

# **SLEEVEPASS RCT: SLEEVE vs. byPASS 5-year results**

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morbid Obesity  
and metabolic disorders



**LIHAVUUS-JA**  
METABOLIAKIRURGIAN YHDISTYS

# Disclosures

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  - Academy of Finland
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  - Mary and Georg C. Ehrnrooth foundation
  - Government research grant foundation (EVO)
  - Turku University Research Grant

Research

## Key Points

**Question** Is weight loss at 5 years equivalent with laparoscopic sleeve gastrectomy and laparoscopic Roux-en-Y gastric bypass in patients with morbid obesity?

JAMA | **Original Investigation**

# Effect of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass on Weight Loss at 5 Years Among Patients With Morbid Obesity The SLEEVEPASS Randomized Clinical Trial

Paulina Salminen, MD, PhD; Mika Helmiö, MD; Jari Ovaska, MD, PhD; Anne Juuti, MD, PhD; Marja Leivonen, MD, PhD; Pipsa Peromaa-Haavisto, MD, PhD; Saija Hurme, MSc; Minna Soinio, MD, PhD; Pirjo Nuutila, MD, PhD; Mikael Victorzon, MD, PhD

## Patient enrollment 3/2008 – 6/2010

JAMA | **Original Investigation**

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Research

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# 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

Ralph Peterli, MD; Bettina Karin Wölnerhanssen, MD; Thomas Peters, MD; Diana Vetter, MD; Dino Kröll, MD;  
Yves Borbély, MD; Bernd Schultes, MD; Christoph Beglinger, MD; Jürgen Drewe, MD, MSc; Marc Schiesser, MD;  
Philipp Nett, MD; Marco Bueter, MD, PhD

Research

JAMA | Original Investigation

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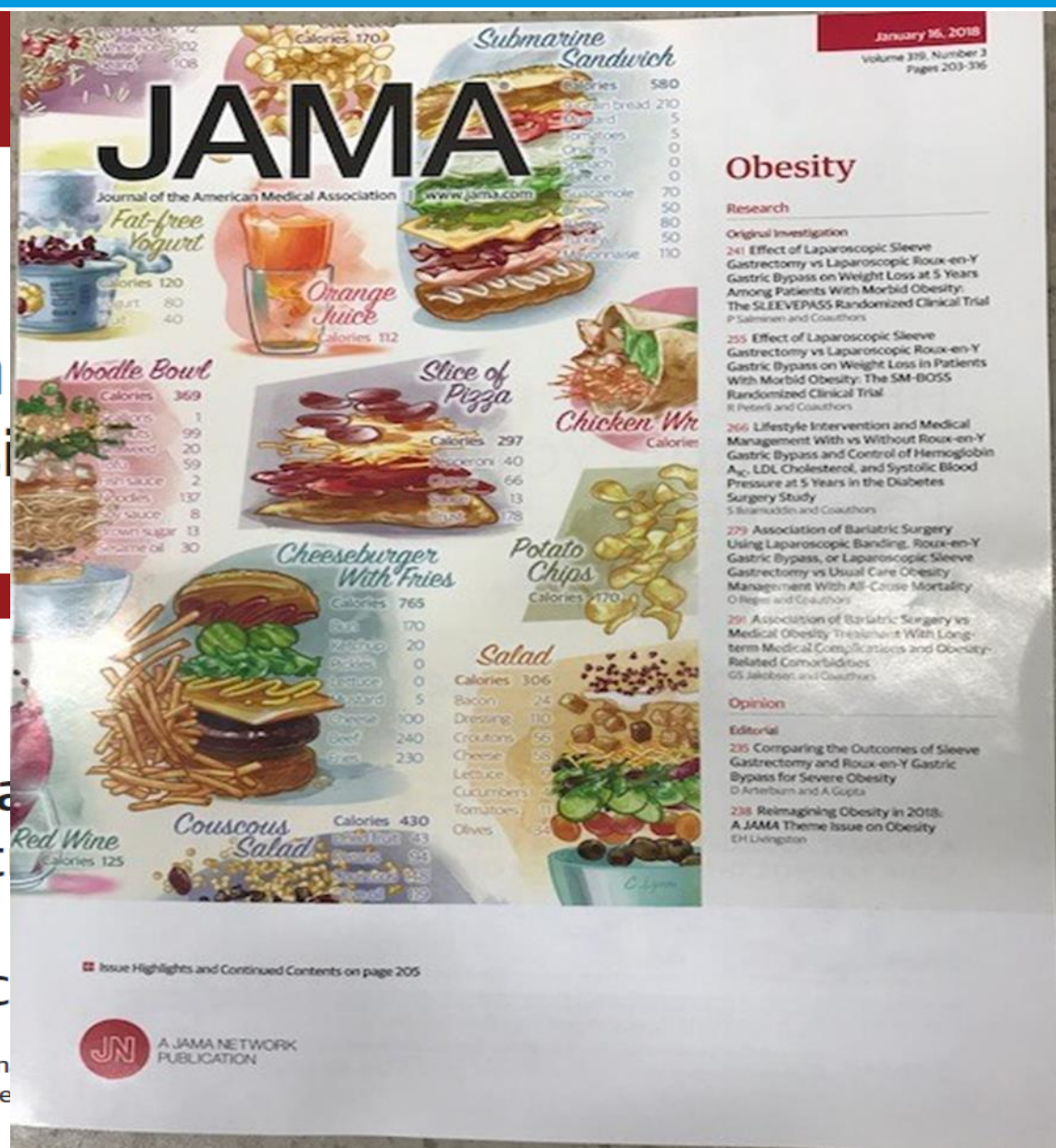
Paulina Salminen, MD, PhD; Saija Hurme, MSc; Minna Soi

Research

JAMA | Original Investigation

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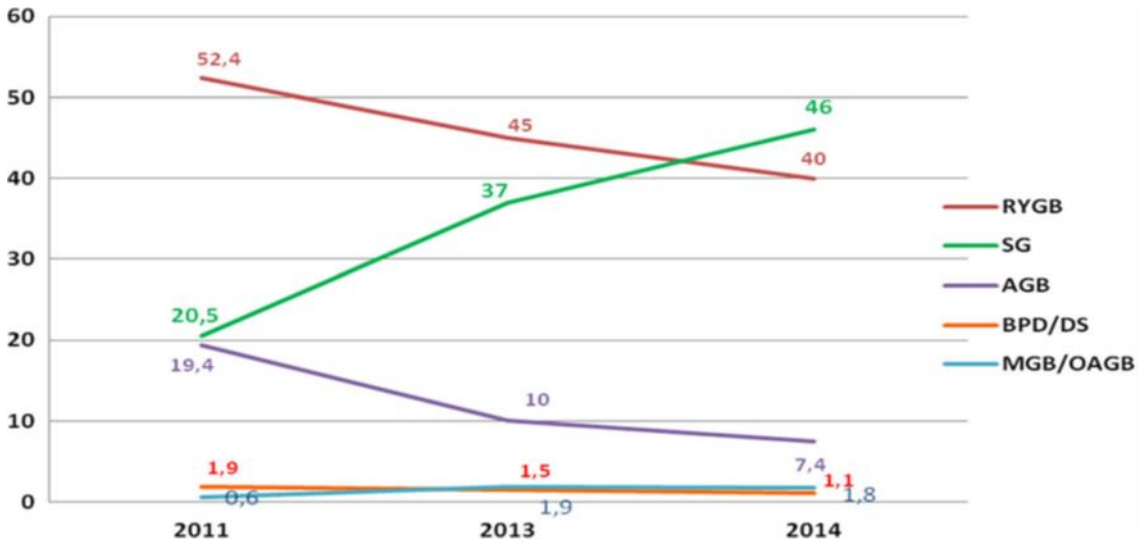
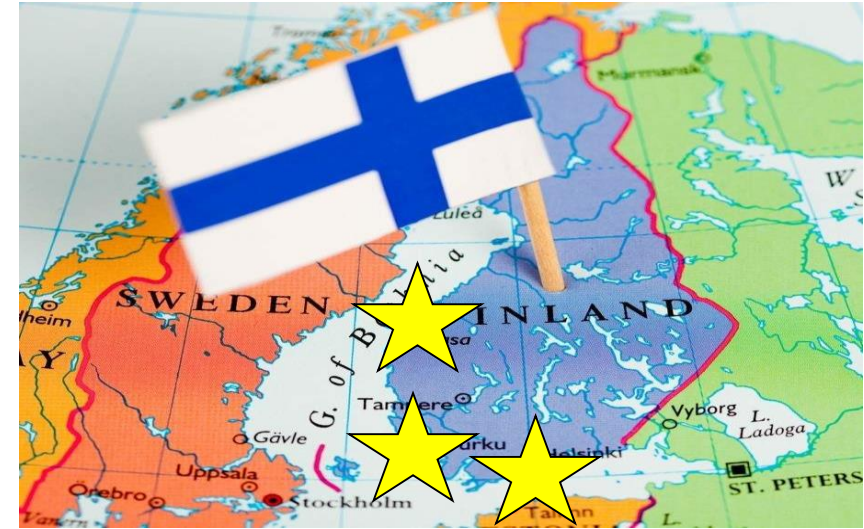


