



S.I.C.O.B.

XXXII CONGRESSO  
NAZIONALE SICOB

23 - 25 MAGGIO 2024  
G I A R D I N I  
N A X O S

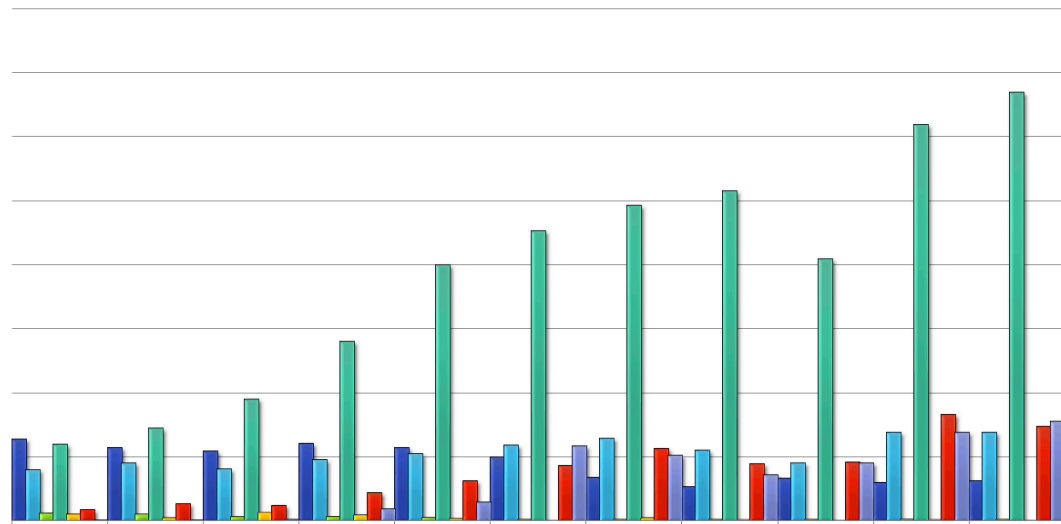


# LAPAROSCOPIC SLEEVE GASTRECTOMY: FOLLOW UP A 10 ANNI

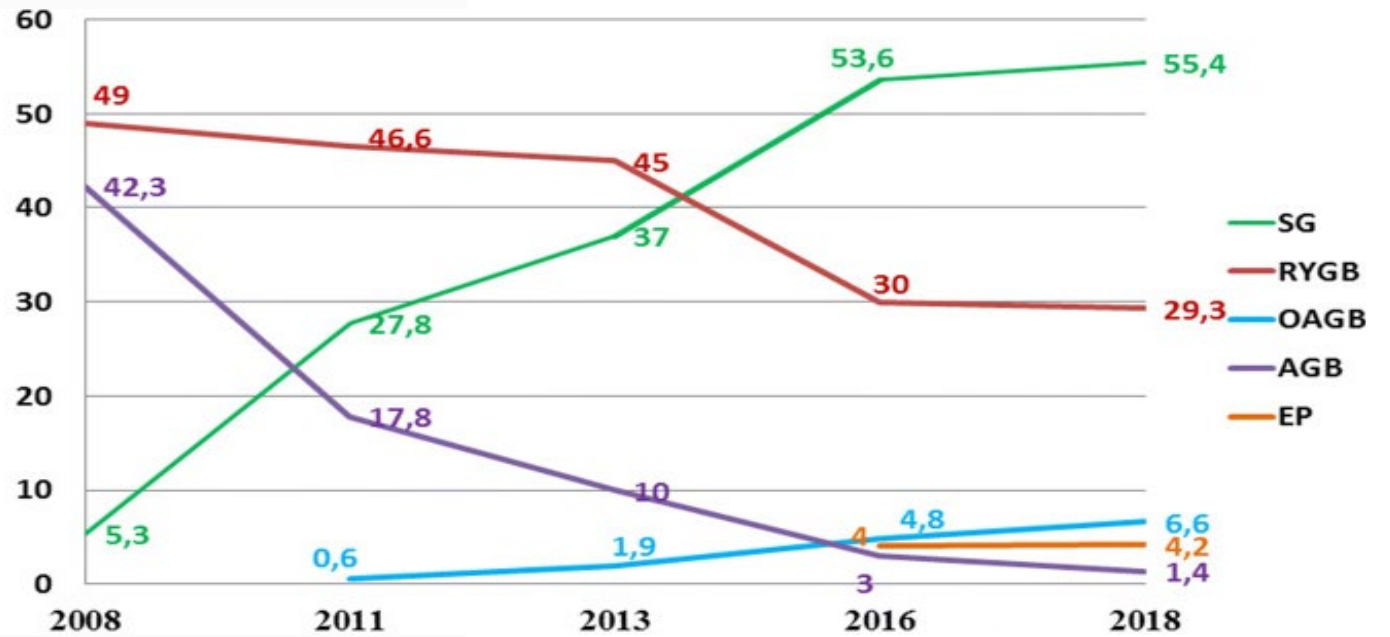
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# Tipologia delle procedure eseguite dal 2012 al 2022



	Casistica 2012	Casistica 2013	Casistica 2014	Casistica 2015	Casistica 2016	Casistica 2017	Casistica 2018	Casistica 2019	Casistica 2020	Casistica 2021	Casistica 2022
Bendaggio gastrico	2556	2283	2182	2406	2293	1988	1351	1065	1325	1191	1237
By pass gastrico	1593	1805	1628	1912	2104	2361	2581	2205	1814	2748	2768
Deversione + Duodenal switch	246	202	124	143	101	41	45	43	42	53	43
Sleeve gastrectomy	2383	2889	3799	5594	7976	9046	9850	10291	8178	12359	13381



# SLEEVE AND WL

Randomized Controlled Trial > JAMA. 2018 Jan 16;319(3):255-265.

doi: 10.1001/jama.2017.20897.

