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RESEARCH

Redo-Endoscopic Sleeve Gastroplasty for Obesity Treatment: a Multicenter Study on Feasibility, Safety, Efficacy, and Technical Predictors of Outcomes

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Abstract

Background Endoscopic sleeve gastroplasty (ESG) is an effective bariatric procedure; however, a subset of patients experiences suboptimal weight loss or recurrent weight gain over time. Redo-ESG has emerged as a potential revisional approach aimed at restoring gastric restriction.

Objective To assess the feasibility, safety, and efficacy of Redo-ESG and to identify clinical and technical variables associated with greater weight loss outcomes.

Methods This multicenter, retrospective observational study included consecutive patients who underwent Redo-ESG at six tertiary bariatric endoscopy centers. Demographic, clinical, and procedural variables were collected, including indication for revision, baseline BMI, previous reduction grade, suture pattern and location, number of sutures and stitches, procedure duration, endoscope type, and operator experience. Univariate analyses were performed to identify predictors of success and were predefined as exploratory and hypothesis-generating.

Results Twenty-five patients (84% female; mean age 48 ± 9 years; baseline BMI 34.4 ± 5.1 kg/m²) underwent Redo-ESG with 100% technical success. At a mean follow-up of 17 ± 12 months, additional %TWL was 10.8 ± 8.7%, and 52% of patients achieved clinically meaningful weight loss. Recurrent weight gain as the indication, higher baseline BMI, overlapping suture configuration, and single-channel endoscope use were identified as independent variables of greater weight loss. Two self-limited bleeding adverse events (8%) were observed, with no mortality or need for surgery.

Conclusion Redo-ESG appears a feasible, safe, and effective revisional endoscopic therapy in selected patients. Recurrent weight gain indication, higher baseline BMI, overlapping suture configuration, and single-channel endoscope use were associated with superior outcomes.

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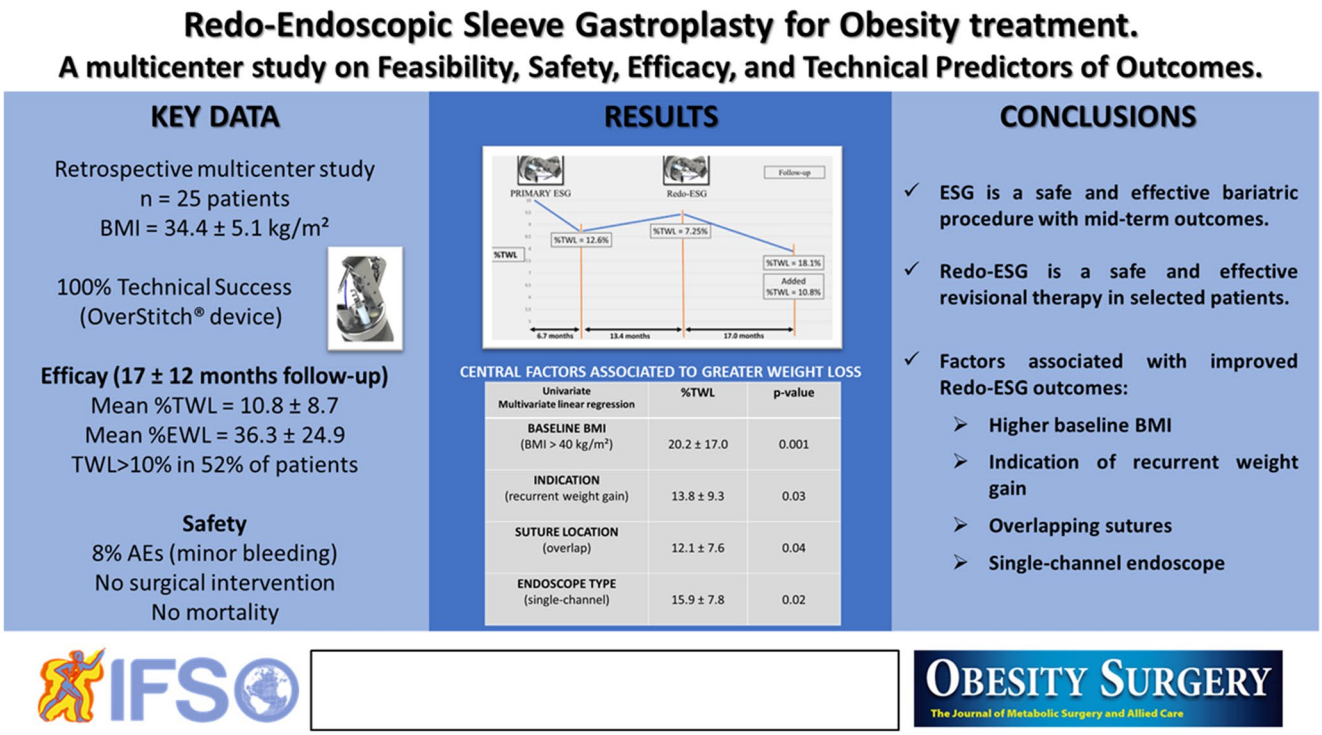
Graphical Abstract



Key Points

- ESG is a safe and effective bariatric procedure with mid-term outcomes.
- Redo-ESG is a safe and effective revisional therapy in selected patients.
- Recurrent weight gain indication, higher baseline BMI, and overlapping sutures are associated with improved Redo-ESG outcomes.

