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Preoperative GLP-1 Therapy Before Bariatric Surgery

A two-year cohort study of body composition and weight outcomes after gastric bypass.

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SPEAKER DISCLOSURE

Conflict of Interest

No, nothing to disclose

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None	None	None	None

Presentation layout made with Claude Design

INTRODUCTION · SETTING THE STAGE

Two of the most powerful obesity treatments in history, now used together

1 billion+

people worldwide are living with obesity — prevalence has more than doubled since 1990.

– 49% mortality

MBS cuts the risk of dying by almost half compared with usual care — about 6 more years of life.

15–21% TBWL

Modern GLP-1 RAs (semaglutide, tirzepatide) now approach surgical-grade weight loss in RCT.

*GLP-1 RAs are now routinely prescribed **before** bariatric surgery — as a bridge, an optimisation step, or simply because patients already arrive on already arrive on them.*

Sources: NCD-RisC, Lancet 2017 · Schauer et al. (STAMPEDE), NEJM 2017 · Syn et al., Lancet 2021 · Wilding et al., NEJM 2021 · Jœstreboff et al., NEJM 2022

INTRODUCTION · THE OPEN QUESTION

GLP-1 Rapid weight loss has a hidden cost

25 – 35%

of TWL during GLP-1 RA therapy can be **lean mass, not fat**

Preoperative weight loss

Meta-analyses of **5,000+ patients** show **no consistent effect of preoperative GLP-1 RA on postoperative weight loss** — and its effect on fat vs. muscle after surgery remains, in the literature's own words, *"essentially uncharacterized."*

This is exactly the gap our study set out to close.

Sources: Wilding et al. (STEP 1), NEJM 2021 · Jastreboff et al. (SURMOUNT-1), NEJM 2022 · Eisa & Barood, Diabetes Obes Metab 2026 · Stefanakis et al., Metabolism 2024 · Gaillard et al., Obes Surg 2018 · Liu et al., SOARD 2026 · Esparham et al., Obes Surg 2025

*Does better weight loss **before** surgery mean better results **two years after** surgery?*

INTRODUCTION · WHY THIS QUESTION, WHY NOW

2026: a field in flux — guidance is racing to catch up

< 4,600 → 1.4M

GLP-1 prescriptions among patients with severe obesity, 2018 → 2025.

43,000 → < 40,000

US MBS volumes dipped for the first time in 2024–2025.

430,000+ patients

Real-world ASMBS 2026 data: surgery still outperformed GLP-1 drugs on TWL & metabolic control.

Source: ASMBS Annual Meeting 2026 (San Antonio) news releases · Surgery for Obesity and Related Diseases

STUDY AIM

Does pre-op GLP-1 change what happens at 2 years?

Weight loss

Total & excess body-weight lost at 2 years

Metabolic control

Diabetes, lipids & labs

Body composition

Fat & muscle mass — body scan (DXA)

Predictors

What drives suboptimal weight loss?

METHODS & COHORT

270 primary gastric bypass, two groups

270

patients · primary laparoscopic RYGB · 2017–2023

Upfront surgery · S

202 patients (74.8%)

Straight to gastric bypass

GLP-1 + surgery · MS

68 patients (25.2%)

≥ 4 weeks of a GLP-1 RA (liraglutide, semaglutide or tirzepatide) before surgery.