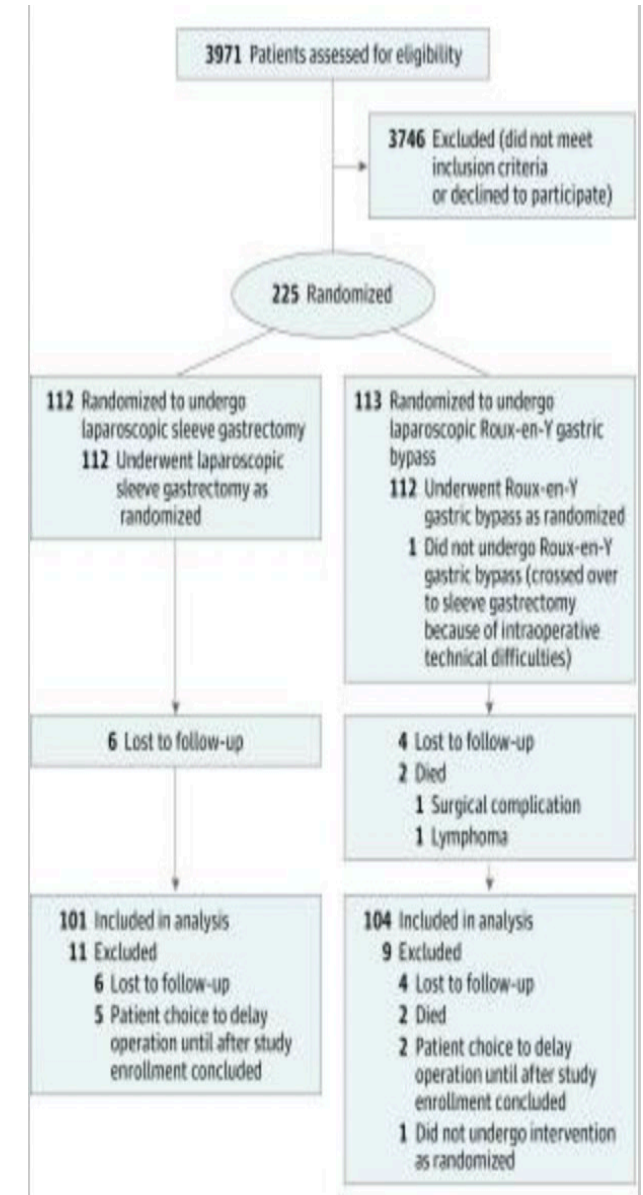
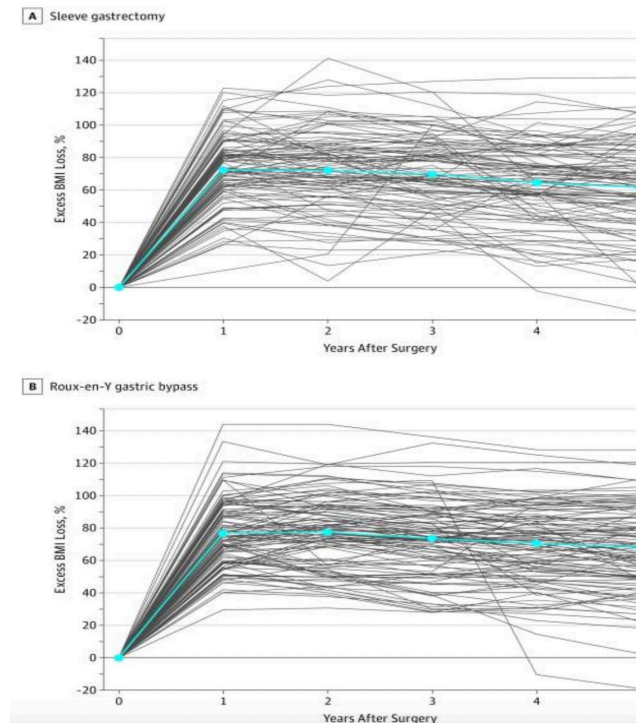
## Effect of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass on Weight Loss in Patients With Morbid Obesity: The SM-BOSS Randomized Clinical Trial

Ralph Peterli<sup>1</sup>, Bettina Karin Wölnerhanssen<sup>2,3</sup>, Thomas Peters<sup>4</sup>, Diana Vetter<sup>5</sup>, Dino Kröll<sup>6</sup>, Yves Borbély<sup>6</sup>, Bernd Schultes<sup>7</sup>, Christoph Beglinger<sup>2</sup>, Jürgen Drewe<sup>8</sup>, Marc Schiesser<sup>9</sup>, Philipp Nett<sup>6</sup>, Marco Bueter<sup>5</sup>

Characteristics	Sleeve Gastrectomy (n = 107)	Roux-en-Y Gastric Bypass (n = 110)
Age, mean (SD), y	43.0 (11.1)	42.1 (11.2)
Female	77 (72.0)	79 (71.8)
Weight, mean (SD), kg	123.5 (19.4)	124.8 (19.8)
Body mass index, mean (SD) <sup>b</sup>	43.6 (5.2)	44.2 (5.3)
Type 2 diabetes	26 (24.3)	28 (25.5)
Dyslipidemia	72 (67.3)	56 (50.9)
Gastroesophageal reflux	47 (43.9)	51 (46.4)
Hypertension	67 (62.6)	65 (59.1)
Obstructive sleep apnea	51 (47.7)	46 (41.8)
Back or joint pain	65 (60.7)	75 (68.2)
Hyperuricemia	16 (15)	11 (10)
Depression	21 (19.6)	12 (10.9)

<sup>a</sup>Data are expressed as No. (%) of participants unless otherwise indicated.

