Management of Weight Regain
Clinical Case Post Bariatric Surgery

Case Study Teaching Workshop
The case of Rosella

Age: 56 years  
BMI: 37.3 kg/m²

T2DM in metformin  
Mild depression in the past

Long-standing obesity  
Regular eating at meals  
Sometimes snacking at home
Bariatric Surgery versus Intensive Medical Therapy for Diabetes — 5-Year Outcomes

C Body-Mass Index

Change in BMI from Baseline

Mean Value at Visit

<table>
<thead>
<tr>
<th></th>
<th>Medical therapy</th>
<th>Sleeve gastrectomy</th>
<th>Gastric bypass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Value at Visit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical therapy</td>
<td>36.4</td>
<td>34.1</td>
<td>35.0</td>
</tr>
<tr>
<td>Gastric bypass</td>
<td>37.0</td>
<td>26.9</td>
<td>27.4</td>
</tr>
<tr>
<td>Sleeve gastrectomy</td>
<td>36.0</td>
<td>26.9</td>
<td>27.4</td>
</tr>
</tbody>
</table>

Schauer PA. NEJM 2017;376:641
Bariatric Surgery: Weight Regain

Effect of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass on Weight Loss in Patients With Morbid Obesity
The SM-BOSS Randomized Clinical Trial

There was a significant trend (P < .001) for a linear decrease in excess BMI loss over the follow-up period for both treatment groups (for sleeve gastrectomy, slope, -3.05% [95% CI, -4.53% to -1.58%] per year; P < .001; intercept, 77.0% [95% CI, 72.07%-81.85%]; P < .001 and for Roux-en-Y gastric bypass, slope, -2.34% [95% CI, -3.72% to -0.97%] per year; P = .001; intercept, 80.4% [95% CI, 75.9%-85.0%]; P < .001).

Peterli R. JAMA 2018;319:255
Bariatric Surgery: Weight regain

Weight and Metabolic Outcomes 12 Years after Gastric Bypass

A   Mean Percent Change in Body Weight from Baseline to Years 2, 6, and 12 in the Surgery Group

<table>
<thead>
<tr>
<th>No. of Patients</th>
<th>Baseline</th>
<th>2 Yr</th>
<th>6 Yr</th>
<th>12 Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery group</td>
<td>418</td>
<td>409</td>
<td>379</td>
<td>387</td>
</tr>
<tr>
<td>Deaths</td>
<td>3</td>
<td>9</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>418</td>
<td>412</td>
<td>388</td>
<td>401</td>
</tr>
</tbody>
</table>

Adams T et al. NEJM 2017;377:1143
Bariatric Surgery: Weight regain

497 RYGB patients: 81% MAX EWL → 70% EWL 3-10 yrs after surgery (mean 4.2 yrs)

Table 3  % Excess weight loss (EWL) regained postgastric bypass surgery (N = 497)

<table>
<thead>
<tr>
<th>Reported EWL regain</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0%</td>
<td>14% (n = 69)</td>
</tr>
<tr>
<td>&gt;0 to &lt;10%</td>
<td>39% (n = 194)</td>
</tr>
<tr>
<td>≥10 to &lt;20%</td>
<td>33% (n = 164)</td>
</tr>
<tr>
<td>≥20 to &lt;30%</td>
<td>8% (n = 39)</td>
</tr>
<tr>
<td>≥30 to &lt;40%</td>
<td>4% (n = 20)</td>
</tr>
<tr>
<td>≥40 to &lt;50%</td>
<td>&lt;1% (n = 5)</td>
</tr>
<tr>
<td>≥50%</td>
<td>1% (n = 6)</td>
</tr>
</tbody>
</table>
Bariatric Surgery: Weight regain

Question 1. What you should perform FIRST for Rosella?

- Revisional Surgery
- Reinforcement of the lifestyle modifications programme
- Prescription of a weight-loss drug
- Evaluation of the functionality/anatomy of the first procedure
Bariatric Surgery: Weight regain

Question 1. What you should perform FIRST for Rosella?