Keywords Redo-ESG · Endoscopic sleeve gastroplasty · Bariatric endoscopy · Recurrent weight gain · Obesity.

Abbreviations

ESG	Endoscopic Sleeve Gastroplasty
P-ESG	Primary-ESG
TWL	Total Weight Loss
EWL	Excess Weight Loss
BMI	Body Mass Index
AEs	Adverse Events. LSG: Laparoscopic sleeve gastrectomy
RYGB	Roux-en-Y gastric bypass

Introduction

Obesity is a chronic, relapsing disease and a major global health burden [1]. Although lifestyle interventions and pharmacotherapy may induce short-term weight loss, long-term durability remains limited for many patients [2]. Metabolic and bariatric surgery remains the most effective treatment for moderate-to-severe obesity; however, surgical risk, irreversibility, cost, and patient preference limit its acceptance [3].

Endoscopic bariatric therapies have emerged as minimally invasive alternatives bridging medical and surgical approaches [4–6]. Endoscopic sleeve gastroplasty (ESG), first described in 2013 [7], induces gastric restriction through full-thickness endoluminal suturing, resulting in delayed gastric emptying, early satiety, and clinically meaningful weight loss [8].

Multiple studies and meta-analyses have demonstrated sustained 15–20% TWL up to 24 months, with emerging long-term durability data and serious adverse event rates below 2.5% [9–21]. Despite its efficacy, a proportion of patients experience weight loss plateau or recurrent weight gain over time. Revisional strategies include dietary optimization, pharmacotherapy, surgical conversion, or endoscopic re-intervention [22, 23]. Redo-ESG aims to restore gastric restriction by reinforcing or modifying previous sutures [24, 25]; however, evidence

regarding its efficacy and technical predictors remains limited.

This multicenter study evaluates the feasibility, safety, and efficacy of Redo-ESG and explores demographic, clinical, and procedural-related predictor factors of improvement weight loss outcomes.

Methods

Study Design and Population

This multicenter, retrospective, observational study included all consecutive adult patients underwent Redo-ESG between April 2018 and June 2024 at six tertiary reference bariatric endoscopy centers. All primary ESG (P-ESG) and Redo-ESG procedures were performed using the Over-Stitch™ Endoscopic Suturing System (Apollo Endosurgery Inc., Austin, Texas, USA, nowadays Boston Scientific, Marlborough, MA, USA) by experienced ESG endoscopists and following standardized institutional protocols within multidisciplinary bariatric teams.

Inclusion criteria were age ≥ 18 years, primary ESG performed at least 3 months earlier, documented recurrent weight gain or suboptimal clinical response, a minimum follow-up of 6 months after Redo-ESG, and refusal or contraindication to bariatric surgery. All patients underwent endoscopic reassessment prior to Redo-ESG.

A total of 608 patients underwent P-ESG. Redo-ESG was offered to patients presenting with documented recurrent weight gain or suboptimal response who refused or were unsuitable for surgical conversion after multidisciplinary evaluation. Not all patients with weight recurrence underwent revisional intervention; some were managed with lifestyle optimization, pharmacotherapy, or observation. Finally, Redo-ESG was performed in 25 patients (4.1%). Therefore, the 4.1% figure reflects performed Redo-ESG procedure and does not represent the overall rate of weight recurrence after P-ESG.

All centers participating in the study complied with local ethical regulations and the study was conducted in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained before the procedure for every patient.

Data Collection

Collected variables included: (a) *Demographics (*age, gender, BMI); (b) *Clinical indication*: they were classified as recurrent weight gain (≥ 10% TWL and gained ≥ 50% of the maximum weight loss), weight loss plateau (≥ 10% TWL but could not lose further over 3-months) and weight loss failure (suboptimal clinical response, < 10% TWL); and (c) *Procedural characteristics*: previous ESG reduction grade (absent, mild, moderate or severe, according to the endoscopist's assessment), suture pattern (triangular, 'U'-shape or 'Z'-shape), suture location (overlap, fundus or mixed), number of sutures (3 to 6) and stitches (< 20, 20–30 or > 30 bites), procedure duration (< 45, 45–60 or > 60 min), endoscope type (single- vs. double-channel), and operator experience (< 100 or > 100 previous P-ESG performed) (Fig. 1).

No standardized volumetric gastric measurements or objective sleeve dilation metrics were systematically applied. Gastric reduction grading was based on endoscopist assessment, reflecting real-world practice and representing an acknowledged limitation.

Although minor technical variations (suture removal discretion, suture configuration, and endoscope platform) occurred across centers, all participating institutions were high volume tertiary bariatric endoscopy units with experienced operators and standardized peri-procedural care protocols. Given the small number of Redo-ESG procedures per center (range 1–10), formal center-effect or learning-curve analysis was not statistically feasible.

Outcomes

The primary outcome assessed following Redo-ESG was percentage of total weight loss (%TWL), and their relationship with all data collection. Secondary outcomes included percentage of excess weight loss (%EWL) and BMI loss (BMIL), technical success, feasibility, and adverse events.

Statistical Analysis

Continuous variables were assessed for normality using the Shapiro–Wilk test. Normally distributed variables were reported as mean ± standard deviation (SD). For small subgroups and non-normally distributed variables, median and interquartile range (IQR) were prioritized in tables to improve descriptive accuracy. Categorical variables were reported as counts and percentages.