Body composition scan (DXA) — fat & muscle at 0, 12 & 24 months

Follow-up — 6 / 12 / 18 / 24 months

Multivariable regression — predictors of failure

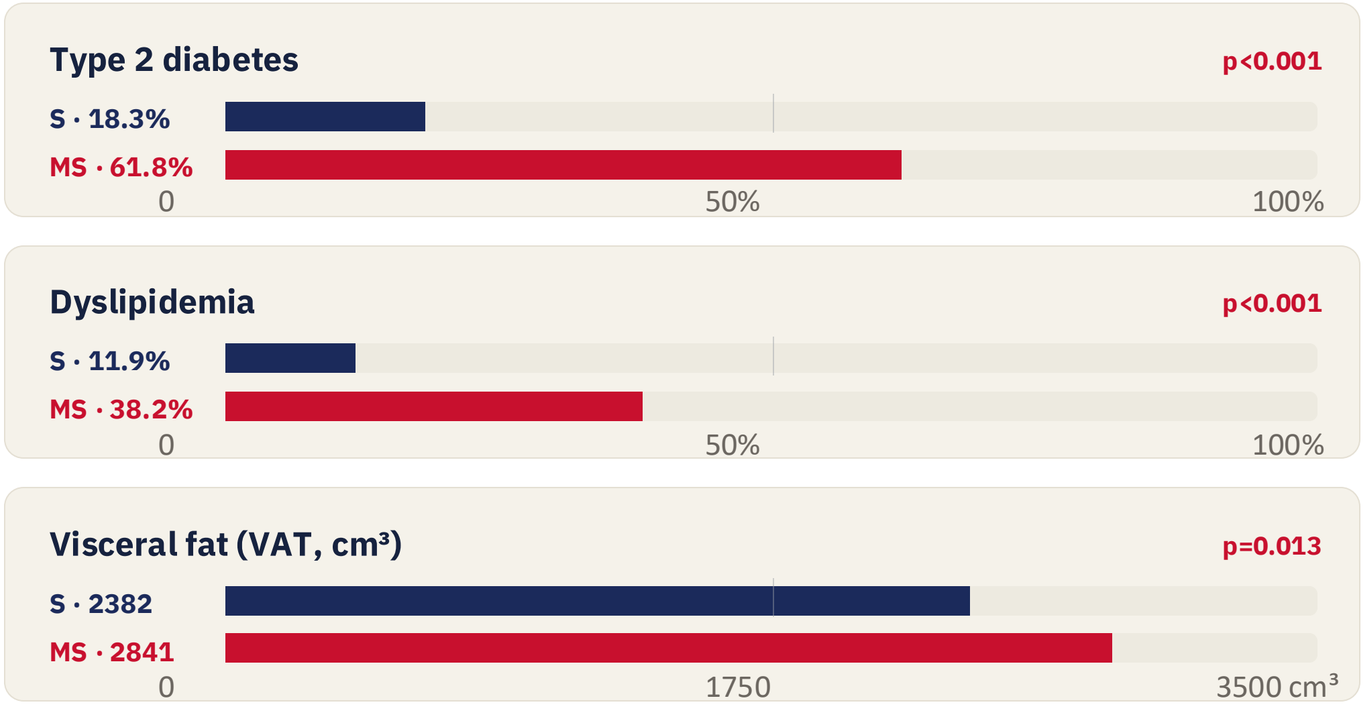
BASELINE ·

The two groups did not start equal

Variable	S (n=202)	MS (n=68)	p
DEMOGRAPHICS & ANTHROPOMETRICS			
Female sex	**78.7%**	63.2%	**0.015**
Age (years)	42.5 ± 10.7	44.6 ± 11.3	0.170
Initial weight (kg)	119.0 ± 21.9	**127.7 ± 24.3**	**0.007**
Initial BMI (kg/m²)	43.1 ± 5.6	44.6 ± 6.4	0.083
Waist circumference (cm)	126.9 ± 14.9	131.3 ± 12.8	0.070
COMORBIDITIES			
Hypertension	38.1%	48.5%	0.154
Type 2 diabetes	18.3%	**61.8%**	**<0.001**
Obstructive sleep apnea	38.6%	42.6%	0.569
Dyslipidemia	11.9%	**38.2%**	**<0.001**
Cardiac disease	5.0%	7.5%	0.538
Asthma	14.4%	14.7%	1.000
Cholelithiasis	29.6%	31.3%	0.878

BASELINE ·

The two groups did not start equal



3×

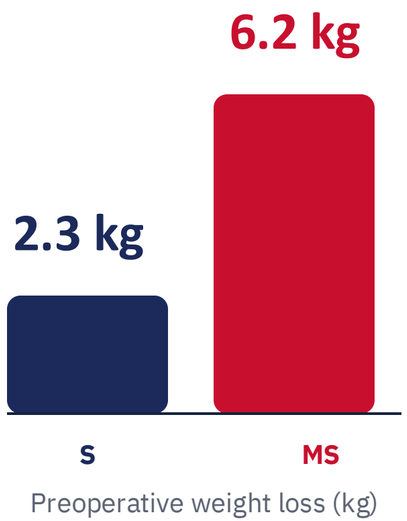
more diabetes in the GLP-1 group

The GLP-1 (MS) group carried a heavier metabolic burden from the start.