A. Evaluation of the functionality/anatomy of the first procedure
   • Revisional Surgery
   • Reinforcement of the lifestyle modifications programme
   • Prescription of a weight-loss drug
### Weight Recidivism Post-Bariatric Surgery: A Systematic Review

#### I) Patient-related:
- Dietary non-compliance: Poor diet quality
  - Inappropriate food choices
  - Lack of nutritional counseling
- Mental health disorders: Binge eating
  - Grazing behaviours
- Physical inactivity
- Hormonal/metabolic: Ghrelin
  - Glucose homeostasis

#### II) Surgery-related:
- Adjustable gastric banding: Pouch distension
  - Band removal
- Roux-en-Y bypass:
  - Stoma dilatation
  - Pouch dilatation
  - Gastro-gastric fistulae
- Sleeve Gastrectomy:
  - Sleeve dilatation

---

The case of Rosella

EGDS: Normal for LSG
Rx Upper digestive tract: Normal for LSG

LABS data:

- Normal HbA1c
- No micronutrients deficits
Question 2. What you should perform SECOND for Rosella?

A. Evaluation of the functionality/anatomy of the first procedure

- Revisional Surgery
- Reinforcement of the lifestyle modifications programme
- Prescription of a weight-loss drug
Question 2. What you should perform SECOND for Rosella?

A. Evaluation of the functionality/anatomy of the first procedure

B. Reinforcement of the lifestyle modifications programme

- Revisional Surgery
- Prescription of a weight-loss drug
### Postoperative Behavioral Variables and Weight Change 3 Years After Bariatric Surgery

**Table 2. Predicted Year 3% Weight Change for 3 Modifiable Behaviors Together**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Pattern 1 (SE)</th>
<th>Pattern 2 (SE)</th>
<th>Pattern 3 (SE)</th>
<th>Pattern 2 Minus Pattern 1 (95% CI)</th>
<th>Pattern 3 Minus Pattern 1 (95% CI)</th>
<th>Pattern 3 Minus Pattern 2 (95% CI)</th>
<th>P Value Pattern 2 vs Pattern 1</th>
<th>P Value Pattern 3 vs Pattern 1</th>
<th>P Value Pattern 3 vs Pattern 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>RYGB (n = 1513)</td>
<td>-24.6 (1.6)</td>
<td>-33.2 (0.6)</td>
<td>-38.8 (0.8)</td>
<td>-8.6 (-12.8 to -4.3)</td>
<td>-14.2 (-18.7 to -9.8)</td>
<td>-5.7 (-7.8 to -3.5)</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>LAGB (n = 509)</td>
<td>-7.1 (2.0)</td>
<td>-18.6 (1.2)</td>
<td>-26.4 (1.6)</td>
<td>-11.5 (-17.8 to -5.2)</td>
<td>-19.3 (-25.6 to -13.0)</td>
<td>-7.8 (-11.9 to -3.7)</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Abbreviations: LAGB, laparoscopic adjustable gastric banding; RYGB, Roux-en-Y gastric bypass.

*a The following are the behavior patterns: behavior pattern 1, never self-weighed, always kept eating when full, and always ate continuously; behavior pattern 2, always self-weighed, never kept eating when full, and never ate continuously, and behavior pattern 3, started self-weighing, stopped eating when full, and stopped eating continuously. Never indicates participant reported not doing the behavior at baseline or at any follow-up time, always, participant reported doing the behavior at baseline and at every follow-up time; started, participant reported not doing the behavior at baseline and doing the behavior at every follow-up time, and stopped, participant reported doing the behavior at baseline and not doing the behavior at every follow-up time.*

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Mitchell JE et al. JAMA Surg 2016;151:752
Post-operative behavioural management in bariatric surgery: a systematic review and meta-analysis of randomized controlled trials

Records identified through database searching MEDLINE (n = 276), PsychINFO (n = 114)

Records after duplicates (n = 10) removed (n = 404)

Additional records identified through other sources (n = 24)

Records screened (n = 404)

Records excluded based on title and abstract (n = 359)

