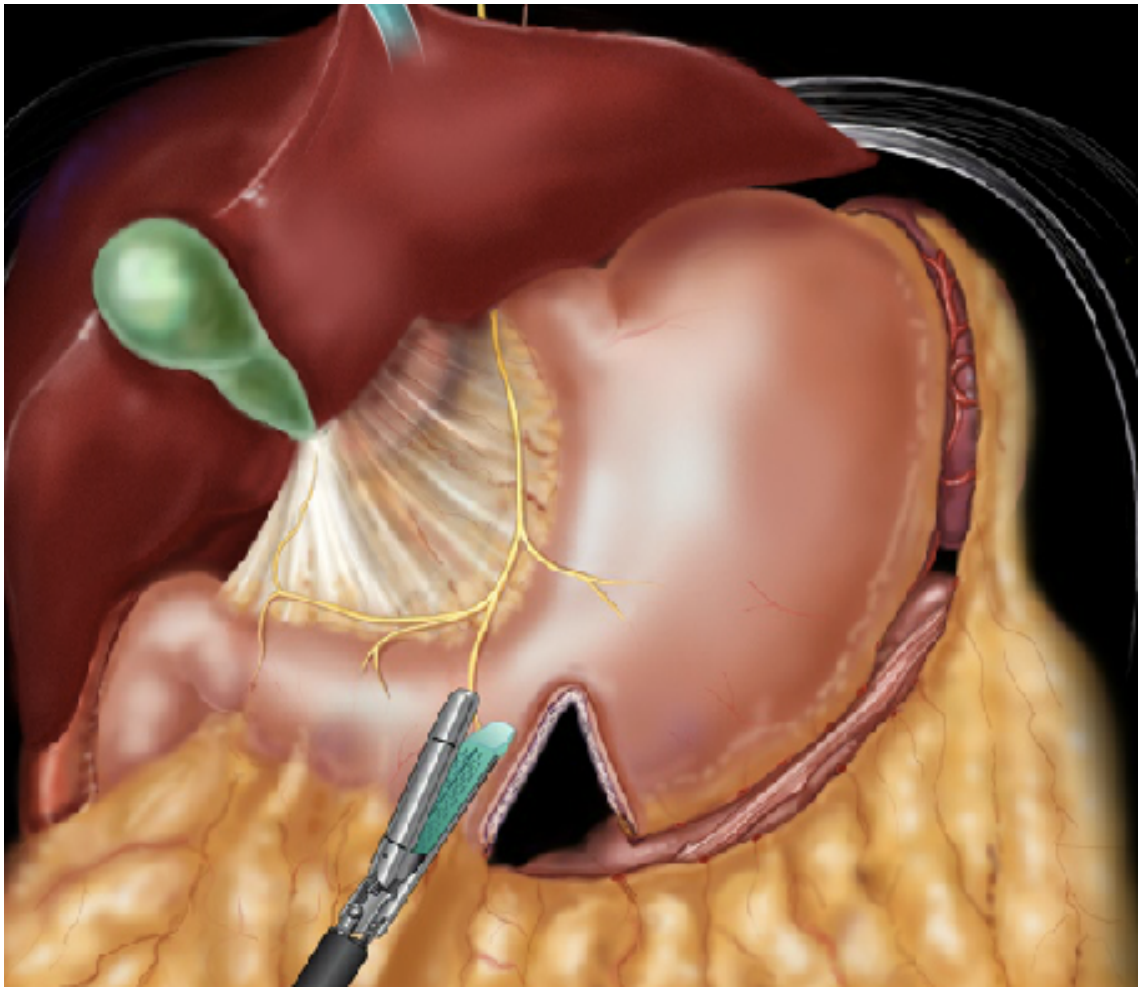
www.websurg.com

Surgical Treatment
Vertical Gastrectomy (Gastric Sleeve)



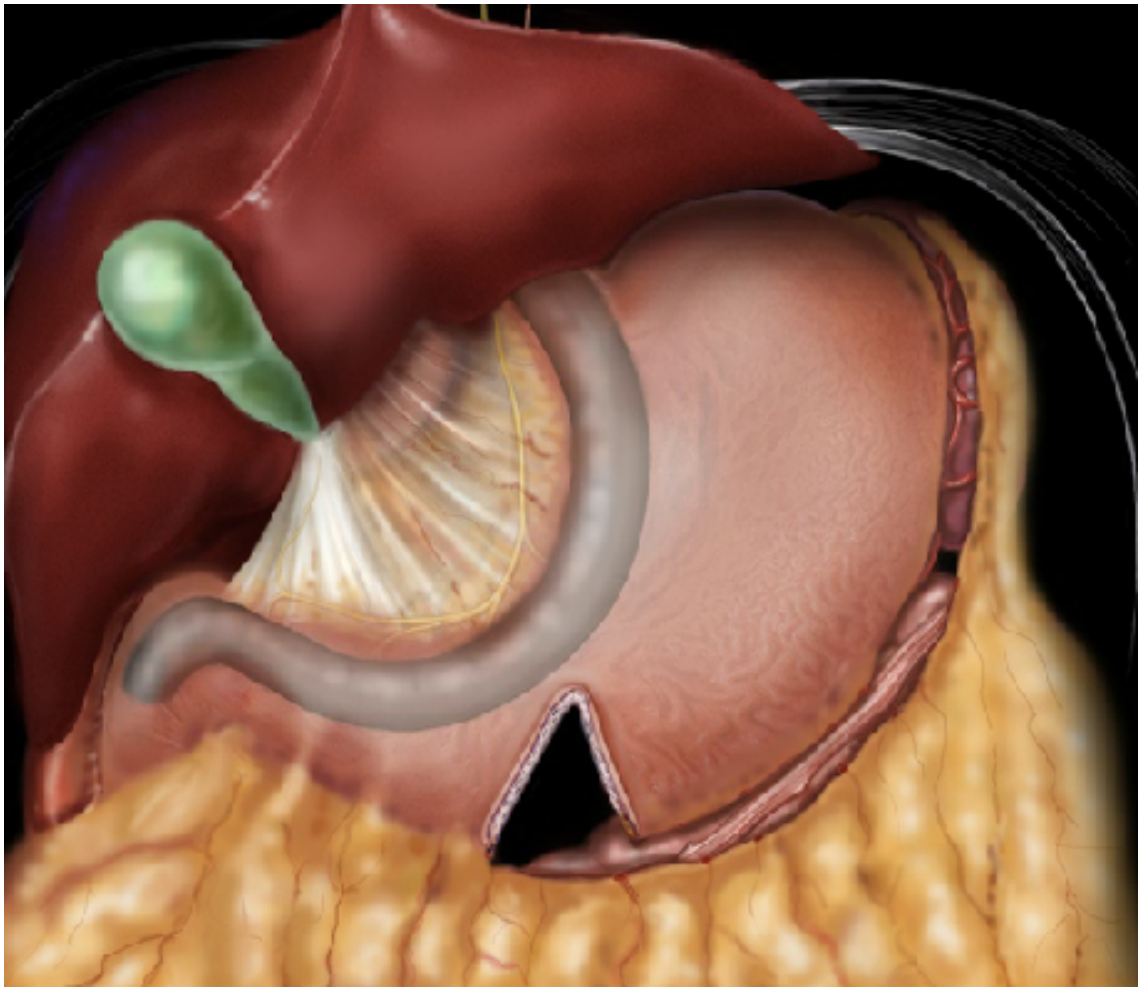
www.websurg.com

Surgical Treatment
Vertical Gastrectomy (Gastric Sleeve)



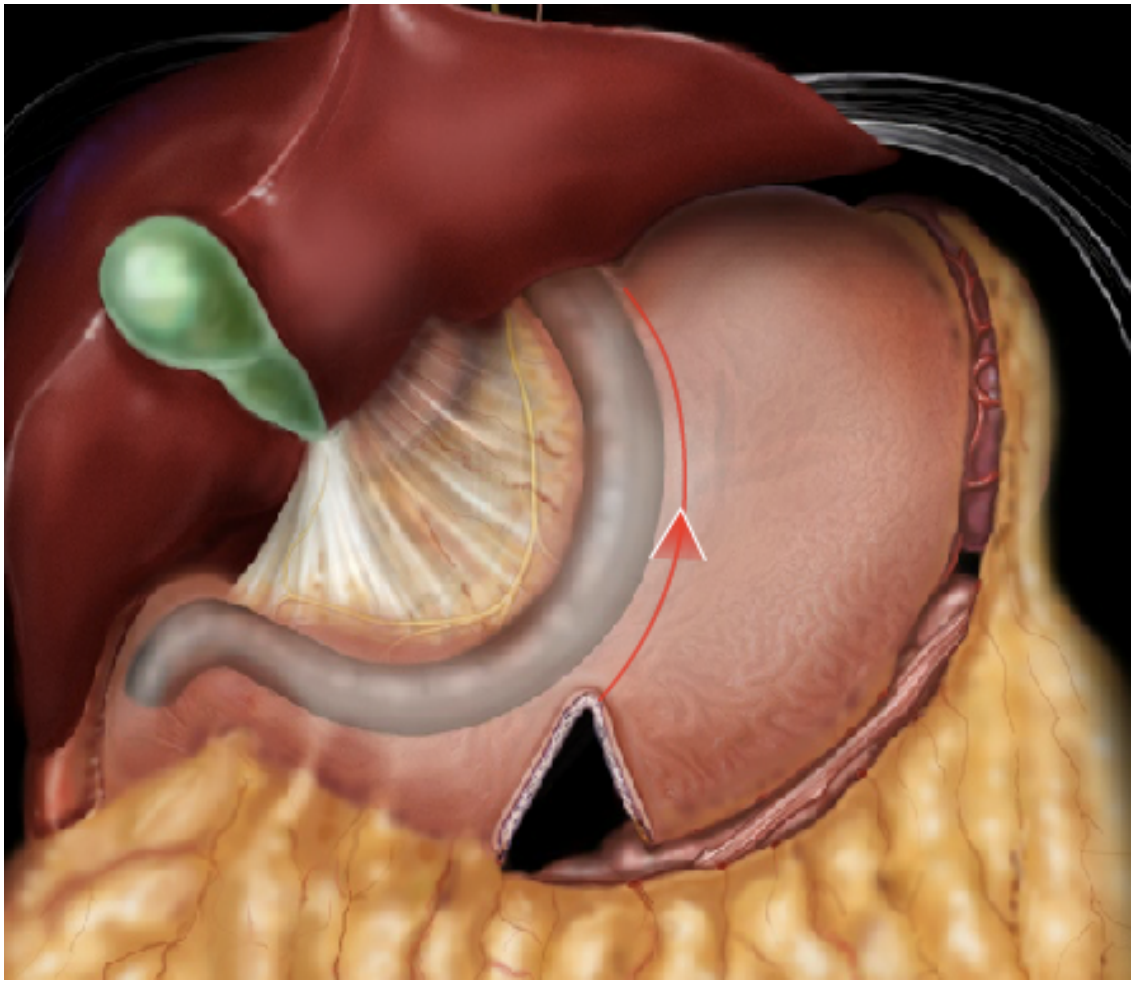
www.websurg.com

Surgical Treatment
Vertical Gastrectomy (Gastric Sleeve)



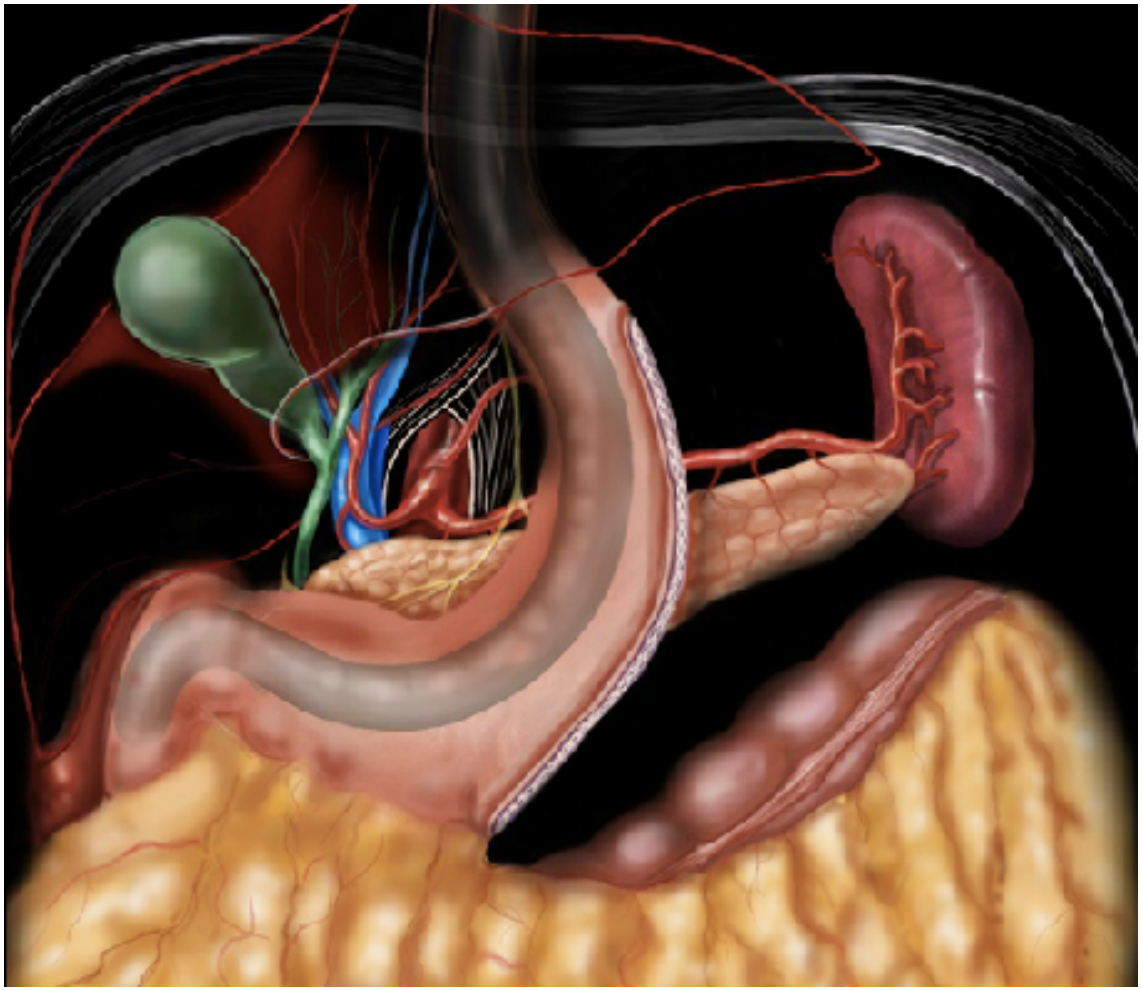
www.websurg.com

Surgical Treatment
Vertical Gastrectomy (Gastric Sleeve)



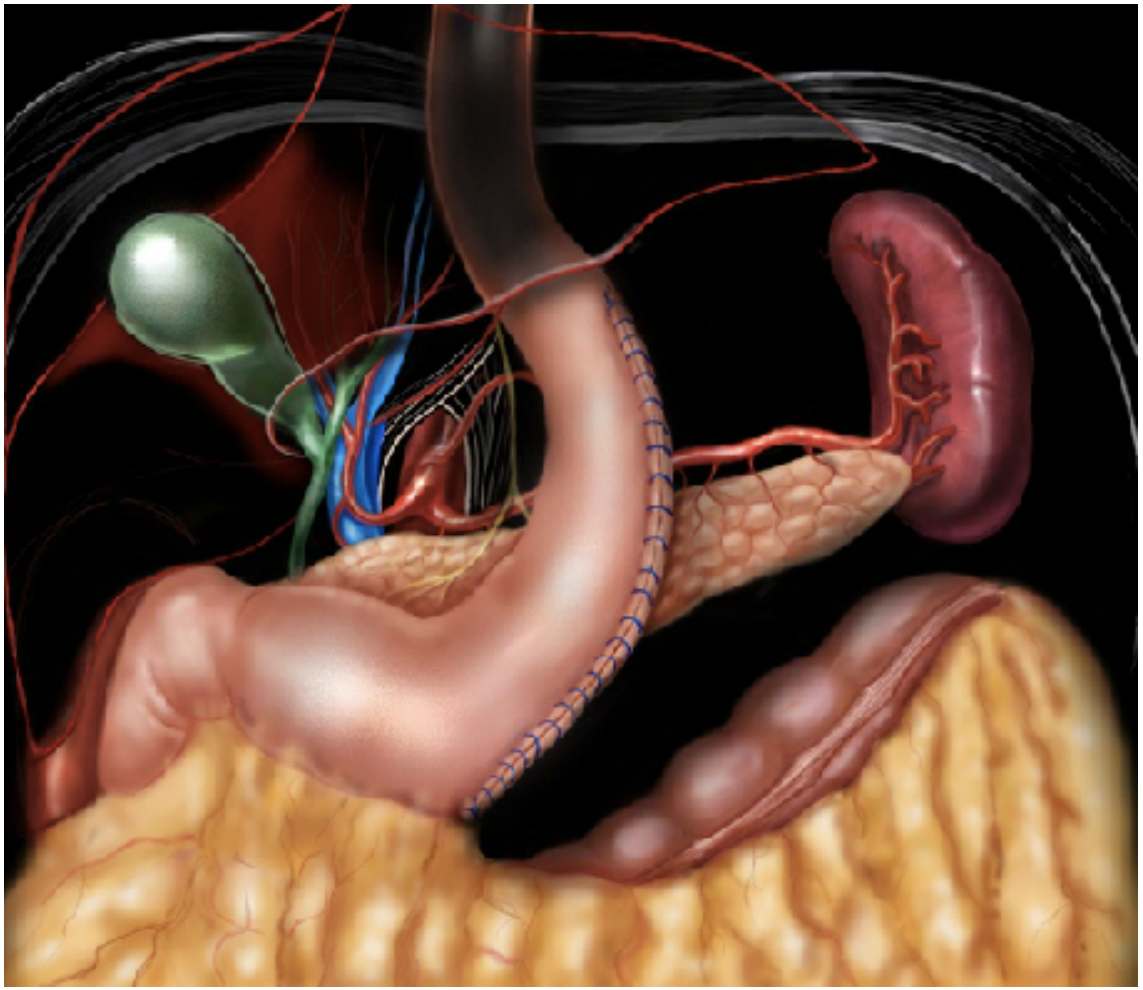
www.websurg.com

Surgical Treatment
Vertical Gastrectomy (Gastric Sleeve)



www.websurg.com

Surgical Treatment
Vertical Gastrectomy (Gastric Sleeve)



www.websurg.com

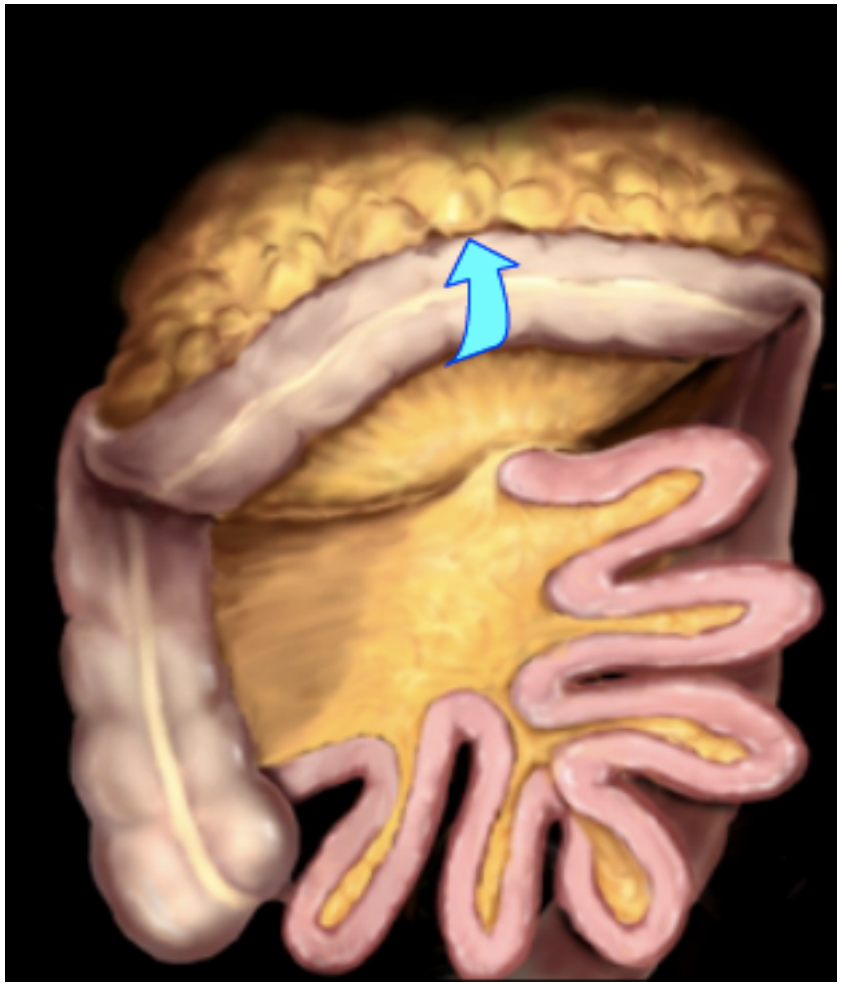
Surgical Treatment
Vertical Gastrectomy (Gastric Sleeve)

- **Extensive gastric section with risk of fistulas (1-2%) and postoperative bleeding (1.9 to 4.5%)**

- **Despite predominantly restrictive, long term nutritional and vitamin deficits may arise**