JAMA | Original Investigation

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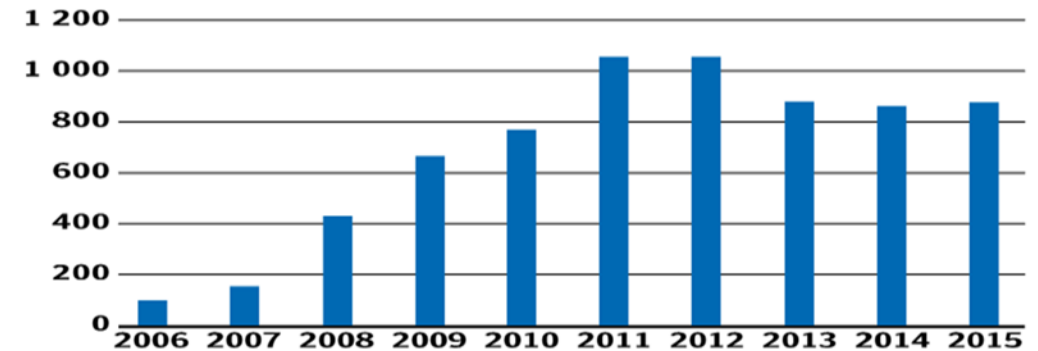
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- Multicenter RCT: Turku, Vaasa and Helsinki



## Lihavuusleikkausten määrät Suomessa 2006–2015.

### Leikkauksia



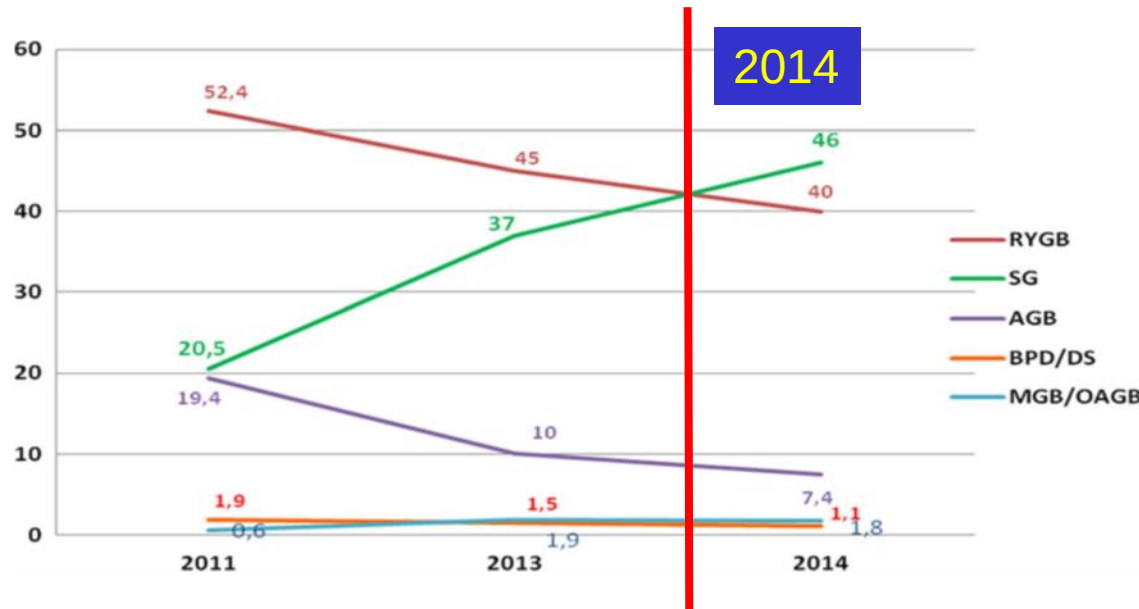
Lähde: Suomen lihavuus- ja metabolisen kirurgian yhdistys

JAMA | Original Investigation

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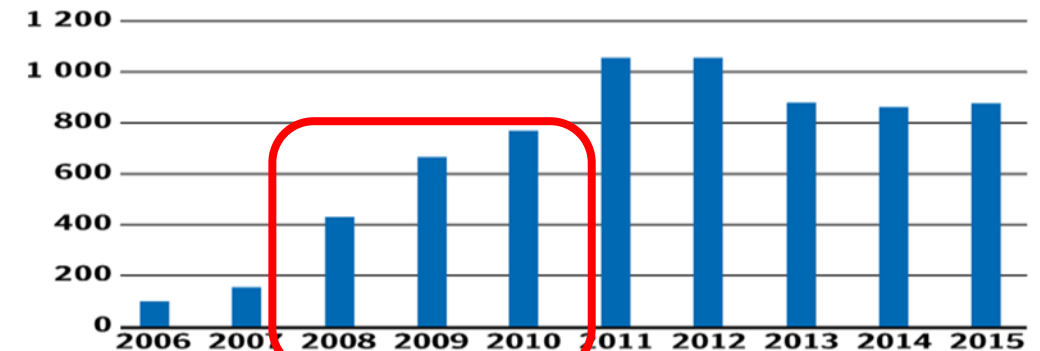
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## SLEEVEPASS patient enrollment 2008-2010



## Lihavuusleikkausten määrät Suomessa 2006–2015.

### Leikkauksia



Lähde: Suomen lihavuus- ja metabolisen kirurgian yhdistys

# SLEEVEPASS RCT: Primary endpoint

- Primary endpoint: weight loss = %excess weight loss, %EWL
  - Equivalence trial: prespecified equivalence margins for minimal clinically important weight loss difference LSG vs. LRYGB from -9% to 9 % in %EWL
    - At the time of study initiation, no available long-term data on LSG
  - Originally at 1-year follow-up ➤ revised during the study to 5 years (no effect on the sample size calculation)

%EWL:  $(\text{initial weight} - \text{follow-up weight}) / (\text{initial weight} - \text{ideal weight for BMI 25}) \times 100\%$





ASMBS, SOARD, outcome reporting standards

## Standardized outcomes reporting in metabolic and bariatric surgery

Stacy A. Brethauer, MD<sup>a,\*</sup>, Julie Kim, MD<sup>b</sup>, Maher el Chaar, MD<sup>c</sup>, Pavlos Papasavas, MD<sup>d</sup>,  
Dan Eisenberg, MD<sup>e</sup>, Ann Rogers, MD<sup>f</sup>, Naveen Ballem, MD<sup>g</sup>, Mark Kligman, MD<sup>h</sup>,  
Shanu Kothari, MD<sup>i</sup> for the ASMBS Clinical Issues Committee