Patients who needed medical optimisation first

RESULT 1 · BEFORE SURGERY

The bridge works — GLP-1 wins pre-op



Preoperative weight loss (kg)

2.7× **more pre-op weight loss with GLP-1**

6.2 ± 8.2 kg vs 2.3 ± 5.4 kg · **p<0.001**

Same finding as the literature: GLP-1 is an effective **bridge to surgery** .

Preoperative Changes & Operative Variables

Variable	S (n=202)	MS (n=68)	p
INTRAOPERATIVE VARIABLES			
Operating time (min)	144.3 ± 41.3	**159.1 ± 42.5**	**0.012**
Biliopancreatic limb (cm)	60.2 ± 35.6	**79.0 ± 42.8**	**<0.001**
Length of hospital stay (days)	2.8 ± 3.3	2.8 ± 1.0	0.815
Concomitant cholecystectomy	65.5%	76.1%	0.130

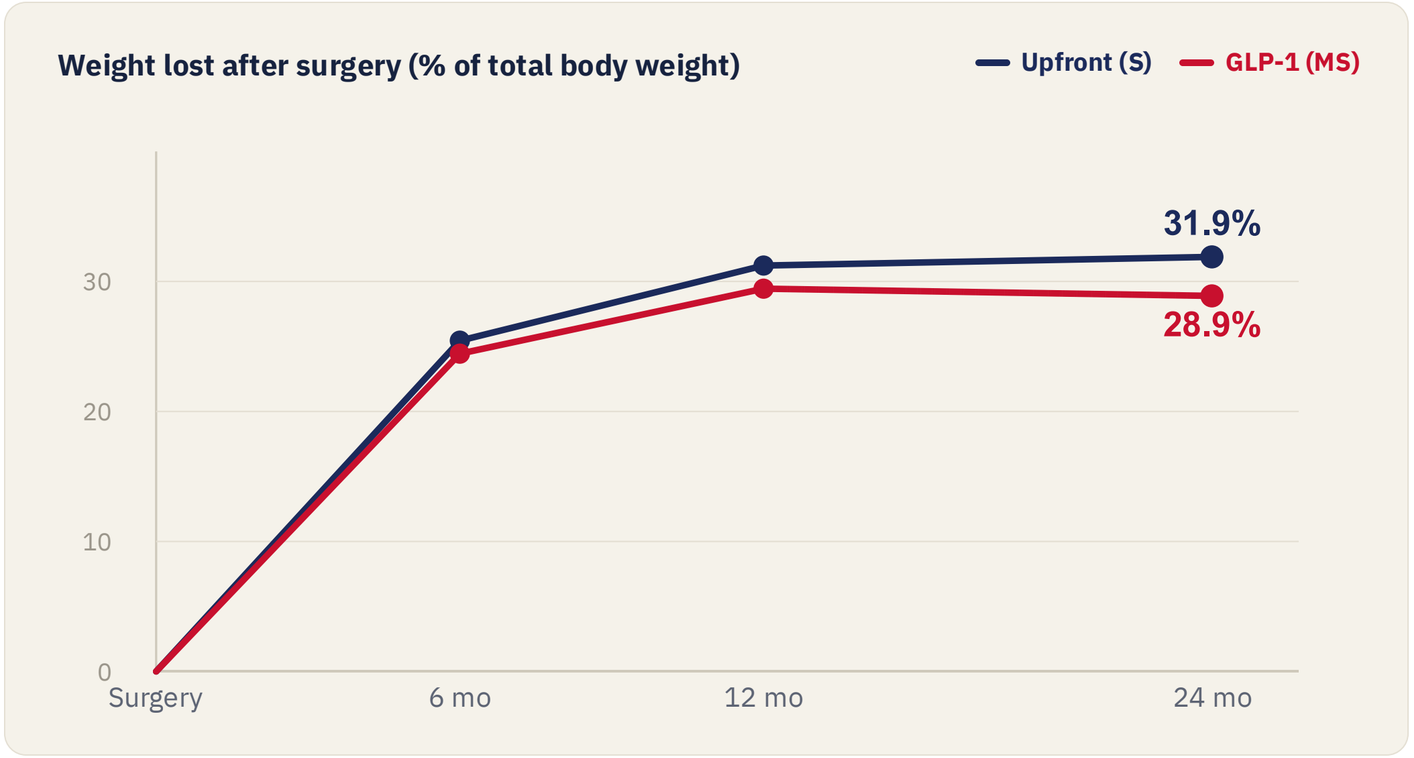
Perioperative Complications

Complication	S (n=202)	MS (n=68)	p
Any complication	12.9%	13.2%	0.949
Major (Clavien-Dindo ≥ III)	2.5%	2.9%	1.000
Rehospitalization	5.0%	4.4%	0.851
Reoperation	1.5%	1.5%	1.000
Anastomotic leak	1.0%	1.5%	1.000
Hemorrhage	2.5%	2.9%	0.949
Venous thromboembolism	0.5%	0.0%	0.560
Ileus	1.0%	0.0%	0.409
Surgical site infection	1.0%	0.0%	0.711

✓ Every complication category was statistically comparable between groups — preoperative GLP-1 RA did not increase perioperative risk.

RESULT 2 · THE KEY FINDING

After surgery, the head start disappears



At 24 months

Upfront surgery reached reached higher weight loss loss

31.9% vs 28.9% · **p=0.019**