Surgical Treatment

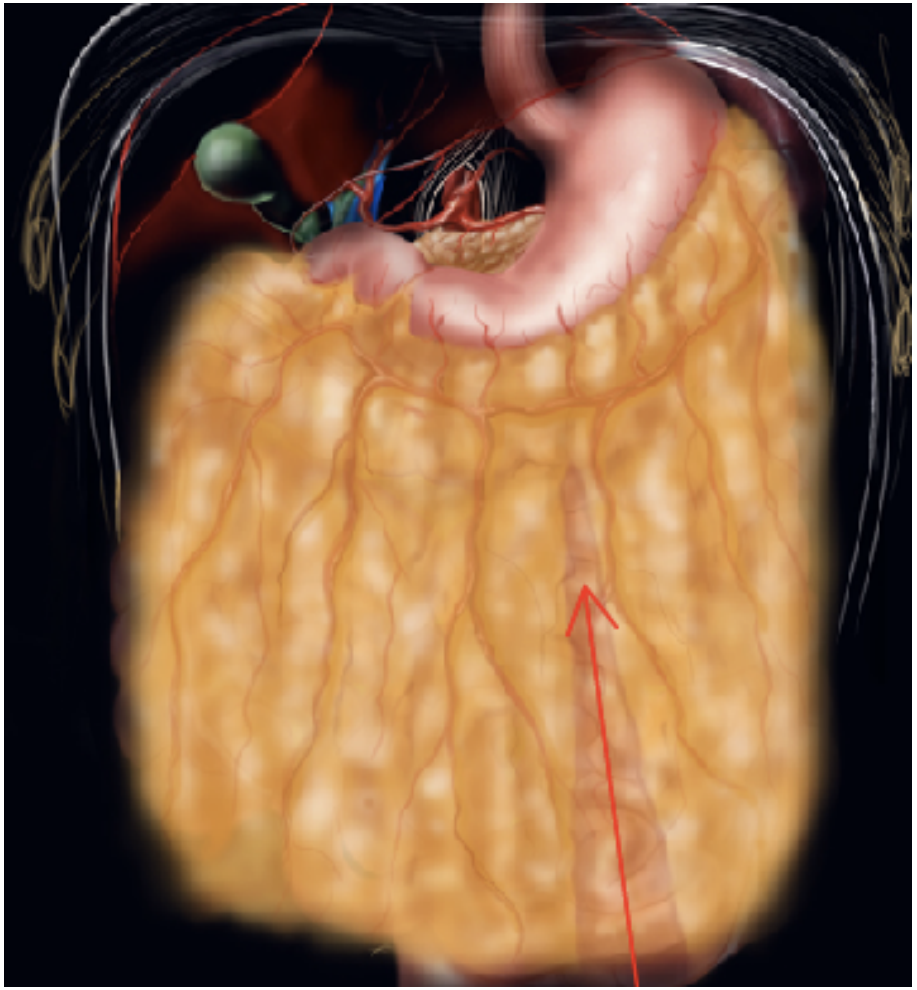
Gastric bypass



www.websurg.com

Surgical Treatment

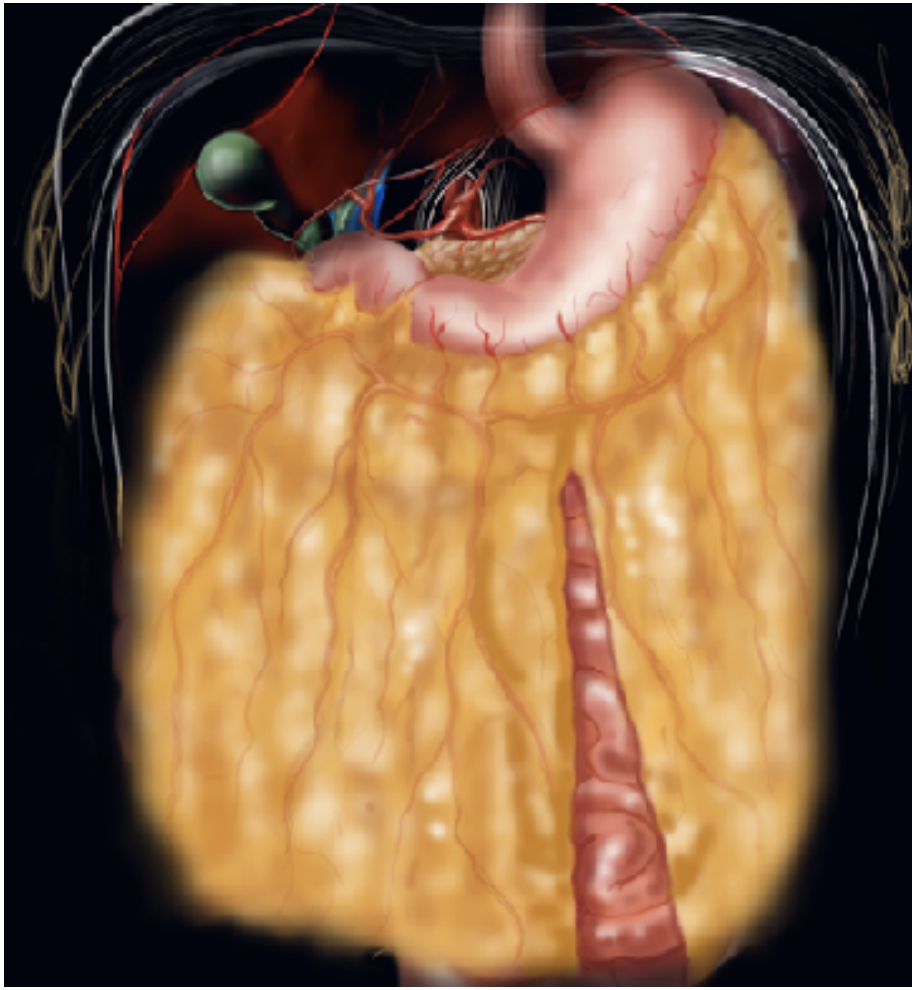
Gastric bypass



www.websurg.com

Surgical Treatment

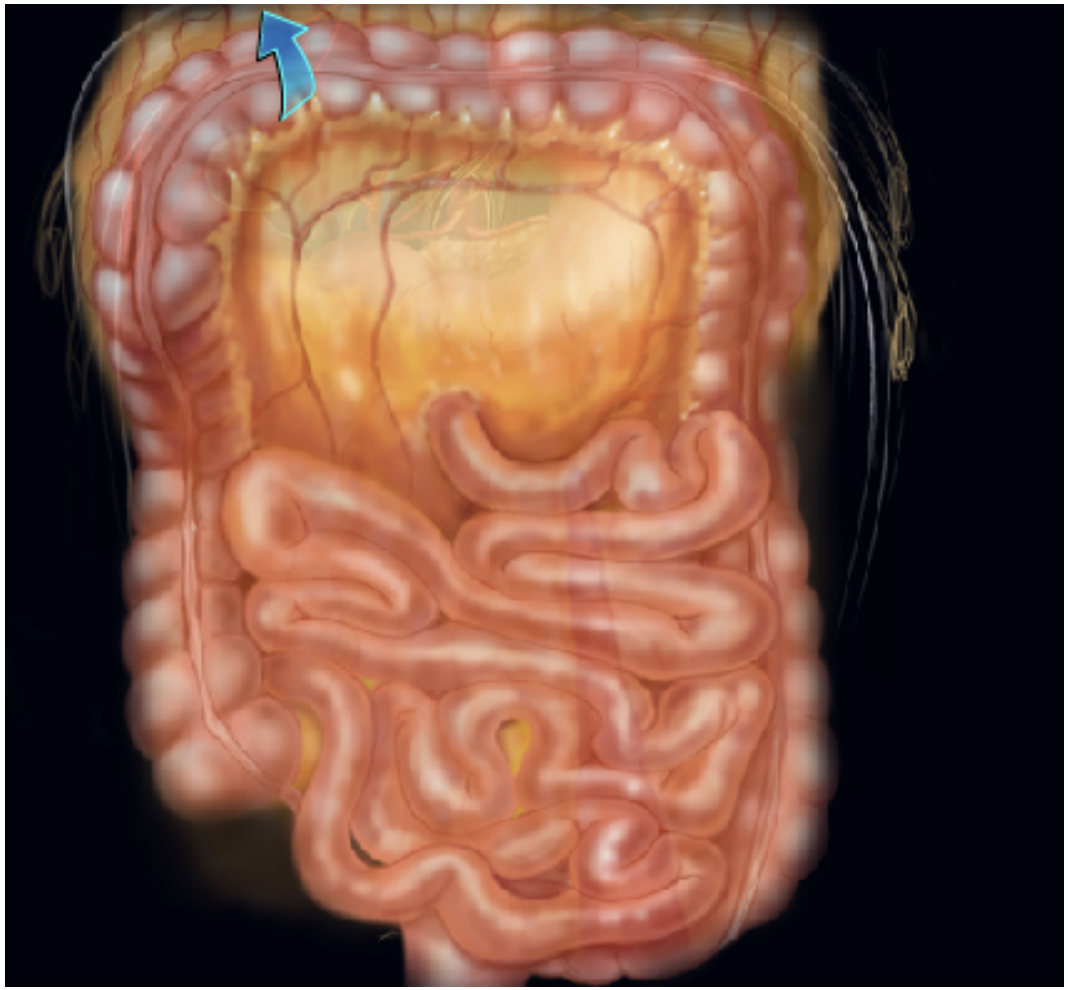
Gastric bypass



www.websurg.com

Surgical Treatment

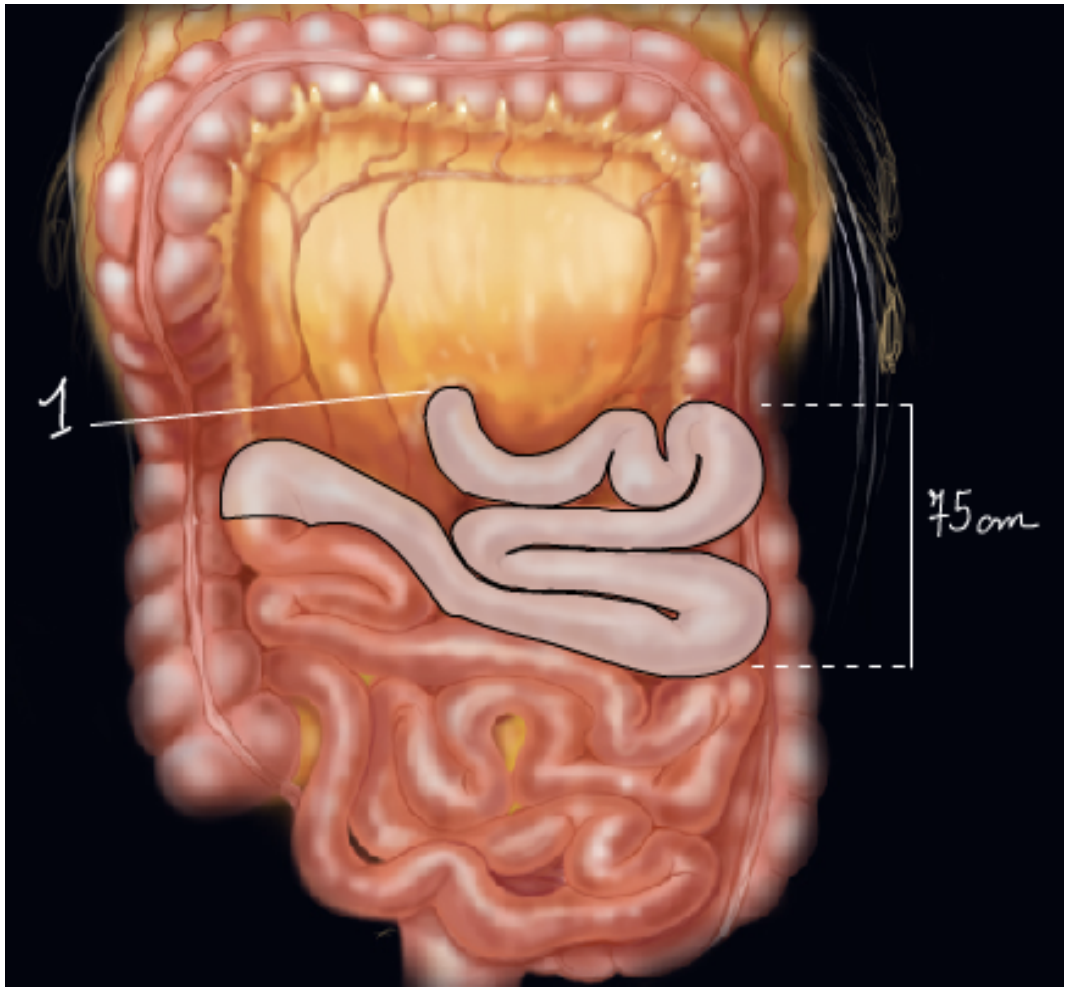
Gastric bypass



www.websurg.com

Surgical Treatment

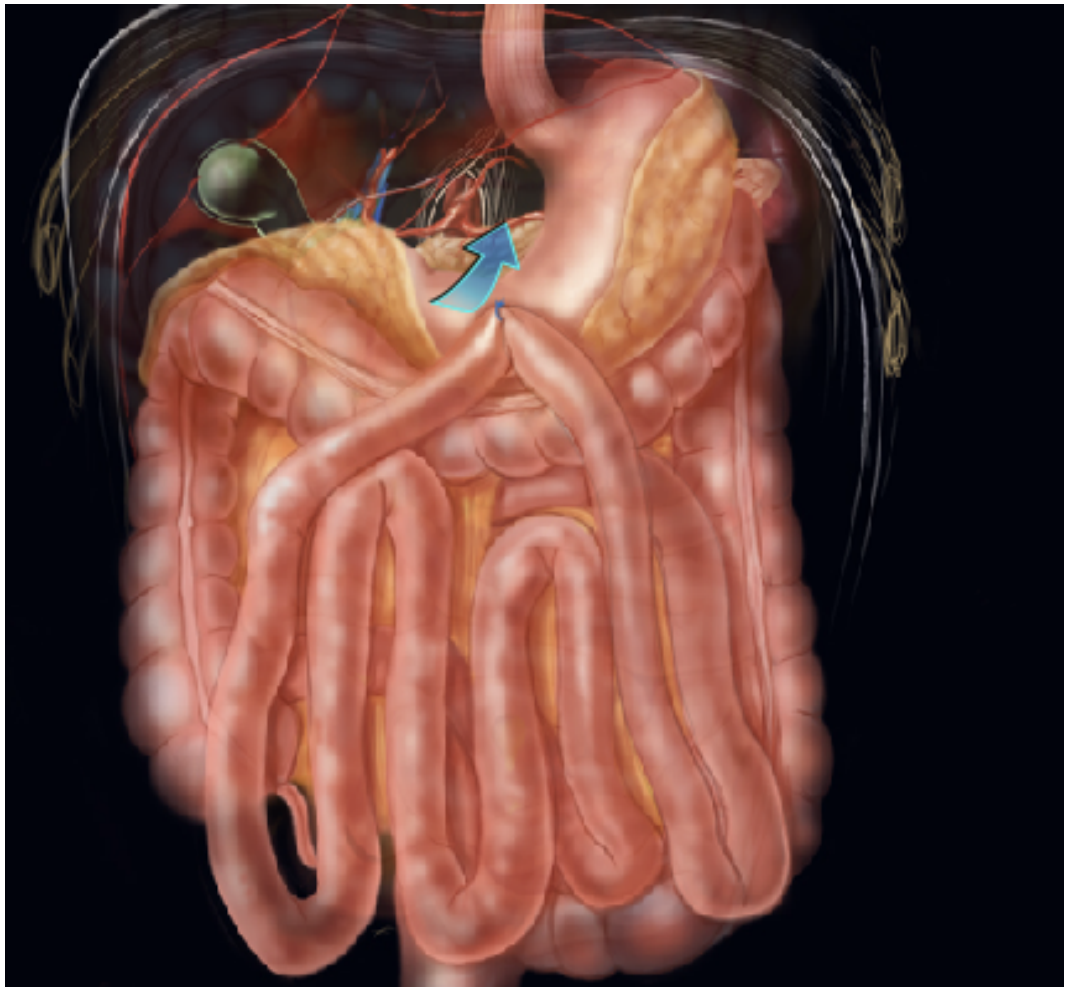
Gastric bypass



www.websurg.com

Surgical Treatment

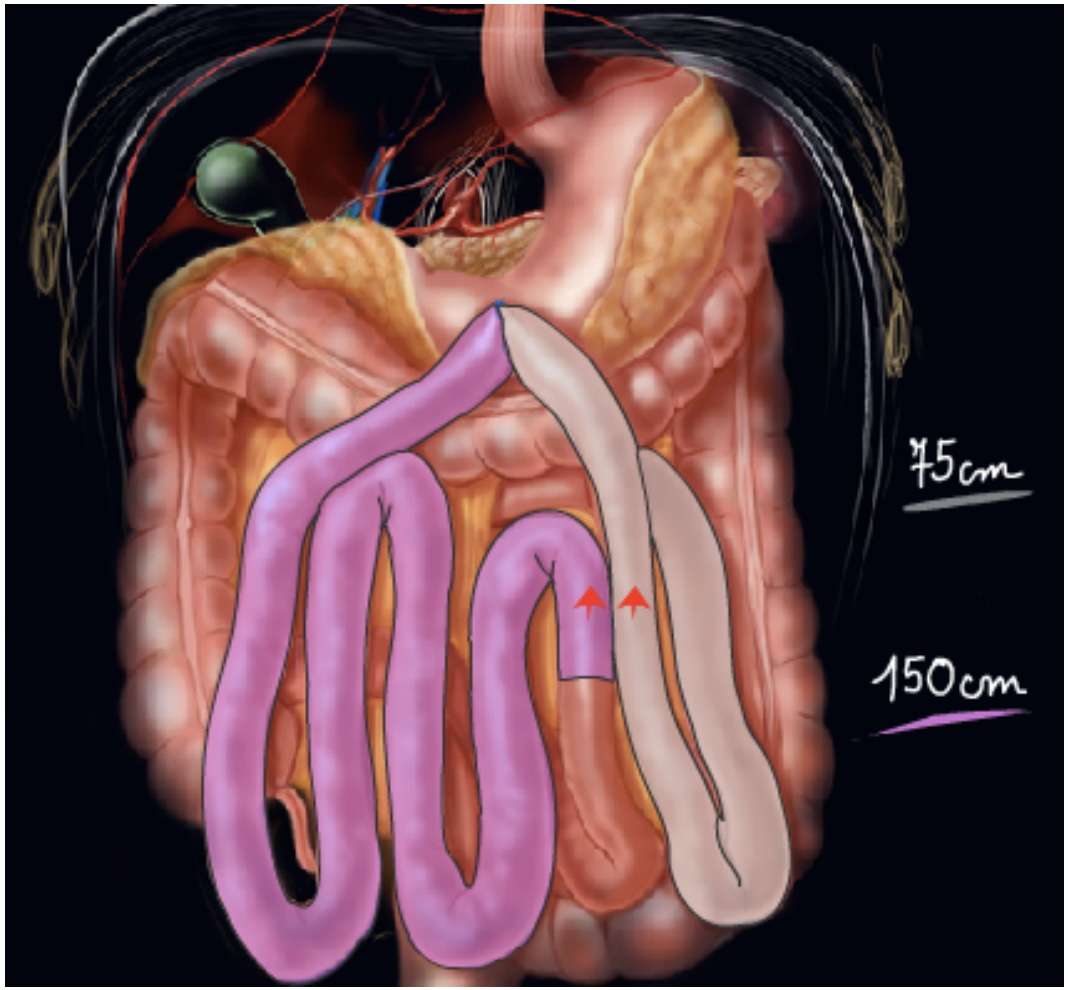
Gastric bypass



www.websurg.com

Surgical Treatment

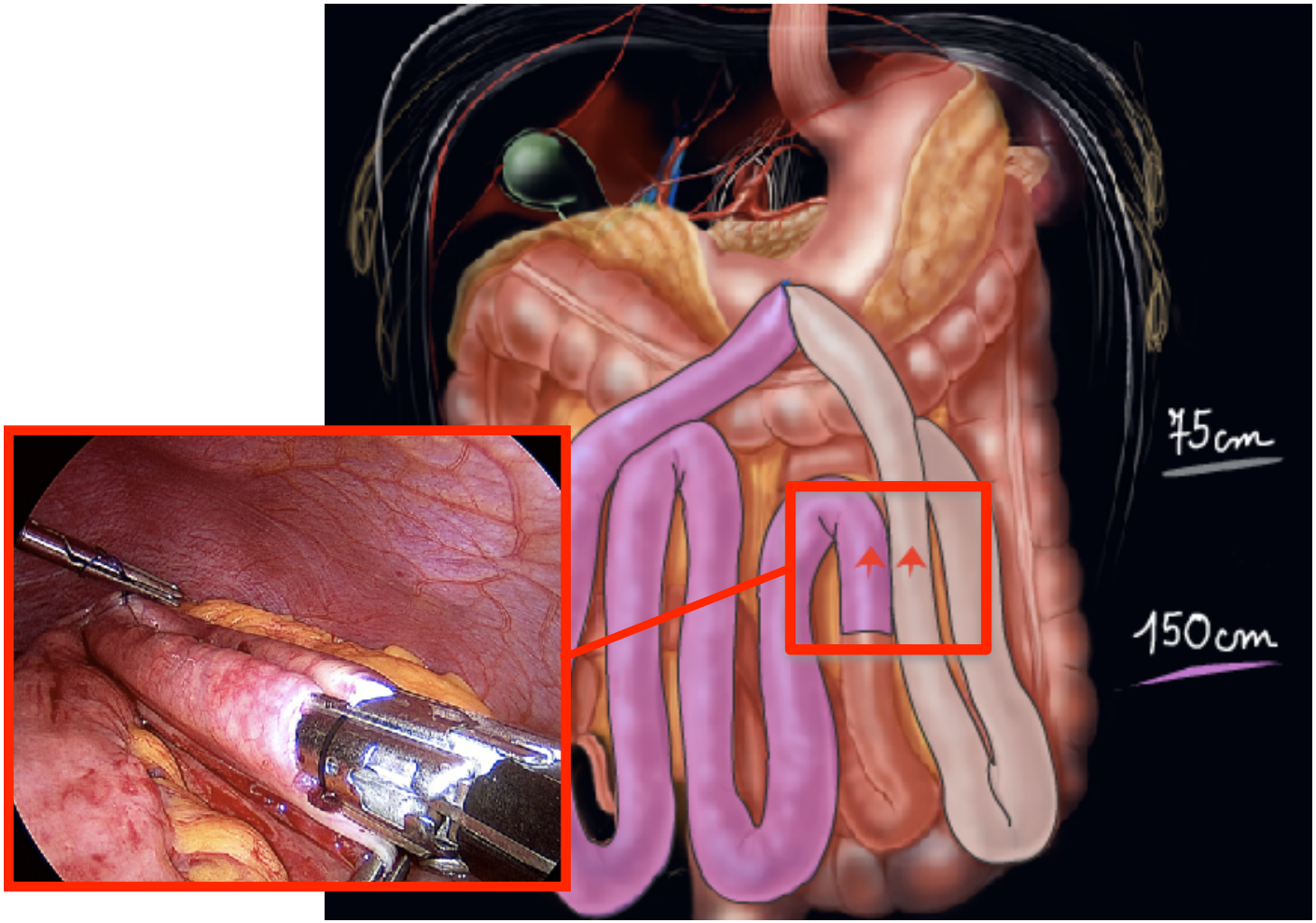
Gastric bypass



www.websurg.com

Surgical Treatment

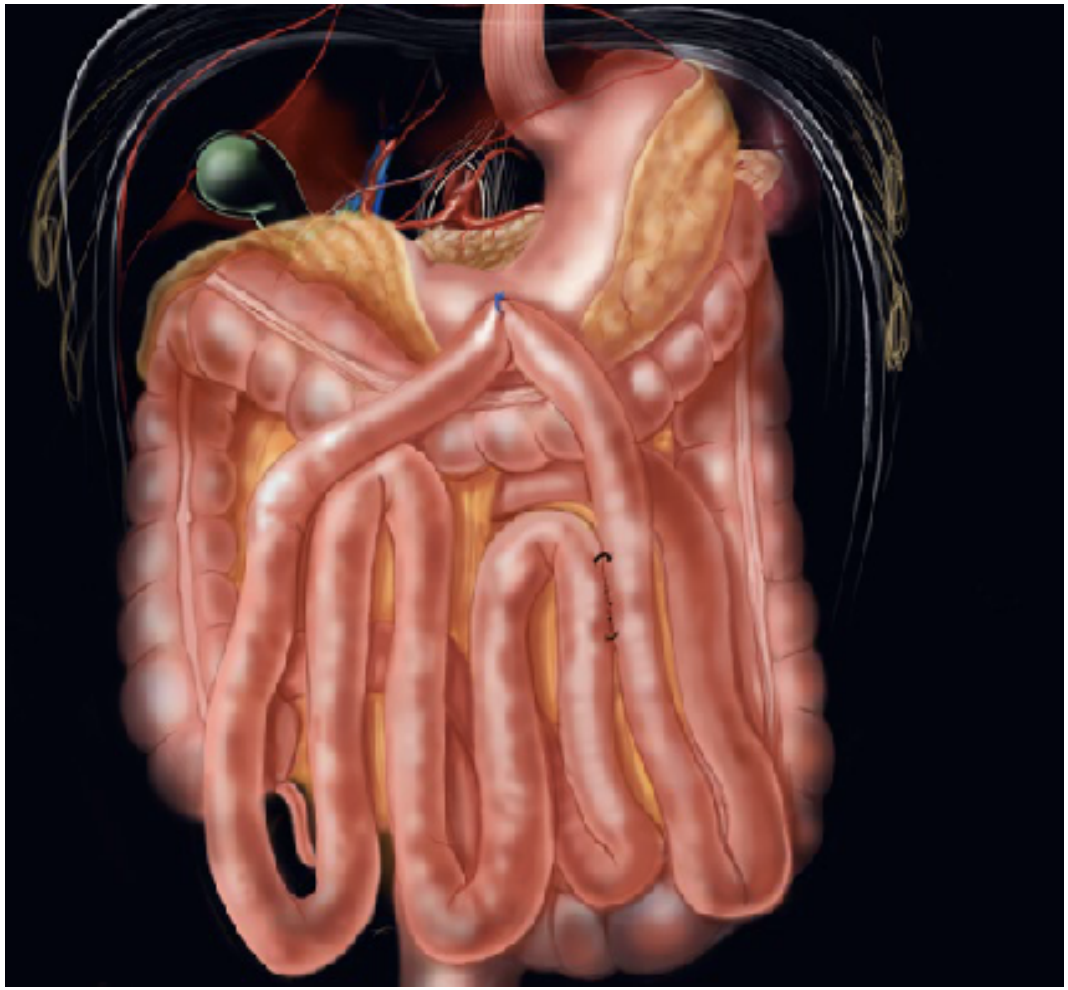
Gastric bypass



www.websurg.com

Surgical Treatment

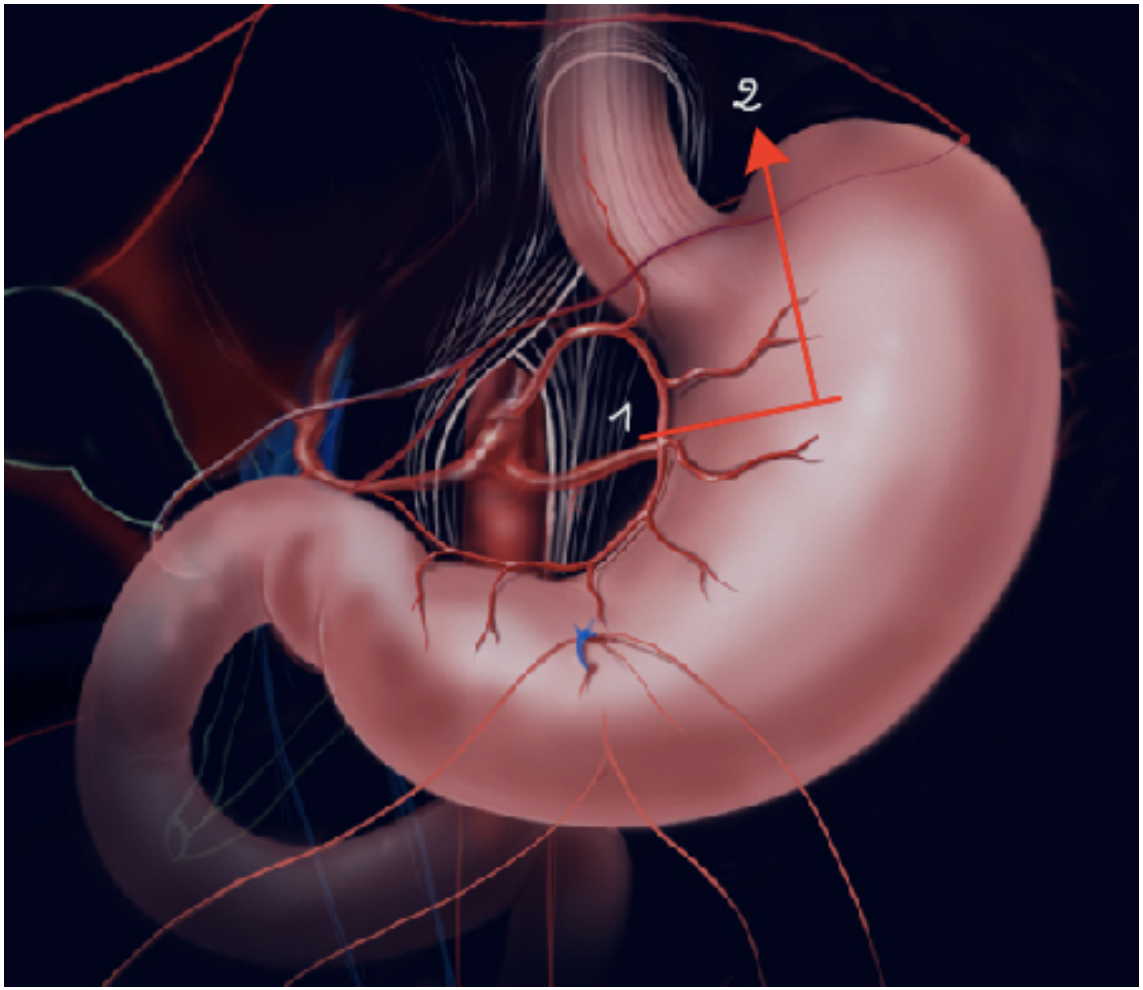
Gastric bypass