Comparisons between groups were performed using Student's *t*-test or one-way ANOVA for normally distributed continuous variables, and the Mann–Whitney *U* test or Kruskal–Wallis test for non-normally distributed variables, as appropriate. Categorical variables were compared using the χ^2 test or Fisher's exact test.

Exploratory univariate analyses were performed to evaluate the association between weight loss outcomes (%TWL

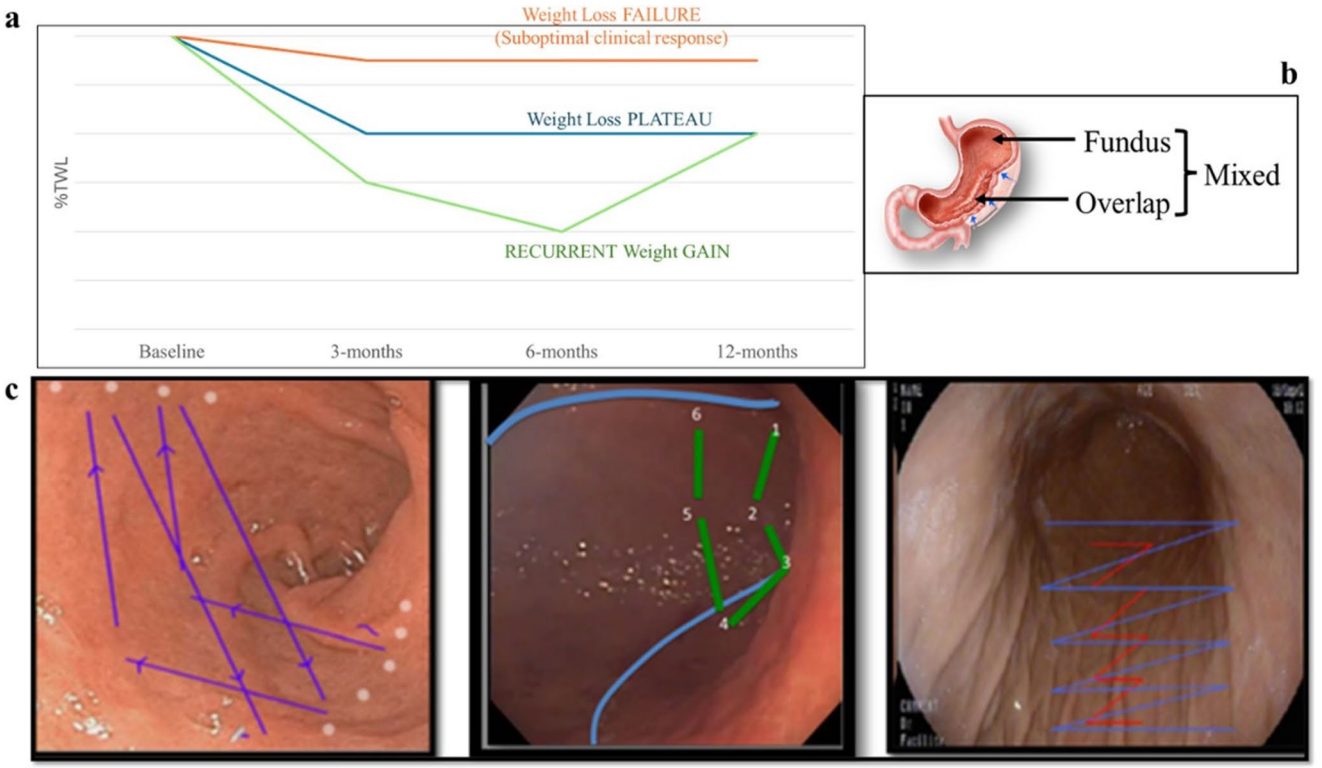


Fig. 1 Redo-ESG characteristics. Indication, Suture location, and Suture pattern. (**a**) Clinical indication: Recurrent weight gain, weight loss plateau, and weight loss failure (suboptimal clinical response). (**b**) Suture location: Fundus, Overlap, Mixed. (**c**) Suture pattern: Triangular, 'U'-shape, 'Z'-shape

and %EWL) and a total of 12 clinical and procedural variables.

Statistical significance was defined as a two-sided p-value < 0.05. All statistical analyses were performed using IBM SPSS Statistics version 27 (IBM Corp., Chicago, IL, USA).

Results

Patient Characteristics

Redo-ESG was performed in 25 of 608 primary P-ESG patients (4.1%). This value should not be interpreted as the true rate of weight recurrence, as not all patients with suboptimal outcomes underwent Redo-ESG procedures.

The cohort consisted of 21 women (84%) with a mean age of 48 ± 9 years and baseline BMI of 34.4 ± 5.1 kg/m². Mean time from P-ESG to Redo-ESG was 20.1 months (range 3–72), with a persistent mean %TWL of 7.25% (Table 1; Figs. 2 and 3).

Indications for Redo-ESG included recurrent weight gain (60%), weight loss plateau (28%), and weight loss failure – suboptimal clinical response (12%).

Technical Description

P-ESG and Redo-ESG were performed using the Over-Stitch™ Suturing System, in a first-generation double-channel endoscope device or in a single-channel endoscope (SX™ vs. NXT™ systems), depending on the hospital's availability.