<sup>b</sup>Calculated as weight in kilograms divided by height in meters squared



# SLEEVE AND WL

## Changes in Comorbidities at 5 Years

Comorbidities <sup>a</sup>	No. (%)	
	Sleeve Gastrectomy (n = 101)	Roux-en-Y Gastric Bypass (n = 104)
<b>Type 2 Diabetes</b>		
Comorbidity present at baseline	26/101 (25.7)	28/104 (26.9)
Remission	16 (61.5)	19 (67.9)
Improved	4 (15.4)	2 (7.1)
Unchanged	3 (11.5)	3 (10.7)
Worsened	3 (11.5)	4 (14.3)
De novo development of comorbidity	0	3/76 (3.9)
<b>Dyslipidemia</b>		
Comorbidity present at baseline	68/101 (67.3)	53/104 (51)
Remission	29 (42.6)	33 (62.3)
Improved	28 (41.2)	16 (30.2)
Unchanged	11 (16.2)	4 (7.5)
Worsened	0	0

## Changes in Comorbidities at 5 Years

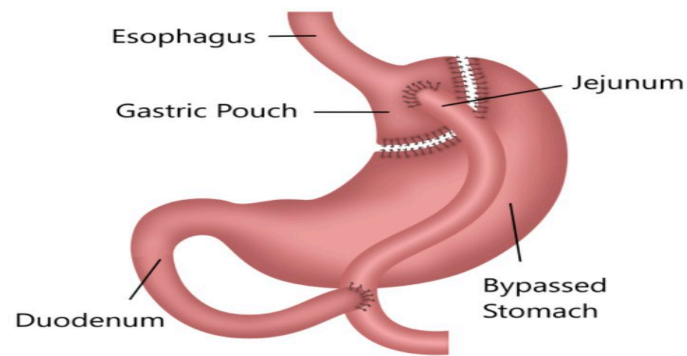
<b>Gastroesophageal Reflux</b>		
Comorbidity present at baseline	44/101 (43.6)	48/104 (46.2)
Remission	11 (25)	29 (60.4)
Improved	4 (9.1)	3 (6.3)
Unchanged	15 (34.1)	13 (27.1)
Worsened	14 (31.8) <sup>a</sup>	3 (6.3)
De novo development of comorbidity	18/57 (31.6)	6/56 (10.7)
<b>Hypertension</b>		
Comorbidity present at baseline	64/101 (63.4)	64/104 (61.5)
Remission	40 (62.5)	45 (70.3)
Improved	16 (25)	14 (21.9)
Unchanged	4 (6.3)	2 (3.1)
Worsened	4 (6.3)	3 (4.7)

## Changes in Comorbidities at 5 Years

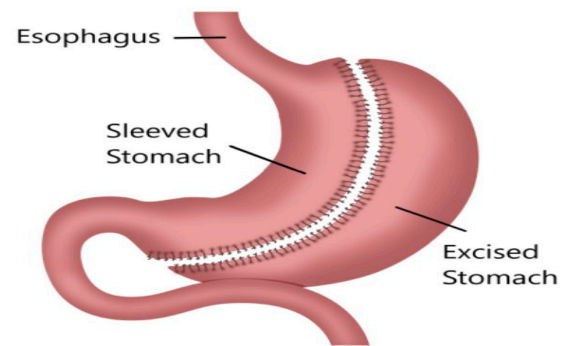
<b>Obstructive Sleep Apnea</b>		
Comorbidity present at baseline	48/101 (47.5)	43/104 (41.3)
Remission	22 (45.8)	19 (44.2)
Improved	24 (50)	22 (51.2)
Unchanged	0	1 (2.3)
Worsened	2 (4.2)	1 (2.3)
De novo development of comorbidity	5/53 (9.4)	1/61 (1.6)

## Mortality and Adverse Events Requiring Reoperation or Endoscopic Intervention

Events	No. With Event/Total No. (%)	
	Sleeve Gastrectomy	Roux-en-Y Gastric Bypass
Early morbidity (0-30 d)	1/107 (0.9)	5/110 (4.5)
Leak	0	1
Infection	0	3
Obstruction	1	1
Death	0	1 <sup>b</sup>
Late morbidity (1 mo–5 y)	15/101 (14.9)	18/104 (17.3)
Operative		
Conversion to Roux-en-Y gastric bypass due to gastroesophageal reflux	9	NA
Small bowel obstruction	0	2
Internal hernia	0	9
Incisional hernia	1	1
Gastroscopy necessary: laparoscopy	NA	1
Severe dumping	0	3 <sup>c</sup>
Insufficient weight loss	5 <sup>d</sup>	2
Death	0	1 <sup>e</sup>
Total reoperations or interventions	16/101 (15.8)	23/104 (22.1)
Total mortality	0	2/104 (1.9)



Gastric Bypass (Roux-en-Y)



Vertical Sleeve Gastrectomy (VSG)

# SLEEVE AND WL

Meta-Analysis > Int J Surg. 2020 Apr;76:101-110. doi: 10.1016/j.ijss.2020.02.035.

Epub 2020 Mar 6.

## Comparative analysis of weight loss and resolution of comorbidities between laparoscopic sleeve gastrectomy and Roux-en-Y gastric bypass: A systematic review and meta-analysis based on 18 studies

Youkui Han <sup>1</sup>, Yang Jia <sup>2</sup>, Honglei Wang <sup>1</sup>, Lei Cao <sup>1</sup>, Yongjie Zhao <sup>3</sup>

The characteristics of included studies for the analysis of LRYGB versus LSG for weight loss and resolution of co-morbidity.

