Management of Significant Malnutrition (RYGB and BPD/DS)

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Disclosure

- Consultant and Speaker for BD (Carefusion)
- Speaker for Gore

No conflict with today’s presentation
Management

- Dietary Manipulation
  - Avoid excessive Carbohydrates (dumping-like syndrome)
  - Avoid excessive Fats
  - Active culture yogurt
- Probiotics (3x day x 3 weeks)
- Lomotil
- Pancreatic enzymes and protein shakes while awaiting revision/reversal.
- Fecal fat studies may confirm what is obvious
BPD/DS can be set-up for malnutrition

- Risk of excessive weight loss and malnutrition
  - Narrow gastric pouch (reduced intake capacity)
  - Short common channel and reduction of the length of functional small bowel
  - Poor resorption of bile salts
  - Low protein resorption
  - Reduced intake of fat (and fat-soluble vitamins)
BPD/DS

• Protein-calorie Malnutrition (1-6%) depending on length of common channel, or excessive reduction of stomach size
  • Careful nutritional evaluation and support
  • Enteral/Parenteral nutrition
  • Improve protein stores prior to OR for revision/reversal

• GERD
  • Conversion to RYGB
  • Re-sleeve / repair hiatal hernia
Revision BPD/DS

- Hess et al reported 1404 open BPD/DS, 37 required revision. 22 because of excess weight loss and protein deficiency.
- During a 15 year period 8 reversals (0.6%) were required.
- Complication after revision or reversal (3 late deaths and 15% overall complication rate)
- Revision usually within 18 mos - 2 yrs of original operation
  - Due to protein malnutrition (43-60%)
  - Intractable diarrhea and flatus (30%) decreasing daily BM from 5 to 1
  - Bone demineralization
  - Inability to cope with procedure (unexplained abd pain, recurrent urinary oxalate stones or GERD)
- Reversal rates 0.2-7% (malabsorptive component), usually after failure of revision attempt
  - Complete suppression of malabsorption
  - Increased risk when common channel shorter
  - Increased risk in tighter sleeve
Revision

- Revision rates (reduce the amount of malabsorption)
  - Increase common channel by 50 to 125cm
  - 0.5-4.9% BPD/DS

Fig. 1. Common channel elongation after biliopancreatic diversion with duodenal switch. (A) Initial procedure. (B) Revisional procedure.
Reversal Options

• (B) Proximal side to side anastomosis between BP and alimentary limbs.
• (C) Division of distal alimentary limb and anastomosis near the Ligament of Treitz
• (D) Division of distal alimentary limb and anastomosis to duodenal stump
• (not pictured) Full anatomical reconstruction

Fig. 2. Restoration options after biliopancreatic diversion with duodenal switch. (A) Initial procedure. (B–D) Reversal options.
Table 4
Indications for reversal after biliopancreatic diversion (from Clare WM [14])

<table>
<thead>
<tr>
<th>Medical condition</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic ureteral stones</td>
<td>2.5</td>
</tr>
<tr>
<td>Acute ulcerative colitis</td>
<td>2.5</td>
</tr>
<tr>
<td>Nephrotic syndrome</td>
<td>2.5</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>5.0</td>
</tr>
<tr>
<td>Hyperacidity ulcers</td>
<td>5.0</td>
</tr>
<tr>
<td>Intolerance of stools/odor</td>
<td>5.0</td>
</tr>
<tr>
<td>Anorexia/bulimia</td>
<td>8.0</td>
</tr>
<tr>
<td>Disturbance of bone metabolism</td>
<td>8.0</td>
</tr>
<tr>
<td>Nausea/hyperemesis syndrome</td>
<td>16</td>
</tr>
<tr>
<td>Protein malnutrition/anemia</td>
<td>43</td>
</tr>
</tbody>
</table>
### Table 1
Incidence of revision and reversal after biliopancreatic diversion