All Redo-ESG were performed under general anesthesia and with CO2 insufflation. A single dose of antibiotic and antacid pre-procedure prophylaxis was administered.

Redo-ESG was technically successful in all cases (100%). When old sutures remained, the possibility to be removed with endoscopic scissors was left to the discretion of the endoscopist: in 7 cases all sutures were cut, in 4 cases only some interfering procedural sutures were removed, and in 14 cases no sutures were cut. The mean procedure time was 55 ± 19 min, with an average of 3.8 ± 1.1 sutures and 33 ± 12 stitches placed per patient.

Weight Loss Outcomes

At 17 ± 12 months of follow-up, additional mean %TWL was 10.8 ± 8.7. Secondary, additional mean %EWL was 36.3 ± 24.9 and BMI decreased from a mean of 34.4 kg/m²

Table 1 Demographic data of patients undergoing Redo-ESG and the endoscopists' experience

Variables		Outcomes	
Number of patients, *n*		25	
Gender: Male, *n (%)*/ Female, *n (%)*		4 (16%)/21 (84%)	
Age, *mean (SD)*, *years*		48 ± 9	
Time from P-ESG to Redo-ESG, *mean (range)*, *months*		20.1 (3–72)	
Persistent TWL/EWL from P-ESG, *mean*, *%*		7.25%/26.1%	
BMI before Redo-ESG, *mean (SD)*, *kg/m²*		34.4 ± 5.1	
Persistent sutures from P-ESG, *mean (range)*, *n*		2.25 (1–6)	
Number of endoscopists *(n)*		6	
Endoscopist experience	**Years performing P-ESG**	**Number of P-ESG performed**	**Number of Redo-ESG performed**
Endoscopist 1	10	100	3
Endoscopist 2	5	50	10
Endoscopist 3	4	128	6
Endoscopist 4	6	265	4
Endoscopist 5	3	55	1
Endoscopist 6	1	10	1
	Mean 4.8 (1–10)	**Total** 608 (10–265)	**Total** 25 (1–10)

P-ESG Primary Endoscopic Sleeve Gastroplasty, *TWL* Total Weight Loss, *EWL* Excess Weight Loss, *BMI* Body Mass Index

to 30.5 kg/m² ($p = 0.001$). Clinically meaningful weight loss (TWL ≥ 10% and EWL ≥ 25%) was observed in 13 (52%) of patients (Table 2; Fig. 3).

Predictors of Efficacy

Univariate analysis demonstrated significant associations between weight loss outcomes and baseline BMI, indication for Redo-ESG, suture location, and endoscope type (Table 3; Fig. 4).

- Baseline BMI: [BMI>40 kg/m²] > [BMI 35–40 kg/m²] > [BMI<35 kg/m²], (mean %TWL of 20.2 vs. 11.7 vs. 5.4, $p < 0.001$).
- Indication: [recurrent weight gain] > [weight loss failure – suboptimal clinical response] > [weight loss plateau], (mean %TWL of 13.8 vs. 8.0 vs. 6.0, $p = 0.03$).
- Suture location: [overlap] > [mixed] > [fundus], (mean %TWL of 12.1 vs. 8.7 vs. 6.3, $p = 0.04$).
- Endoscope type: [single-channel] > [double-channel], (mean %TWL of 15.9 vs. 7.9, $p = 0.02$).

No statistically significant associations were observed between weight loss and age, gender, previous gastric reduction degree, suture pattern, number of sutures, number of stitches, procedure duration, or operator experience ($p > 0.05$) (Table 3).

Safety

In 7 cases (28%), the procedure was outpatient, and in 18 cases (72%), the patient remained one-night hospitalized in accordance with the hospital's usual protocol. No patient required admission longer than 24 h.

Transient post-procedural symptoms (nausea or mild abdominal pain) were observed in several patients, consistent with P-ESG, but resolved with conservative management. No persistent vomiting, abdominal pain, severe reflux, dehydration requiring readmission, or clinically significant nutritional deficiencies were documented during follow-up.

Two adverse events (8%) were observed: one intraoperative self-limited minor bleeding allowing the procedure to be completed and resolved without any therapeutic maneuver (Clavien-Dindo grade I); and one 5th day post-procedure moderate bleeding (melena) occurred: a gastroscopy was performed, although gastric lumen narrowing prevented