www.websurg.com

Surgical Treatment

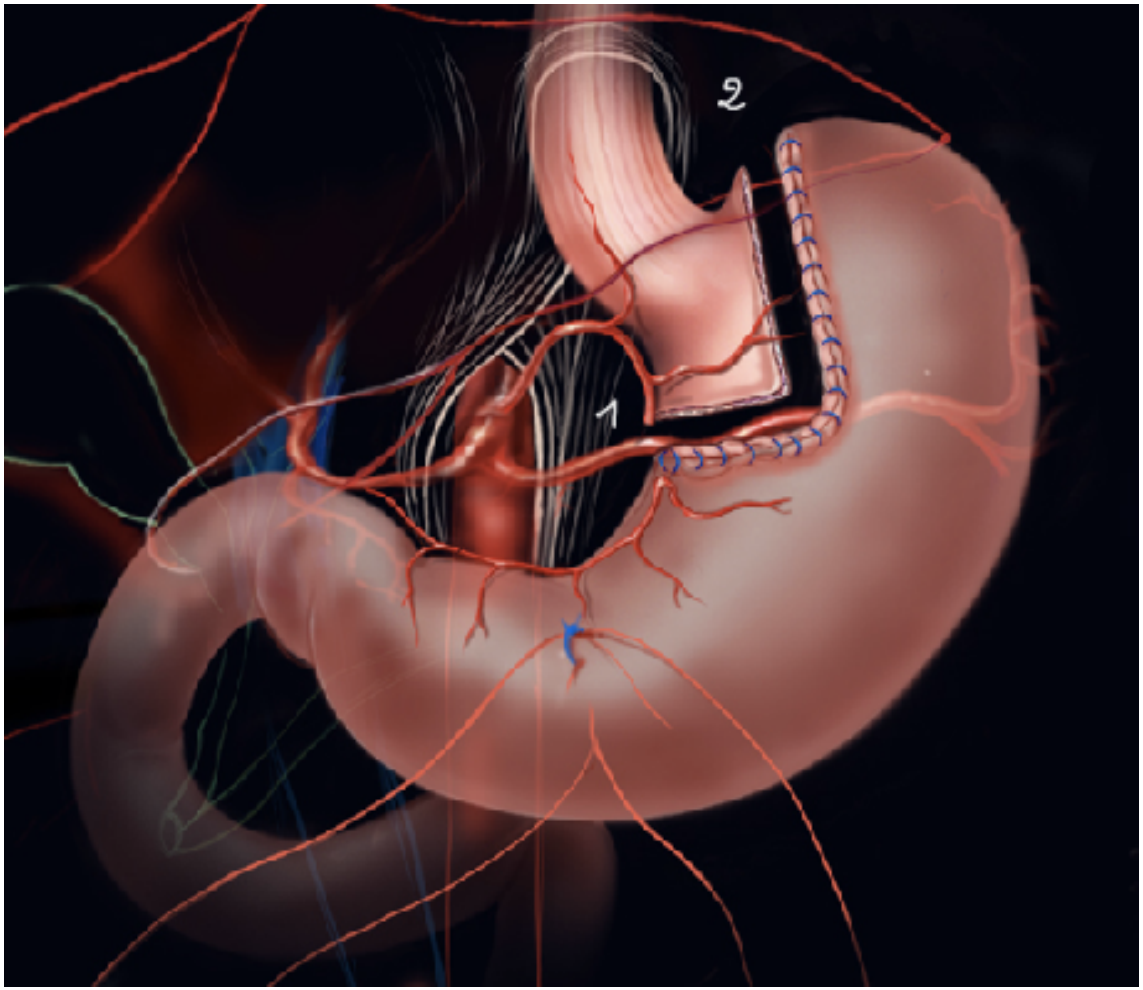
Gastric bypass



www.websurg.com

Surgical Treatment

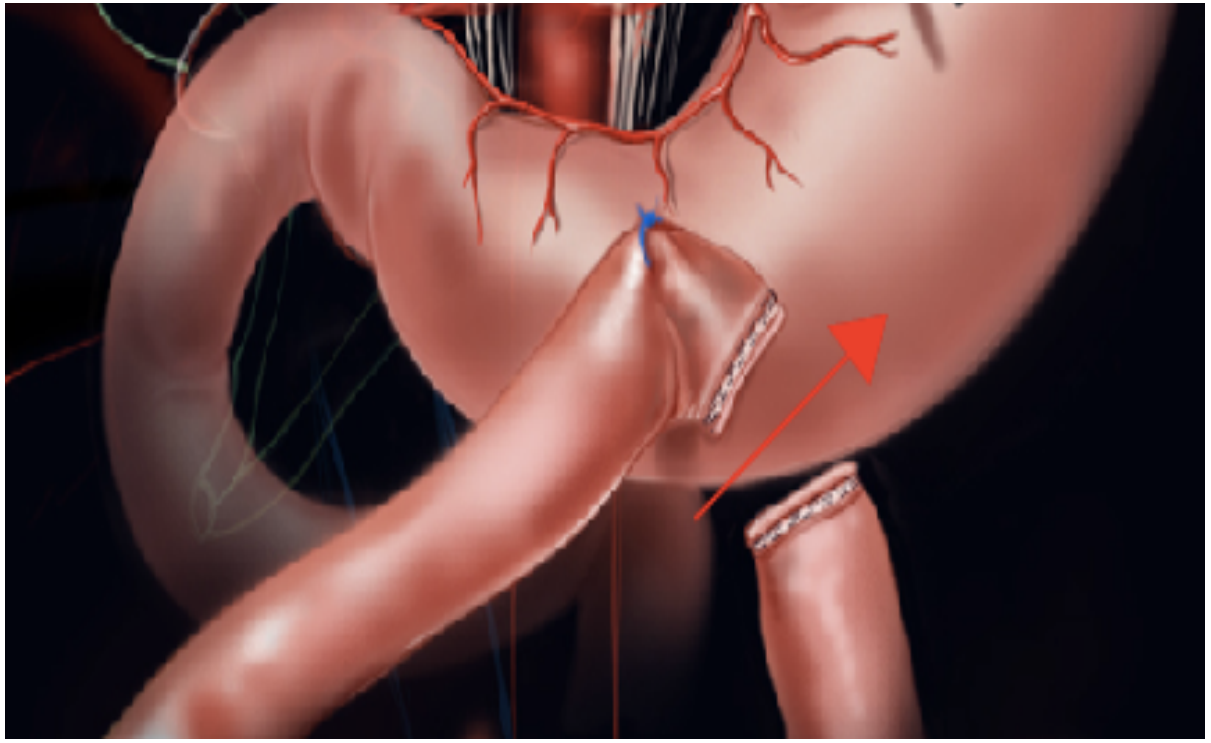
Gastric bypass



www.websurg.com

Surgical Treatment

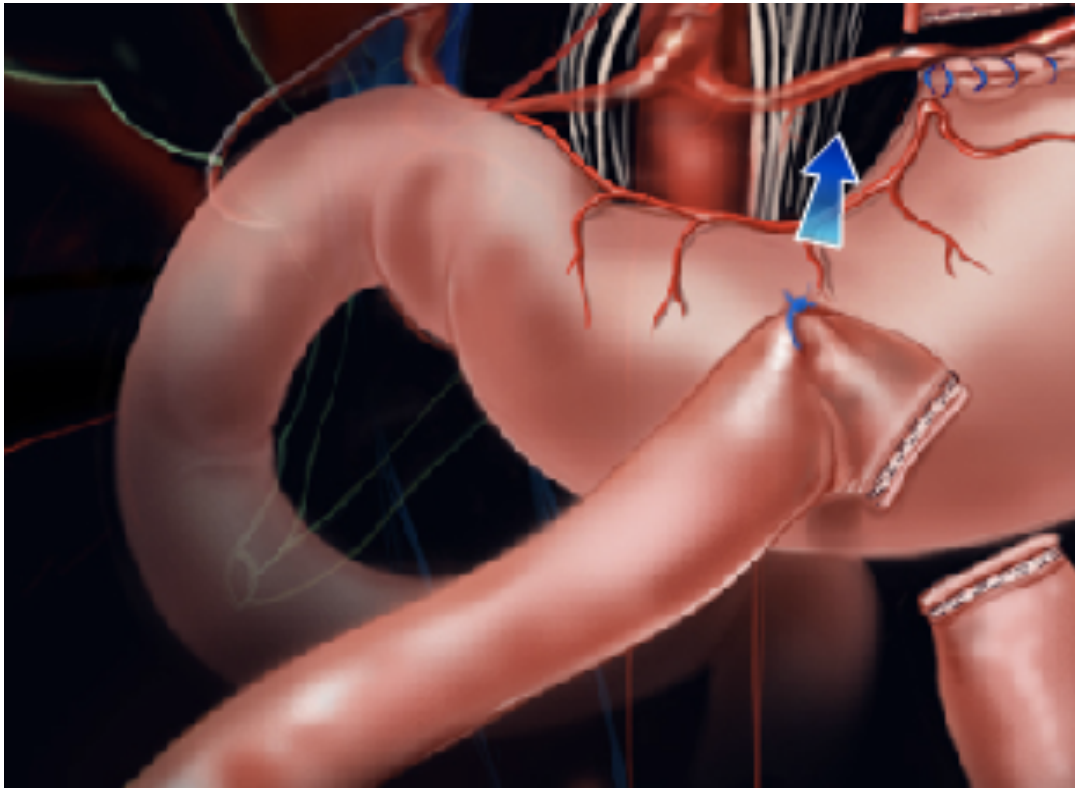
Gastric bypass



www.websurg.com

Surgical Treatment

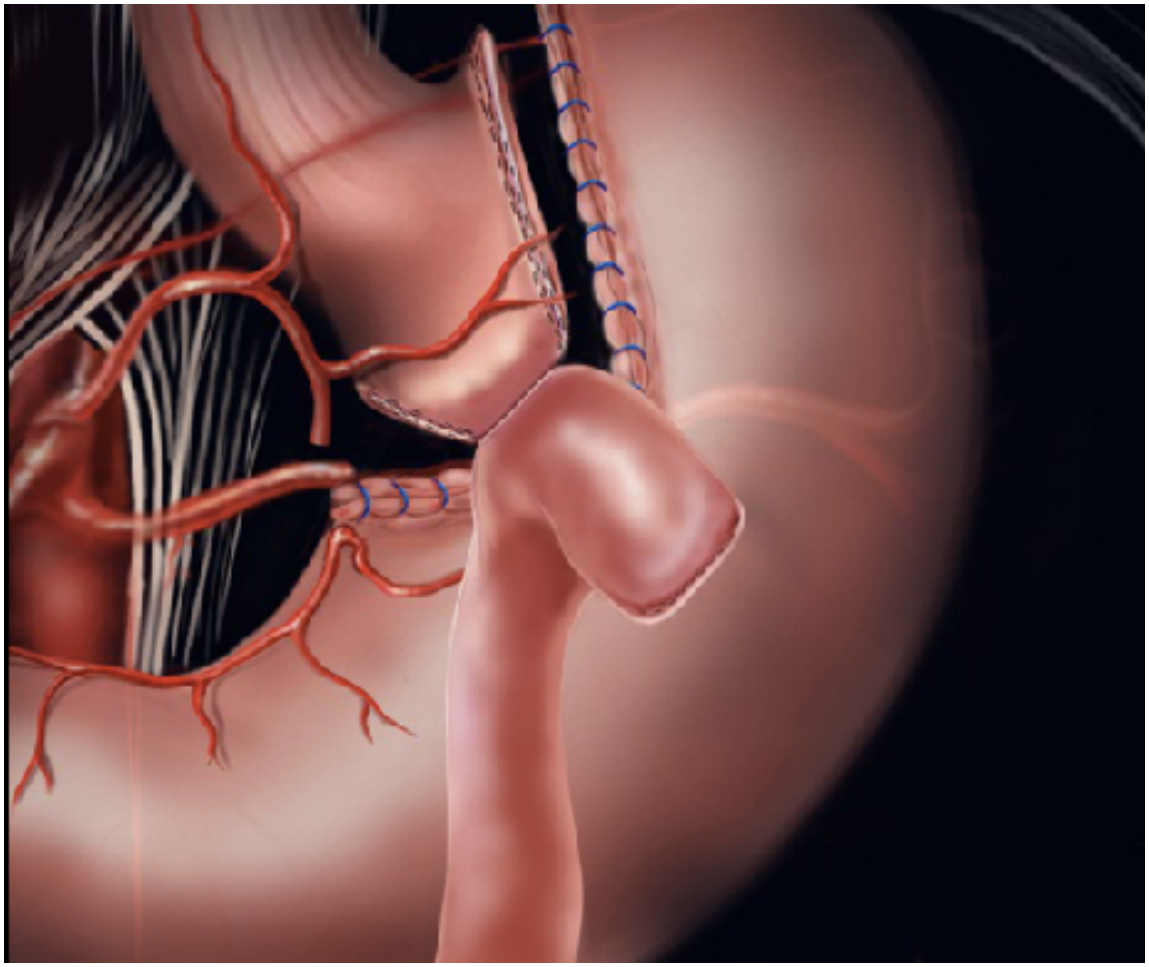
Gastric bypass



www.websurg.com

Surgical Treatment

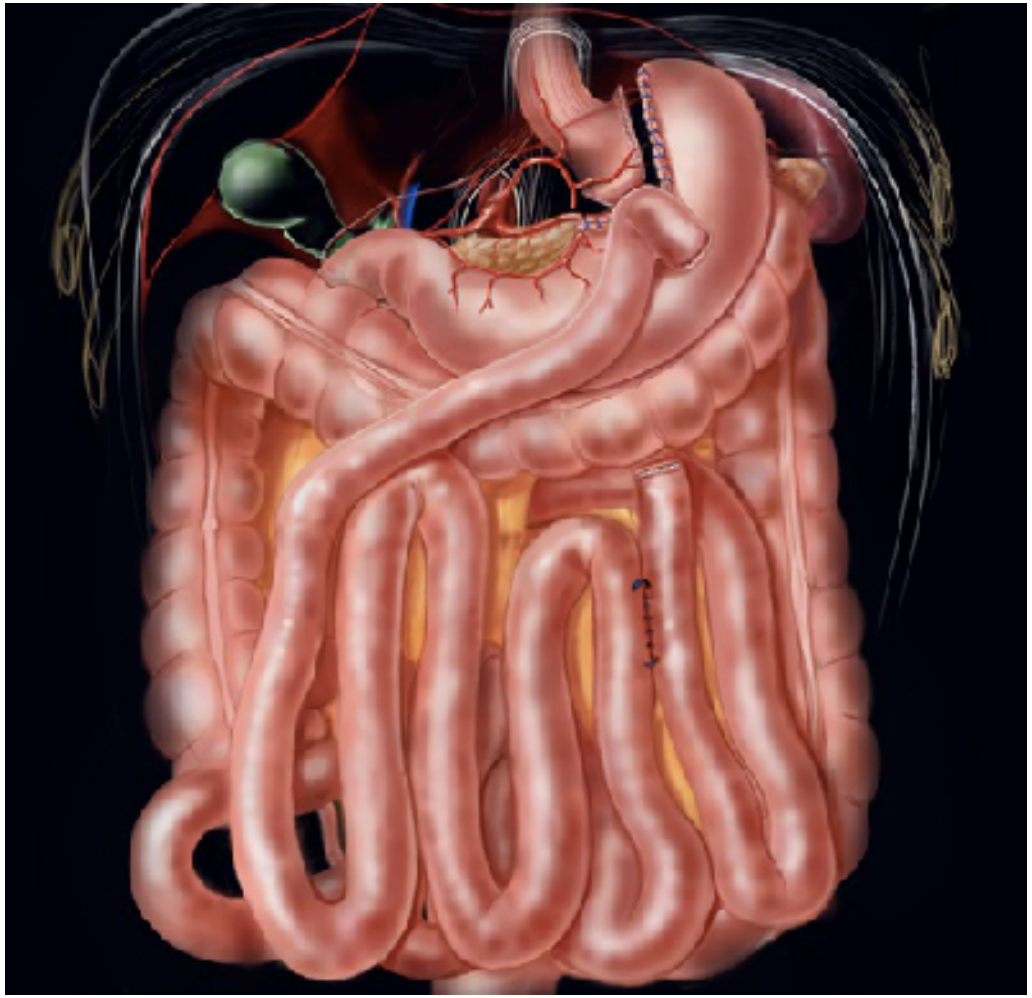
Gastric bypass



www.websurg.com

Surgical Treatment

Gastric bypass



www.websurg.com

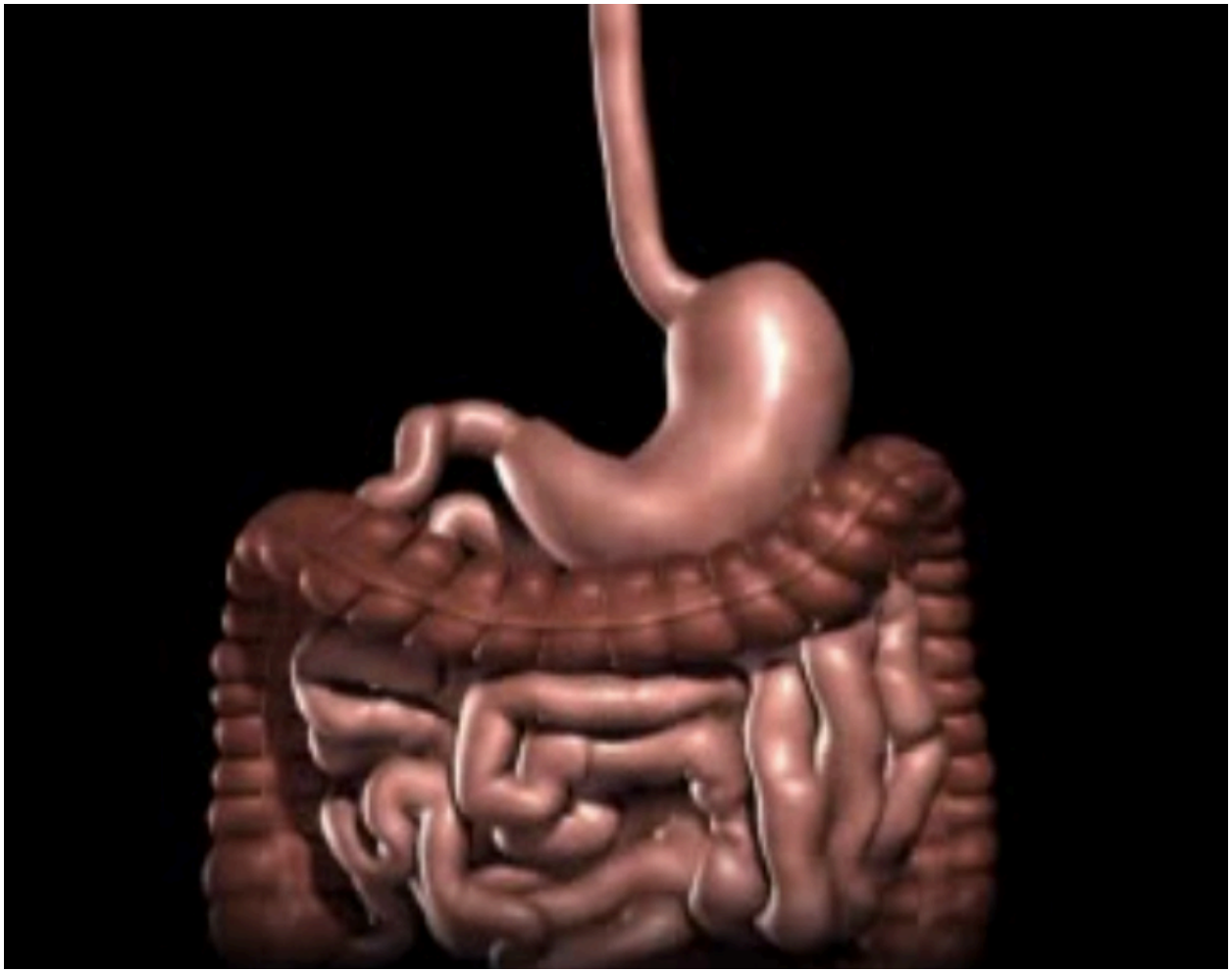
Surgical Treatment

Gastric bypass

- **Higher operating time → higher risk of DVT / PE**
- **Fistula risk (0.4 to 5.2%) / hemorrhage (1.9 to 4.4%) postoperative (gastrenterostomy or enteroenterostomy)**
- **Malnutrition risk and / or hypovitaminosis**

