

Comparison of weight loss and improvement in metabolic syndrome outcomes between endoscopic gastroplasty and lifestyle modifications: a meta-analysis

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Overview and Aim

- Obesity epidemic is a growing global concern
- Management of obesity is multi-pronged: includes lifestyle modifications (LM), bariatric surgery in selected candidates
- Technological advancements have led to development of endoscopic techniques such as endoscopic gastroplasty (EG)
 – a term encompassing endoscopic restrictive procedures which use suture and/or stapling techniques to reduce gastric volume
- Previous meta-analysis comparing EG to LM published back in 2019 by Madrugo-Neto et al only included 2 studies and did not include endoscopic sleeve gastroplasty (ESG) – newer and more widely used technique currently

Aim: updated meta-analysis to evaluate weight loss (TBWL and EWL) between EG and LM



Methodology

- Performed in accordance with PRISMA guidelines
- Systematic search done on three databases (Pubmed, Embase and Cochrane Library)
- Following search terms were used: ("endoscopic sleeve gastroplasty" OR "ESG" OR "endoscopic gastric reduction" OR "Apollo" OR "Overstitch" OR "endoluminal vertical gastroplasty" OR "endoscopic bariatric therapy" OR "bariatric endoscopy" OR "obesity surgery endoluminal" OR "POSE" OR "endoscopic suturing" OR "transoral gastroplasty") AND ("obese" OR "obesity" OR "bariatric" OR "overweight" OR "weight loss")
- Inclusion criteria:
 - Studies comparing EG to LM
- Exclusion criteria:
 - Short follow-up period < 1 month
 - Evaluating revisional endoscopic or other endobariatric procedures
 - Included patients on weight loss medications





PRISMA diagram



Screening

Eligibility

Included



- Total 5 studies with 1007 patients
- 4 RCTs and 1 casematched study
- 199 males (19.8%)
- Mean BMI 34.2-40.5
- Types of EG done: 2 POSE (13 sutures), 3 ESG (6-9 sutures) LM included both dietary modification and exercise

prescriptions



Results

Figure 1: Percentage of total body weight (TBW) loss at 6 months (A), and 12 months (B)

(A)		ESG		C	onserv	ative	Mean diff.	Weight
Study	N	Mean		N	Mear			(%)
Cheskin, 2020	105	-17.7	6.4	281	-14.7	8.2		34.98
Miller, 2017	34	-12.7	1.1	10	-4.7	2.4	-8.00 [-9.04, -6.96]	37.10
Huberty, 2020	49	-11	7.14	22	-2.7	5.82	-8.30 [-11.70, -4.90]	27.93
Overall							-6.33 [-9.78, -2.89]	
Heterogeneity:	$\tau^2 = 8$.04, l² =	90.50)%, H	² = 10.5	3		
Test of $\theta_i = \theta_j$: C	2(2) =	24.20,	p < 0.	001				
Test of $\theta = 0$: z	= -3.6	1, p = 0	0.0003					
							-10 -5 0 5 10	
Random-effects REML	model						Favours ESG Favours Conservative	
(B)				-				
	Ν	ESG Mean	SD	Co N	nservat Mean	ive SD	Mean diff. with 95% Cl	Weight
Study	IN	wear	50	IN	wear	50	with 95% Ci	(%)
Dayyeh, 2022	77	-13.6	8	110	8	5	-12.80 [-14.67, -10.93]	20.48
Cheskin, 2020	105	-20.6	8.3	281	-14.3	10.2	-6.30 [-8.48, -4.12]	20.12
Sullivan, 2017	213	-4.95	7.04	106	-1.38	5.58		20.81
Miller, 2017	34	-13	1.4	10	-5.3	2.5	-7.70 [-8.90, -6.50]	21.09
Huberty, 2020	49	-11.9	8.14	22	-10.9	7.21	-1.00 [-4.96, 2.96]	17.49
Overall							-6.43 [-10.25, -2.61]	
Heterogeneity: τ	r ² = 17	.61, l² =	= 95.34	1%, H	² = 21.4	6		
Test of $\theta_i = \theta_i$: Q	(4) = (66.78, p	0.0	01				
Test of $\theta = 0$: z =	= -3.30), p = 0.	001					
Random-effects REML	model						-15 -10 -5 0 5 Favours ESG Favours Conservative	

Figure 2: Percentage of excess body weight (EWL) loss at 6 months (A), and 12 months (B)

(A)		ESG	à	(Conserv	Mean diff.	Weight (%)	
Study	Ν	Mean	vlean SD		Mean	SD		with 95% Cl
Sullivan, 2017	213	-22.3	20.455	106	-13.6	20.455	-8.70 [-13.47, -3.93]	35.83
Miller, 2017	34	-45.5	4.2	10	-14.5	10.5	-31.00 [-35.32, -26.68]	36.10
Huberty, 2020	49	-38.6	24.75	22	-13.4	29.41	-25.20 [-38.41, -11.99]	28.06
Overall							-21.38 [-35.39, -7.37]	
Heterogeneity:	$\tau^{2} = 13$	36.71, l ^a	2 = 93.69	%, H²	= 15.84	ŀ		
Test of $\theta_i = \theta_j$: (2(2) =	46.58, p	o < 0.001					
Test of $\theta = 0$: z	= -2.9	9, p = 0	.0028					
						-4		
andom-effects REML	model						Favours ESG Favours Conservative	
(B)								
1	1212	ì	Conservative				Weight	
Study	Ν	Mean	SD	Ν	Mean	SD	with 95% CI	(%)
Dayyeh, 2022	77	-49.2	32	110	-3.2	18.6	-46.00 [-53.28, -38.72]	25.48
Sullivan, 2017	213	-16	25.213	106	-4.19	25.213	-11.81 [-17.68, -5.94]	25.80
Miller, 2017	34	-45	5	10	-18.1	8.7	-26.90 [-31.12, -22.68]	26.10
Huberty, 2020	49	-42.7	30.4	22	-43.6	31.36	0.90 [-14.54, 16.34]	22.62
Overall							-21.59 [-40.91, -2.26]	
Heterogeneity:	$\tau^{2} = 30$	67.81, l ^a	² = 96.96 ⁴	%, H ²	= 32.95	i		
Test of $\theta_i = \theta_j$: 0	2(3) =	62.94, p	0 < 0.001					
Test of $\theta = 0$: z	= -2.1	9, p = 0	.0286					
						Г		
						-6	-40 -20 0 20 Fayours ESG Fayours Conservative	

6-month and 12-month TBWL/EWL significantly higher in EG compared to LM



Results and Conclusion

- Significant improvement in DM (p<0.001) and HTN (p=0.016) control in EG group, but not in HLD
 - Improvement in DM, HLD and HTN were defined as decrease in medications (either number or dose), or decrease in HbA1c by ≥0.5%, decrease in LDL≥10% and decrease in systolic blood pressure ≥10mmHg respectively
- Low incidence of serious adverse events in EG group (2-5%)

In conclusion,

- EG is safe and effective for weight loss in obese patients.
- Improvements in other metabolic syndrome co-morbidities may also be observed, compared to LM alone.
- Further prospective studies should be conducted, and considerations should also be made to include pharmacotherapy as combination therapy may be more effective in attaining weight loss.