1. Mean initial BMI of the cohort
2. Change in BMI ( $\Delta$ BMI):  
$$\Delta \text{BMI} = (\text{Initial BMI}) - (\text{Postop BMI})$$
3. Percent of total weight loss (%TWL):  
$$\% \text{TWL} = [(\text{Initial Weight}) - (\text{Postop Weight})] / [(\text{Initial Weight})] \times 100$$
4. Percent excess BMI loss (%EBMIL):  
$$\% \text{EBMIL} = [\Delta \text{BMI} / (\text{Initial BMI} - 25)] \times 100$$

*and/or*

Percent excess weight loss (%EWL)

$$\% \text{EWL} = [(\text{Initial Weight}) - (\text{Postop Weight})] / [(\text{Initial Weight}) - (\text{Ideal Weight})]$$

(in which *ideal weight* is defined by the weight corresponding to a BMI of 25 kg/m<sup>2</sup>; see [Appendix A](#))

JAMA | **Original Investigation**

# **Effect of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass on Weight Loss at 5 Years Among Patients With Morbid Obesity**

## **The SLEEVEPASS Randomized Clinical Trial**

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- Secondary endpoints

- Resolution of comorbidities
  - T2DM
  - Dyslipidemia
  - Hypertension
- Improvement of quality of life (QOL)
- All adverse events (overall morbidity)
- Mortality (intervention related mortality 0%)

### [SM-BOSS \(Peterli et al. JAMA 2018\)](#)

- n = 217, 1/2007 – 11/2011
- T2DM: sleeve 24 %, bypass 26 %

### [SLEEVEPASS \(Salminen et al. JAMA 2018\)](#)

- n = 240, 3/2008 – 6/2010
- T2DM: sleeve 43 %, bypass 41 %

JAMA | **Original Investigation**

# Effect of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass on Weight Loss at 5 Years Among Patients With Morbid Obesity The SLEEVEPASS Randomized Clinical Trial

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- Secondary endpoints

- Resolution of comorbidities

- T2DM
    - Dyslipidemia
    - Hypertension

- Improvement of quality of life (QOL)

- All adverse events (overall morbidity)

- Mortality (intervention related mortality 0%)

Patients with T2DM

## 2. SM-BOSS (Peterli et al. JAMA 2018)

- n = 217, 1/2007 – 11/2011
- T2DM: sleeve 24 %, bypass 26 %

25 %

## 3. SLEEVEPASS (Salminen et al. JAMA 2018)

- n = 240, 3/2008 – 6/2010
- T2DM: sleeve 43 %, bypass 41 %

42 %

# Operation techniques

## LSG

- 33 or 35 Fr bougie
- Resection initiated 4-6 cm proximal to the pylorus
- Difficult / severe GERD = exclusion criterion (large hiatal hernia)
  - Upper gastrointestinal endoscopy
  - No pH-monitoring / manometry / symptom questionnaire

## LRYGB

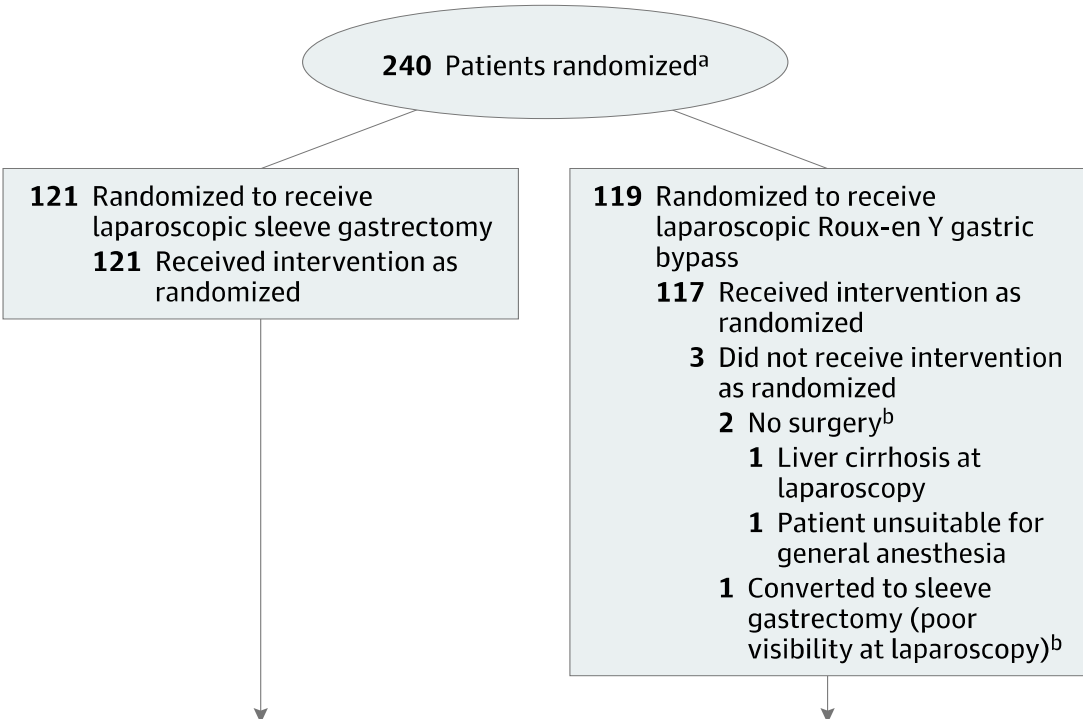
- 150 cm antecolic alimentary limb
- 50 -80 cm biliopancreatic limb
- Circular or linear gastrojejunostomy (surgeon preference)
- No closure of mesenteric defects at the time of the trial



**SLEEVEPASS: A randomized prospective multicenter study comparing laparoscopic sleeve gastrectomy and gastric bypass in the treatment of morbid obesity: preliminary results**

Mika Helmiö · Mikael Victorzon · Jari Ovaska ·  
 Marja Leivonen · Anne Juuti · Nabil Jaser · Pipsa Peromaa ·  
 Pekka Tolonen · Saija Hurme · Paulina Salminen

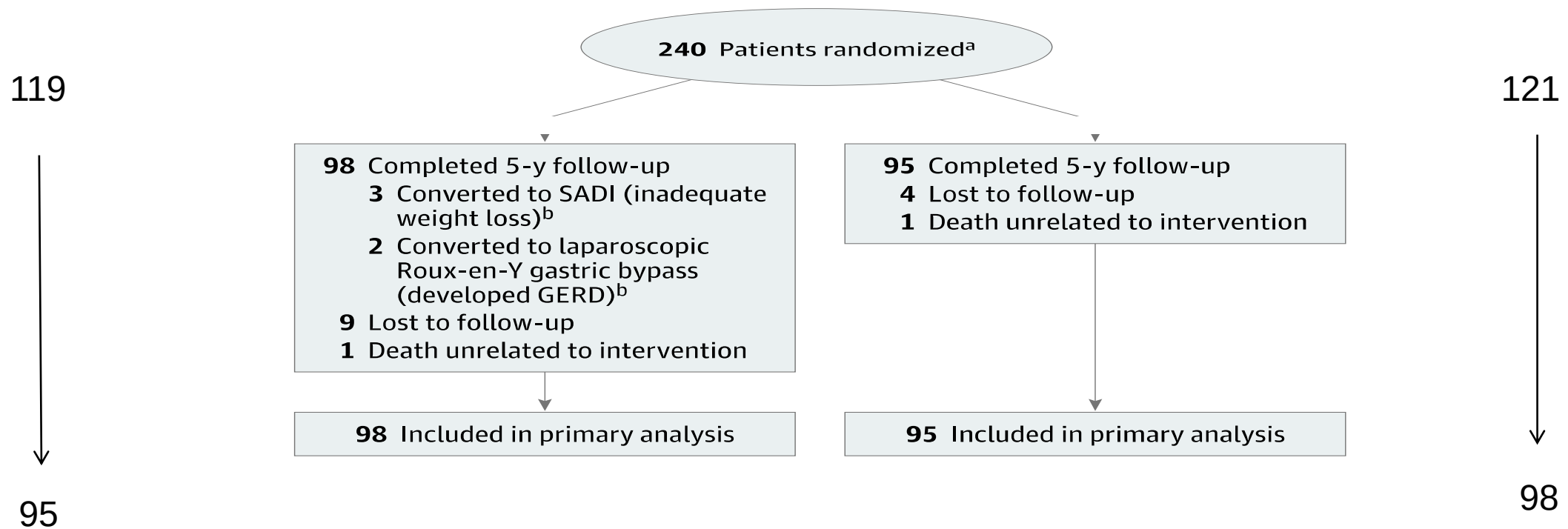
| Characteristic                                           | Laparoscopic Sleeve Gastrectomy (n = 121) | Laparoscopic Roux-en-Y Gastric Bypass (n = 119) |
|----------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| Sex, No. (%)                                             |                                           |                                                 |
| Women                                                    | 87 (71.9)                                 | 80 (67.2)                                       |
| Men                                                      | 34 (28.1)                                 | 39 (32.8)                                       |
| Age, mean (SD), y                                        | 48.5 (9.6)                                | 48.4 (9.3)                                      |
| Weight, mean (SD), kg                                    | 130.1 (21.5)                              | 134.9 (22.5)                                    |
| BMI, mean (SD) <sup>a</sup>                              | 45.5 (6.2)                                | 46.4 (5.9)                                      |
| Type 2 diabetes, No. (%)                                 | 52 (43.0)                                 | 49 (41.2)                                       |
| Hypertension, No. (%)                                    | 83 (68.6)                                 | 87 (73.1)                                       |
| Dyslipidemia, No. (%)                                    | 39 (32.2)                                 | 45 (37.8)                                       |
| Moorehead-Ardelt QOL total score, mean (SD) <sup>b</sup> | 0.10 (0.94)                               | 0.12 (1.12)                                     |
| Hospitals participating in the study, No.                |                                           |                                                 |
| Turku                                                    | 40                                        | 40                                              |
| Vaasa                                                    | 40                                        | 40                                              |
| Helsinki                                                 | 41                                        | 39                                              |