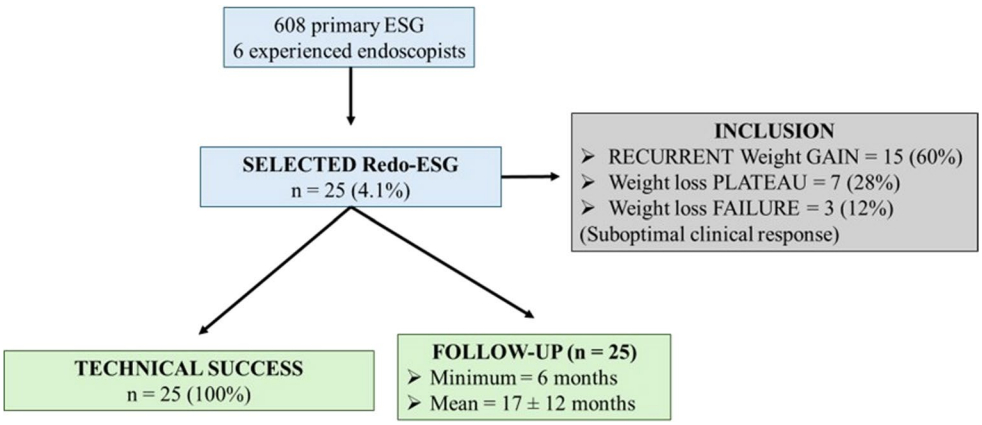


Fig. 2 Flowchart of patient inclusion and Redo-ESG analysis

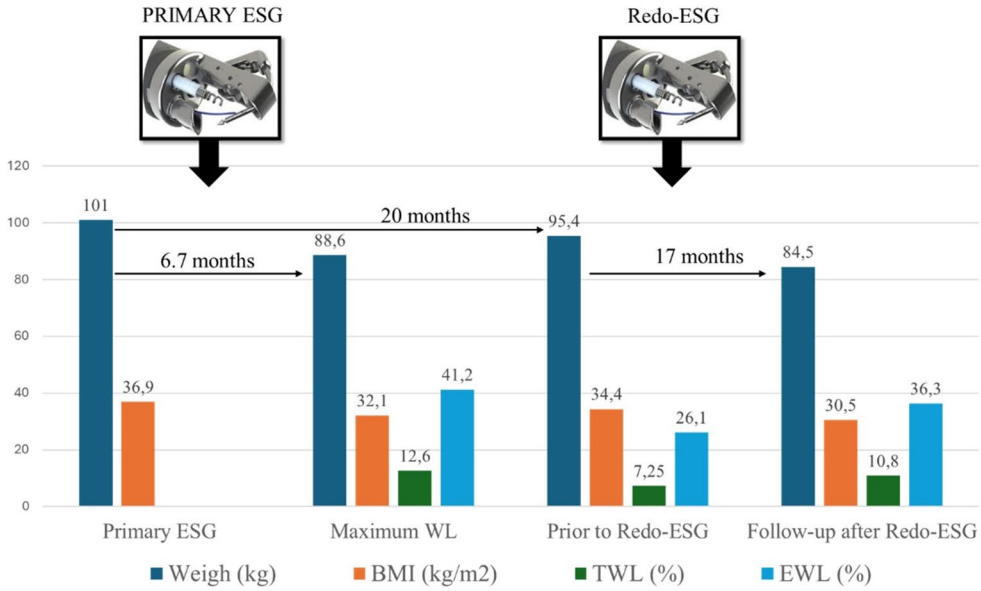


Fig. 3 Time course of Weight Loss after Primary ESG and Redo-ESG

Table 2 General additional Weight Loss Outcomes after Redo-ESG (17 ± 12 months follow-up)

Variable	Additional Weight Loss ($p < 0.001$, 95%CI)
WL, *mean (SD)*, *kg*	10.9 ± 10.
WL, *median (IQR)*, *kg*	10.6 (4.9, 17.0)
BMIL, *mean (SD)*, *kg/m²*	3.9 ± 4.1
BMIL, *median (IQR)*, *kg/m²*	4.2 (1.9, 17.5)
TWL, *mean (SD)*, *%*	10.8 ± 8.7
TWL, *median (IQR)*, *%*	10.7 (6.8, 15.3)
EWL, *mean (SD)*, *%*	36.3 ± 24.9
EWL, *median (IQR)*, *%*	42.1 (17.0, 56.4)
Patients with TWL ≥ 10% and EWL ≥ 25%, *(n)*, *%*	13 (52%)

WL Weight Loss, *BMIL* Body Mass Index Loss, *TWL* Total Weight Loss, *EWL* Excess Weight Loss

endoscope advancement and therapeutics. After a normal CT scan, transfusion and stabilization, the patient was discharged after 48 h (Clavien-Dindo grade II). No other major AEs, endoscopic or radiological interventions, surgical conversions, or mortality were observed.

Discussion

In this multicenter retrospective study, Redo-ESG demonstrated high technical success, an acceptable safety profile, and clinically relevant additional weight loss in selected patients with suboptimal outcomes after P-ESG. At a mean follow-up of 17 months, Redo-ESG resulted in an additional mean %TWL of 10.8% and %EWL of 36.3%, with clinically meaningful weight loss achieved in more than half of patients.

Weight recurrence after bariatric interventions reflects the chronic and relapsing nature of obesity and is influenced by behavioral, metabolic, and anatomical factors. It requires a multidisciplinary approach, including dietary, pharmacological, surgical, and endoscopic options [22, 23]. Endoscopic reassessment frequently reveals partial suture dehiscence and loss of gastric restriction, providing a clear rationale for re-suturing [24–26]. Redo-ESG may restore restriction and satiety while maintaining a minimally invasive and repeatable profile.

Comparison with Existing Evidence

The proportion of patients undergoing Redo-ESG (4.1%) aligns with previously reported series [24, 27, 28]. This low revisional rate does not equate to overall failure rate and only suggests that the majority of P-ESG patients did not perform revisional endoscopic therapy within mid-term follow-up. This value should not be interpreted as the true rate of weight recurrence, as not all patients with suboptimal outcomes underwent Redo-ESG procedures. Different indications have been proposed [27], although recurrent weight gain seems to be the most common accepted [24, 29].