Suboptimal (< 20% of TWL) at 24 mo: **8.8% vs 15.9%** (p=0.15, NS).

No weight loss advantage from the pre-op drug.

RESULT 2 · MULTIVARIABLE ANALYSIS

After surgery, the head start disappears

MULTIVARIATE TWL 24M — Not adjusted for baseline diabetes			
Variable	β	95% CI	p
MS group (GLP1)	**−2.50**	−4.94 to −0.05	**0.045**
Female sex	2.67	0.19 to 5.15	**0.035**
Preoperative BMI (per kg/m²)	0.30	0.13 to 0.48	**0.001**
Age (per year)	−0.09	−0.19 to 0.01	0.083
Baseline diabetes		*— not included in model —*	

MULTIVARIATE TWL 24M — Adjusted for baseline diabetes			
Variable	β	95% CI	p
MS group (GLP1)	**−0.56**	−3.21 to 2.09	0.678
Female sex	2.73	0.31 to 5.16	**0.027**
Preoperative BMI (per kg/m²)	0.33	0.15 to 0.51	**<0.001**
Age (per year)	−0.03	−0.13 to 0.08	0.639
Baseline diabetes	**−4.53**	−7.18 to −1.88	**0.001**

β = adjusted absolute difference in 24-month TWL (%) · enter method · Model A R^2 = 0.144, Model B R^2 = 0.103 · 26/270 patients without 24-month weight · significant p (<0.05) in bold

Unadjusted, preoperative GLP-1 RA appears to blunt 24-month weight loss.
Once **baseline diabetes** — more frequent in the MS group — **is entered in the model, the association vanishes**; diabetes itself carries the −4.53% penalty

Comorbidity Persistence Over Time

● S · upfront surgery ● MS · GLP-1 + surgery · bold red = significant vs S, p<0.05