# Trial flow chart at five-year follow-up

**Figure 1. Flow of Participants Through the SLEEVEPASS Trial of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass**

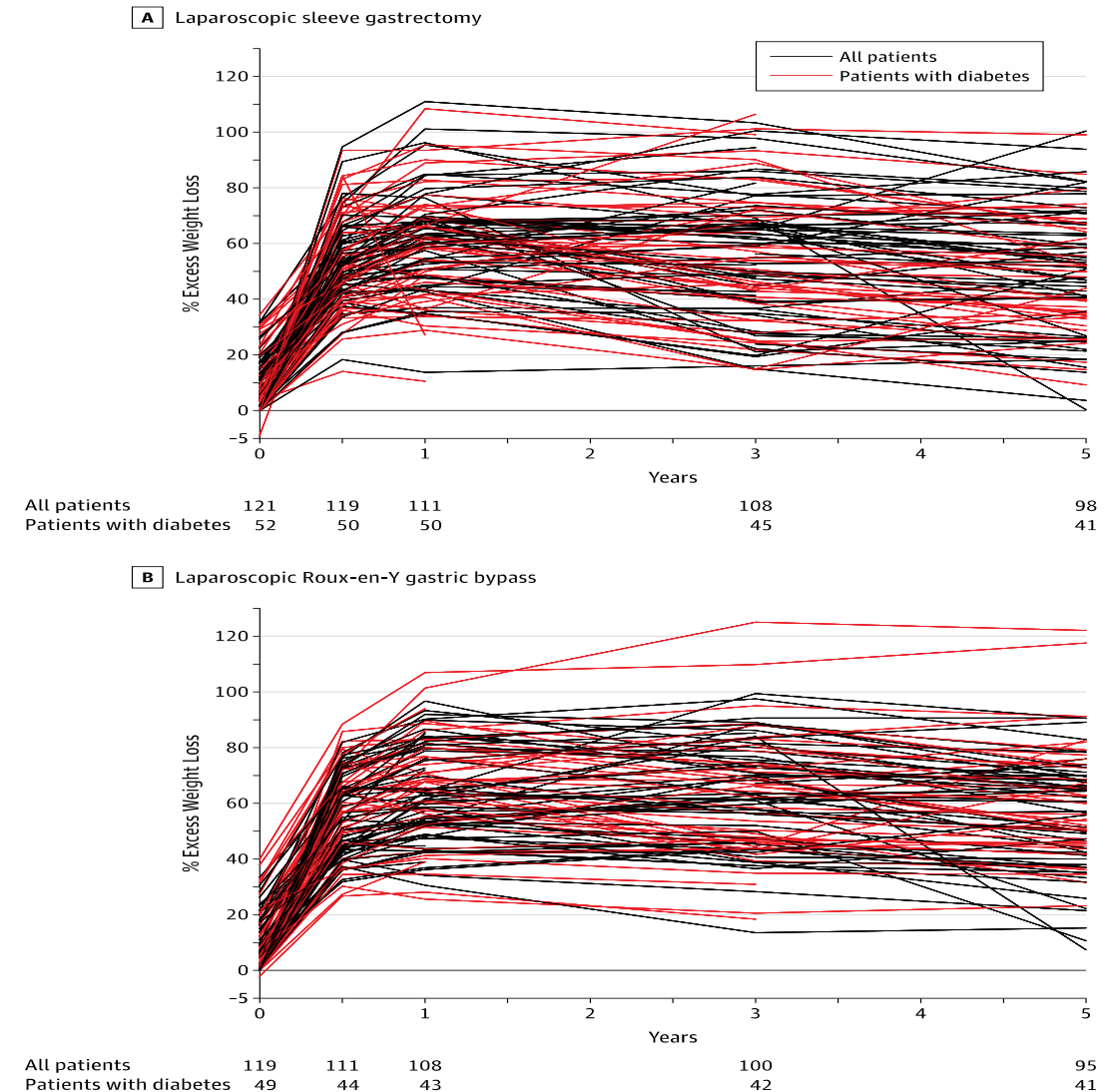


5-year follow-up rate 80.4%

# %EWL at 5 years

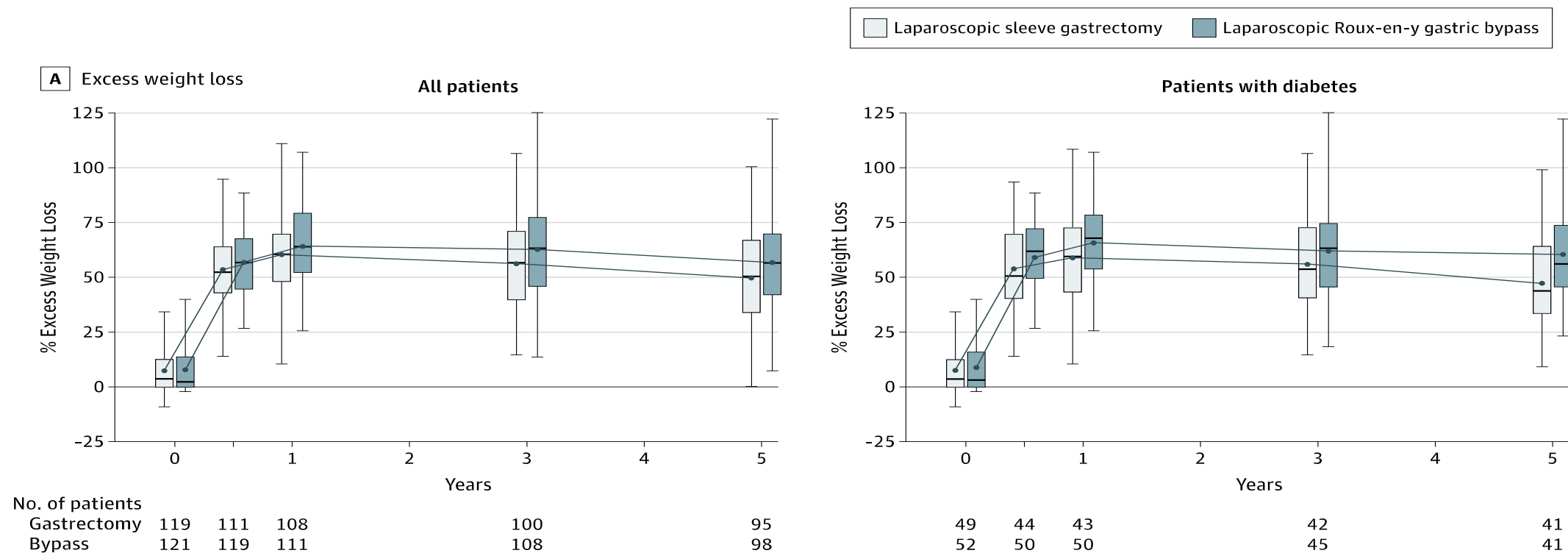
- LSG 49% (95%CI, 45%-52%)
- LRYGB 57% (95%CI, 53%-61%)
- Difference 8.2 percentage units (95%CI, 3.2%-13.2%)
- Post hoc outcomes in patients with diabetes
  - %EWL difference 11.7% (95%CI, 3.7%-19.7%)