Full-text articles assessed for eligibility (n = 45)

Studies included in qualitative synthesis (n = 16)

Full-text articles excluded (n = 29):
- Non-systematic review articles (n = 16)
- No psychosocial intervention (n = 6)
- Preoperative intervention (n = 6)
- No weight-related outcome (n = 1)

Studies included in qualitative synthesis (n = 16)

Studies included in quantitative synthesis (meta-analysis) (n = 5)
Bariatric Surgery: Weight regain

Post-operative behavioural management in bariatric surgery: a systematic review and meta-analysis of randomized controlled trials

Table 3: Forest plot of standardized mean differences in a random-effects model for percentage of excess weight loss in treatment and control group patients 6-12 months after start of the intervention.

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Intervention M</th>
<th>Intervention SD</th>
<th>Intervention Total N</th>
<th>Control M</th>
<th>Control SD</th>
<th>Control Total N</th>
<th>Weight</th>
<th>Standardized mean differences IV, random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalarchian et al. (2011) (44)</td>
<td>5.8</td>
<td>3.5</td>
<td>18</td>
<td>0.9</td>
<td>3.2</td>
<td>18</td>
<td>20.1%</td>
<td>1.43 (0.69, 2.17)</td>
</tr>
<tr>
<td>Nijamkin et al. (2012) (38)</td>
<td>79.6</td>
<td>15.5</td>
<td>72</td>
<td>83.8</td>
<td>14.2</td>
<td>72</td>
<td>23.5%</td>
<td>1.06 (0.71, 1.41)</td>
</tr>
<tr>
<td>Papalazarou et al. (2010) (41)</td>
<td>76.4</td>
<td>4.1</td>
<td>15</td>
<td>57.5</td>
<td>4.1</td>
<td>15</td>
<td>13.6%</td>
<td>4.49 (3.07, 5.90)</td>
</tr>
<tr>
<td>Sarwer et al. (2012) (47)</td>
<td>26.1</td>
<td>1.5</td>
<td>41</td>
<td>23.5</td>
<td>1.5</td>
<td>43</td>
<td>22.3%</td>
<td>1.72 (1.21, 2.22)</td>
</tr>
<tr>
<td>Tucker et al. (1991) (46)</td>
<td>55</td>
<td>15.9</td>
<td>17</td>
<td>48.8</td>
<td>17.9</td>
<td>15</td>
<td>20.5%</td>
<td>0.36 (-0.34, 1.06)</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>163</td>
<td>163</td>
<td>100.0%</td>
<td>1.60 (0.82, 2.38)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.64; Chi² = 31.04, df = 4 (P < 0.0001); I² = 87%

Test for overall effect: Z = 4.04 (P < 0.0001)

CI, confidence interval; df, degrees of freedom; M, mean; N, number of patients; SD, standard deviation.
There was a positive relationship between increased exercise and weight loss after surgery in 15 studies.
Does exercise improve weight loss after bariatric surgery? A systematic review

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Exercise</th>
<th>No exercise</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrasco 2007</td>
<td>8 2.23</td>
<td>0 1.3</td>
<td>4.31 [2.96, 5.65]</td>
</tr>
<tr>
<td>Cook 1999</td>
<td>3 2.24</td>
<td>0 2.1</td>
<td>1.37 [0.93, 1.81]</td>
</tr>
<tr>
<td>Das 2003</td>
<td>8.4 2.81</td>
<td>0 2.9</td>
<td>2.86 [1.81, 3.92]</td>
</tr>
<tr>
<td>Metcalf 2005</td>
<td>7.3 1.3</td>
<td>0 1.1</td>
<td>6.02 [5.08, 6.95]</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>131</td>
<td>3.62 [1.28, 5.96]</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 5.45; Chi² = 86.92, df = 3 (P < 0.00001); I² = 97%
Test for overall effect: Z = 3.03 (P = 0.002)

Fig. 2  Forest plot of standardised mean difference at 6 months for weight loss (kg) in exercising and non-exercising patients

Egberts K et al. Obes Surg 2012;22:335
The case of Rosella

The graph shows the weight change of Rosella over a period of 7 years, with significant events marked as LSG (Laparoscopic Sleeve Gastrectomy), MOURNING (Mourning Phase), and LIFESTYLE REINFORCEMENT.
Question 3. What you should perform THIRD for Rosella?