Comorbidity persisting	6 months		12 months		18 months		24 months	
	S	MS	S	MS	S	MS	S	MS
Hypertension	20.6%	23.5%	20.1%	23.5%	17.8%	23.7%	16.9%	17.2%
Diabetes / prediabetes	10.4%	**25.0%***	8.7%	17.6%	10.2%	**25.9%***	10.2%	**30.2%***
Obstructive sleep apnea	21.6%	30.8%	18.1%	23.1%	12.5%	19.6%	11.4%	16.7%
Dyslipidemia	4.1%	10.3%	2.2%	**10.3%***	2.6%	**15.3%***	1.7%	**17.2%***
Cardiac disease	3.6%	7.4%	3.8%	8.8%	4.5%	10.2%	4.5%	9.4%

✓ Diabetes and dyslipidemia remained significantly more common in the GLP-1 group

RESULT 3 · BODY COMPOSITION · FAT & MUSCLE (DXA SCAN)

Same fat loss — but watch the muscle early

Visceral fat
fat around the organs (VAT)

Fell sharply in both groups and was **comparable at 24 months**.

12 mo	S 805 · MS 984 cm³	p=0.058 · NS
24 mo	S 798 · MS 997 cm³	p=0.296 · NS

Muscle mass
muscle in arms & legs (ALMI)

Comparable at 24 months
but the upfront group had **lower ALMI at 12 months**.

12 mo	S 8.2 · MS 8.6 kg/m²	p=0.038 · significant
24 mo	S 8.2 · MS 8.3 kg/m²	p=0.721 · NS

Two likely drivers:

- **Faster weight loss** after upfront surgery — more lean mass lost per kg
- **Earlier dietary adaptation** — GLP-1 patients settle protein intake before surgery

Absolute ALMI loss was similar: –2.0 vs –1.7 kg/m² (p=0.364)

Exploratory finding — no difference between groups at 24 months.

RESULT 4 · MULTIVARIABLE ANALYSIS

What predicts suboptimal weight loss?

ONLY INDEPENDENT PREDICTOR

Preoperative BMI

Adjusted OR **0.861**

95% CI 0.786–0.944 · **p=0.001**

Not independent predictors:

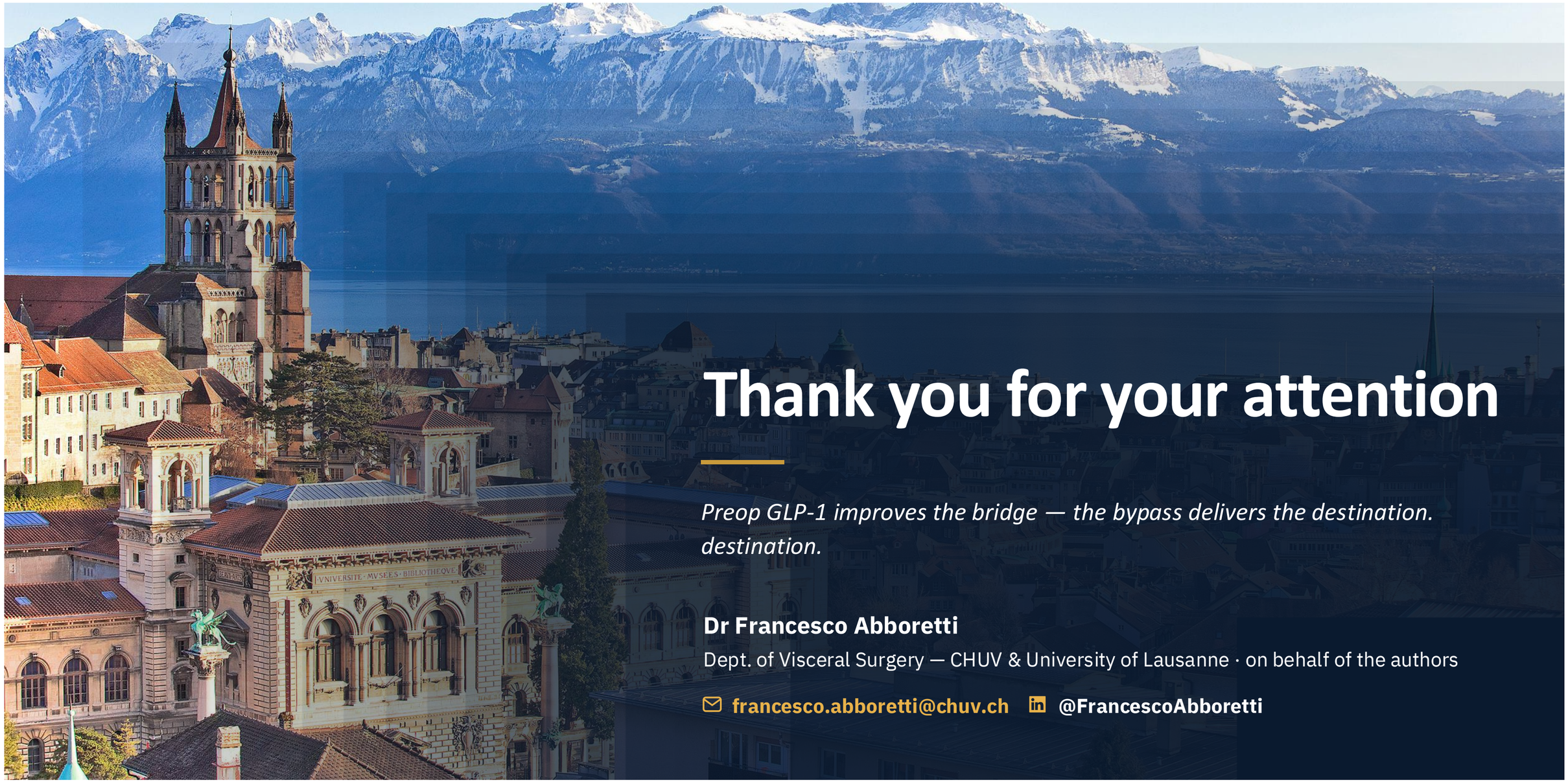
Treatment group (GLP-1 vs upfront)
OR 1.71 (0.69–4.24) · p=0.25