Figure 2. Percentage Excess Weight Loss Over 5-Year Follow-up for Individual Patients After Laparoscopic Sleeve Gastrectomy (n = 121) and Laparoscopic Roux-en-Y Gastric Bypass (n = 119)



# %EWL at 5 years: 0, 1, 3, and 5 years

Figure 3. Percentage Excess Weight Loss and Body Mass Index for the Whole Study Group and by Procedure Over 5-Year Follow-up



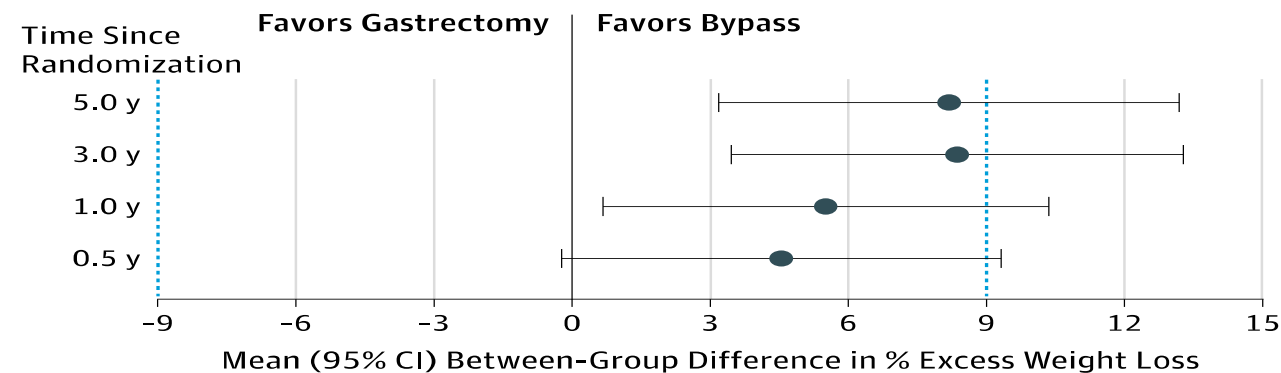
Weight loss difference (kg): All patients median 6.6 kg, patients with T2DM median 9.7 kg

JAMA | Original Investigation

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**Figure 4. Differences in Estimates of Mean Percentage Excess Weight Loss Between Laparoscopic Sleeve Gastrectomy and Laparoscopic Roux-en-Y Gastric Bypass Over 5-Year Follow-up**



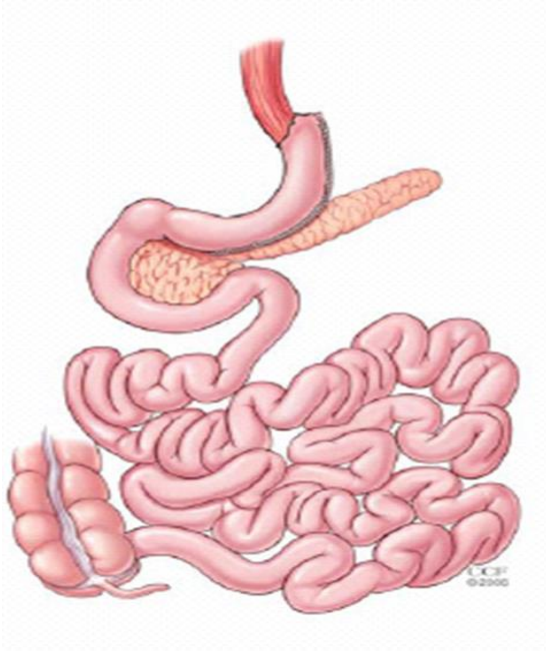
Prespecified equivalence margins (blue dotted lines) for the clinical significance of weight loss differences between gastric bypass and sleeve gastrectomy were -9% to +9% excess weight loss. Error bars indicate 95% confidence intervals.

Weight loss after LSG vs. LRYGB did not meet criteria for equivalence, no statistically significant difference based on the prespecified equivalence margins.

# T2DM remission at 5 years: ADA criteria ( $p>0.99$ ), baseline $n=101$ (42%)

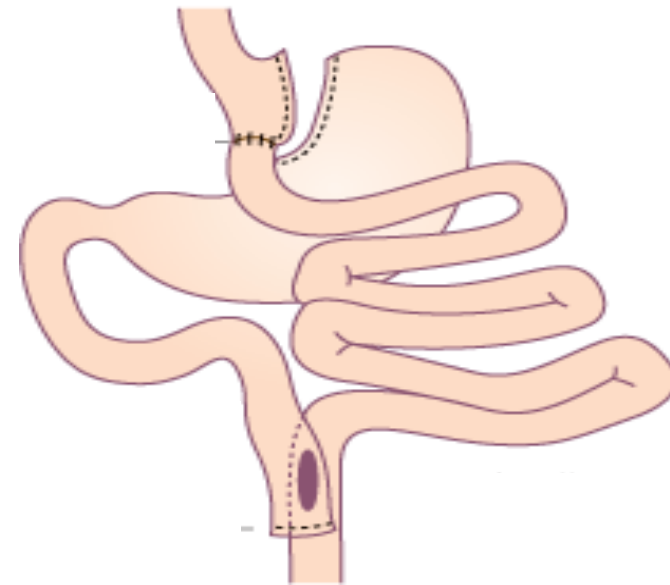
## LSG

- Complete or partial remission 37%



## LRYGB

- Complete or partial remission 45%





# Glycemic status at 5 years

|                                               | Model-Based Mean<br>(95% CI) in<br>Operations | Baseline         | 0.5 y            | 1 y              | 3 y              | 5 y              | P Value for Effects in ANOVA         |
|-----------------------------------------------|-----------------------------------------------|------------------|------------------|------------------|------------------|------------------|--------------------------------------|
| Fasting glucose, mmol/L <sup>a</sup>          |                                               |                  |                  |                  |                  |                  | .03 for operation × time interaction |
| Sleeve gastrectomy                            |                                               |                  |                  |                  |                  |                  |                                      |
| No.                                           |                                               | 52               | 50               | 50               | 46               | 41               |                                      |
| Model-based mean (95% CI)                     |                                               | 7.5 (6.9 to 8.1) | 6.2 (5.9 to 6.5) | 6.4 (6.0 to 6.7) | 6.6 (6.2 to 7.0) | 7.5 (6.9 to 8.2) |                                      |
| Gastric bypass                                |                                               |                  |                  |                  |                  |                  |                                      |
| No.                                           |                                               | 49               | 43               | 43               | 42               | 40               |                                      |
| Model-based mean (95% CI)                     |                                               | 7.8 (7.2 to 8.5) | 6.1 (5.7 to 6.4) | 5.9 (5.6 to 6.3) | 6.7 (6.2 to 7.2) | 6.7 (6.1 to 7.3) |                                      |
| P value (corrected with step-down Bonferroni) |                                               |                  | >.99             | .30              | >.99             | .21              |                                      |
| Glycated hemoglobin, % <sup>a</sup>           |                                               |                  |                  |                  |                  |                  | .05 for operation × time interaction |
| Sleeve gastrectomy                            | 6.6 (6.4 to 6.8)                              |                  |                  |                  |                  |                  | .93 for main effect of operation     |
| Gastric bypass                                | 6.6 (6.4 to 6.8)                              |                  |                  |                  |                  |                  |                                      |
| Model-based means (95% CI) in time points     |                                               | 7.2 (7.0 to 7.5) | 6.6 (6.2 to 6.5) | 6.2 (6.1 to 6.4) | 6.4 (6.2 to 6.6) | 6.7 (6.5 to 6.9) | <.001 for main effect of time        |
| Glycemic status, No./total (%)                |                                               |                  |                  |                  |                  |                  |                                      |