Surgical Treatment

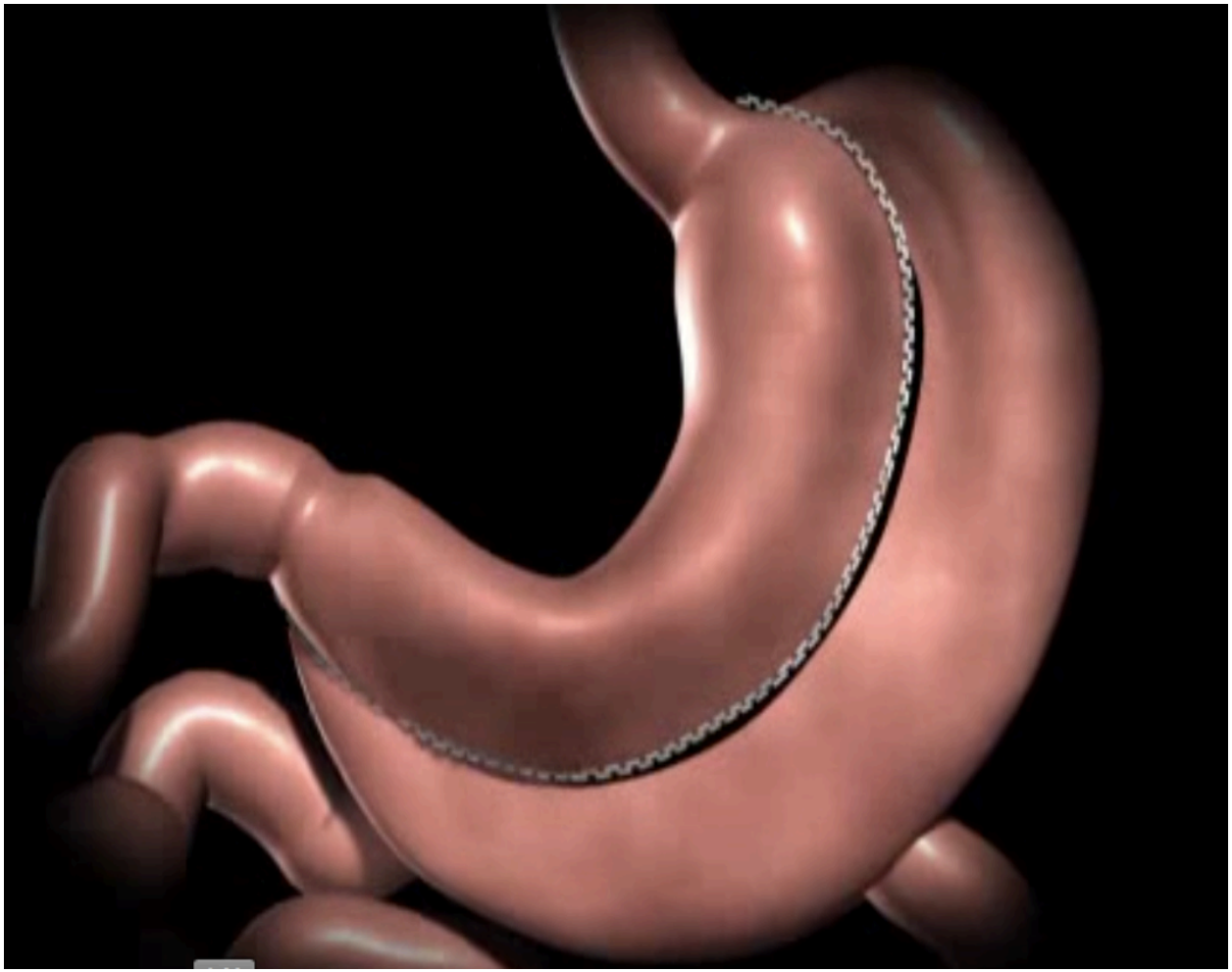
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

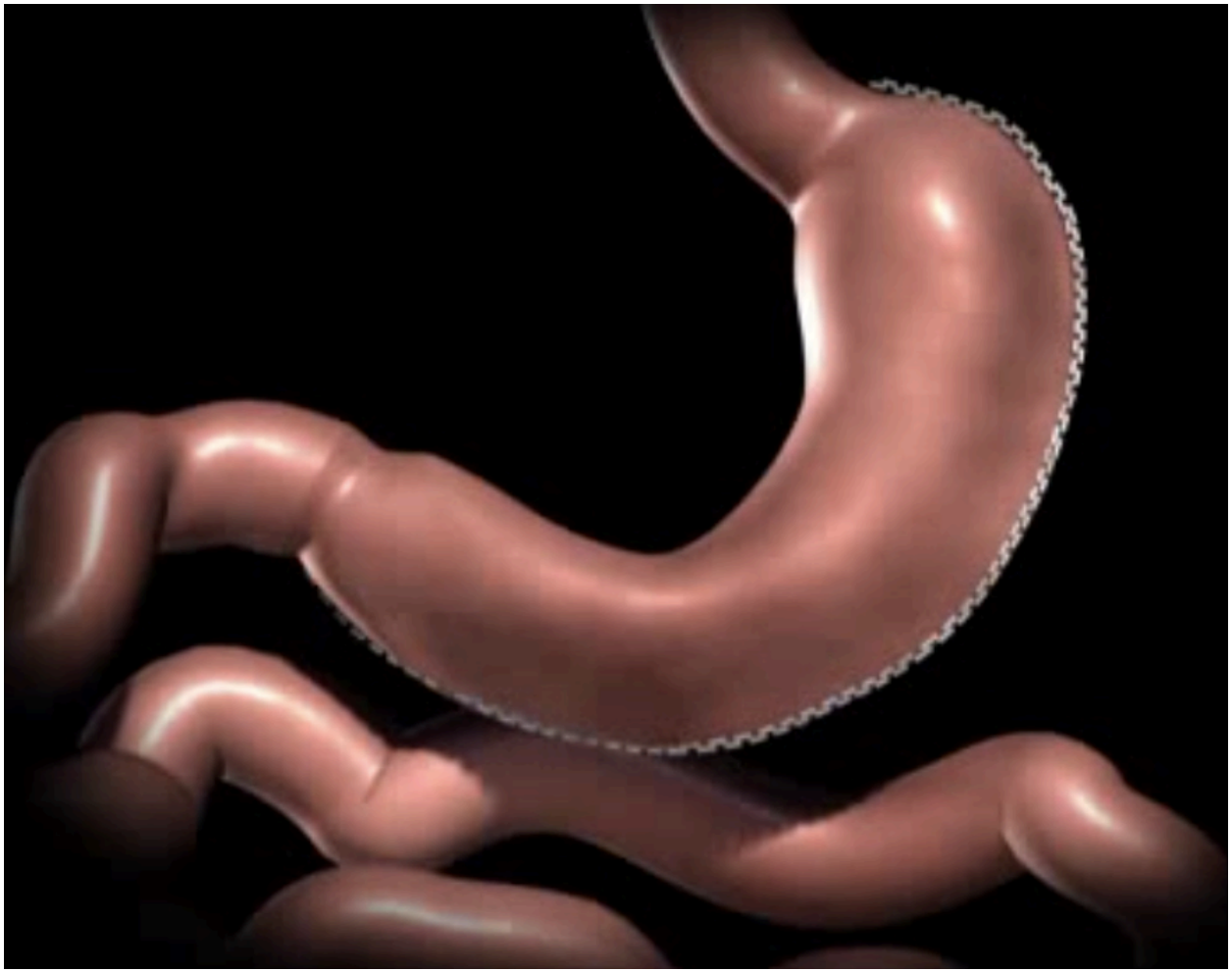
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

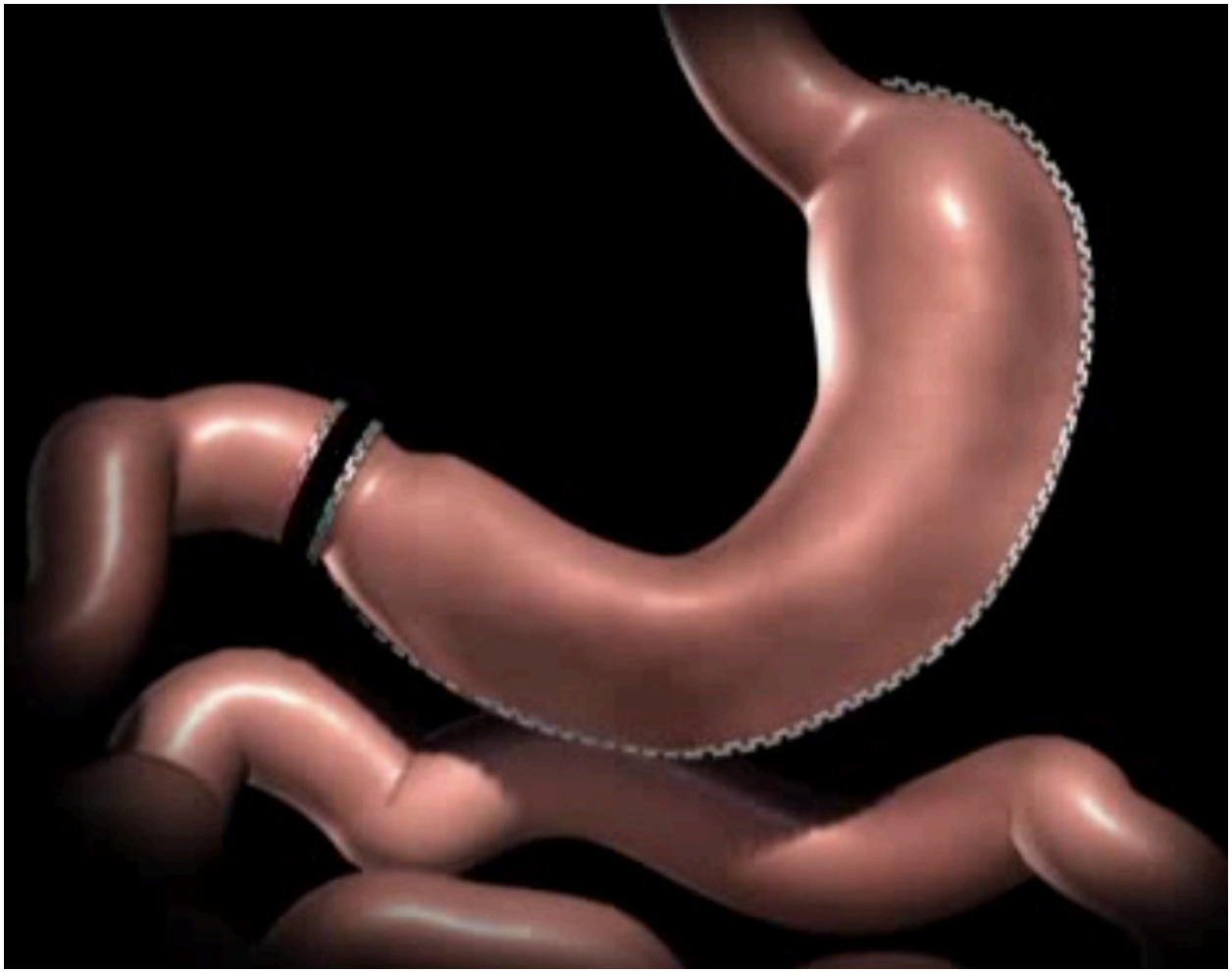
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

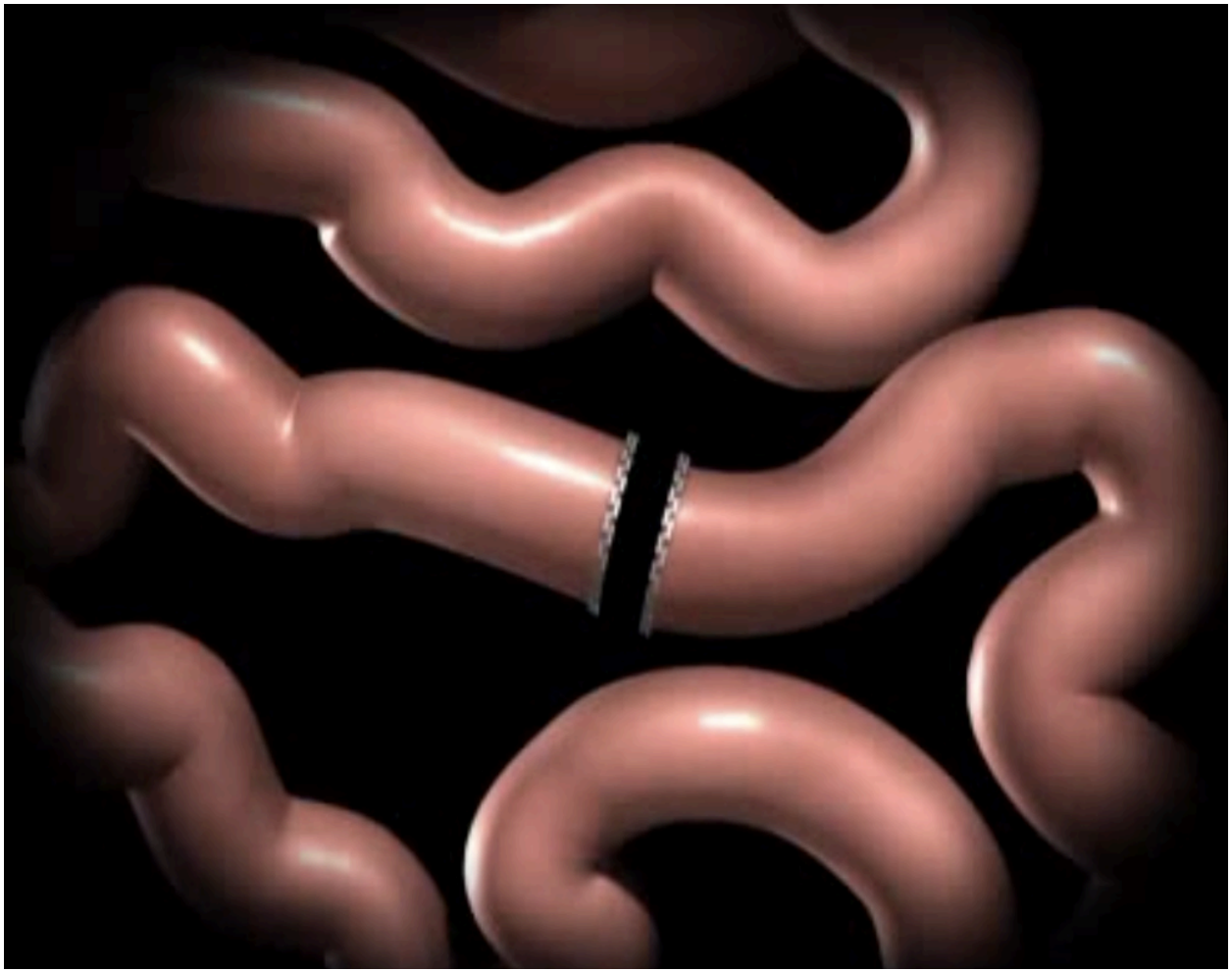
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

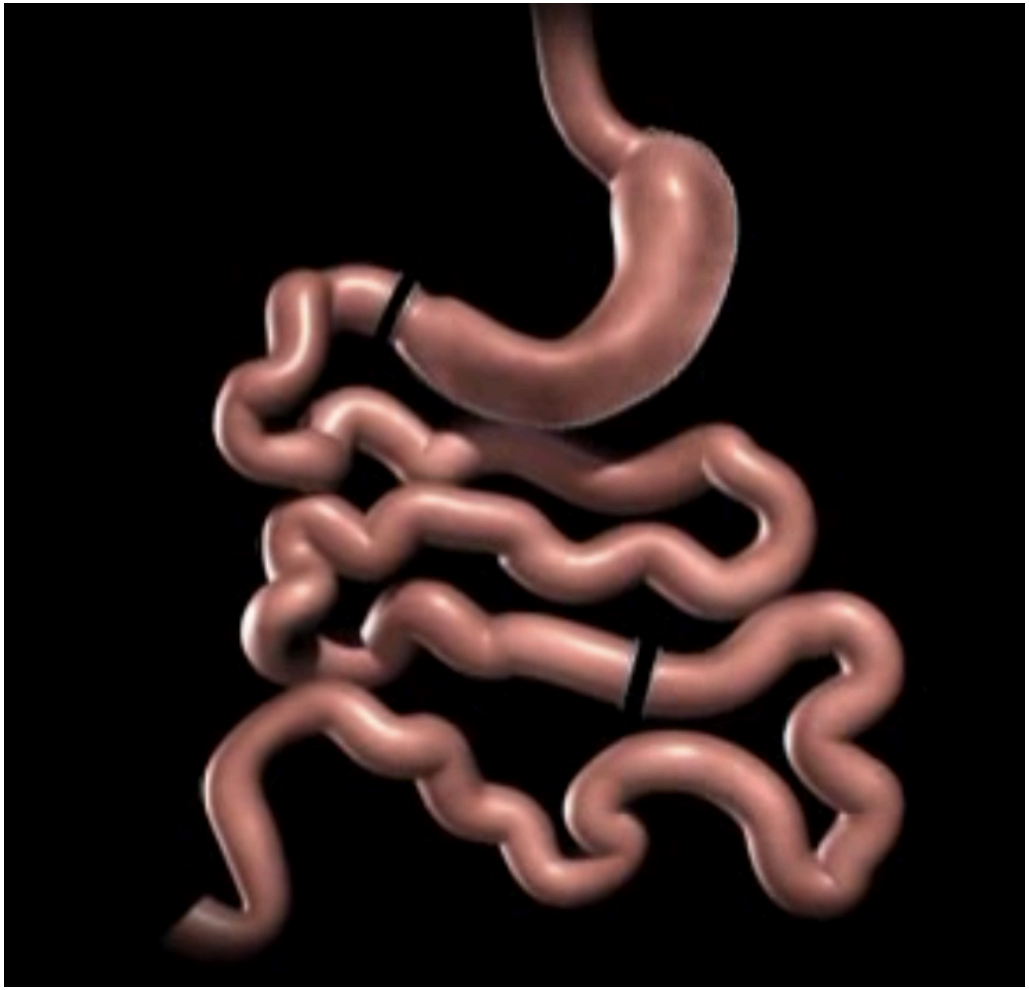
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

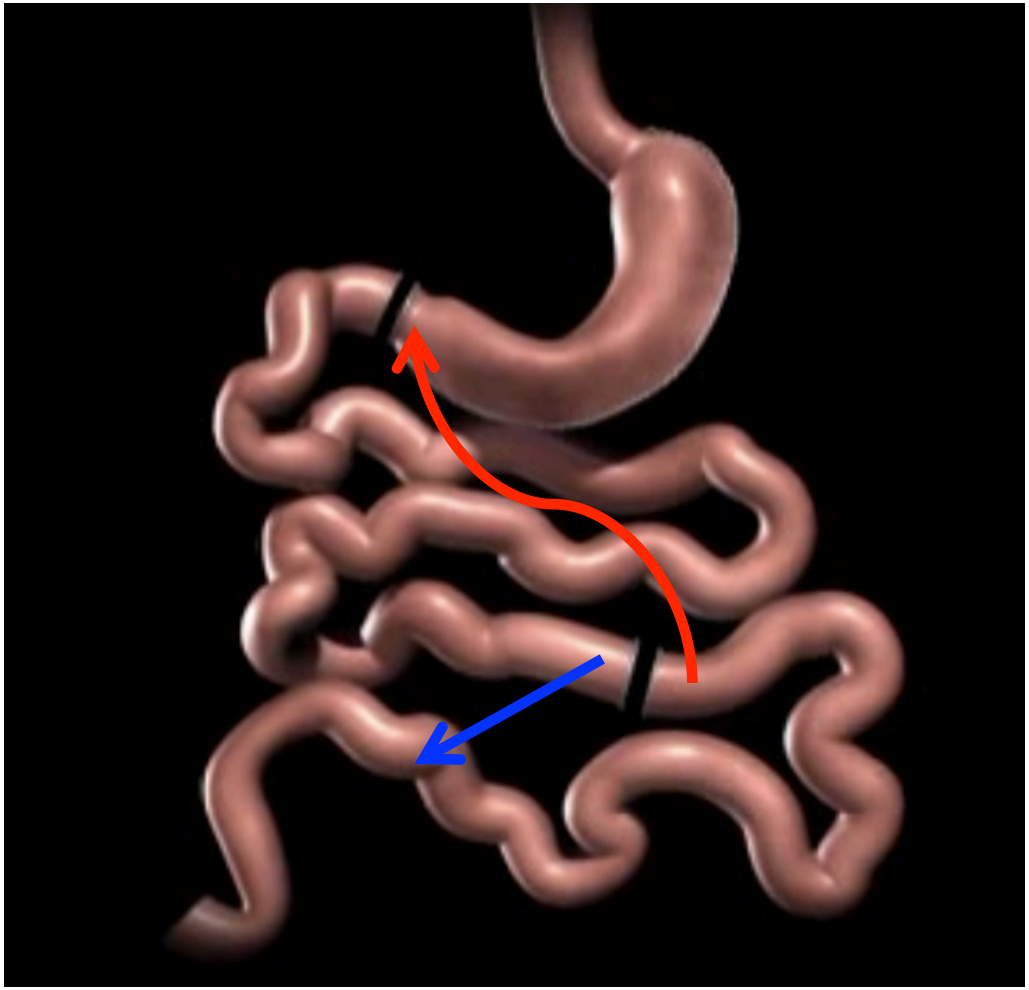
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