Female sex
OR 0.77 (0.30–2.00) · p=0.59

TAKE-HOME MESSAGES

What to remember

1. GLP-1 improves **pre-op** weight loss — but adds **no weight or metabolic benefit** at 2 years after gastric bypass.
2. The **operation** drives the mid-term result — **preoperative BMI**, not the drug, predicts suboptimal weight loss.
3. **Don’t delay definitive surgery** — use pre-op GLP-1 when indicated, as a **bridge, not a substitute**.
4. **GLP-1 non-responders still benefit** — surgery, not the drug, is the true determinant of weight loss.



Thank you for your attention

Preop GLP-1 improves the bridge — the bypass delivers the destination. destination.

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Baseline — Laboratory Values & Body Composition

Variable	S (n=202)	MS (n=68)	p
LABORATORY VALUES			
HbA1c (%)	5.7 ± 0.7	6.2 ± 1.1	**<0.001**
Hemoglobin (g/L)	139.4 ± 13.0	143.1 ± 14.2	**0.049**
Total cholesterol (mmol/L)	4.9 ± 0.9	4.7 ± 1.6	0.271
HDL cholesterol (mmol/L)	1.2 ± 0.4	1.1 ± 0.2	0.060
LDL cholesterol (mmol/L)	2.9 ± 0.8	2.6 ± 0.8	**0.002**
Triglycerides (mmol/L)	1.6 ± 0.8	2.1 ± 1.4	**0.004**
ALT (U/L)	34.6 ± 21.6	37.7 ± 22.6	0.339
AST (U/L)	24.3 ± 9.1	26.2 ± 10.7	0.179
Albumin (g/L)	43.5 ± 2.6	44.6 ± 2.5	**0.008**
BASELINE BODY COMPOSITION (DXA)			
VAT (cm^3)	2382 ± 1146	2841 ± 1282	**0.013**
ALMI (kg/m^2)	9.7 ± 1.4	10.1 ± 1.2	0.071
FMI (kg/m^2)	21.8 ± 4.3	21.4 ± 6.0	0.585
Body fat (%)	51.6 ± 5.5	49.2 ± 8.8	**0.022**

VAT = visceral adipose tissue. ALMI = appendicular lean mass index. FMI = fat mass index. Body composition available in ~73% of patients. Source: Manuscript Table 1.