Study (author/year)	Country	Study design	Sample size	Gender (M/F)	Mean age (range/SD)		BMI (kg/m <sup>2</sup> )		Follow-up time (month)	Outcomes
					LRYGB	LSG	LRYGB	LSG		
<b>Randomized control trials (RCTs)</b>										
LRYGB/LSG										
Kehagias I et al., 2011	Greece	RCT	30/30	16/44	36.0 (8.4)	33.7 (9.9)	45.8 (3.7)	44.9 (3.4)	36.0	BMI, T2DM, co-morbidities
Keidar A et al., 2013	Israel	parallel un-blinded RCT	30/30	21/39	51.45 (8.3)	47.7 (11.7)	42.0 (4.8)	42.5 (5.2)	12.0	BMI, T2DM, FBG
Nogues X et al., 2010	Spain	RCT	7/8	0/15	45.86 (8.6)	49.63 (9.6)	43.1 (3.9)	43.5 (3.2)	12.0	BMI, reoperation
Salminen P et al., 2018	Finland	multicenter, multisurgeon, open-label RCT	95/98	73/120	48.4 (9.3)	48.5 (9.6)	46.4 (5.9)	45.5 (6.2)	60.0	Excessweight loss, resolution of comorbidities, improvement of QoL, all AEs and mortality.
Schauer PR et al., 2014	US	RCT	48/49	31/66	48.0 (8.45)	47.8 (8.08)	37.1 (3.39)	36.1 (3.91)	36.0	BMI, T2DM, reoperation, LDL
Vix M et al., 2013	France	RCT	45/55	18/82	35.23 (9.37)	35.13 (9.7)	47.09 (5.64)	45.57 (4.79)	12.0	FBG, LDL
Yang J et al., 2015	China	RCT	27/28	22/33	41.4 (9.3)	40.4 (9.4)	32.3 (2.4)	31.8 (3)	36.0	BMI, T2DM, HTN, HLP
Zhang Y et al., 2014	China	RCT	32/32	26/38	32.2 (9.2)	29.3 (9.8)	39.3 (3.8)	38.5 (4.2)	60.0	BMI, T2DM, co-morbidities
Peterli R et al., 2018	Switzerland	Multicenter RCT	110/107	61/156	42.1 (11.2)	43.0 (11.1)	44.2 (5.3)	43.6 (5.3)	60.0	weight loss, changes in comorbidities, increase in QoL and AEs.
<b>Non-randomised studies of interventions (NRSI)</b>										
Abbatini F et al., 2010	Italy	Retrospective	16/20	11/25	53 (8.3)	46.6 (4.2)	47.4 (8.0)	51.6 (15.9)	36.0	BMI, HTN, HLP, HTG
Dogan K et al., 2015	Netherlands	Retrospective	245/245	88/402	41.2 (9.7)	39.7 (10.0)	47.2 (5.8)	45.8 (6.0)	37.2 (13.2)	BMI
Jammus GS et al., 2016	India	Prospective	33/23	30/25	38	23	42.5	35	53.5	BMI, T2DM, HTN, HLP
Jimenez A et al., 2012	Spain	Prospective	98/55	60/93	49.6 (8.2)	52.4 (9.1)	44.8 (4.6)	49.8 (7.2)	35.4 (13.5)	BMI, T2DM
Leyba JL et al., 2014	Venezuela	Prospective	47/24	22/49	38 (9.9)	34.6 (9.2)	42.1 (4.7)	41.1 (4.9)	60.0	BMI, T2DM
Moizze V et al., 2013	Spain	Prospective	294/61	88/267	45.2 (10.6)	46.6 (11.6)	47.4 (6)	51.6 (6.7)	60	BMI
Pekkarinen T et al., 2016	Finland	Retrospective	163/94	92/165	47 (24-63)	49 (24-67)	49 (39-68)	47 (37-77)	82.2	BMI
Perrone F et al., 2016	Italy	Prospective	142/162	94/210	43.8 (4.6)	41.8 (4.6)	46.8 (3.6)	47.4 (4.2)	75.8 (8.4)	BMI, HLP
Lee WJ et al., 2015	China	Prospective	218/116	272/62	36.1 (9.3)	36.0 (9.1)	37.5 (6.0)	37.5 (6.1)	60.0	BMI

LRYGB, laparoscopic Roux-en-Y gastric bypass; LSG, laparoscopic sleeve gastrectomy; RCT, randomized control trial; NRSI, non-randomised studies of interventions; BMI, body mass index; T2DM, type 2 diabetes mellitus; AEs, adverse events; QoL, quality of life; SD, standard deviation; HTN, hypertension; HLP, hyperlipidemia; FBG, fasting blood glucose; LDL, Low Density Lipoprotein.

The pooled results of the resolution of co-morbidities with LRYGB and LSG based on RCTs.

Outcomes	No. of studies	Pooled results			heterogeneity		
		RR	95% CI	P value	I <sup>2</sup>	P <sub>h</sub> value	Analytical effect model
<b>Dyslipidemia</b>							
Overall remission [6,10,11,21,26]	5	1.36	1.17, 1.59	< 0.0001	40%	0.14	Fixed-effect model
Midterm remission [21,26]	2	1.13	0.93, 1.38	0.23	0%	0.72	Fixed-effect model
Long-term remission [6,10,11]	3	1.43	1.19, 1.72	0.0001	34%	0.21	Fixed-effect model
Improved [10,11,21]	3	0.67	0.47, 0.95	0.03	0%	0.40	Fixed-effect model
Unchanged [10,11,21]	3	0.50	0.16, 1.59	0.24	68%	0.05	Random-effect model
<b>Hypertension</b>							
Overall remission [6,10,11,21,26]	5	1.23	1.05, 1.44	0.01	1%	0.41	Fixed-effect model
Midterm remission [21,26]	2	1.23	0.71, 2.15	0.46	14%	0.28	Fixed-effect model
Long-term remission [6,10,11]	3	1.23	1.04, 1.45	0.01	22%	0.28	Fixed-effect model
Improved [10,11,21]	3	0.80	0.59, 1.10	0.17	0%	0.82	Fixed-effect model
Unchanged [10,11,21]	3	0.62	0.37, 1.04	0.07	9%	0.33	Fixed-effect model
<b>OSAHS</b>							
Remission [10,21]	2	0.93	0.78, 1.12	0.46	0%	0.81	Fixed-effect model
Improved [10,21]	2	1.15	0.78, 1.69	0.49	0%	0.34	Fixed-effect model
<b>Back or Joint Pain</b>							
Remission [10,21]	2	0.93	0.72, 1.19	0.57	0%	0.68	Fixed-effect model
Improved [10,21]	2	1.03	0.76, 1.40	0.85	52%	0.15	Fixed-effect model
Unchanged [10,21]	2	1.30	0.18, 9.27	0.79	84%	0.01	Random-effect model
Worsened [10,21]	2	0.87	0.22, 3.41	0.84	0%	0.49	Fixed-effect model
<b>GERD</b>							
GERD remission [10,21]	2	1.68	0.86, 3.29	0.13	79%	0.03	Random-effect model
GERD improved [10,21]	2	1.48	1.07, 2.04	0.02	7%	0.34	Fixed-effect model
GERD unchanged [10,21]	2	0.67	0.38, 1.17	0.16	0%	0.35	Fixed-effect model
GERD worsened [10,21]	2	0.16	0.06, 0.44	0.0004	0%	0.59	Fixed-effect model
de novo GERD [10,21]	2	0.33	0.15, 0.68	0.003	0%	0.86	Fixed-effect model
<b>Hyperuricemia remission [10,21]</b>							
Remission [10,21]	2	1.11	0.78, 1.59	0.55	80%	0.02	Random-effect model
<b>Depression</b>							
Remission [10,21]	2	0.98	0.52, 1.88	0.96	2%	0.31	Fixed-effect model
Improved [10,21]	2	2.07	0.24, 17.61	0.51	78%	0.03	Random-effect model
Unchanged [10,21]	2	0.76	0.32, 1.79	0.53	58%	0.12	Fixed-effect model