<table>
<thead>
<tr>
<th>Surgery type</th>
<th>Nb patients</th>
<th>Initial BMI (kg/m²)</th>
<th>AL/CC (cm)</th>
<th>Stomach size</th>
<th>Revision type</th>
<th>Incidence</th>
<th>Indication</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltasar [8]</td>
<td>125</td>
<td>65% ≥ 50</td>
<td>250/75</td>
<td>40F bougie</td>
<td>“Conversion”</td>
<td>2.5%</td>
<td>Liver failure</td>
<td>2 deaths</td>
</tr>
<tr>
<td>Biertho [6]</td>
<td>1000</td>
<td>51 ± 8</td>
<td>250/100</td>
<td>—</td>
<td>CC elongation by 100 cm Reversal</td>
<td>.5%</td>
<td>Protein malnutrition diarrhea</td>
<td>FU 2 yr 2 feeding jejunostomy</td>
</tr>
<tr>
<td>Clare [14]</td>
<td>504</td>
<td>—</td>
<td>250/50</td>
<td>200 mL</td>
<td>—</td>
<td>7%</td>
<td>43% protein malnutrition</td>
<td></td>
</tr>
<tr>
<td>Dolan [11]</td>
<td>73</td>
<td>44.8</td>
<td>250/50</td>
<td>—</td>
<td>CC elongation by 100 cm Reversal</td>
<td>.5%</td>
<td>Excessive weight loss</td>
<td>Median FU 28 mo</td>
</tr>
<tr>
<td>Hamou [10]</td>
<td>61</td>
<td>250/100–75–50</td>
<td>—</td>
<td>CC elongation by 100 cm Reversal</td>
<td>.4%</td>
<td>60% protein malnutrition</td>
<td>At a median 17 mo</td>
<td></td>
</tr>
<tr>
<td>Hess [9]</td>
<td>1000</td>
<td>50.9</td>
<td>250–325/50–100</td>
<td>40F</td>
<td>CC elongation by 100 cm Reversal</td>
<td>.3%</td>
<td>22/30 excessive weight loss malnutrition</td>
<td>FU 10 yr</td>
</tr>
<tr>
<td>Michielsen [12]</td>
<td>33</td>
<td>49.5</td>
<td>50% small bowel/50 mL</td>
<td>—</td>
<td>—</td>
<td>.6%</td>
<td>Bone disease</td>
<td>FU 6–36 mo</td>
</tr>
<tr>
<td>Marceau [2]</td>
<td>1423</td>
<td>51.5 ± 9.9</td>
<td>250/100</td>
<td>65% sleeve Reversal</td>
<td>.7%</td>
<td>Malnutrition/diarrhea</td>
<td>FU 7.3 yr</td>
<td></td>
</tr>
<tr>
<td>Scopinaro [13]</td>
<td>1639</td>
<td>47</td>
<td>250/50</td>
<td>200–500 mL</td>
<td>CC elongation by 150 cm Reversal</td>
<td>.4%</td>
<td>Excessive weight loss malnutrition</td>
<td>FU 19 yr</td>
</tr>
<tr>
<td>Marceau [7]</td>
<td>248</td>
<td>46.4 ± 8.7</td>
<td>250/50</td>
<td>—</td>
<td>CC elongation by 50 cm Reversal</td>
<td>18.5%</td>
<td>Malnutrition diarrhea</td>
<td>FU 10 yr</td>
</tr>
<tr>
<td>Marceau [7]</td>
<td>438</td>
<td>49.5 ± 9.6</td>
<td>250/100</td>
<td>—</td>
<td>CC elongation by 60 cm Reversal</td>
<td>2.7%</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

FU = follow-up; CC = common channel; F = French units; BPD = biliopancreatic diversion (Scopinaro procedure); BPD-DS = biliopancreatic diversion with duodenal switch; BMI = body mass index.
LRYGB

• Reversal indications Rare:
  • Severe intractable N/V
  • Excessive weight loss
  • Psychological issues
  • Chronic pain
  • Recurrent anastomotic ulceration
  • Malnutrition (due to one of above)

• Neuroglycopenia
• Hyperinsulinemic hypoglycemia (nesidioblastosis)
• Recalcitrant hypocalcemia with hypoparathyroidism
• Severe malnutrition
• After abdominal catastrophe (internal hernia with loss of significant small bowel)
Anaemia and related nutrient deficiencies after Roux-en-Y gastric bypass surgery: a systemic review and meta-analysis

Weng et al. BMJ Open 2015

• Derangement after RYGB
  • Anemia 12.2% baseline increased to 20.9% and 25.9%, @ 12 and 24 mos respectively (based on H/H levels no significant change in Iron levels)
  • Ferritin Def 7.9% baseline to 13.4% and 23%, @ 12mos and 24 mos respectively.
  • Vit B12 2.3% baseline to 6.5% at 12 mos.

• Reasons for reversal
  • Malnutrition (12.3%)
  • Severe Dumping Syndrome (9.4%)
  • Post prandial hypoglycemia (8.5%)
  • Excessive weight loss (8.5%)

• 35 articles encompassing 100 reversal patients

• Method of reversal
  • G-G anastomosis
    • Hand sewn (67.4%)
    • Linear stapler (23.2%)
    • EEA Stapler (6.9%)
    • Endoscopic technique (6.9%)
  • Roux Limb handling (when described)
    • Reconnection of distal BP to prox Roux (57.2%)
    • Resection of Roux (42.8%)

• Post-reversal events
  • Weight regain (28.8%)
  • Severe GERD (10.2%)
  • Persistent Abd Pain (6.8%)
Reversal RYGB Video
Malnutrition after SIPS

- Cottam reported two patients needing common channel lengthening after SIPS and described technique.
Revision SIPS video
Thank You

• Questions?