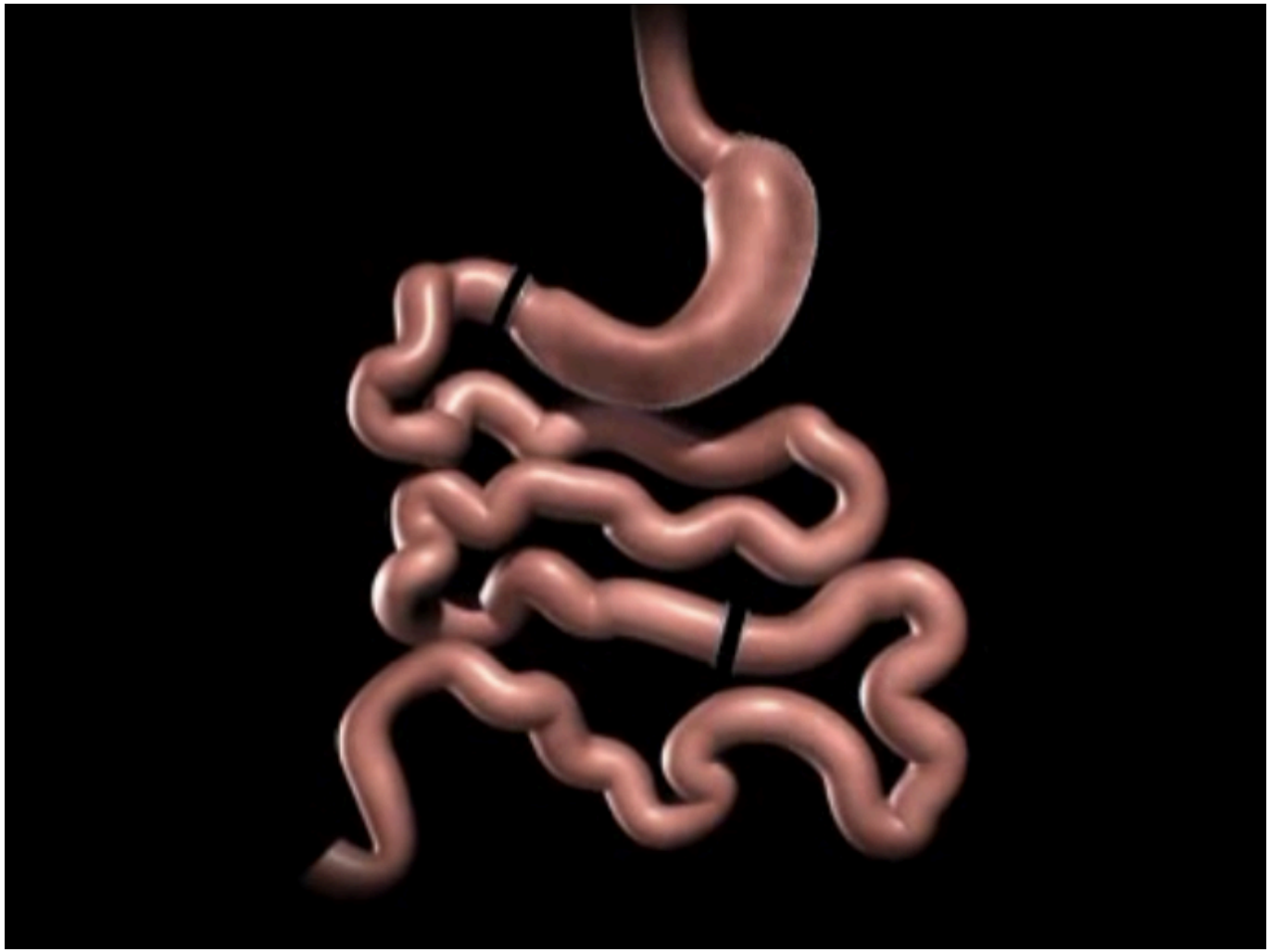
Duodenal switch



www.newlifebariatricsurgery.com

+ Surgical Treatment

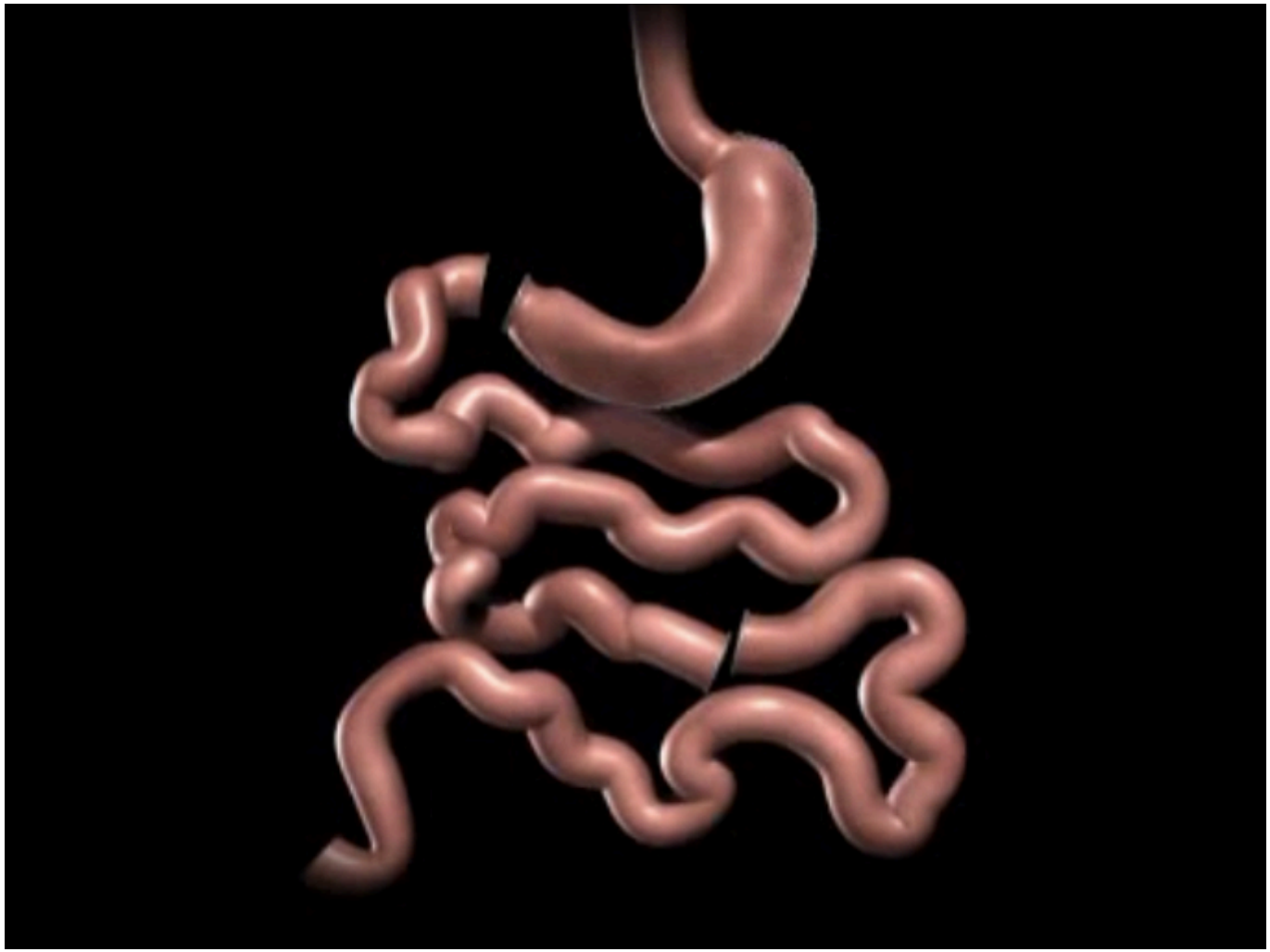
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

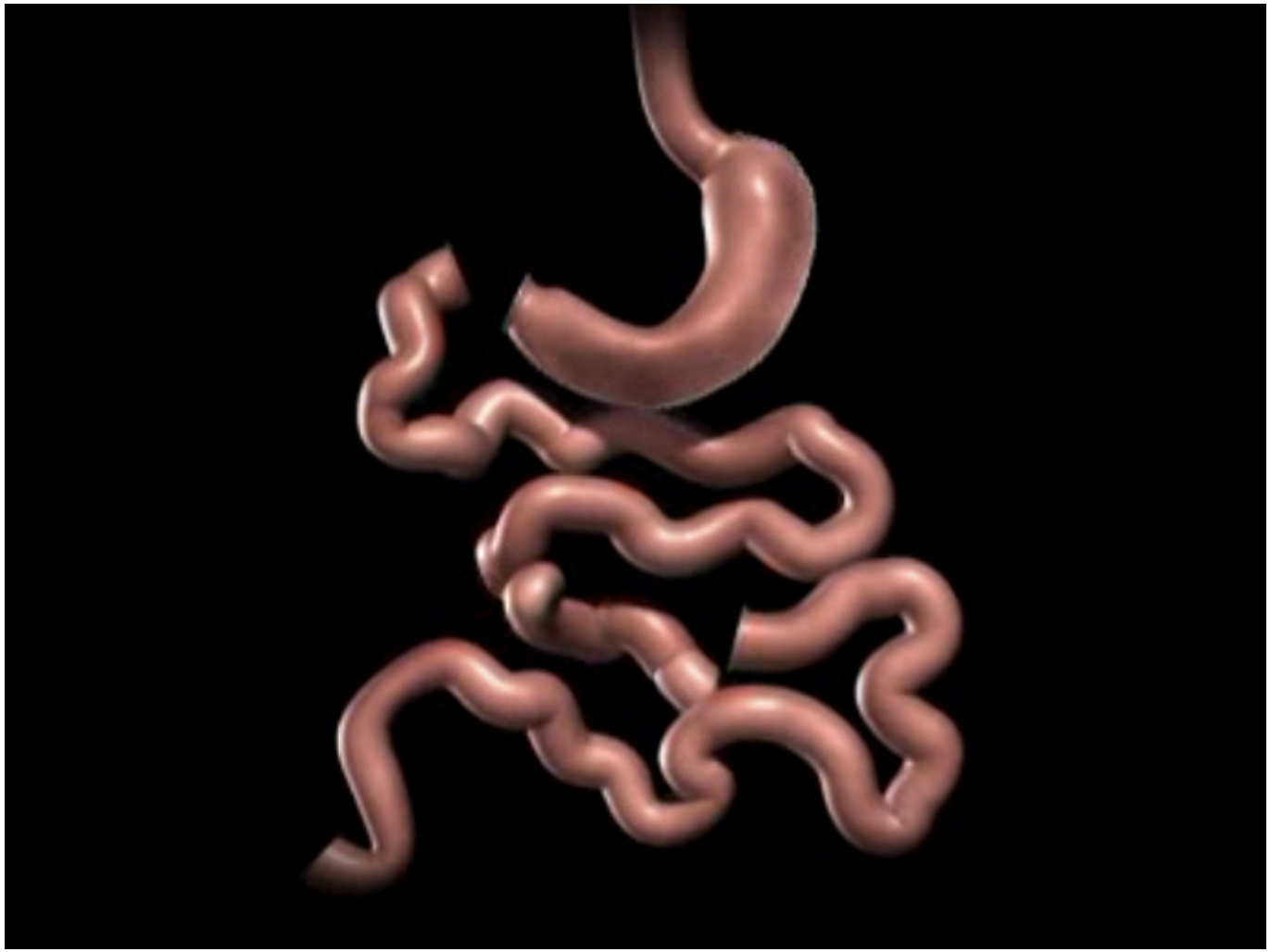
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

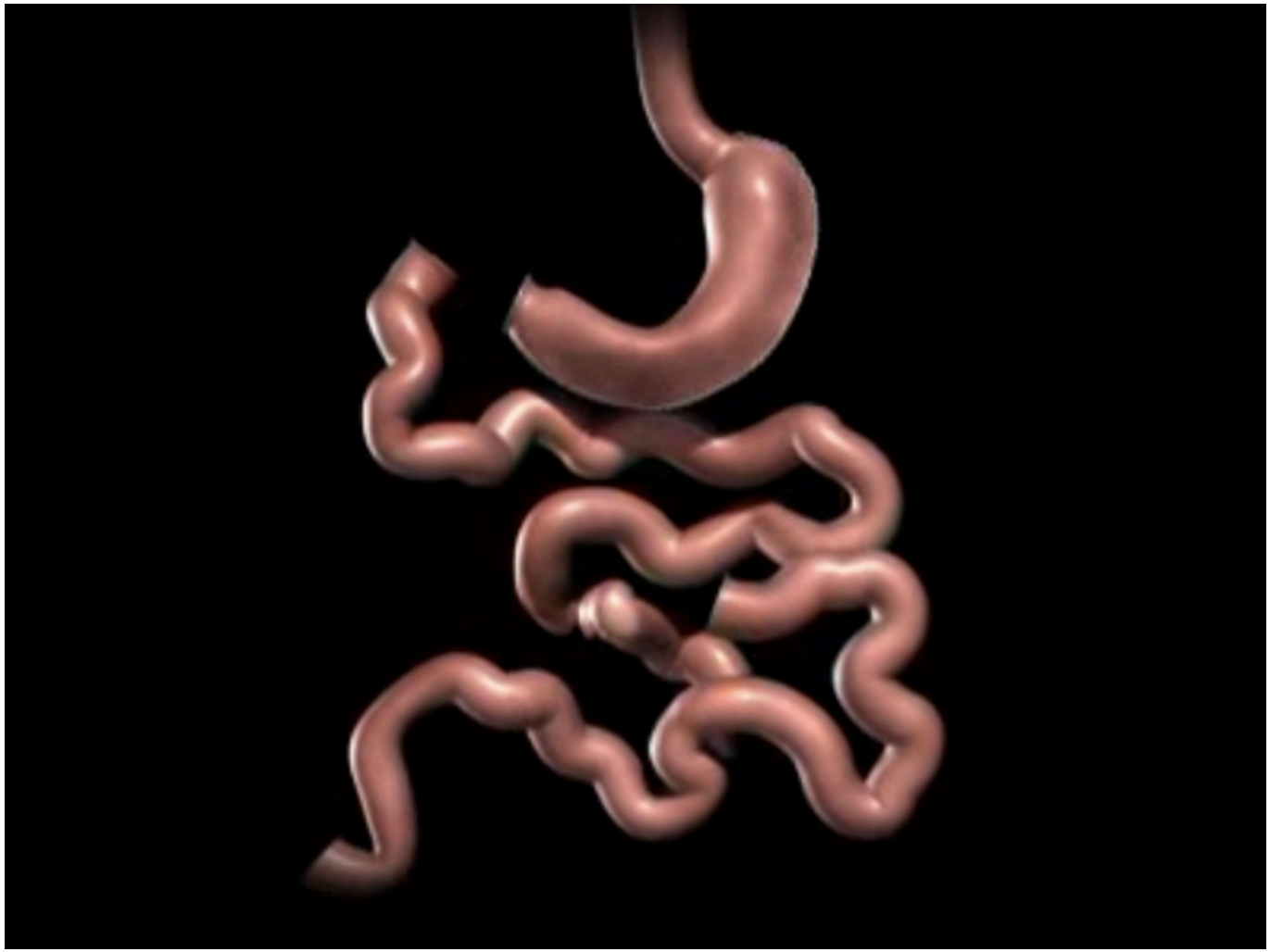
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

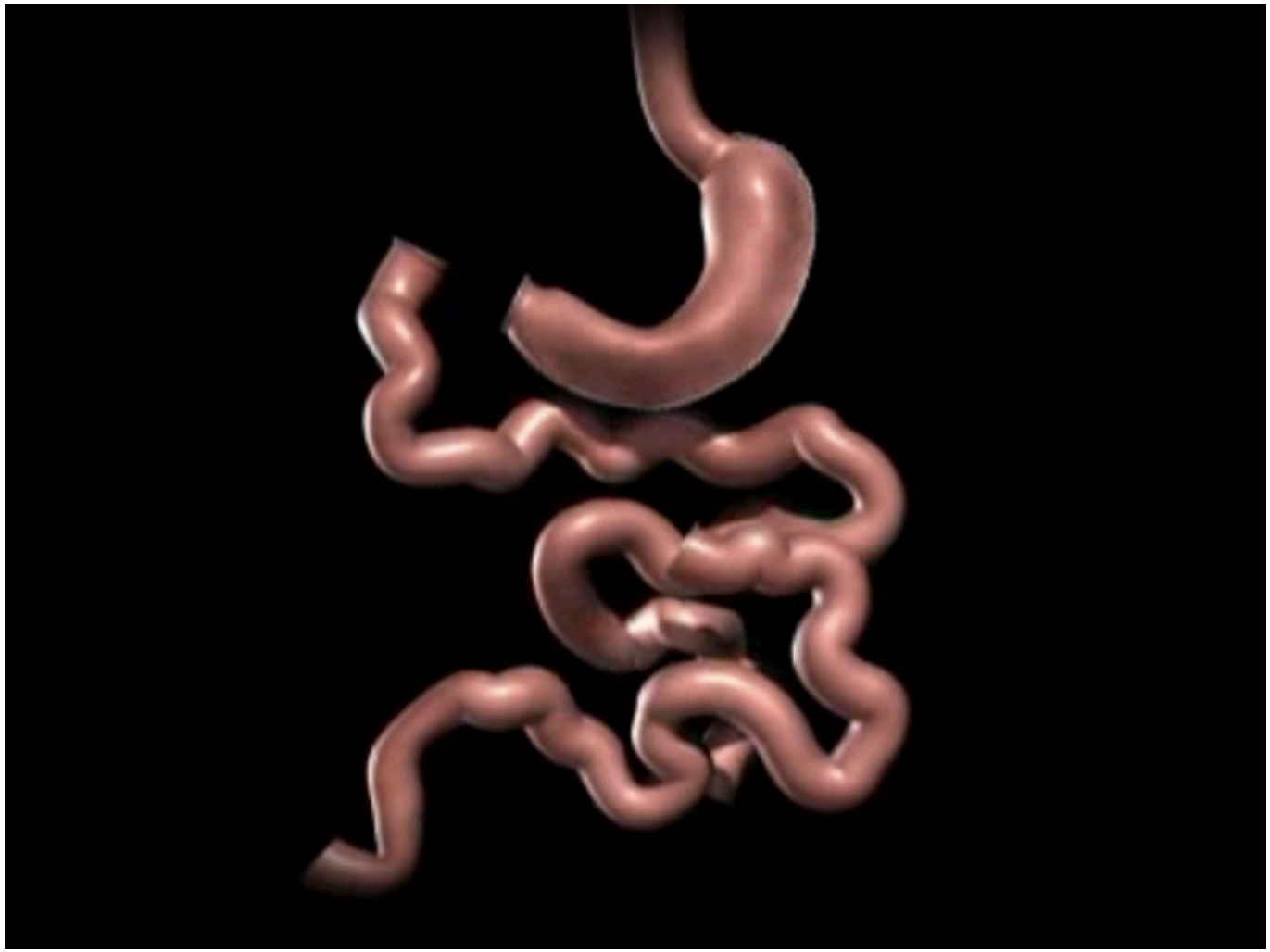
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

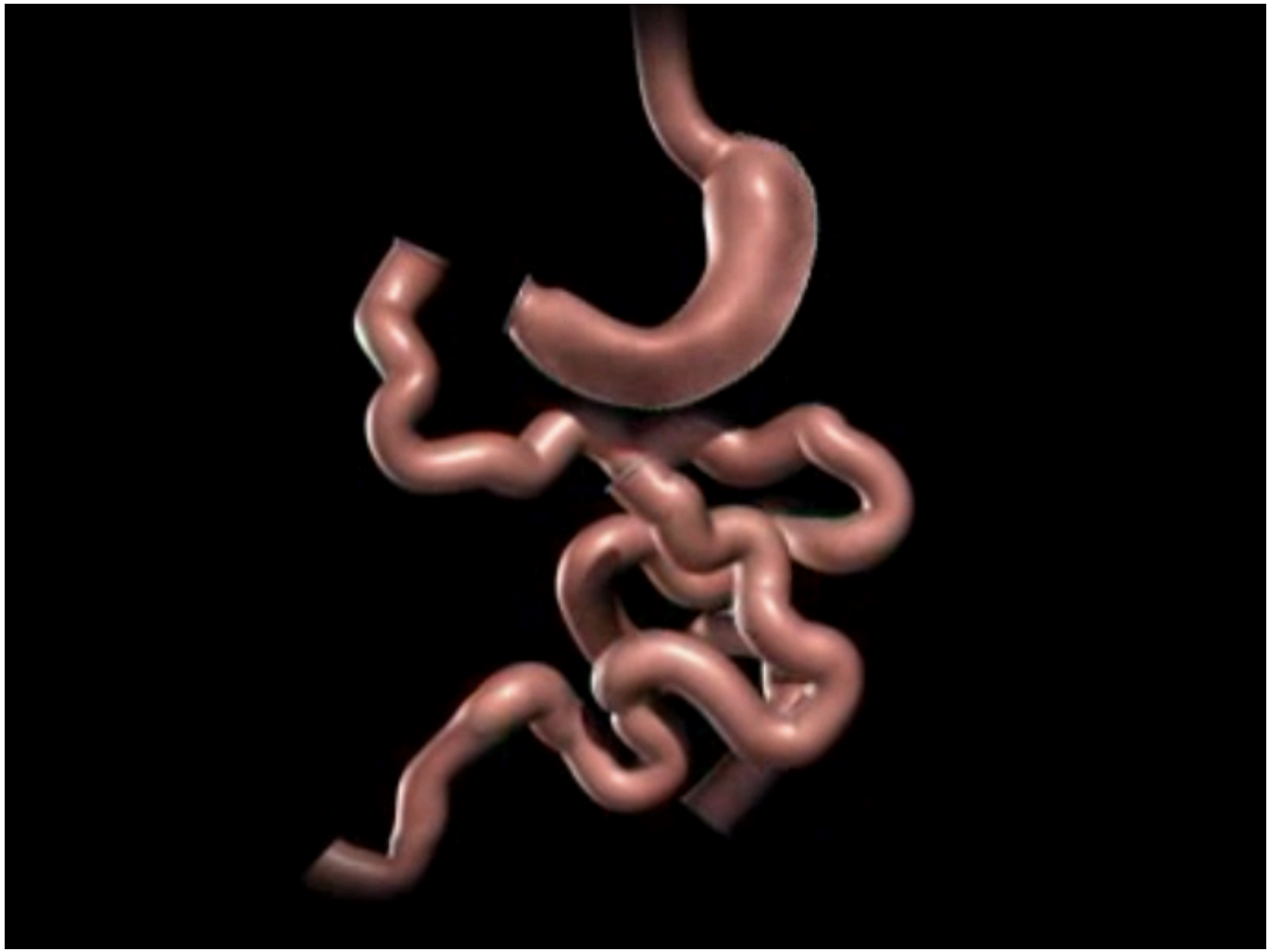
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