Additional weight loss observed in this cohort is consistent with published data [28, 29] and supports Redo-ESG as an intermediate option between medical therapy and revisional surgery. Compared with pharmacological escalation alone after P-ESG, Redo-ESG may result in superior weight loss, while patients treated exclusively with obesity management medications demonstrated higher noncompliance rates [29]. Combining Redo-ESG with pharmacotherapy may represent a more effective multimodal strategy to optimize weight loss outcomes. Compared with surgical revision,

Table 3 Univariate Analysis comparing Weight Loss Efficacy according to Clinical and Technical variables (outcomes at 17 ± 12 months after Redo-ESG)

	%TWL Mean ± SD Median (IQR)	%EWL Mean ± SD Median (IQR)	*p*-value (%TWL/%EWL)
Age			
< 50 years *(n = 14, 56%)*	17.7 ± 7.2	32.7 ± 27.6	*p = 0.31/0.27*
> 50 years *(n = 11, 44%)*	10.6 ± 10.1	34.5 ± 30.5	
Gender			
Male *(n = 4, 16%)*	11.8 (6.4, 15.4)	34.5 (0.0, 45.8)	*p = 0.29/0.35*
Female *(n = 21, 86%)*	13.6 (9.8, 18.9)	42.1 (17.0, 53.0)	
Baseline BMI			
< 35 kg/m² *(n = 10, 40%)*	5,41 ± 5.7	25.5 ± 22.1	*p = 0.001/0.001*
35–40 kg/m² *(n = 11, 44%)*	11.7 ± 9.3	40.9 ± 20.4	
> 40 kg/m² *(n = 4, 16%)*	20.2 ± 17.0	50.5 ± 42.9	
Indication			
Recurrent weight gain *(n = 15, 60%)*	13.8 ± 9.3	42.7 ± 28.1	*p = 0.03/0.04*
Weight loss failure *(n = 3, 12%)*	8.0% ± 5.2	27.0 ± 19.3	
Weight plateau *(n = 7, 28%)*	6.0% ± 4.9	26.6 ± 18.7	
Previous ESG reduction			
Absent *(n = 8, 32%)*	11.2 (0.8, 16.0)	49.2 (41.0, 56.4)	*p = 0.82/0.77*
Mild *(n = 12, 48%)*	11.4 (4.9, 37.0)	34.5 (0.0, 65.8)	
Moderate *(n = 5, 20%)*	9.7 (6.3, 14.2)	43.9 (20.7, 65.2)	
Severe *(n = 0, 0%)*	0.0	0.0	
Suture pattern			
Triangular *(n = 4, 16%)*	9.6 (7.7, 10.5)	55.3 (42.1, 65.2)	*p = 0.91/0.87*
'U'-shaped *(n = 15, 60%)*	11.9 (4.5, 14.2)	26.9 (0.0, 46.0)	
'Z'-shaped *(n = 6, 24%)*	13.7 (6.3, 18.7)	47.1 (16.2, 65.8)	
Suture location			
Overlap *(n = 16, 64%)*	12.1 ± 7.6	40.4 ± 25.3	*p = 0.04/0.06*
Mixed *(n = 7, 28%)*	8.7 ± 6.1	28.3 ± 18.4	
Fundus *(n = 2, 8%)*	6.3 ± 4.7	20.7 ± 15.2	
Number of sutures			
3 *(n = 14, 56%)*	9.3 ± 7.9	30.2 ± 29.6	*p = 0.44/0.51*
4 *(n = 4, 16%)*	12.6 ± 6.4	43.1 ± 23.1	
5 *(n = 6, 24%)*	13.5 ± 11.2	41.2 ± 32.7	
6 *(n = 1, 4%)*	7.7 ± 0	65.2 ± 0	
Number of stitches			
< 20 *(n = 4, 16%)*	18.2 ± 4.2	53.5 ± 5.9	*p = 0.39/0.47*
20–30 *(n = 10, 40%)*	6.6 ± 6.5	22.6 ± 27.4	
> 30 *(n = 11, 44%)*	12.4 ± 10.4	43.3 ± 33.1	
Duration (min) (*n* = 18)			
< 45 *(n = 6, 33.3%)*	12.6 ± 8.1	42.3 ± 16.4	*p = 0.45/0.32*
45–60 *(n = 8, 44.4%)*	7.3 ± 5.9	24.0 ± 34.6	
> 60 *(n = 4, 22.2%)*	10.4 ± 6.7	41.1 ± 24.5	
Endoscope type			
Double-channel *(n = 16, 64%)*	7.9 ± 5.6	29.6 ± 20.7	*p = 0.02/0.01*
Single-channel *(n = 9, 36%)*	15.9 ± 7.8	48.1 ± 27.3	
Endoscopist experience			
> 100 ESG *(n = 12, 48%)*	11.9 ± 7.5	24.0 ± 29.1	*p = 0.11/0.16*
< 100 ESG *(n = 13, 52%)*	9.8 ± 8.9	43.2 ± 25.1	
TOTAL (*n* = 25)	10.8 ± 8.7	36.3 ± 24.9	*p* < 0.001/0.001
	10.7 (6.8, 15.3)	42.1 (17.0, 56.4)	