# Glycemic status at 5 years: fasting glucose

## LSG 7.5 mmol/L vs. LRYGB 6.7 mmol/L (p=0.052)

|                                               | Model-Based Mean<br>(95% CI) in<br>Operations | Baseline         | 0.5 y            | 1 y              | 3 y              | 5 y              | P Value for Effects in ANOVA         |
|-----------------------------------------------|-----------------------------------------------|------------------|------------------|------------------|------------------|------------------|--------------------------------------|
| Fasting glucose, mmol/L <sup>a</sup>          |                                               |                  |                  |                  |                  |                  | .03 for operation × time interaction |
| Sleeve gastrectomy                            |                                               |                  |                  |                  |                  |                  |                                      |
| No.                                           |                                               | 52               | 50               | 50               | 46               | 41               |                                      |
| Model-based mean (95% CI)                     |                                               | 7.5 (6.9 to 8.1) | 6.2 (5.9 to 6.5) | 6.4 (6.0 to 6.7) | 6.6 (6.2 to 7.0) | 7.5 (6.9 to 8.2) |                                      |
| Gastric bypass                                |                                               |                  |                  |                  |                  |                  |                                      |
| No.                                           |                                               | 49               | 43               | 43               | 42               | 40               |                                      |
| Model-based mean (95% CI)                     |                                               | 7.8 (7.2 to 8.5) | 6.1 (5.7 to 6.4) | 5.9 (5.6 to 6.3) | 6.7 (6.2 to 7.2) | 6.7 (6.1 to 7.3) |                                      |
| P value (corrected with step-down Bonferroni) |                                               |                  | >.99             | .30              | >.99             | .21              |                                      |
| Glycated hemoglobin, % <sup>a</sup>           |                                               |                  |                  |                  |                  |                  | .05 for operation × time interaction |
| Sleeve gastrectomy                            | 6.6 (6.4 to 6.8)                              |                  |                  |                  |                  |                  | .93 for main effect of operation     |
| Gastric bypass                                | 6.6 (6.4 to 6.8)                              |                  |                  |                  |                  |                  |                                      |
| Model-based means (95% CI) in time points     |                                               | 7.2 (7.0 to 7.5) | 6.6 (6.2 to 6.5) | 6.2 (6.1 to 6.4) | 6.4 (6.2 to 6.6) | 6.7 (6.5 to 6.9) | <.001 for main effect of time        |
| Glycemic status, No./total (%)                |                                               |                  |                  |                  |                  |                  |                                      |

## Dyslipidemia resolution at 5 years ( $p=0.15$ ), baseline $n=84$ (35%)

- Dyslipidemia resolution = discontinuing medication
  - Resolution **LSG 47%** vs. **LRYGB 69%** (dyslipidemia baseline 35%)
  - Less medications LSG 20% vs. LRYGB 5%
  - No improvement LSG 33% vs. LRYGB 35%
- True dyslipidemia resolution = discontinuing medication + normal lipid values ( $LDL < 3.0$  mmol/L)
  - 22/38, **LSG 20%** vs. **LRYGB 40%**

# Lipid profiles at 5 years

- LDL-C: **LRYGB 2.5 mmol/L** vs. **2.7 mmol/L LSG** (p=0.02)
- Total cholesterol **LRYGB 4.6 mmol/L** vs. **4.9 mmol/L LSG** (p=0.053)

Table 4. Lipid Profiles for the Whole Study Group After Laparoscopic Sleeve Gastrectomy and Laparoscopic Roux-en-Y Gastric Bypass at Baseline, 6 Months, and 1, 3, and 5 Years

|                                               | Model-Based Mean<br>(95% CI) in<br>Operations | Baseline         | 0.5 y            | 1 y              | 3 y              | 5 y                 | P |
|-----------------------------------------------|-----------------------------------------------|------------------|------------------|------------------|------------------|---------------------|---|
| Total cholesterol, mmol/L <sup>a</sup>        |                                               |                  |                  |                  |                  |                     |   |
| Sleeve gastrectomy                            |                                               |                  |                  |                  |                  |                     |   |
| No.                                           |                                               | 106              | 115              | 110              | 108              | 97                  |   |
| Model-based mean (95% CI)                     |                                               | 4.5 (4.4 to 4.7) | 4.5 (4.3 to 4.7) | 4.7 (4.5 to 4.8) | 5.0 (4.8 to 5.1) | 4.9 (4.7 to 5.0)    |   |
| Gastric bypass                                |                                               |                  |                  |                  |                  |                     |   |
| No.                                           |                                               | 106              | 107              | 105              | 100              | 91                  |   |
| Model-based mean (95% CI)                     |                                               | 4.6 (4.4 to 4.8) | 4.1 (4.0 to 4.3) | 4.3 (4.1 to 4.5) | 4.5 (4.4 to 4.7) | 4.6 (4.5 to 4.8)    |   |
| Difference                                    |                                               |                  | 0.4 (0.1 to 0.6) | 0.4 (0.1 to 0.6) | 0.4 (0.2 to 0.7) | 0.2 (−0.003 to 0.5) |   |
| P value (corrected with step-down Bonferroni) |                                               |                  | .008             | .006             | <.001            | .053                |   |
| LDL-C, mmol/L <sup>b</sup>                    |                                               |                  |                  |                  |                  |                     |   |
| Sleeve gastrectomy                            |                                               |                  |                  |                  |                  |                     |   |
| No.                                           |                                               | 101              | 111              | 109              | 107              | 95                  |   |
| Model-based mean (95% CI)                     |                                               | 2.6 (2.4 to 2.8) | 2.6 (2.5 to 2.8) | 2.6 (2.5 to 2.8) | 2.8 (2.7 to 2.9) | 2.7 (2.6 to 2.9)    |   |
| Gastric bypass                                |                                               |                  |                  |                  |                  |                     |   |
| No.                                           |                                               | 103              | 107              | 104              | 100              | 91                  |   |
| Model-based mean (95% CI)                     |                                               | 2.6 (2.4 to 2.7) | 2.3 (2.2 to 2.4) | 2.3 (2.2 to 2.4) | 2.4 (2.3 to 2.5) | 2.5 (2.3 to 2.6)    |   |
| Difference                                    |                                               |                  | 0.3 (0.1 to 0.5) | 0.3 (0.2 to 0.5) | 0.4 (0.2 to 0.6) | 0.2 (0.04 to 0.5)   |   |
| P value (corrected with step-down Bonferroni) |                                               |                  | .006             | .003             | <.001            | .02                 |   |

# Hypertension resolution at 5-year follow-up, $p=0.02$ baseline $n=170$ (71%)

- Evaluation criteria:
  - No medications = resolution
  - less medications
  - no change in medications (baseline 71%)
- No objective measurements
- Resolution: LSG 29% vs. LRYGB 51%
- Less medications: LSG 35% vs. LRYGB 30%
- No improvement: LSG 35% vs. LRYGB 19%

