Malabsorptive Bariatric Procedures R-en-Y, and Biliopancreatic Diversion with the Duodenal Switch

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Disclosures

No conflicts of interest
Objectives

- Understand the main differences between R-en-Y and BPD/DS
- Describe the complications
- Discuss the development of robot assisted bariatric procedures
Types of Obesity Surgery

- Gastric Restrictive
  - Lap band
  - Sleeve Gastrectomy

- Combined mode of action
  - Roux en Y Bypass
  - BPD
  - BPD/DS
Roux-en-Y Gastric Bypass
Surgical Difference

Divided Roux-en-Y Gastric Bypass

BPD/DS
## Surgical differences

<table>
<thead>
<tr>
<th></th>
<th><strong>Roux en Y</strong></th>
<th><strong>BPD/DS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach pouch</td>
<td>(15-30cc)</td>
<td>(150-250cc)</td>
</tr>
<tr>
<td>Gastric outlet</td>
<td>narrow</td>
<td>is unrestricted</td>
</tr>
<tr>
<td>Pylorus</td>
<td>non-functional</td>
<td>functional</td>
</tr>
<tr>
<td>Malabsorption</td>
<td>Less</td>
<td>More</td>
</tr>
<tr>
<td>Procedure</td>
<td>Performed most commonly</td>
<td>Less common</td>
</tr>
<tr>
<td></td>
<td>laparoscopically</td>
<td>More complex</td>
</tr>
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<td></td>
<td></td>
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- **Roux en Y**
  - Stomach pouch (15-30cc)
  - Gastric outlet narrow
  - Pylorus non-functional
  - Less malabsorption
  - Performed most commonly
  - Laparoscopically

- **BPD/DS**
  - Stomach pouch (150-250cc)
  - Gastric outlet is unrestricted
  - Pylorus functional
  - More malabsorption
  - Less common
  - More complex laparoscopically
## Life style differences

<table>
<thead>
<tr>
<th>Roux en Y</th>
<th>BPD/DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity and quality of food more restricted</td>
<td>More normal</td>
</tr>
<tr>
<td>Dumping more common</td>
<td>Incidence very low</td>
</tr>
<tr>
<td>Nausea and vomiting more common</td>
<td>Less common</td>
</tr>
<tr>
<td>Less frequent bowel movements (q OD)</td>
<td>More frequent bowel movements (2-3/day)</td>
</tr>
<tr>
<td>Less foul smelling</td>
<td>More foul smelling</td>
</tr>
</tbody>
</table>
# Metabolic differences

<table>
<thead>
<tr>
<th>Roux en Y</th>
<th>BPD/DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>B12 and iron deficiency more common</td>
<td>Vit A and D deficiency more common</td>
</tr>
<tr>
<td>Oxalate stones less</td>
<td>More</td>
</tr>
<tr>
<td>Long term weight loss 60% of EBW</td>
<td>Weight loss 75% of EBW</td>
</tr>
<tr>
<td>Effective for DM Type 2 (84%), less effective for hypercholesterolemia</td>
<td>Very Effective for DM type 2 (98-99% resolution), more effective for hypercholesterolemia</td>
</tr>
<tr>
<td>Better for GERD</td>
<td>Less effective for GERD</td>
</tr>
</tbody>
</table>
Introduction of Robotics

- FDA approval of da Vinci system for non-cardiac use in July 2000
- We performed our first robot-assisted bowel resection on 18th August 2000 on a 64yr old patient with Crohn’s disease
- First totally intracorporeal BPD/DS in October 2000
- Have now performed more than 300 robot assisted BPD/DS with no mortality
RoboticDS technique

Robotically assisted biliary pancreatic diversion with a duodenal switch: a new technique

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Abstract

Background: Minimally invasive surgical techniques decrease the length of hospitalization and the morbidity for general surgery procedures. Application of minimally invasive techniques to obesity surgery had previously been limited to stapled techniques used primarily for the Roux-en-Y gastric bypass and laparoscopic band placement. The authors present the technique for totally intracorporeal robotically assisted biliary pancreatic diversion with a duodenal switch (BPD/DS) using five ports.

Methods: After development of the technique in animal and human cadaver models, the da Vinci robot was first used in October 2000 to perform BPD/DS using five ports and a totally intracorporeal technique. Patient selection was based on standard surgery guidelines for the morbidly obese.

Results: Two patients have been operated on to date. The biliary pancreatic diversion for weight loss purposes, described by Scopinaro et al. [12], is a combined restrictive and malabsorptive procedure. The stomach capacity usually is restricted to 250 ml by an extended antrectomy. Malabsorption is the result of a distal Roux-en-Y type reconstruction in which a common channel of 50 cm and an alimentary limb of 250 cm are created.

The duodenal switch (DS) operation for bariatric surgery was initially described by Hess and Hess [4] as a modification of the Scopinaro biliary pancreatic diversion (BPD). In this operation, a sleeve gastrectomy, instead of an antrectomy, restricts the stomach capacity to approximately 150 ml and preserves the pylorus and first part of the duodenum. A distal bypass is performed in a manner similar to the Scopinaro BPD.

As a result of this modification, Marcante et al. [7] reported significant weight loss and a decrease in comorbid conditions in a series of 12 patients.
Complications for Laparoscopic Ren Y

- Conversion rate: 2.2%
- GI hemorrhage: 1.93%
- Wound infections: 2.98%
- Injury to other internal organs: not reported
- Pulmonary embolism: 0.41%
- Leaks: 2.05%
- Pneumonia: 0.14%
- Mortality: 0.23%
- Bowel obstruction: 3.15%
- Stomal stenosis: 4.73%
Complications BPD/DS

- Similar to RNY Gastric Bypass but low dumping and marginal ulceration rate
- Side effects specific to BPD/DS include higher chance of Vitamin D deficiency and bowel side effects.
GI related complications

- GI Bleeds
- Gastric outlet Obstruction
- Bowel Obstruction
- Common Bile duct stones
- Chronic nausea/vomiting
- Fistulas
- Marginal Ulcers
- Vitamin and protein deficiency
Marginal ulcers
Obstruction
Bowel Obstruction
Conclusion

- The current bariatric procedures are either restrictive or have a combined restrictive and malabsorptive effect.
- Surgical weight loss is greater with the more severe procedures.
- Weight loss is sustained with excellent resolution of co-morbid conditions.
- Complications both nutritional and surgical are minimized with an experienced team.
- The risks of not having surgery exceed those of having surgery for morbidly obese.
The end