A. Evaluation of the functionality/anatomy of the first procedure

B. Reinforcement of the lifestyle modifications programme
   - Revisional Surgery
   - Prescription of a weight-loss drug
Bariatric Surgery: Weight regain

Question 3. What you should perform THIRD for Rosella?

A. Evaluation of the functionality/anatomy of the first procedure

B. Reinforcement of the lifestyle modifications programme

C. Prescription of a weight-loss drug

• Revisional Surgery
Question 3bis. Which drugs do you suggest for Rosella?

- Xenical
- Liraglutide 3.0 mg
- Fixed combination Naltrexone / Bupropion
Pharmacotherapy in Conjunction with a Diet and Exercise Program for the Treatment of Weight Recidivism or Weight Loss Plateau Post-bariatric Surgery: a Retrospective Review

Methods From June 2010 to April 2014, bariatric surgery patients who experienced WR or WLP after undergoing Roux-en-Y gastric bypass (RYGB) or laparoscopic adjustable gastric banding (LAGB), and who were treated with phentermine (Ph) or phentermine–topiramate (PhT),

Results Fifty-two patients received Ph while 13 patients received PhT. Overall, patients in both groups lost weight. Among those whose weights were recorded at 90 days, patients on Ph lost 6.35 kg (12.8 % excess weight loss (EWL); 95 % confidence interval (CI) 4.25, 8.44) and those prescribed PhT lost 3.81 kg (12.9 % EWL; CI 1.08, 6.54).
The utility of weight loss medications after bariatric surgery for weight regain or inadequate weight loss: A multi-center study

Methods
We completed a retrospective study to identify patients who had undergone bariatric surgery in the form of a Roux-en-Y gastric bypass (RYGB) or a sleeve gastrectomy from 2000–2014. From this cohort, we identified patients who were placed on weight loss pharmacotherapy postoperatively for inadequate weight loss or weight regain. We extracted key demographic data, medical history, and examined weight loss in response to surgery and after the initiation of weight loss pharmacotherapy.

Results
A total of 319 patients (RYGB = 258; sleeve gastrectomy = 61) met inclusion criteria for analysis. More than half (54%; n = 172) of all study patients lost ≥5% (7.2 to 195.2 lbs) of their total weight with medications after surgery. There were several high responders with 30.3% of patients (n = 96) and 15% (n = 49) losing ≥10% (16.7 to 195.2 lbs) and ≥15% (25 to 195.2 lbs) of their total weight, respectively.
# Weight Loss Medications in Young Adults after Bariatric Surgery for Weight Regain or Inadequate Weight Loss: A Multi-Center Study

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Weight Change (kg)</th>
<th>Weight Change (%)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients (n = 37)</td>
<td>-5.8 (IQR: -2.5, -16.1)</td>
<td>-5.1 (IQR: -2.6, -14.6)</td>
<td></td>
</tr>
<tr>
<td>Patients prescribed medication at weight plateau (n = 8)</td>
<td>-5.7 (IQR: -3.2, -14.2)</td>
<td>-6.0 (IQR: -3.1, -20.1)</td>
<td>0.5304 a</td>
</tr>
<tr>
<td>Patients prescribed medication at weight regain (n = 29)</td>
<td>-5.8 (IQR: -2.3, -16.7)</td>
<td>-5.4 (IQR: -2.4, -13.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Surgery Type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeve Gastrectomy (n = 9)</td>
<td>-3.9 (IQR: -1.5, -6.1)</td>
<td>-3.3 (IQR: -1.5, -5.3)</td>
<td>0.0515 a</td>
</tr>
<tr>
<td>Roux-En-Y Gastric Bypass (n = 26)</td>
<td>-7.6 (IQR: -2.4, -17.9)</td>
<td>-8.1 (IQR: -2.6, -17.5)</td>
<td></td>
</tr>
<tr>
<td>Patients who lost ≥5% total body weight with treatment (n = 20, 54.1%)</td>
<td>-15.6 (IQR: -7.3, -24.3)</td>
<td>-13.3 (IQR: -7.7, -20.9)</td>
<td></td>
</tr>
<tr>
<td>Patients who lost ≥10% total body weight with treatment (n = 12, 34.3%)</td>
<td>-18.1 (IQR: -15.6, -29.5)</td>
<td>-18.2 (IQR: -13.3, -27.1)</td>
<td></td>
</tr>
<tr>
<td>Patients who lost ≥15% total body weight with treatment (n = 8, 22.9%)</td>
<td>-26.0 (IQR: -16.1, -34.4)</td>
<td>-24.3 (IQR: -18.3, -29.4)</td>
<td></td>
</tr>
</tbody>
</table>
Efficacy of High-Dose Liraglutide as an Adjunct for Weight Loss in Patients with Prior Bariatric Surgery