RR, risk ratio; CI, confidence intervals; OSAHS, obstructive sleep apnea hypopnea syndrome; GERD, gastroesophageal reflux disease.

Sleeve	Comorbid remission	Bypass
≡	EWL	≡
≡	T2DM	≡
↓	Gastroesophageal reflux	↑
↓	dyslipidemia	↑
↓	Hypertension	↑

# SLEEVE AND WL

[Obes Surg.](#) 2021; 31(10): 4528–4541.  
Published online 2021 Aug 7. doi: [10.1007/s11695-021-05643-z](https://doi.org/10.1007/s11695-021-05643-z)

PMCID: PMC8346344  
PMID: [34363144](https://pubmed.ncbi.nlm.nih.gov/34363144/)

## Network Meta-Analysis of Metabolic Surgery Procedures for the Treatment of Obesity and Diabetes

[Andrew C. Currie](#),<sup>1</sup> [Alan Askari](#),<sup>2</sup> [Ana Fangueiro](#),<sup>2</sup> and [Kamal Mahawar](#)<sup>3</sup>

Standard pairwise meta-analysis and network meta-analysis of excess weight loss following metabolic surgery

Time point	Intervention	Comparator	No. of direct comparison studies	Pairwise meta-analysis (SMD)*	Between-study variance (MA)	Network meta-analysis (SMD)*	Between-study variance (NMA)
1 year	RYGB	SG	9	0.06 (- 0.09, 0.22)	0.200	1.67 (- 0.89, 4.24)	0.202
		OAGB	2	1.76 (- 0.77, 0.77)	0.210	4.35 (1.30, 7.40)	0.005
	SG	OAGB	2	1.21 (- 0.64, 3.13)	0.233	2.68 (0.16, 5.21)	0.037
2 years	RYGB	SG	5	0.05 (- 0.024, 0.14)	0.347	1.37 (- 2.31, 5.06)	0.465
		OAGB	3	1.00	0.222	3.84	0.026
	RYGB	OAGB	3	1.00 (- 0.63, 2.63)	0.222	3.84 (0.47, 7.22)	0.026
3-5 years	SG	OAGB	2	1.26 (- 1.01, 3.54)	0.309	2.47 (- 0.85, 5.79)	0.144
	RYGB	SG	7	- 0.28 (- 0.49, - 0.07)	0.024	- 7.19 (- 10.88, - 3.51)	< 0.001
OAGB		1	N/A	-	0.85 (- 3.24, 4.93)	0.685	
	SG	OAGB	2	1.78 (- 1.22, 4.78)	0.301	8.04 (3.98, 12.10)	< 0.001

Standard pairwise meta-analysis and network meta-analysis of T2DM remission following metabolic surgery

Intervention	Comparator	No. of direct comparison studies	Pairwise meta-analysis (RR)*	Between-study variance (MA)	Network meta-analysis (RR)*	Between-study variance (NMA)
RYGB	SG	11	0.62 (0.29, 0.95)	0.011	0.55 (0.34, 0.90)	0.016
	OAGB	2	1.05 (0.95, 1.15)	0.411	1.82 (0.70, 4.71)	0.215
SG	OAGB	2	1.45 (0.90, 2.44)	0.101	3.31 (1.33, 8.23)	0.010

Remission T2DM  
>OAGB and RYGB

Standard pairwise meta-analysis and network meta-analysis of perioperative complications following metabolic surgery

Intervention	Comparator	No. of direct comparison studies	Pairwise meta-analysis (RR)*	Between-study variance (MA)	Network meta-analysis (RR)*	Between-study variance (NMA)
RYGB	SG	9	0.61 (0.32, 0.92)	0.033	0.53 (0.38-0.75)	< 0.001
	OAGB	1	0.57	0.210	0.42 (0.24-0.72)	0.002
SG	OAGB	2	0.80 (0.44, 1.41)	0.345	0.78 (0.47, 1.32)	0.263

Perioperative complications  
> RYGB  
SG = OAGB

EWL at 1 year >OAGB. RYGB=SL

EWL at 3-5 years >OAGB e RYGB <SL

# SLEEVE AND DIABETES

Review > Medicina (Kaunas). 2023 May 19;59(5):985. doi: 10.3390/medicina59050985.

## Remission of Type 2 Diabetes Mellitus (T2DM) after Sleeve Gastrectomy (SG), One-Anastomosis Gastric Bypass (OAGB), and Roux-en-Y Gastric Bypass (RYGB): A Systematic Review

Vignesh Balasubramaniam <sup>1</sup>, Sjaak Pouwels <sup>2</sup> <sup>3</sup>

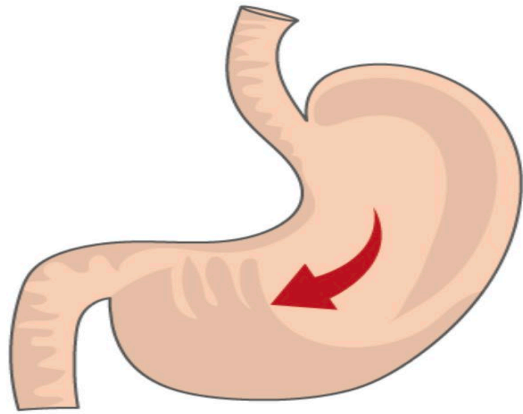


Baseline characteristics.