# Overall morbidity at 5-year follow-up (30 days to 5 years)

## Overall morbidity

- LSG 19% vs. LRYGB 26% (p=0.19)
- Minor complication rate = Clavien-Dindo I-IIIa (p=0.96)
  - LSG 10.7% vs. LRYGB 10.9%
- Major complication rate = Clavien-Dindo IIIb (p=0.10)
  - LSG 8.3% vs. LRYGB 15.1%

## Reoperations

- = Clavien-Dindo IIIb
- LSG n= 10
  - GERD n= 7
  - Incisional hernia n= 3
- LRYGB n= 18
  - Suspected internal herniation n= 17
  - Incisional hernia n= 1



# Overall early (<30 d) and late (>30 d) morbidity

| Complication Category and Type                        | Sleeve Gastrectomy (n = 121) | Gastric Bypass (n = 119) | P Value |
|-------------------------------------------------------|------------------------------|--------------------------|---------|
| <b>Minor Early (&lt;30 d) Complications, No. (%)</b>  |                              |                          |         |
| Bleeding                                              | 3 (2.5)                      | 2 (1.7)                  |         |
| Intra-abdominal infection/infection of unknown origin | 2 (1.7)                      | 8 (6.8)                  |         |
| Pneumonia                                             | 1 (0.8)                      | 6 (5.1)                  |         |
| Superficial wound infection                           | 2 (1.7)                      | 3 (2.6)                  |         |
| Troacar site pain                                     | 1 (0.8)                      |                          |         |
| Dehydration                                           |                              | 1 (0.9)                  |         |
| Total                                                 | 9 (7.4)                      | 20 (17.1)                | .02     |
| <b>Major Early (&lt;30 d) Complications, No. (%)</b>  |                              |                          |         |
| Bleeding                                              | 3 (2.5)                      | 7 (6.0)                  |         |
| Intra-abdominal infection/infection of unknown origin | 1 (0.8)                      | 3 (2.6)                  |         |
| Pneumonia                                             | 1 (0.8)                      |                          |         |
| Bowel perforation                                     | 1 (0.8)                      |                          |         |
| Torsion of the enteroanastomosis                      |                              | 1 (0.9)                  |         |
| Outlet obstruction                                    | 1 (0.8)                      |                          |         |
| Total                                                 | 7 (5.8)                      | 11 (9.4)                 | .29     |
| <b>Minor Late (&gt;30 d) Complications, No. (%)</b>   |                              |                          |         |
| Vomiting/dehydration                                  |                              | 3 (2.5)                  |         |
| Gastroesophageal reflux                               | 11 (9.1)                     |                          |         |
| Ulcer/stricture at gastrojejunal anastomosis          | 2 (1.7)                      | 6 (5.0)                  |         |
| Dumping                                               |                              | 3 (2.5)                  |         |
| Nonspecific abdominal pain                            |                              | 1 (0.8)                  |         |
| Total                                                 | 13 (10.7)                    | 13 (10.9)                | .96     |
| <b>Major Late (&gt;30 d) Complications, No. (%)</b>   |                              |                          |         |
| Gastroesophageal reflux                               | 7 (5.8)                      |                          |         |
| Internal herniation                                   |                              | 17 (14.3)                |         |
| Incisional hernia                                     | 3 (2.5)                      | 1 (0.8)                  |         |
| Total                                                 | 10 (8.3)                     | 18 (15.1)                | .10     |

## Vitamin deficiencies at 5 years, $p = ns$

- Median micronutrient levels regardless of possible vitamin supplementation
- Vitamin D: **LSG** 83 nmol/L vs. **LR YGB** 77 nmol/L ( $p=0.24$ )
- B<sub>12</sub> vitamin: **LSG** 409 pmol/L vs. **LR YGB** 357 pmol/L ( $p=0.07$ )
- Albumin: **LSG** 37 g/L vs. **LR YGB** 38 g/L ( $p=0.28$ )
- Folate: **LSG** 743 nmol/L vs. **LR YGB** 801 nmol/L ( $p=0.78$ )

# In conclusion: SLEEVEPASS 5-year follow-up

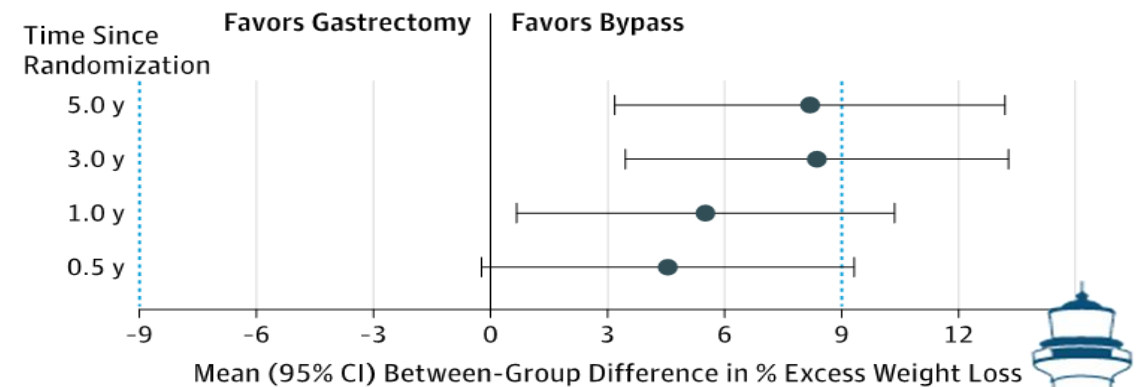
**CONCLUSIONS AND RELEVANCE** Among patients with morbid obesity, use of laparoscopic sleeve gastrectomy compared with use of laparoscopic Roux-en-Y gastric bypass did not meet criteria for equivalence in terms of percentage excess weight loss at 5 years. Although gastric bypass compared with sleeve gastrectomy was associated with greater percentage excess weight loss at 5 years, the difference was not statistically significant, based on the prespecified equivalence margins.

- Weight loss:
  - No statistically significant difference in %EWL, but greater %EWL after LRYGB
- T2DM total / partial remission: no difference
- Dyslipidemia: no difference in remission, better LDL values after LRYGB
- Hypertension resolution: LRYGB? (definition?)
- No differences in micronutrient deficiencies
- LSG: GERD / LRYGB: closure of the defects

# How to choose the optimal bariatric procedure?

- Patient related factors
- Obesity associated comorbidities
  - Duration?
- GERD?
- SM-BOSS + SLEEVEPASS
  - $217 + 240 = 457$

Figure 4. Differences in Estimates of Mean Percentage Excess Weight Loss Between Laparoscopic Sleeve Gastrectomy and Laparoscopic Roux-en-Y Gastric Bypass Over 5-Year Follow-up



Prespecified equivalence margins (blue dotted lines) for the clinical significance of weight loss differences between gastric bypass and sleeve gastrectomy were -9% to +9% excess weight loss. Error bars indicate 95% confidence interval.