Fig. 2 Median weight at each point of interest. Box and whisker plot of median patient weight pre-surgery (126.25 kg), nadir (92.45 kg), prior to starting liraglutide (105.55 kg), after 16 weeks of liraglutide (99.4 kg), and after 28 weeks of liraglutide (95.9 kg). Bottom and top of box represent the first and third quartiles, respectively. The ends of the whiskers represent the minimum and maximum of the data.
Efficacy of adjuvant weight loss medication after bariatric surgery

<table>
<thead>
<tr>
<th>Prescribed weight loss medications</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phentermine</td>
<td>37.5 mg daily for 3 mo at a time</td>
</tr>
<tr>
<td>Phentermine/Topiramate ER</td>
<td>3.75 mg/23 mg daily for 14 d followed by</td>
</tr>
<tr>
<td></td>
<td>7.5 mg/46 mg daily maintenance dose</td>
</tr>
<tr>
<td>And</td>
<td>This dose was increased to the intermediate dose of 11.25 mg/69 mg</td>
</tr>
<tr>
<td></td>
<td>(if the patient did not lose about 5% weight in 12 weeks)</td>
</tr>
<tr>
<td>And</td>
<td>Titration to the full dosage of 15 mg/92 mg</td>
</tr>
<tr>
<td></td>
<td>(if patients did not achieve 5% weight loss with the previous dose)</td>
</tr>
<tr>
<td>Lorcaselar</td>
<td>10 mg twice daily</td>
</tr>
<tr>
<td>Naltrexone SR/Bupropion SR</td>
<td>8 mg/90 mg daily titrated to a full dose of</td>
</tr>
<tr>
<td></td>
<td>32 mg/360 mg by increasing weekly until on</td>
</tr>
<tr>
<td></td>
<td>the full dose after 4 wk</td>
</tr>
</tbody>
</table>


209 pts
156 pts (74.6%)
25 pts (12.0%)
18 pts (8.6%)
10 pts (4.8%)

Hanipah ZN et al. SOARD 2018;14:93-98
Efficacy of adjuvant weight loss medication after bariatric surgery

<table>
<thead>
<tr>
<th></th>
<th>Pre-surgery</th>
<th>Nadir</th>
<th>Pre-pharmacotherapy</th>
<th>3-month</th>
<th>12-month</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAGB</td>
<td>119.5</td>
<td>88.3</td>
<td>106.5</td>
<td>99.6</td>
<td>103.6</td>
</tr>
<tr>
<td>RYGB</td>
<td>129.3</td>
<td>87.2</td>
<td>100.5</td>
<td>97.4</td>
<td>98.2</td>
</tr>
<tr>
<td>SG</td>
<td>126.3</td>
<td>90.1</td>
<td>101.2</td>
<td>99.9</td>
<td>101.1</td>
</tr>
</tbody>
</table>

Hanipah ZN et al. SOARD 2018;14:93-98
The case of Rosella

The graph shows the weight changes of Rosella over 7 years, with key interventions marked as LSG, LIFESTYLE REINFORCEMENT, NALTREXONE/BUPROPIONE, and MOURNING.
Question 3. What you should perform FORTH for Rosella?