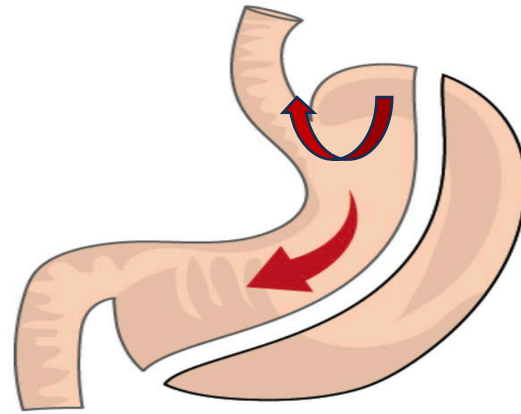
Study	Population (n)	Age (Years)	BMI (kg/m <sup>2</sup> )	Study Design	Follow up (Months)	T2DM Variables	Population with T2DM	Duration of T2DM (Years)	Insulin Treatment (n)	HbA1c (%)	Remission Rate RYGB (%)	Remission Rate OAGB (%)	Remission Rate SG (%)
Toh et al. (2018) [14]	561	43.6	41.4	Retrospective	12	HbA1C	189	-	-	7.5	86.9	71.9	82.2
Wasir et al. (2019) [17]	121	48.2	49.8	Retrospective	24	FPG, HbA1C	121	5.98	38	7.8	80.8	50%	55.6
Castro et al. (2020) [12]	358	43.3	44.0	Retrospective	12, 24, 60	BG, HbA1C	358	6.3	28	5.8	12–83.6	12–91.9	12–81.9
											24–83.6	24–91.9	24–79.5
											60–80.3	60–89.4	60–75.9
Shen et al. (2021) [18]	1016	42.9	39	Retrospective	12	FBG, HbA1C	1016	5	220	8.3	65.0	78.4	69.8
Soong et al. (2021) [13]	498	32.1	56.0	Retrospective	60	BG, HbA1C	219	-	-	6.5	100	100	100
Moradi et al. (2022) [15]	1351	47.3	44.1	Retrospective	12, 36	FBG, HbA1C	1351	5	385	7.8	12–75.6	12–75.4	12–70.6
											36–79.4	36–80.4	36–75.8
Tabesh et al. (2022) [16]	485	41.6	46.1	Retrospective	12	FBG,	103	-	0	-	100	98.6	99.6

BMI (body mass index), HbA1c (haemoglobin A1c), RYGB (Roux-en-Y gastric bypass), OAGB (one-anastomosis gastric bypass), SG (sleeve gastrectomy).

# SLEEVE AND GASTROESOPHAGEAL REFLUX



BEFORE....



AFTER...

Symptoms of gastroesophageal reflux disease

	<b>GERD in obesity</b>	<b>De novo GERD after SG</b>	<b>Improvement of GERD after SG</b>
Mechanism	Increasing BMI	Lack of gastric compliance	Reduced intra-abdominal pressure
	Increasing intragastric pressure	Increased intraluminal pressure	Reduced acid production
	Increasing gastroesophageal pressure gradient	Gastric fundus removal	Accelerated gastric emptying
	Hiatal hernia	LES pressure	Reduced gastric volume
		Final shape of the sleeve	
		Narrowing at the junction of the vertical and horizontal parts of the sleeve	
		Twisting of the sleeve	
		Dilation of the fundus	
		Persistence of hiatal hernia	

GERD: Gastroesophageal reflux disease; SG: Sleeve gastrectomy.

Gerd 40-70%  
HH. 20-53%

Gerd 9-42%







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## IL NOSTRO STUDIO



- 123 PAZIENTI SOTTOPOSTI A LSG
- 2011-2013
- FOLLOW – UP A 3/8/10 ANNI

AGE ( mean $\pm$ DS)	41
FEMALE, n (%)	95 (64,63%)
BMI ( mean $\pm$ DS)	43,2 Kg/m <sup>2</sup>
COMORBIDITIES, n (%)	
DMT2	26%
HYPERTENSION	32%
OSAS	22%

## ENDPOINT PRIMARIO

- Andamento del peso a T3, T8, T 10
- Weight regain and insufficient weight loss

## ENDPOINT SECONDARI

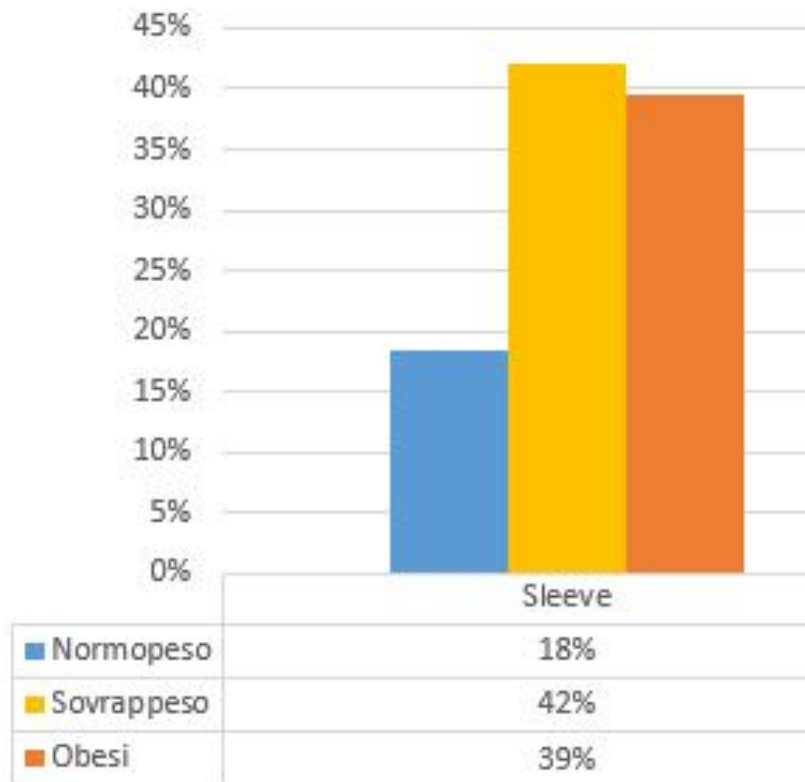
- Remissione delle comorbidità
- Carenze nutrizionali e GERD
- Quality of Life e Food Tolerance