TWL Total Weight Loss, *EWL* Excess Weight Loss, *BMI* Body Mass Index, *ESG* Endoscopic Sleeve Gastroplasty

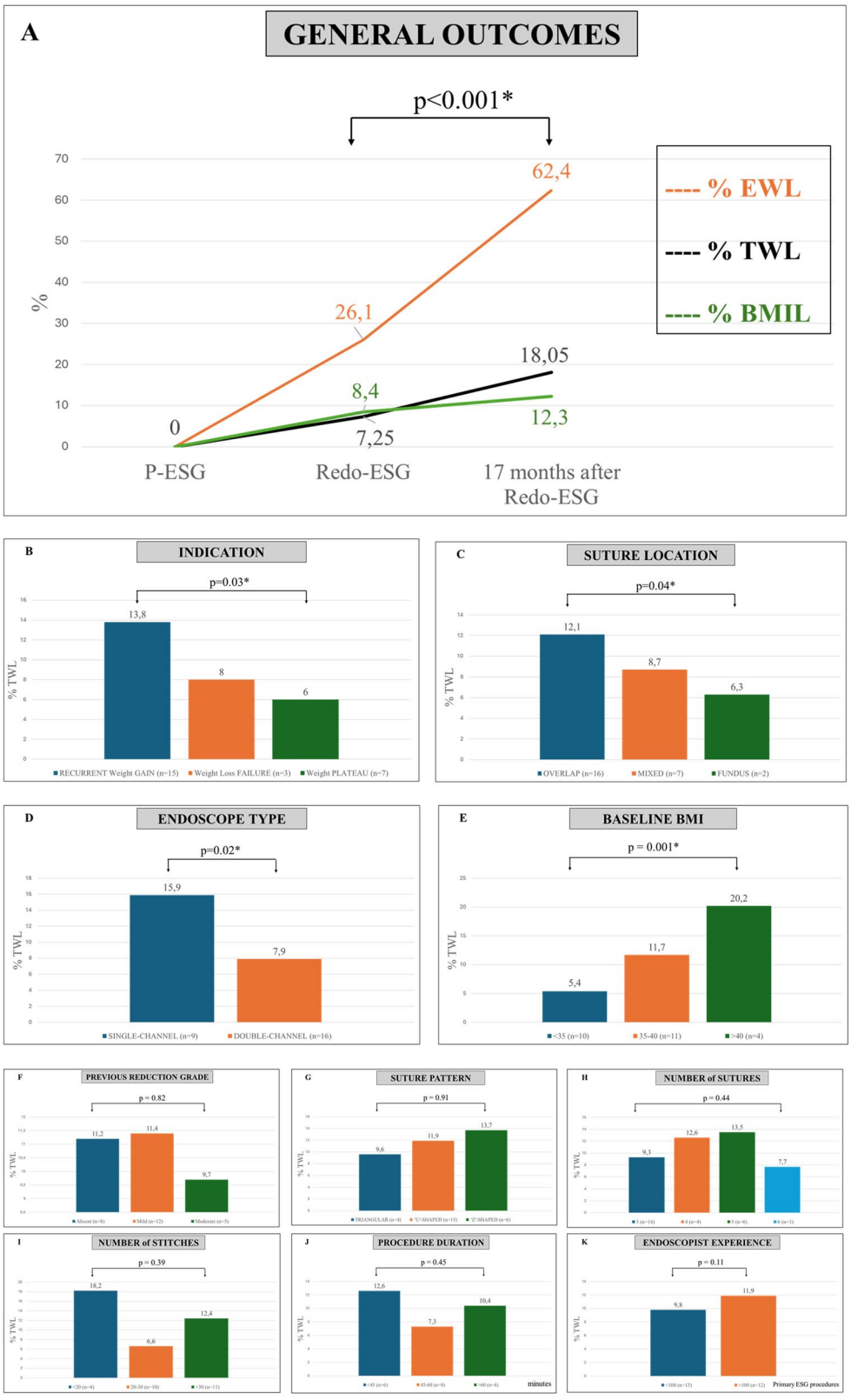


Fig. 4 Comparison of Efficacy according to Procedural Parameters. Data are expressed in %TWL (mean ± SD) with a mean of 17 ± 12 months of follow-up. A to E (*): statistically significance

endoscopic re-suturing offers repeatability, lower invasiveness, reduced morbidity, and favorable safety outcomes [24, 27, 30]. These findings reinforce the role of Redo-ESG as a minimally invasive revisional option before surgical conversion, and a stepwise therapeutic escalation framework.

Predictors of Weight Loss Efficacy

Higher baseline BMI and recurrent weight gain as the indication were independently associated with improved outcomes, suggesting that patients who initially responded to ESG may represent optimal candidates. In contrast, patients with primary non-response or early failure may represent a distinct phenotype in whom restrictive endoscopic revision alone may be insufficient. López-Nava et al. [27] reported weight loss after Redo-ESG across all indication subgroups; however, unlike our findings, the greatest benefit in their cohort was observed among patients with weight plateau.

From a technical standpoint, overlapping suture placement and use of a single-channel endoscope were associated with greater weight loss likely reflecting improved restoration of gastric restriction and maneuverability in fibrotic tissue. These findings should be interpreted as exploratory and hypothesis-generating.