SUPPLEMENTARY DATA · TABLE 2A BACKUP

Preoperative Changes & Operative Variables

Variable	S (n=202)	MS (n=68)	p
PREOPERATIVE WEIGHT CHANGES			
Preoperative weight (kg)	116.7 ± 22.0	121.5 ± 25.7	0.139
Preoperative BMI (kg/m²)	42.7 ± 5.6	42.8 ± 7.3	0.916
Preoperative weight loss (kg)	2.3 ± 5.4	6.2 ± 8.2	**<0.001**
Preoperative follow-up (months)	22.6 ± 14.7	32.6 ± 21.3	**<0.001**
INTRAOPERATIVE VARIABLES			
Operating time (min)	144.3 ± 41.3	159.1 ± 42.5	**0.012**
Biliopancreatic limb (cm)	60.2 ± 35.6	79.0 ± 42.8	**<0.001**
Length of hospital stay (days)	2.8 ± 3.3	2.8 ± 1.0	0.815
Concomitant cholecystectomy	65.5%	76.1%	0.130

Alimentary limb length was comparable (107.4 ± 25.6 vs 102.9 ± 19.5 cm, p=0.192). Source: Manuscript Table 2.

SUPPLEMENTARY DATA · TABLE 3 BACKUP

Weight Outcomes Over Time — Full Matrix

● S · upfront surgery ● MS · GLP-1 + surgery · bold red = significant vs S, p<0.05

Outcome	6 months		12 months		18 months		24 months	
	S	MS	S	MS	S	MS	S	MS
TWL (%)	25.4	24.4	31.2	29.4	32.5	30.0	31.9	**28.9***
EWL (%)	64.8	65.2	79.4	77.8	81.2	79.4	80.8	75.3
Weight (kg)	87.3	91.8	80.3	**85.4***	78.9	**85.0***	79.3	**86.0***
BMI (kg/m²)	31.9	32.3	29.4	30.1	29.0	29.7	29.0	30.2

Weight-loss failure at 24 mo (TWL < 20%): **8.8% (S) vs 15.9% (MS)**, p=0.153, NS · EWL < 50%: **9.9% vs 17.5%**, p=0.119, NS

TWL = total weight loss. EWL = excess weight loss. Source: Manuscript Table 3.

SUPPLEMENTARY DATA · TABLE 4 BACKUP

Comorbidity Persistence Over Time

● S · upfront surgery ● MS · GLP-1 + surgery · bold red = significant vs S, p<0.05

Comorbidity persisting	6 months		12 months		18 months		24 months	
	S	MS	S	MS	S	MS	S	MS
Hypertension	20.6%	23.5%	20.1%	23.5%	17.8%	23.7%	16.9%	17.2%
Diabetes / prediabetes	10.4%	**25.0%***	8.7%	17.6%	10.2%	**25.9%***	10.2%	**30.2%***
Obstructive sleep apnea	21.6%	30.8%	18.1%	23.1%	12.5%	19.6%	11.4%	16.7%
Dyslipidemia	4.1%	10.3%	2.2%	**10.3%***	2.6%	**15.3%***	1.7%	**17.2%***
Cardiac disease	3.6%	7.4%	3.8%	8.8%	4.5%	10.2%	4.5%	9.4%

Higher persistence in MS reflects heavier baseline burden (3× diabetes, 3× dyslipidemia at baseline), not treatment failure. Source: Manuscript Table 4.