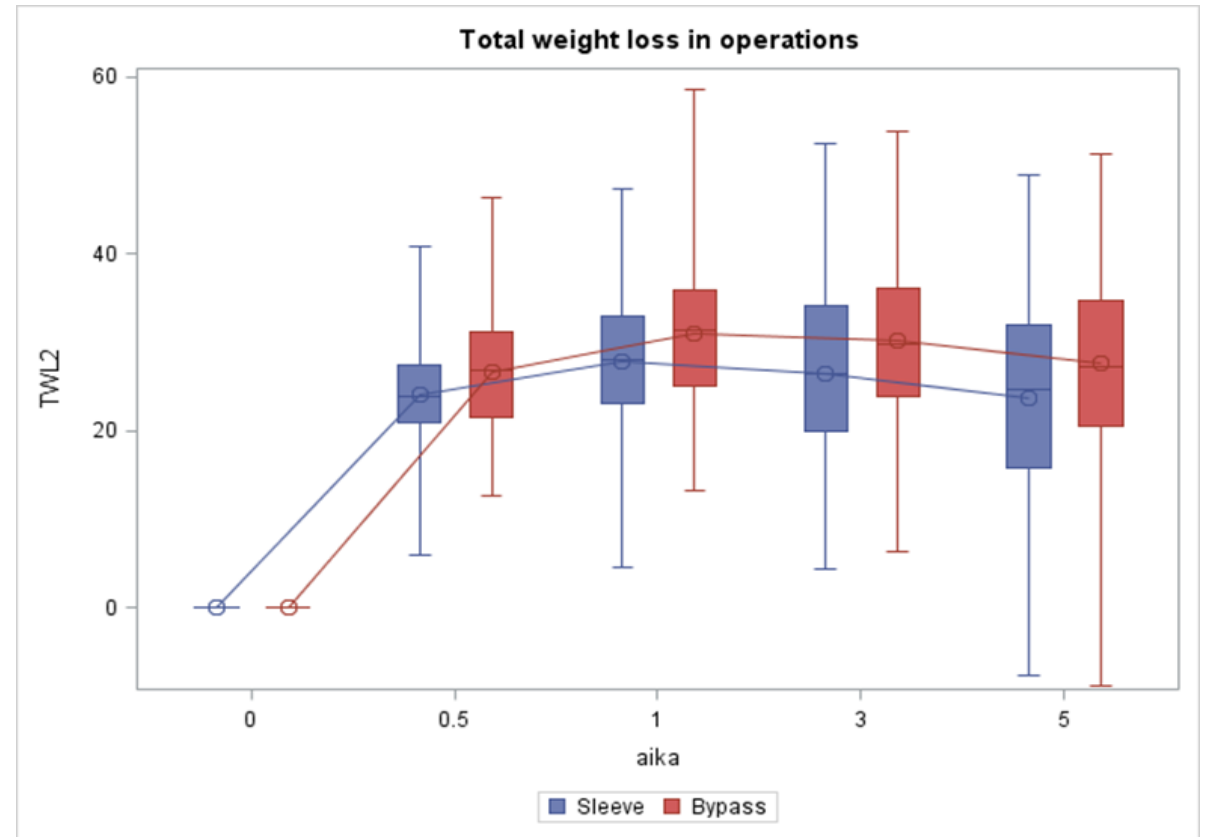
# BEST

BYPASS EQUIPOISE SLEEVE TRIAL



# SLEEVEPASS + SM-BOSS preliminary analyses

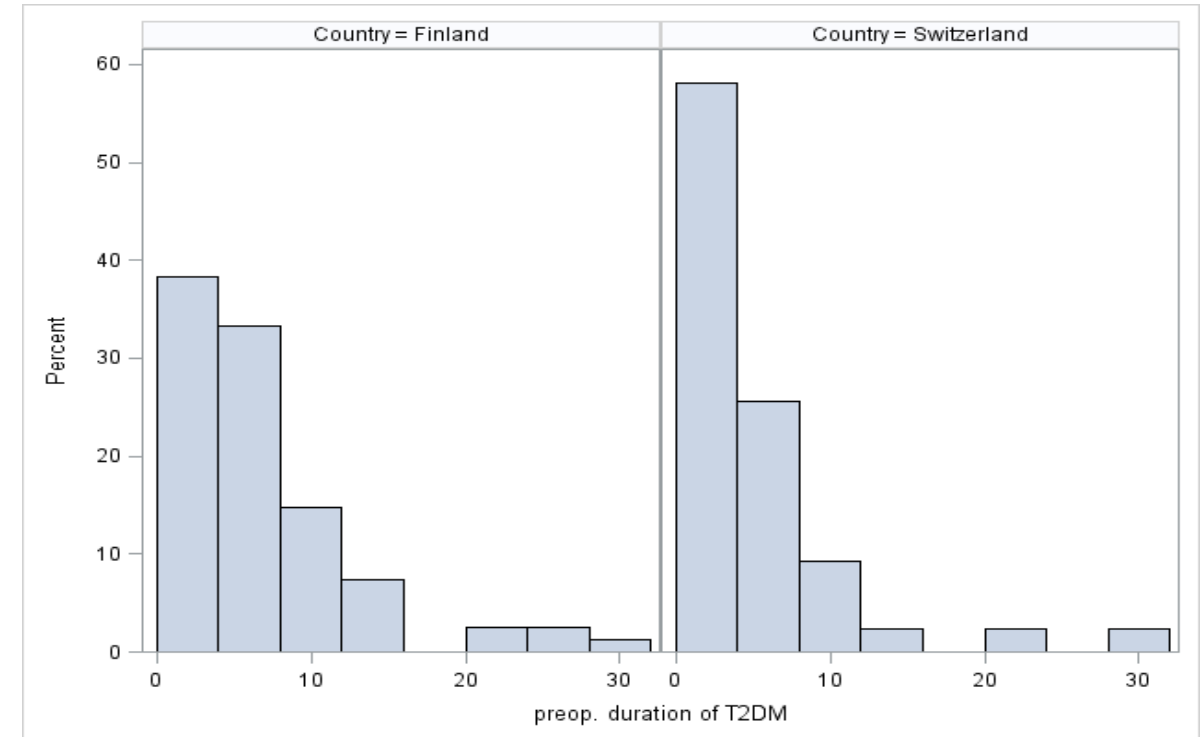
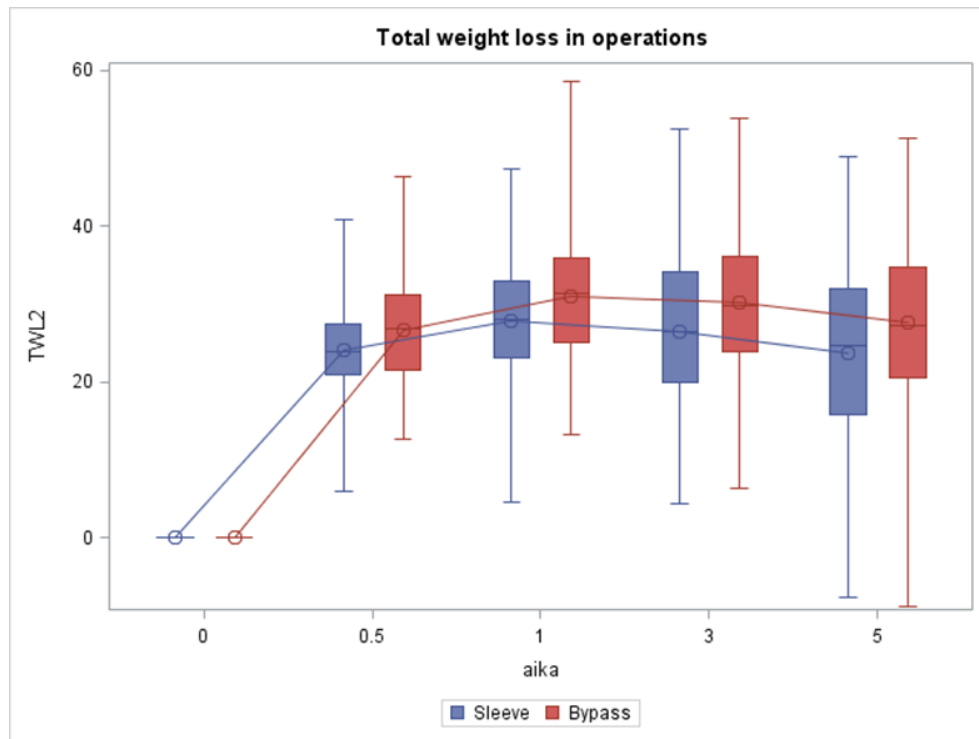
- %TWL is superior in LRYGB (p<0.001)
  - Mean %TWL in LSG 25.4%
  - Mean %TWL in LRYGB 28.7%



Unpublished data

# SLEEVEPASS + SM-BOSS preliminary analyses

- %TWL is superior in LRYGB ( $p < 0.001$ )
  - Mean %TWL in LSG 25.4%
  - Mean %TWL in LRYGB 28.7%



Unpublished data

# SLEEVEPASS Study Group – *Thank you!*



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