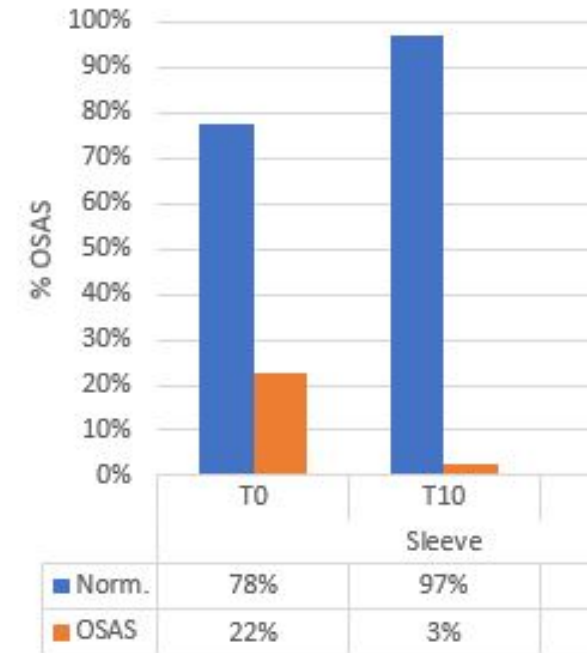
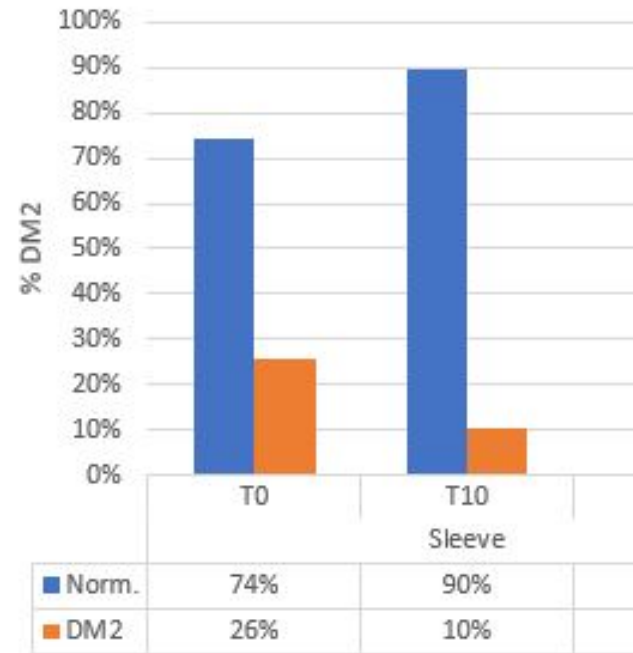
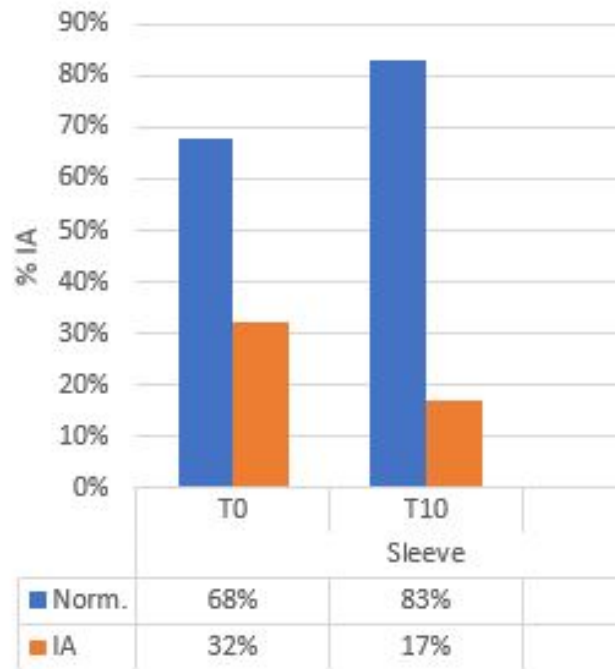
## Weight Loss