Laboratory Values at Follow-up

● S · upfront surgery ● MS · GLP-1 + surgery · bold red = significant vs S, p<0.05

Lab value	6 mo		12 mo		18 mo		24 mo	
	S	MS	S	MS	S	MS	S	MS
HbA1c (%)	5.2	**5.5***	5.2	**5.5***	5.2	**5.6***	5.2	**5.5***
Hemoglobin (g/L)	135.7	138.6	134.6	**139.4***	134.2	137.9	134.1	**139.5***
Total cholesterol	4.1	4.0	4.2	4.2	4.4	4.1	4.4	4.4
LDL cholesterol	2.3	2.1	2.2	2.2	2.2	2.1	2.3	2.2
Triglycerides	1.1	1.2	1.0	**1.2***	1.1	1.2	1.0	1.1
ALT (U/L)	23.6	**31.2***	27.1	**31.1***	30.3	32.6	25.7	**31.2***
AST (U/L)	21.0	**25.3***	23.2	**26.4***	25.9	27.3	22.6	**26.7***
Albumin (g/L)	43.0	43.2	43.4	44.2	43.1	44.0	43.1	**44.2***

Mean values shown (SD omitted for density — see manuscript Table 5). Higher HbA1c/transaminases in MS track their 3× baseline diabetes prevalence. Source: Manuscript Table 5.

Body Composition at Follow-up (DXA)

Variable	12 months		24 months	
	S (n=202)	MS (n=68)	S (n=202)	MS (n=68)
VAT (cm³)	804.9 ± 615.4	983.8 ± 613.4	798.1 ± 594.5	996.7 ± 615.3
VAT reduction from baseline (cm³)	1682.9 ± 881.1	1843.3 ± 831.6	2014.0 ± 897.5	1857.7 ± 619.0
ALMI (kg/m²)	**8.2 ± 1.2**	**8.6 ± 1.3***	8.2 ± 1.3	8.3 ± 1.3
Change in ALMI from baseline (kg/m²)	1.5 ± 1.5	1.3 ± 1.5	2.0 ± 1.2	1.7 ± 0.8
FMI (kg/m²)	11.2 ± 4.9	11.7 ± 6.5	10.2 ± 3.9	10.0 ± 4.7
Body fat (%)	36.2 ± 9.2	33.8 ± 10.2	33.9 ± 8.6	36.3 ± 9.2

⚠ * Only significant between-group difference in the entire body-composition dataset: **ALMI at 12 months** (p=0.038) — the upfront-surgery group had less muscle at that point.

ALMI = appendicular lean mass index (muscle). FMI = fat mass index. VAT reduction = baseline − follow-up (positive = reduction). Source: Manuscript Table 6.

Multivariable Regression — Both Failure Definitions

Table 7 · TWL failure (<20%) at 24 mo

Variable	Adj. OR	95% CI	p
Female sex	0.690	0.273–1.742	0.433
Preoperative BMI	**0.856**	0.780–0.938	**0.001**

Table 8 · EWL failure (<50%) at 24 mo

Variable	Adj. OR	95% CI	p
Female sex	0.492	0.212–1.142	0.099
Preoperative BMI	**1.099**	1.034–1.167	**0.002**

Both models share an identical specification (adjusted for sex; n = 244/270). Treatment group was tested separately in the TWL model and was not an independent predictor: OR 1.71 (0.69–4.24), p=0.250.

For TWL failure, higher preoperative BMI was protective.

For EWL failure, the same variable was a risk factor.

Why the BMI Odds Ratio Flips Between the Two Definitions

%TWL — TOTAL WEIGHT LOSS

(initial weight – current weight) / initial weight × 100

Denominator = the whole body weight the patient started with.

%EWL — EXCESS WEIGHT LOSS

(initial weight – current weight) / (initial weight – weight at BMI 25) × 100

Denominator = only the weight above BMI 25.

THREE PATIENTS, SAME OPERATION — OPPOSITE VERDICTS

Baseline BMI	Final BMI	%TWL	%EWL	TWL < 20%	EWL < 50%
36	29.5	18%	59%	**FAILS**	passes
45	33.8	25%	56%	passes	passes
60	43.8	27%	46%	passes	**FAILS**

WHICH PATIENTS EACH THRESHOLD PENALISES

TWL < 20% → penalises a LOW starting BMI

Little fat reserve left to lose

EWL < 50% → penalises a HIGH starting BMI

Large excess weight in the denominator

Same operation, same patient — opposite verdicts.

This is why %TWL, not %EWL, is the recommended primary outcome metric.