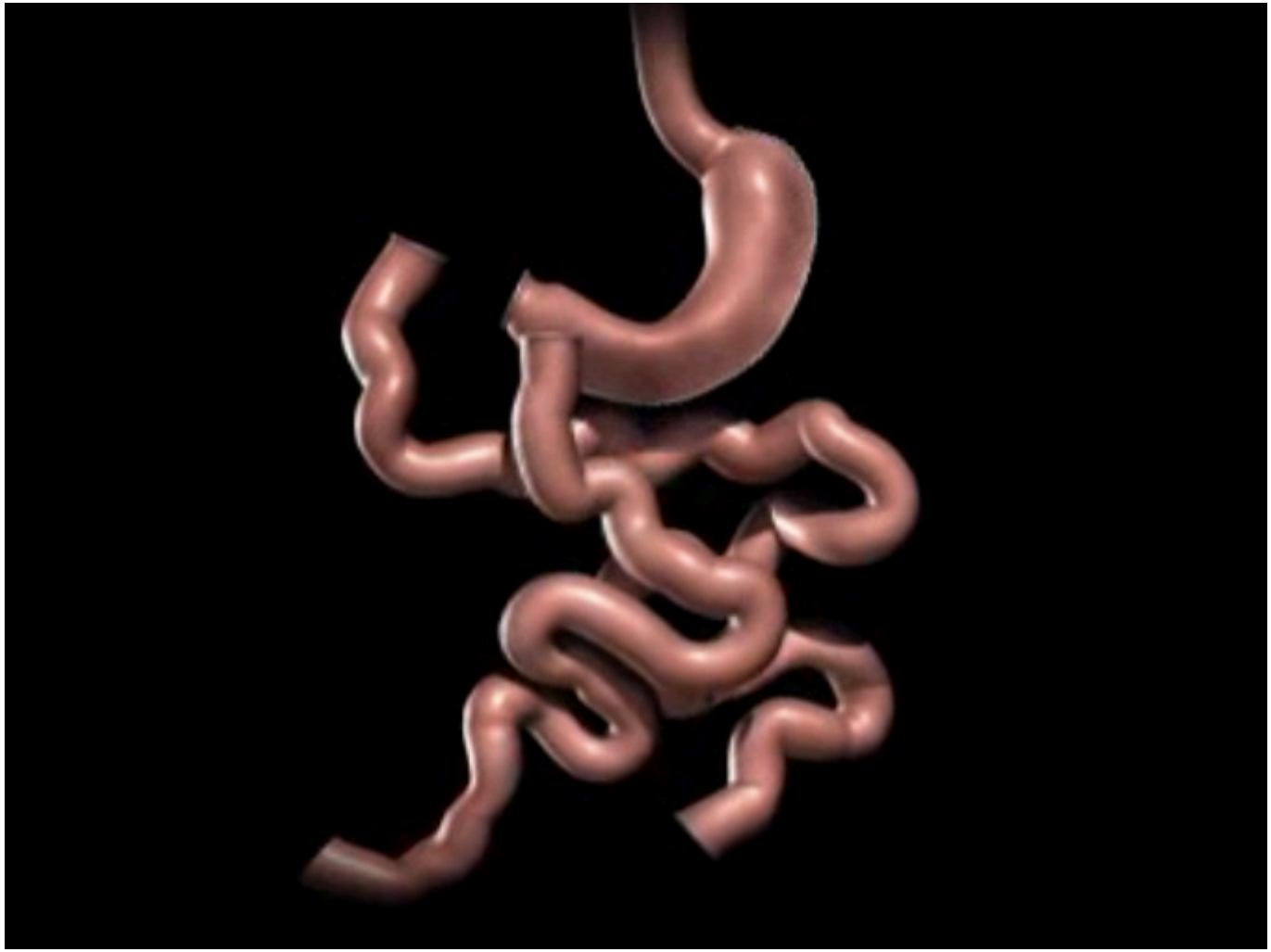
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

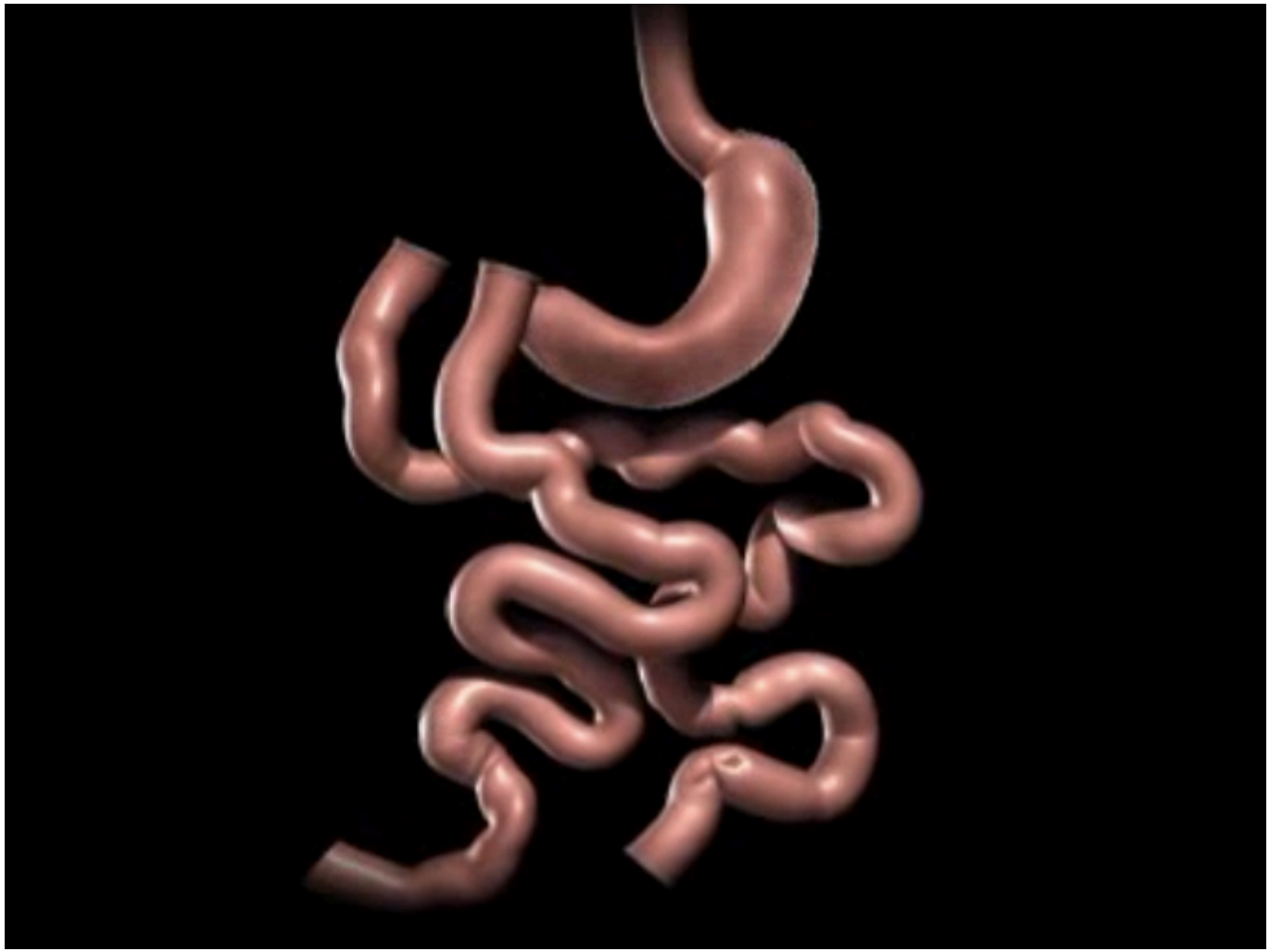
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

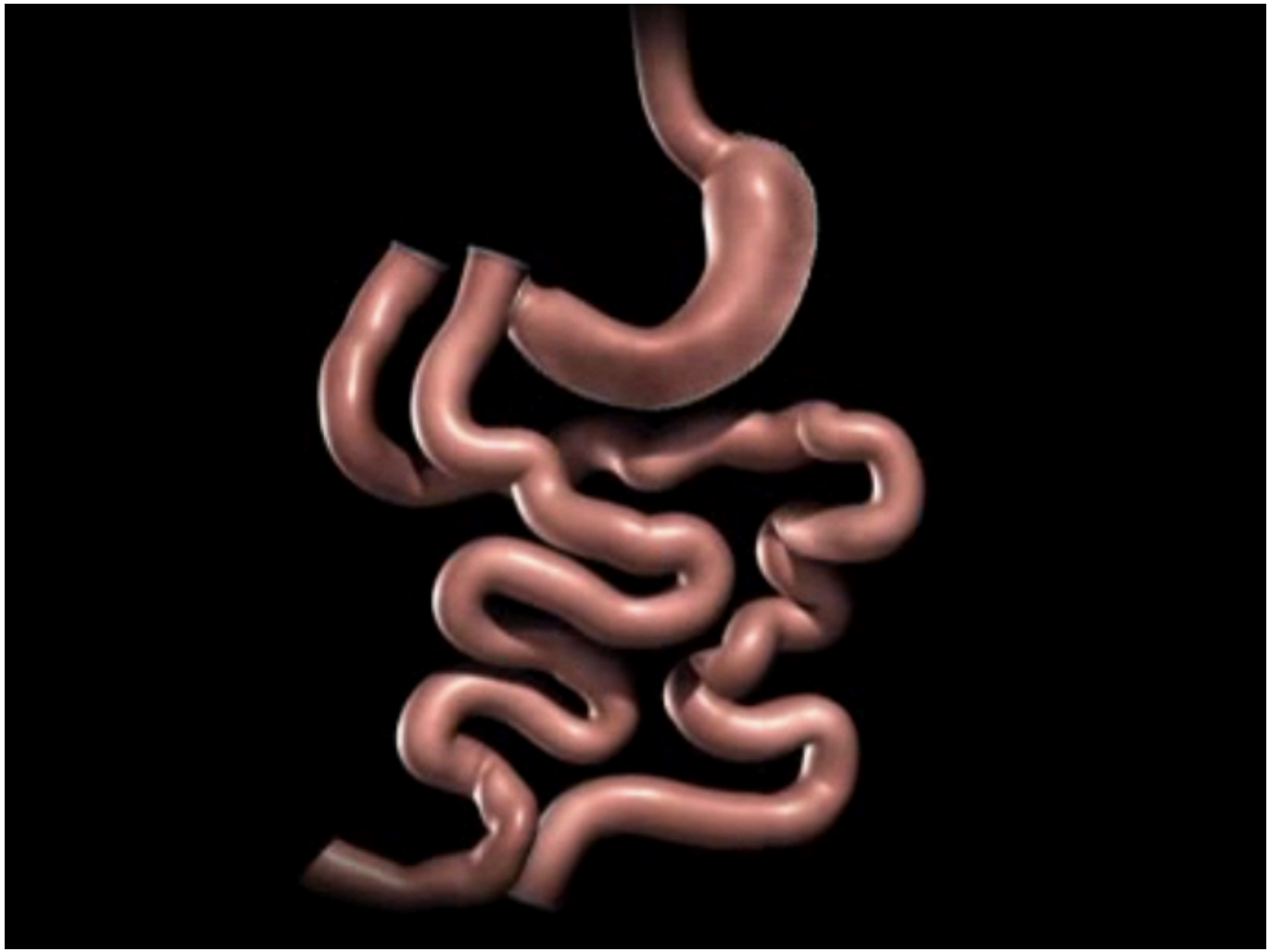
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

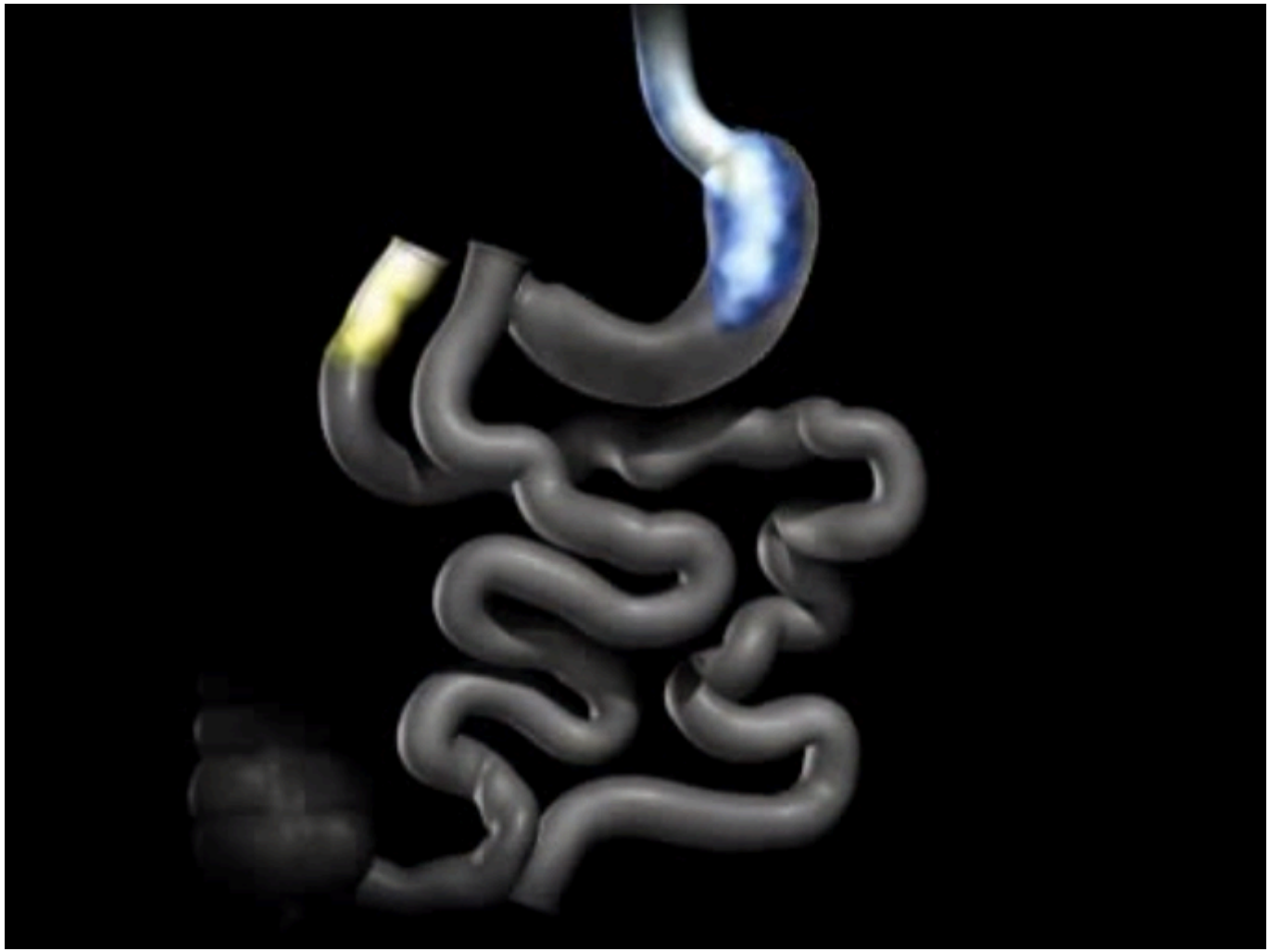
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

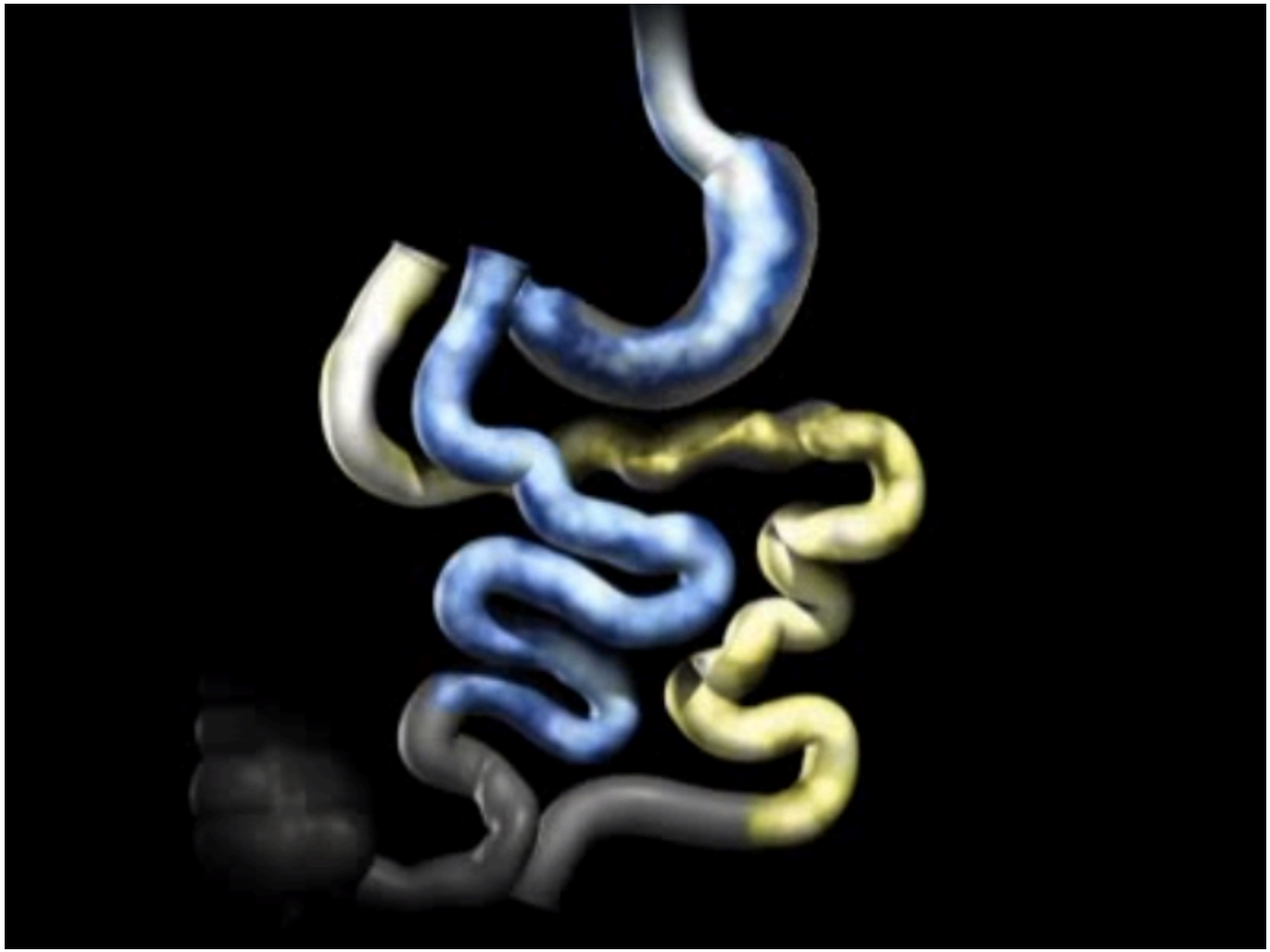
Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

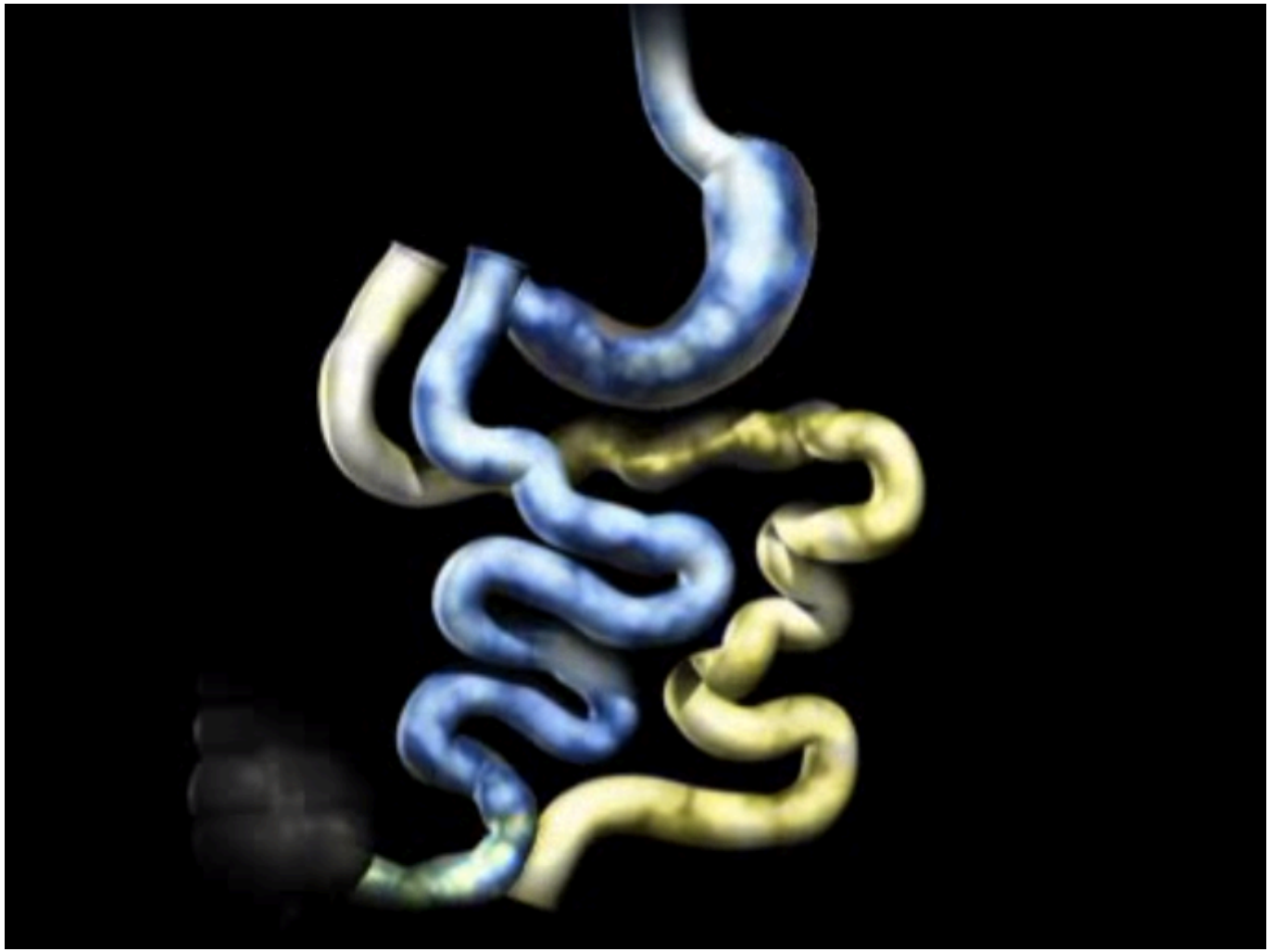
Duodenal switch



www.newlifebariatricsurgery.com

+ Surgical Treatment

Duodenal switch



www.newlifebariatricsurgery.com

Surgical Treatment

Duodenal switch

- Complex surgical technique, which causes malabsorption.
- It is associated with the highest morbidity rate of all bariatric interventions.
- Associated with high rates of readmission for the treatment of complications associated with the procedure (50% more when compared with the Gastric Bypass).
- Hepatic changes after Duodenal Switch have, according to the literature, an occurrence 7 times higher than that may occur after a Gastric Bypass is performed.