Reinforcing areas prone to suture loosening, particularly in the distal gastric body [31], may enhance durability of restriction. Suture dehiscence and subsequent loss of sleeve configuration have been implicated in weight recurrence, providing a clear anatomical rationale for this revisional approach. In contrast, fundus suturing has not been shown to provide benefit in P-ESG [32] and appears unlikely to improve outcomes in the revisional setting. The need for removal of persistent sutures remains undefined and was left to endoscopist discretion in our series. Boskoski et al. [24] described systematic removal of old sutures, with new stitches positioned following a triangular pattern and avoidance of overlap to avoid complications in a fibrotic gastric tissue. These findings support the concept that Redo-ESG requires a technical approach distinct from P-ESG.

The association between single-channel endoscope use and improved weight loss after a Redo-ESG procedure is a novel observation. It may reflect enhanced maneuverability in fibrotic gastric tissue, clearer endoscopic visualization, and better tissue helix endoscopist control, particularly when using the new-generation OverStitch™-NXT suturing system; however, this observation remains hypothesis-generating and warrants confirmation in prospective studies, and no causal inference can be established.

Factors Not Associated with Outcomes

Consistent with prior P-ESG studies, suture pattern, number of sutures or stitches (mean 3–4) and procedure duration were not associated with significant higher weight loss outcomes [24, 27, 33, 34]. It may suggest that restoration of effective gastric restriction, rather than procedural complexity, drives efficacy. Careful mucosal bridges avoidance is essential in the fibrotic gastric wall, with controlled traction using the tissue helix; in some cases, argon plasma coagulation may assist tissue apposition while sparing existing sutures [26].

Endoscopist experience showed a nonsignificant trend toward better outcomes, as all procedures were performed by experienced bariatric endoscopists. These findings suggest that standardized techniques may mitigate inter-operator variability in high-volume centers.

Safety

Redo-ESG showed a minimal invasiveness and excellent safety profile procedure [24, 27–29]. Only one mild and one moderate bleeding event occurred, probably more related to helix injury than sutures themselves. However, only hemodynamic stabilization was required, without the need for endoscopic, radiological, or surgical therapy, being able to remain at grade I and II of the Clavien-Dindo classification.

Revisional Options

Importantly, the need for Redo-ESG should be considered part of a stepwise obesity management strategy rather than a failure of the primary procedure. When there is not an adequate weight loss after Redo-ESG, surgical revision remains a feasible option. Laparoscopic sleeve gastrectomy (LSG) and Roux-en-Y gastric bypass (RYGB) have both been shown to be revisional safe and effective procedures, with hypometabolic approaches such as RYGB potentially preferable to purely restrictive strategies [31]. Individualized multidisciplinary assessment is essential.

Redo-ESG has also demonstrated safety and efficacy as a revisional option following LSG weight recurrence and, in selected cases, with similar outcomes to surgical revision or conversion to RYGB, while maintaining a superior safety profile and sustained results for at least one year [35, 36]. According to Jirapinyo et al. [37], Redo-ESG should be considered before pursuing more invasive surgical revisional options.

Limitations

This study has several limitations: retrospective design; small sample size; absence of a control group; risk of selection bias; lack of standardized anatomical measurements; heterogeneous short- to mid-term follow-up duration (but with a minimum follow-up of 6 months); and procedural heterogeneity across centers. Findings should not be interpreted as definitive predictors, but rather as exploratory associations that may help inform patient selection and procedural optimization. Causal inferences cannot be established, and these observations should be considered hypothesis-generating rather than confirmatory.

Conclusions

In contemporary obesity management, minimally invasive revisional options may be considered before surgical conversion, particularly in patients unwilling or unsuitable for surgery.

Redo-ESG appears a feasible, safe and effective revisional endoscopic option in selected patients following primary ESG. Recurrent weight gain as the indication, higher baseline BMI, overlapping suture placement, and use of a single-channel endoscope were associated with greater weight loss outcomes.

Given the exploratory nature of the analysis and methodological limitations, findings should be interpreted as hypothesis-generating. Larger prospective, controlled studies with standardized protocols and comparison to modern pharmacotherapy are required to define the precise role of Redo-ESG in long-term obesity management.

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Data Availability No datasets were generated or analysed during the current study.

Declarations

Informed Consent Informed consent was obtained from all individual participants included in the study.

Human and Animal Rights All centers participating in the study complied with local ethical regulations and the study was conducted in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Competing interests Dr. Eduard Espinet-Coll is consultant for Apollo Endosurgery®, Boston Scientific®, and SwanMedical®. The author declares no conflict of interest related to this study. Dr. Juan-Carlos Rodríguez-Duque is consultant for Boston Scientific®. The author declares no conflict of interest related to this study. Dr. Jonathan Jerez-Ortiz has no conflict of interest. Dr. Andrés J. del Pozo-García is consultant for Apollo Endosurgery® and Boston Scientific®. The author declares no conflict of interest related to this study. Dr. Jaime Bernabéu-López has no conflict of interest. Dra. María Muñoz-Tornero has no conflict of interest. Dr. Javier Nebreda-Durán has no conflict of interest. Dr. Manoel Galvao-Neto has received grants and personal fees from Apollo Endosurgery®, Boston Sci®, Fractyl Labs®, GI dynamics®, GI windows®, Olympus®, Medtronic®, and M.I. Tech®. The author declares no conflict of interest related to this study.

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