A. Evaluation of the functionality/anatomy of the first procedure

B. Reinforcement of the lifestyle modifications programme

C. Prescription of a weight-loss drug

• Revisional Surgery
Question 3. What you should perform FORTH for Rosella?

A. Evaluation of the functionality/anatomy of the first procedure

B. Reinforcement of the lifestyle modifications programme

C. Prescription of a weight-loss drug

D. Revisional Surgery
Bariatric Surgery: Weight regain

IFSO Worldwide Survey 2016: Primary, Endoluminal, and Revisional Procedures

Fig. 8 The number of endoluminal, primary, and revisional procedures

Angrisani L et al. Obes Surg 2018
Bariatric Surgery: Weight regain

WEIGHT REGAIN POST BS → RE-DO SURGERY
The risk of surgical complications is higher than in primary procedures.

We have no good quality data on weight loss in the long-term.

Tendency to shift toward malabsorptive procedures with a higher risk of long-term nutritional complications.
The first consensus statement on revisional bariatric surgery using a modified Delphi approach.

BACKGROUND:
Revisional bariatric surgery (RBS) constitutes a possible solution for patients who experience an inadequate response following bariatric surgery or significant weight regain following an initial satisfactory response. This paper reports results from the first modified Delphi consensus-building exercise on RBS.

METHODS:
We created a committee of 22 recognised opinion-makers with a special interest in RBS. The committee invited 70 RBS experts from 27 countries to vote on 39 statements concerning RBS. An agreement amongst \( \geq 70.0\% \) experts was regarded as a consensus.

RESULTS:
Seventy experts from twenty-seven countries took part. There was a consensus that the decision for RBS should be individualised (100.0\%) and multi-disciplinary (92.8\%). Experts recommended a preoperative nutritional (95.7\%) and psychological evaluation (85.7\%), endoscopy (97.1\%), and a contrast series (94.3\%). Experts agreed that Roux-Y gastric bypass (RYGB) (94.3\%), One anastomosis gastric bypass (OAGB) (82.8\%), and single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) (71.4\%) were acceptable RBS options after gastric banding (84.3\%). OAGB (84.3\%), bilio-pancreatic diversion/duodenal switch (BPD/DS) (81.4\%), and SADI-S (88.5\%) were agreed as consensus RBS options after sleeve gastrectomy. lengthening of bilio-pancreatic limb was the only consensus RBS option after RYGB (94.3\%) and OAGB (72.8\%).

CONCLUSION:
Experts achieved consensus on a number of aspects of RBS. Though expert opinion can only be regarded as low-quality evidence, the findings of this exercise should help improve the outcomes of RBS while we develop robust evidence to inform future practice.
Bariatric Surgery: Weight regain

What you should perform for Rosella?

A. Evaluation of the functionality/anatomy of the first procedure

B. Reinforcement of the lifestyle modifications programme

C. Prescription of a weight-loss drug

D. Revisional Surgery
Bariatric Surgery: Weight regain

**Practical Recommendations of the Obesity Management Task Force of the European Association for the Study of Obesity for the Post-Bariatric Surgery Medical Management**


**Table 14.** List of graded clinical practical recommendations on weight regain prevention and management after bariatric surgery

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Level of evidence</th>
<th>Grade of recommendation*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight regain after bariatric surgery is a result of hormonal and metabolic alterations, surgical failure, nutritional non-adherence, mental health issues and physical inactivity.</td>
<td>3</td>
<td>D</td>
</tr>
<tr>
<td>Enforcing and sustaining healthy lifestyle facilitates weight regain prevention.</td>
<td>3</td>
<td>D</td>
</tr>
<tr>
<td>Adding anti-obesity drugs and/or re-do operations may halt weight regain or create further weight loss when applied at optimal timing.</td>
<td>3</td>
<td>D</td>
</tr>
</tbody>
</table>
Thanks for your attention !!!

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