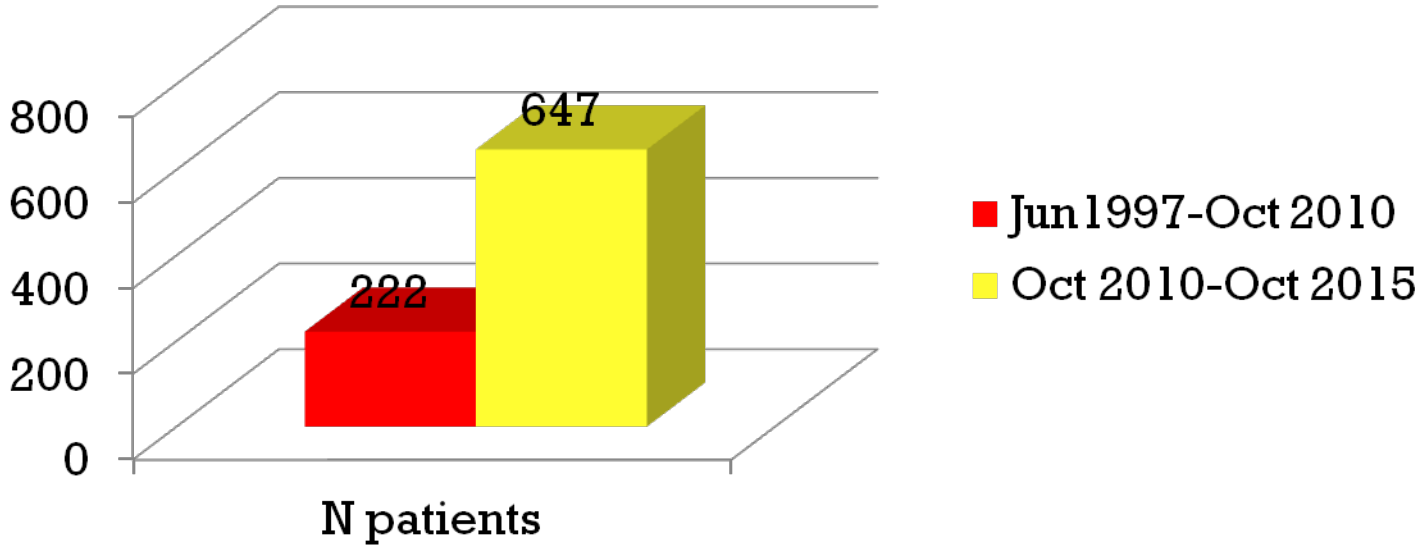
EASC – EMERGENCY ABDOMINAL SURGERY COURSE

14.11.2015

COMPLICATIONS OF BARIATRIC SURGERY

INTRODUCTION

- As the number of bariatric operations increases, the complications arising from these procedures increase accordingly.



Patients operated in our Institution

INTRODUCTION

- **The risk of complications and mortality is associated with certain controllable factors common to other patients and procedures:**
  - **Older age**
  - **Presence of associated systemic diseases**
  - **Prior surgeries**
  - **Experience of the surgeon**
  - **Volume of the center**
  - **Experience of the institution concerning ability to make early diagnosis and intervention.**

INTRODUCTION

- **On the basis of the published clinical series of bariatric surgery, the complications can be classified, as**
  - **Perioperative (up to 30 days after de operation)**
  - **Immediate postoperative (up to six months)**
  - **Late complications (after six months)**

In addition, based on the severity of the complication, it can be classified as:

- **Major (requiring reoperation or resulting in death)**
- **Minor**

INTRODUCTION

- **Clavien-Dindo Simplified Classification of Surgical Complications**
- GRADE I
  - Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic or radiological interventions.
- GRADE II
  - Complications requiring pharmacological treatment, blood transfusion or PTH.
- GRADE III
  - Surgical, endoscopic or radiological intervention required.
- GRADE IV
  - Life-threatning complications requiring intermediate/intensive unit care.
- GRADE V – Death of the patient.

PERI AND POSTOPERATIVE COMPLICATIONS

1. FISTULA

- **Classification**
  - **Early** — **appearing 1- 4 days following surgery**
  - **Intermediate** — **appearing 5- 9 days following surgery**
  - **Late** — **appearing 10 or more days following surgery**

Cendes A, et al: Conservative management of anastomotic leaks after 557 open gastric Bypasses. Obes Surg 2005; 15: 1252-1256

PERI AND POSTOPERATIVE COMPLICATIONS

1. FISTULA

- **Classification**
- **Regarding the clinical relevance and extent of dissemination:**
  - **Type I (or subclinical) – well localized without dissemination into pleural or abdominal cavity and without any sistemic clinical manifestations, usualy easy to treat conservatively.**
  - **Type II – leaks with dissemination into abdominal or pleural cavity, or the drains with consequent severe and systemic clinical manifestations.**

Burgos AM et al: Gastric leak after laparoscopic sleeve gastrectomy fpr obesity. Obes Surg 2009; 19: 1672-1677

PERI AND POSTOPERATIVE COMPLICATIONS

1. FISTULA

- **The leak rate after Sleeve Gastrectomy can vary between 1% to 3% for the primary procedure and more than 10% in revision procedures.**

(Fuks D et al. Results of laparoscopic Sleeve gastrectomy: a prospective study in 135 patients with morbid obesity. Surgery 2009; 145:106-113)

Lacy A et al. Revisional Surgery after Sleeve Gastrectomy. Surg Laparosc Endosc Percutan Tech 2010; 20: 351-356

PERI AND POSTOPERATIVE COMPLICATIONS

1. FISTULA - Causes

- **MECHANICAL**
  - **Stappler misfiring**
  - **Improper choice of the size of stapler's height**
  - **Direct tissue injuries (usually appearing within 2 days)**

  - **Distal obstructions and stenosis (late leaks)**
  - **Intraluminal hypertension**
  - **Twisted gastric pouch**
  - **Narrowing at the angularis nicisure**

PERI AND POSTOPERATIVE COMPLICATIONS

1. FISTULA - Causes

- **<u>ISCHEMIC</u> (usually appear on day 5-7 postoperatively)**
  - **Improper vascularization due to aggressive dissection**
  - **Thermal injuries**
  - **Inadvertent stappler usage**

PERI AND POSTOPERATIVE COMPLICATIONS

1. FISTULA - Diagnostic

- **Early detection is critical**
- **High index of suspition is the cornerstone**

PERI AND POSTOPERATIVE COMPLICATIONS

1. FISTULA - Diagnostic

- **Clinical presentation can vary between assymptomatic patients to the signs and symptoms of a septic shock:**
  - **Fever**
  - **Tachycardia**
  - **Hypotension**
  - **Abdominal pain**
  - **Leucocytosis**

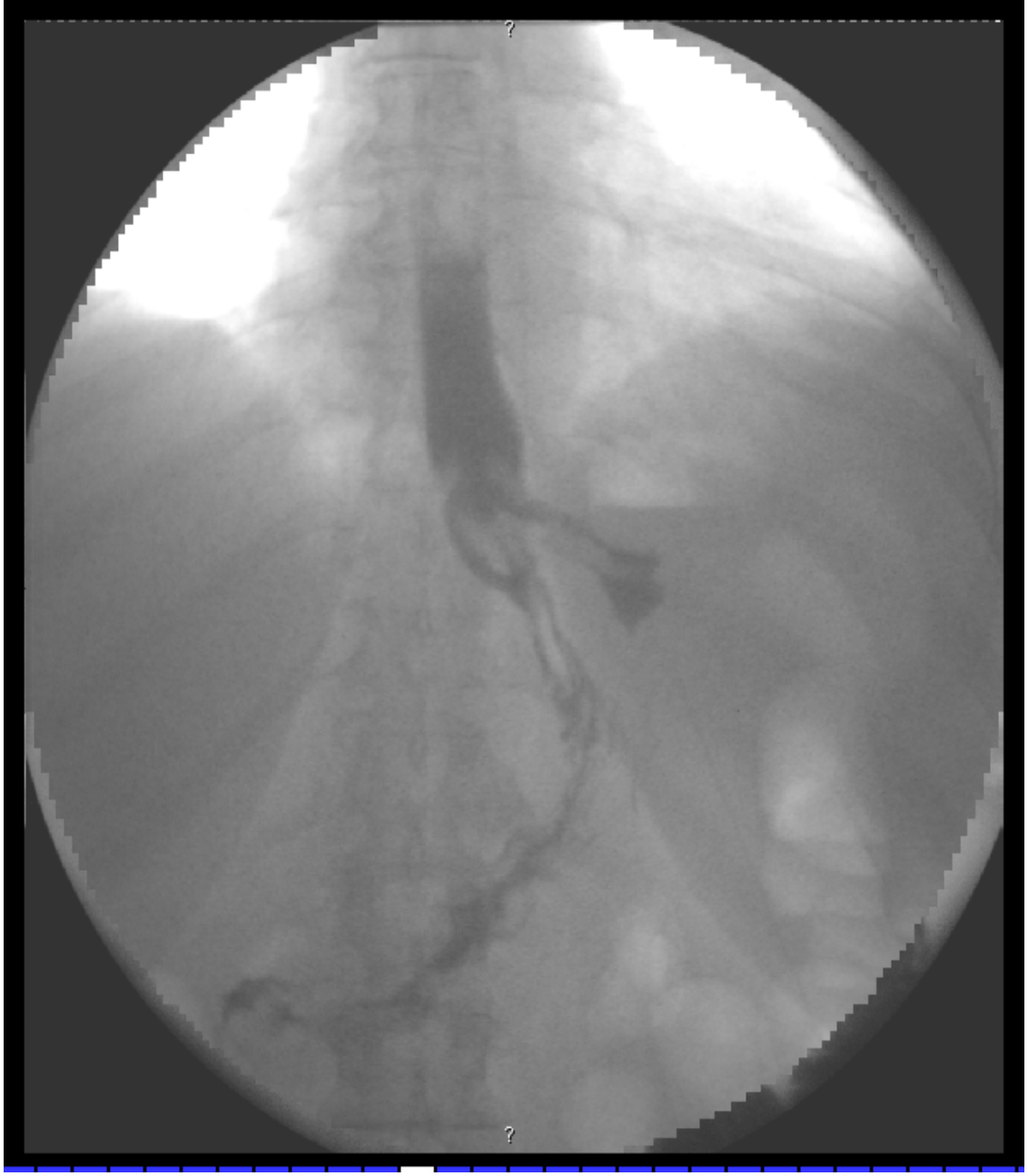
  - **Appearance of the draining fluid (pus, bilious, enteric)**
  - **Extravasation of dye administered orally (methylene blue test)**

  - **Laboratory studies are neither sensitive nor specific**

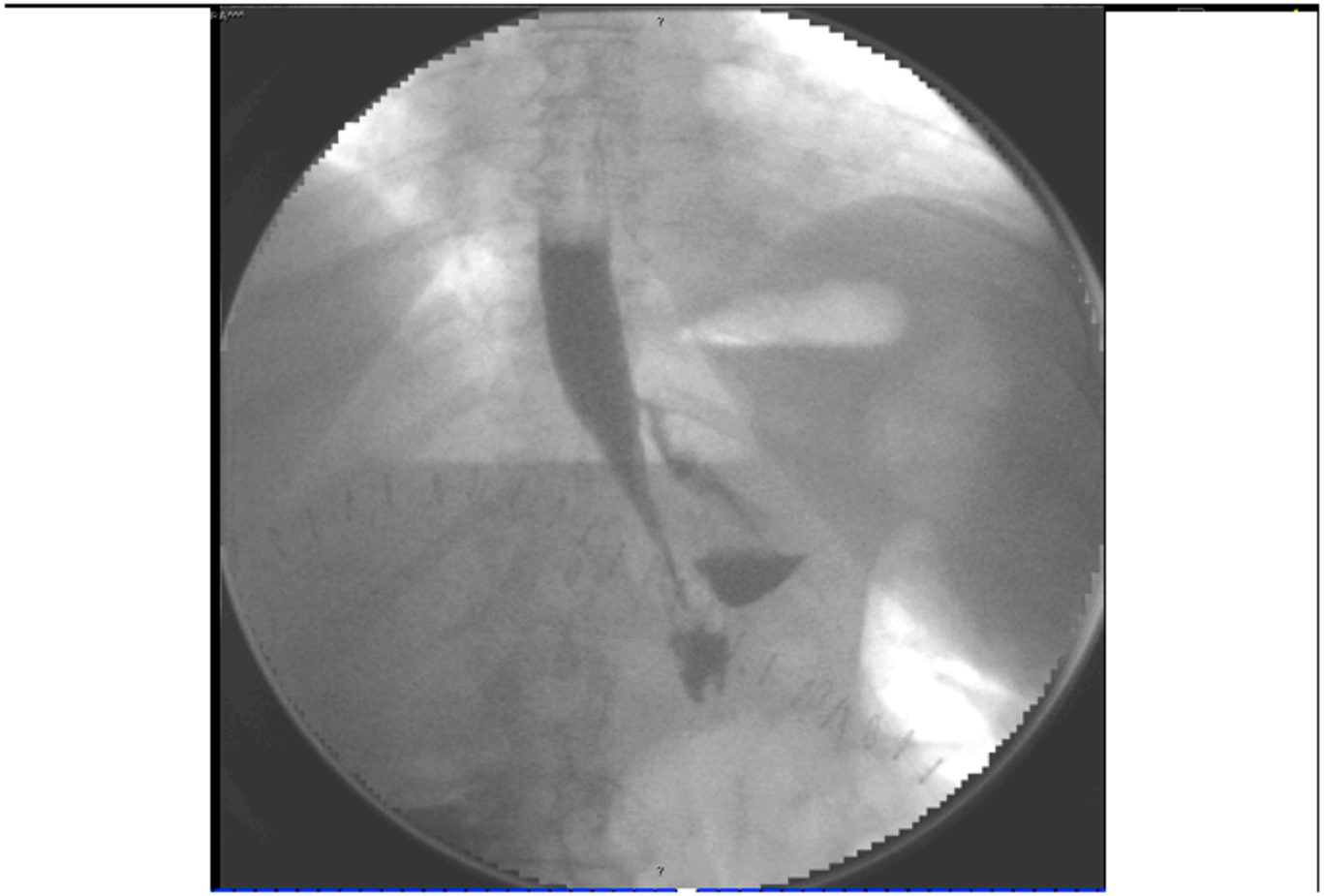
PERI AND POSTOPERATIVE COMPLICATIONS

1. FISTULA - Diagnostic

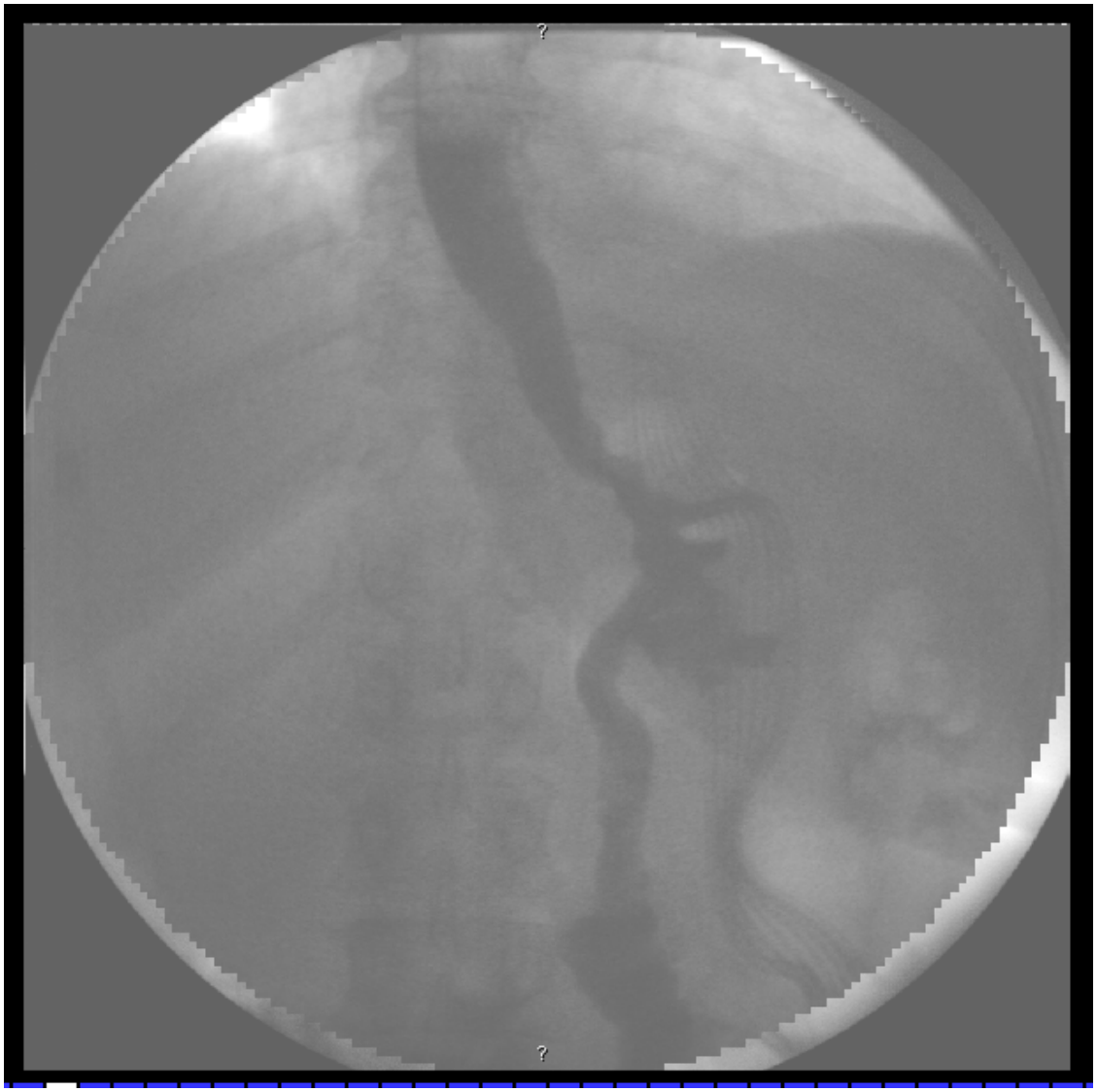
- **Computed tomography with IV and PO contrast is considered to be the best imaging modality for the detection and confirmation of a gastric leak with a detection rate of 86%.**
- **Upper gastrointestinal radiography**
- **Early postoperative leak tests wiyh methylene blue and gastrografin are recommended although they are shown neither specific nor sensitive by retrospective reviews.**
- **A normal test cannot rule out a fistula and may cause delay in diagnosis.**



Fistula after Sleeve



Fistula after Sleeve



Fistula after Bypass

PERI AND POSTOPERATIVE COMPLICATIONS

1. **FISTULA** - Treatment

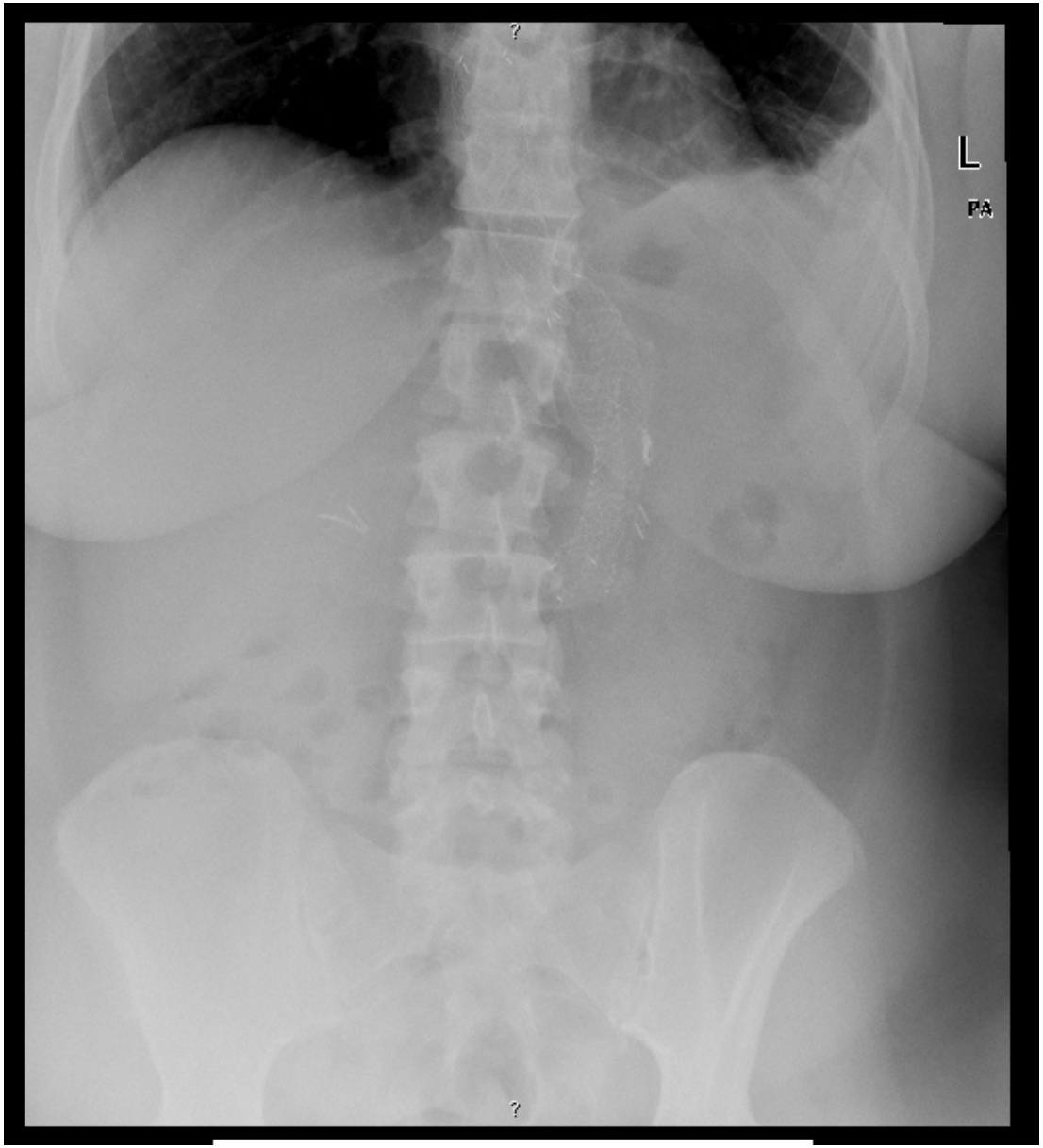
- **Urgent treatment – Reoperation (dependidng on the inicial procedure)**
  - **Immediate surgical interventionin in unstable patients with washout drainage and, if possible, suture (Early oversewing?)**
  - **Roux – Y limb**
  - **total gastrectomy**
  - **Braun anastomosis**