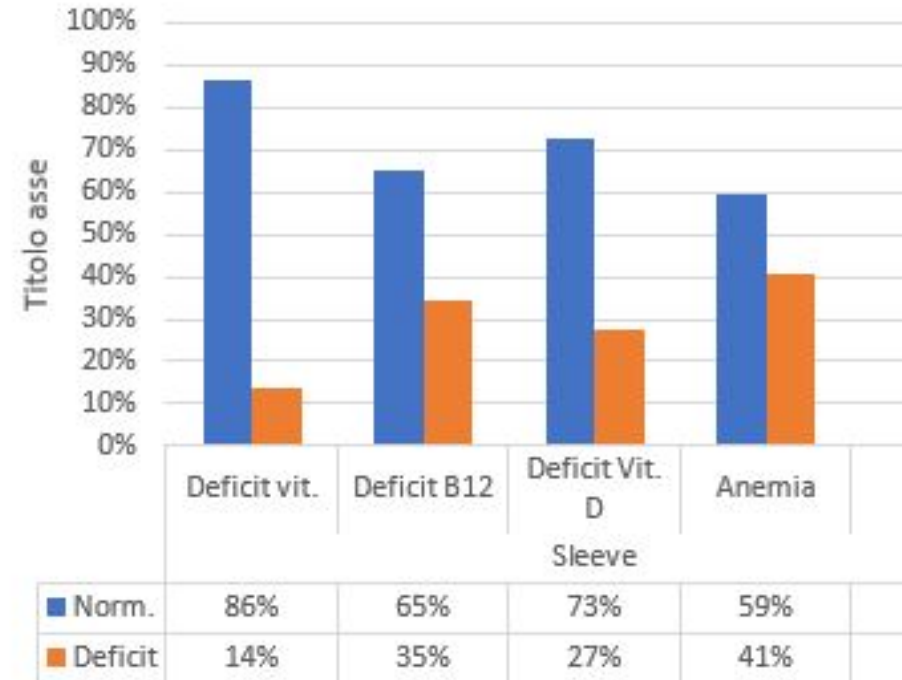
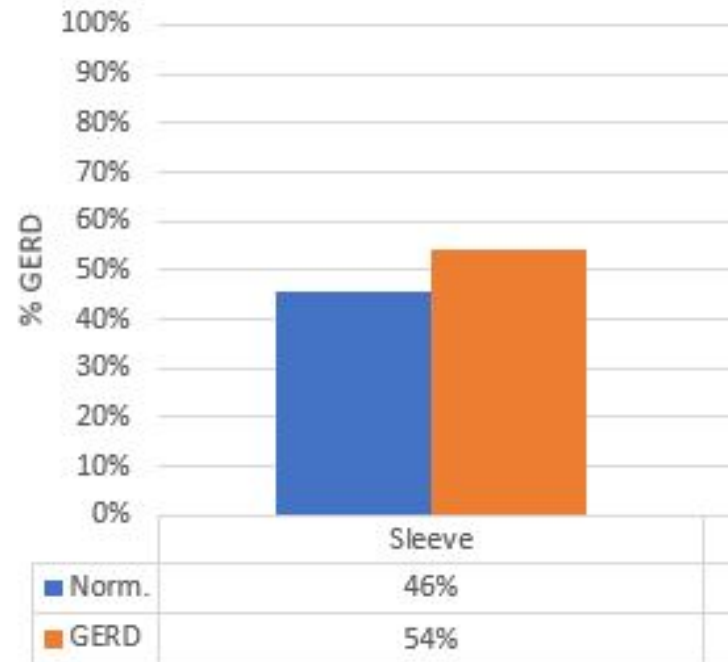
## Categorie di peso a T 10



# Remissione delle comorbidità

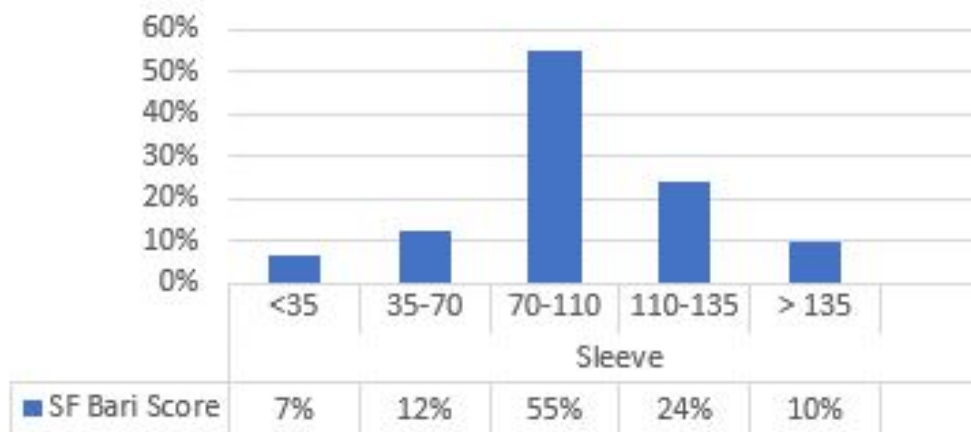


# Insorgenza di complicanze a lungo termine

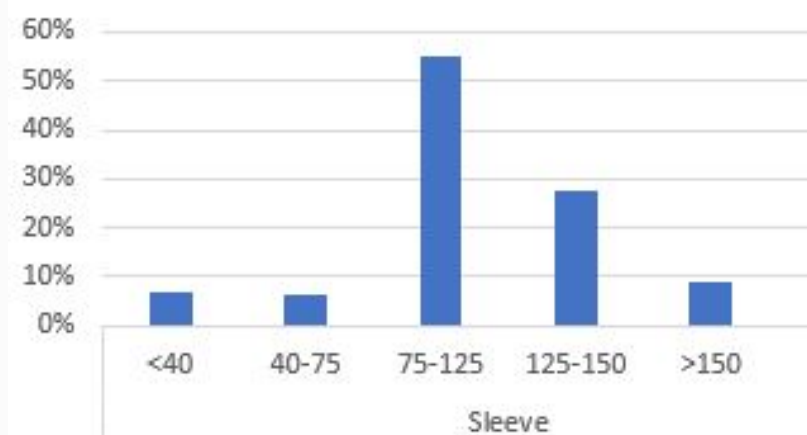


# Food tolerance (FT) & Quality of Life (QoL)

## SF - BARI



## SF – BARI QOL



Risposta	Risultato SF-BARI	Punteggio SF-BARI QOL
Eccellente	$\geq 135$	$\geq 150$
Molto bene	da 110 a <135	da 125 a <150
Bene	da 70 a <110	da 75 a <125
Giusto	da 35 a <70	da 40 a <75
Non ottimale	<35	<40

## TAKE HOME MESSAGE

La Sleeve Gastrectomy garantisce una perdita di peso ed una remissione delle comorbidità significativa a 10 anni. Tuttavia una percentuale di pazienti va incontro a ripresa di peso e comparsa di reflusso gastro-esofageo de novo.



XXXII CONGRESSO  
NAZIONALE SICOB

23 - 25 MAGGIO 2024  
G I A R D I N I  
N A X O S



**Grazie**