PERI AND POSTOPERATIVE COMPLICATIONS

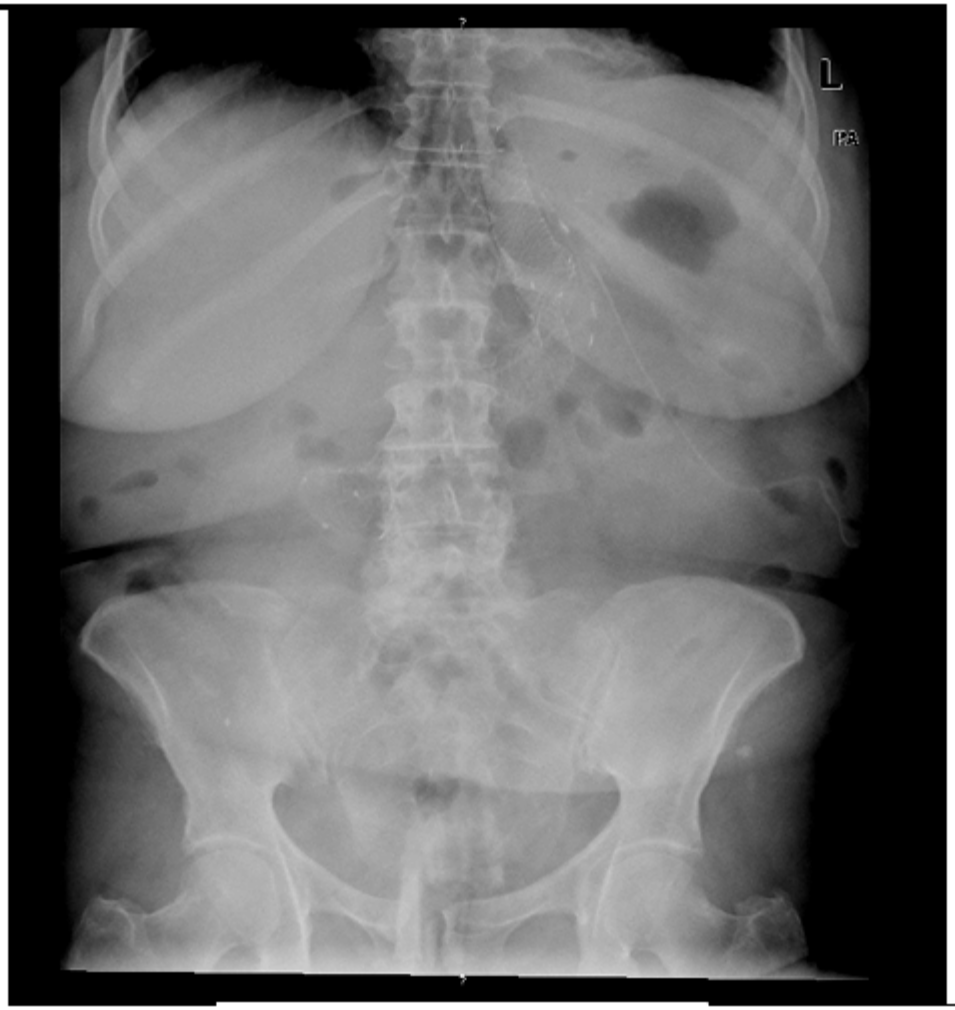
1. FISTULA - Treatment

- **For clinically stable patient**
  - **Adequate hydration**
  - **Proton pump inhibitors**
  - **Nil per os**
  - **Nutritional support**
  - **Percutaneous drainage of any collection**
  - **Broad spectrum antibiotics**

  - **Endoprothesis**
  - **Endoscopic clipping**
  - **Fibrin glue application**



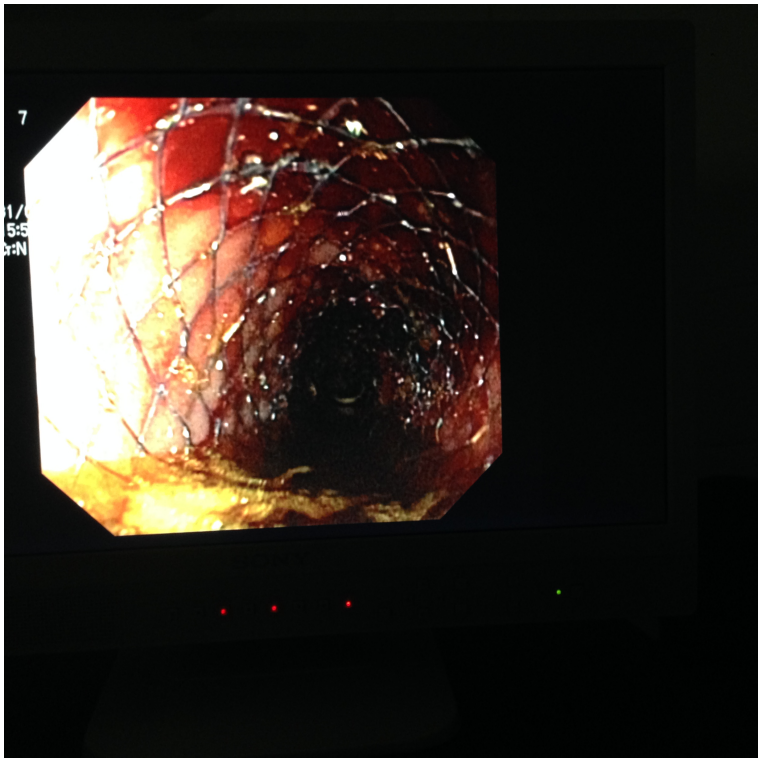
Endoprothesis

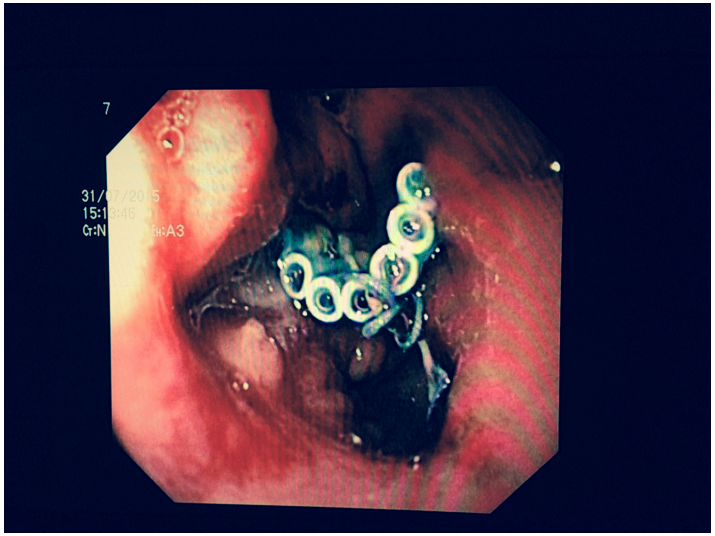


Endoprothesis

PERI AND POSTOPERATIVE COMPLICATIONS

Endoprothesis

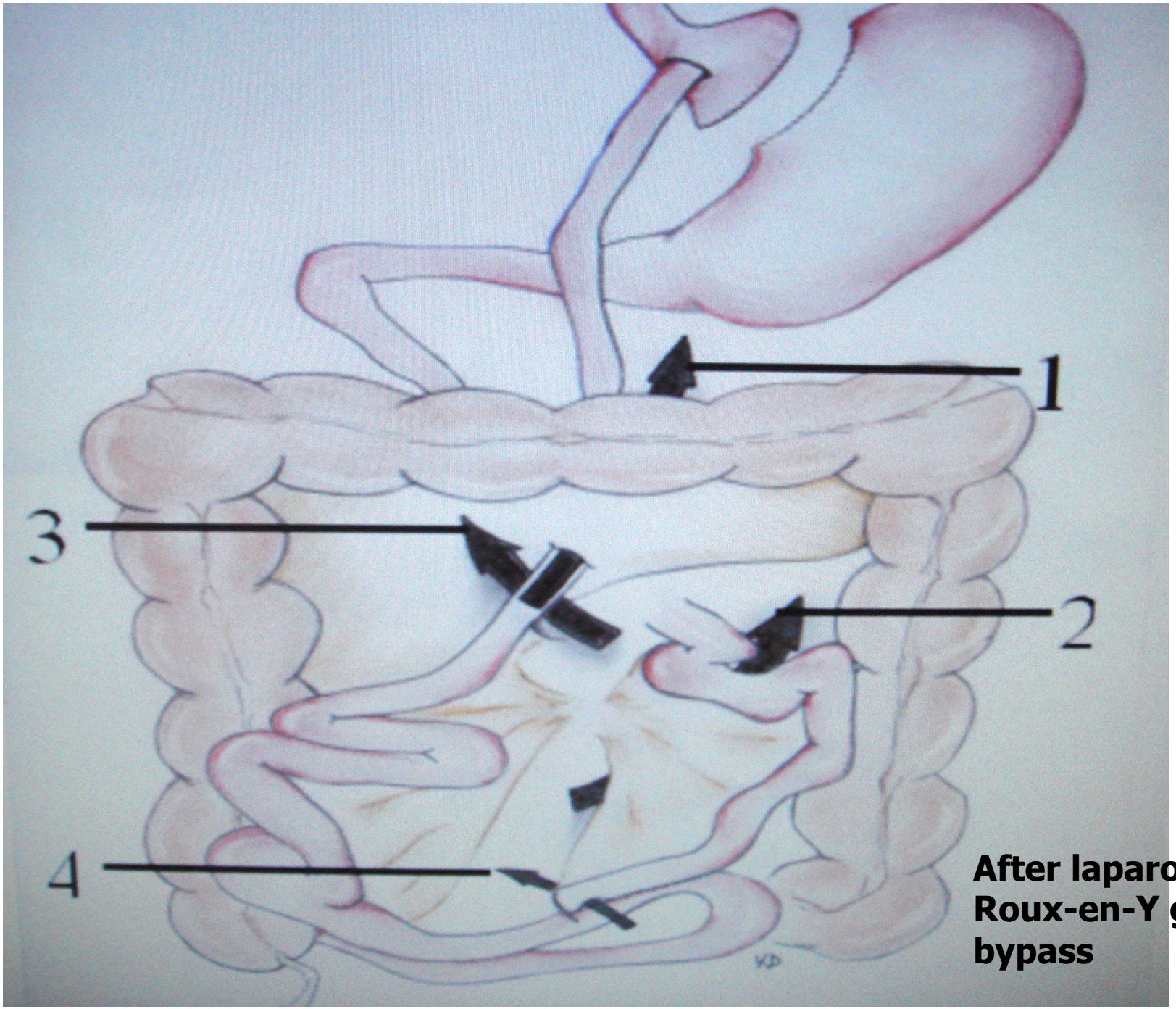




PERI AND POSTOPERATIVE COMPLICATIONS

2. INTESTINAL OBSTRUCTION AND INTERNAL HERNIA

- **Incidence 1-9%**
  - **Elevated gastric drainage from nasogastric tube**
  - **Nausea, vomiting**
  - **Abdominal distension and pain**
  - **Dehydration, tachycardia, electrolyte imbalance.**
- **After laparoscopic Roux-en-Y gastric bypass**
  - **Peterson's hernia (most common) -** The Petersen's space is the opening between the transverse mesocolon and the mesentery of the Roux limb
  - **Jejuno-jejunal hernia -** it is located between the jejunojejunostomy and the extremity of the biliopancreatic limb without mesentery involvement
  - **Mesojejunal hernia -** Small bowel loops prolapse through the entero-enterostomy mesenteric defect



After laparoscopic Roux-en-Y gastric bypass

PERI AND POSTOPERATIVE COMPLICATIONS

2. INTESTINAL OBSTRUCTION AND INTERNAL HERNIA

- **Early intestinal obstructions at entero-entero anastomosis:**
  - **Angulation**
  - **Edema**
  - **Formation of early adhesions**

PERI AND POSTOPERATIVE COMPLICATIONS

2. INTESTINAL OBSTRUCTION AND INTERNAL HERNIA

- **Conservative measures – nil per os, nasogastric drainage, electrolyte and fluid replacement, intestinal rest.**
- **Difficulties in detecting internal herniation with standard imaging techniques**
- **Potentially catastrophic risk of a missed diagnosis:**
- **Surgical exploration (laparoscopic or open)**

PERI AND POSTOPERATIVE COMPLICATIONS

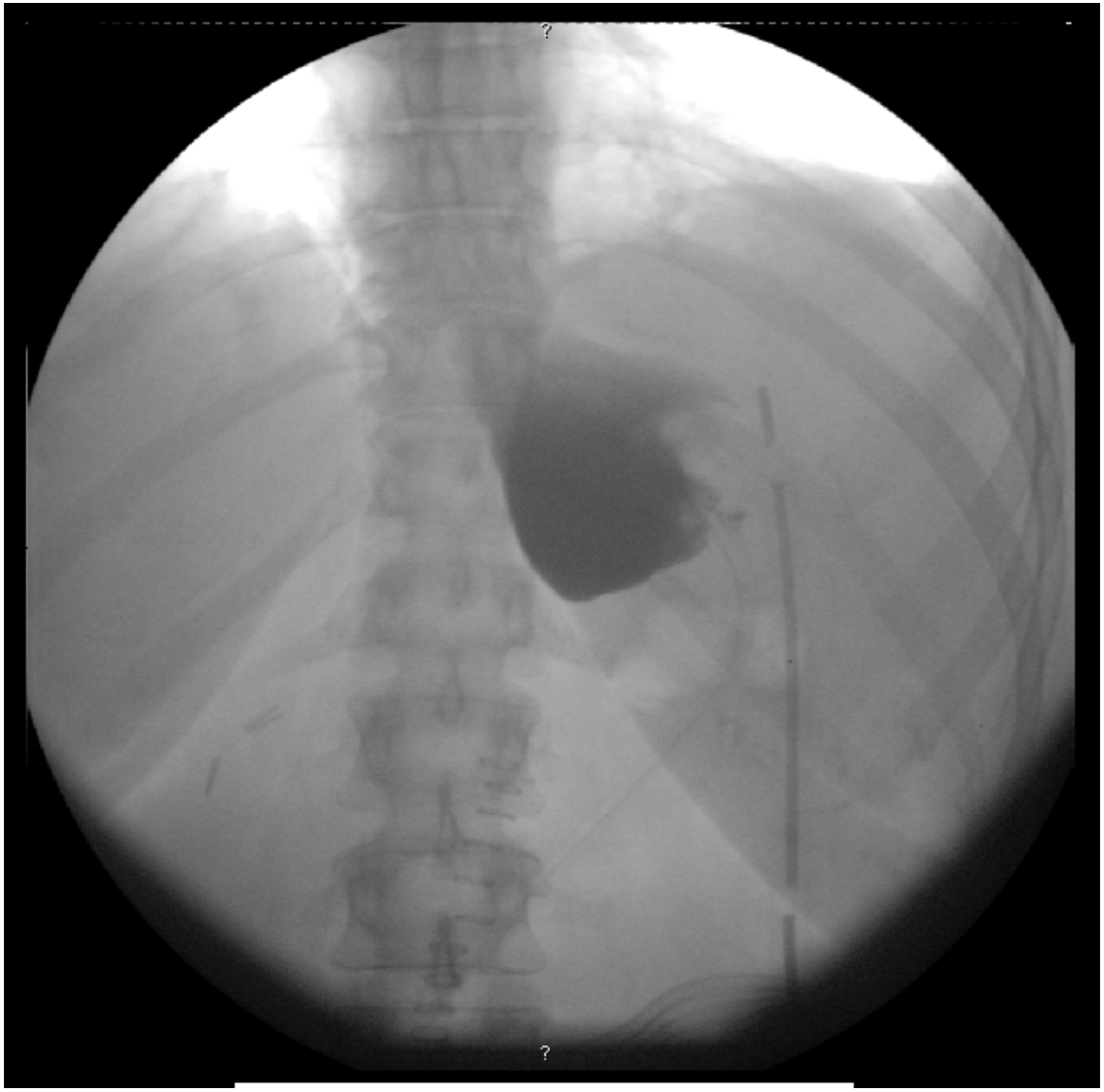
3. BLEEDING

- **The origin may be**
  - **Intraluminal – hematemesis, melena**
  - **Intraperitoneal: bleeding from abdominal drains – staple lines**
- **It may be minor – conservative measures are enough**
- **It may require blood transfusions**
- **Or even reexploration to be fixed**

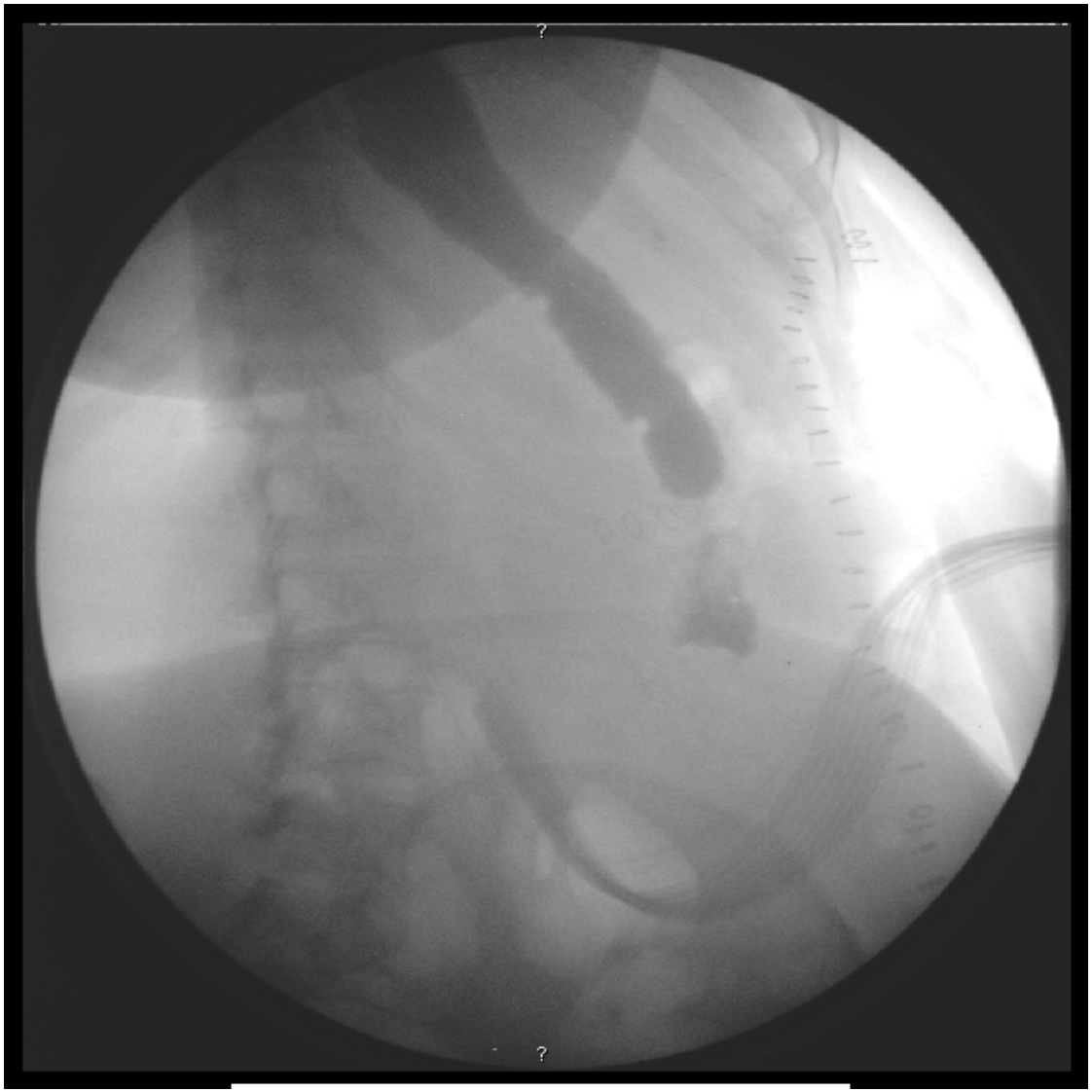
PERI AND POSTOPERATIVE COMPLICATIONS

4. STRICTURE

- **The mostly seen is stenosis of the gastrojejunal anastomosis (gastric bypass)**
- **After Sleeve gastrectomy, the incidence is around 3,5%**
  - **May require revision surgery**
  - **Mostly induced by scar retraction**
  - **The incisura angularis is the greatest potential place for stricture development**
  - **Related to the size of calibration tube**
  - **Multiple endoscopic baloon dilation may be successful**



After Bypass



After Sleeve

PERI AND POSTOPERATIVE COMPLICATIONS

5. WOUND INFECTIONS

- **It includes the presence of :**
  - **Cellulitis**
  - **Peri-incisional necrosis**
  - **May require hospitalization**
    - **IV antibiotics and/or surgical debridement**
- **It may evolve, especially in diabetics, to necrotizing fasciitis**
- **With laparoscopic approach the incidence of severe wound complications is currently decreasing.**

PERI AND POSTOPERATIVE COMPLICATIONS

6. OTHER COMPLICATIONS

- **PULMONARY EMBOLISM (0,05% - 1%)**
  - **Mortality associated with PTE has been has high as 75%**
  - **Prophylaxis of deep venous thrombosis – elastic stockings, early ambulation and antithrombotic drug until postoperative day 21.**
  - **Clinical presentation usually consists of respiratory failure**
  - **Diagnosis confirmed by CT Angiography.**

PERI AND POSTOPERATIVE COMPLICATIONS

6. OTHER COMPLICATIONS

- **ANASTOMOTIC ULCER**
  - **After gastric bypass (0,6%-16%)**
  - **Reduced local blood flow, anastomotic tension, Helicobacter Pylori infection, exposition to undiluted acid juice produced by the gastric pouch**
  - **Clinical features: pain, lack of appetite, abnormal weight loss, nausea, vomiting, anemia, even fistula**
  - **1/3 th of patients will need surgical revision:**
    - **Correction of large gastric pouches**
    - **Gastrogastric fistulas**
    - **Local ischemia caused by tension.**

PERI AND POSTOPERATIVE COMPLICATIONS

6. OTHER COMPLICATIONS

- **RHABDOMYOLISIS**
  - **Clinical and biochemical syndrome varying from asymptomatic increase of muscle enzymes, to acute renal failure, compartment syndrome, and even death.**
  - **Produced by injury and necrosis of skeletal muscles with release of intracellular toxic substances into circulation.**
  - **Incidence not clear (1,4% - 75% ??)**
  - **Early diagnosis essential.**
  - **Signs and symptoms usually reported during the first 24 h after the injury – reddish-brown urine, gluteal and back pain, oliguria. Must be confirmed - a five-fold elevation of serum CK level is considered diagnostic.**
  - **Acute renal failure in rhabdomyolisis patients occurs in 20-50% with a mortality of 20%.**
  - **Once detected - Vigorous fluid administration and forced diuresis.**

LATE COMPLICATIONS

- **ABDOMINAL WALL COMPLICATIONS**
  - **Incisional hernia of open approach**
  - **Trocar or port site hernia (1-6%)**
    - **Bowel or omentum incarceration, intestinal obstruction or perforation**

LATE COMPLICATIONS

- **CHOLELITHIASIS**
- **Obesity and rapid weight loss are known risk factors for gallstone formation.**
- **Asymptomatic gallstones range are reportes in 26,5% in gastric banding patients though only 6,8% of patients become symptomatic gallstones postoperatively.**
- **Asymptomatic gallstones range from 30 to 53% after 6 to 12 months postoperatively whilst symptomatic gallstones occur by 7-16% in Roux-en-Y bypass patients.**

LATE COMPLICATIONS

- NUTRICIONAL DEFICIENCES

Obrigado pela atenção!