

# Modified Sleeve Gastrectomy

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**Guilherme M. Campos, MD, PhD, FACS, FASMBS**

**Paul J. Nutter Professor of Surgery**

**Chair, Division of Bariatric and Gastrointestinal Surgery**

**Director - Bariatric Surgery Program**

**Co-Director - Foregut, Bariatric and Adv GI/MIS Fellowship**

**[gcampos@vcu.edu](mailto:gcampos@vcu.edu)**

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# Disclosure slide

- **No financial disclosures**

# **Modified Sleeve Gastrectomy**

- 1. The Problem: Post-Sleeve GERD**
- 2. The Possible Solutions**
- 3. Factors Associated with Post-Sleeve GERD**
- 4. Types and Results Modified Sleeve**  
**‘Nissen’, ‘Rossetti’, ‘Dor’, ‘Toupet’**
- 5. Video: Modified Sleeve + Toupet**

# The Problem

- Post-Sleeve GERD symptoms ~ 35%
- De Novo Esophagitis, any Grade ~ 25% (8 to 50%)
- De Novo Barrett's Esophagus ~ 10% (6 to 35%)



**Post-Sleeve GERD: 30% vs No: 70%**

# Possible Solutions

1. Accept Current State Do nothing

2. Decrease GERD Rates

a. Tailor Choice Based on Characteristics

70% no Post-Sleeve GERD

30% Post-Sleeve GERD - LRYGB or (Modified LSG)

b. Modified Sleeve Applied to All-comers

# Factors Associated with Post-Sleeve GERD

## Objective Diagnose GERD

- a. LA Grade C or D (with/without GERD symptoms)
- b. + pH test (with/without GERD symptoms)


Obesity Surgery (2020) 30:1360–1367  
<https://doi.org/10.1007/s11695-019-04286-5>



ORIGINAL CONTRIBUTIONS



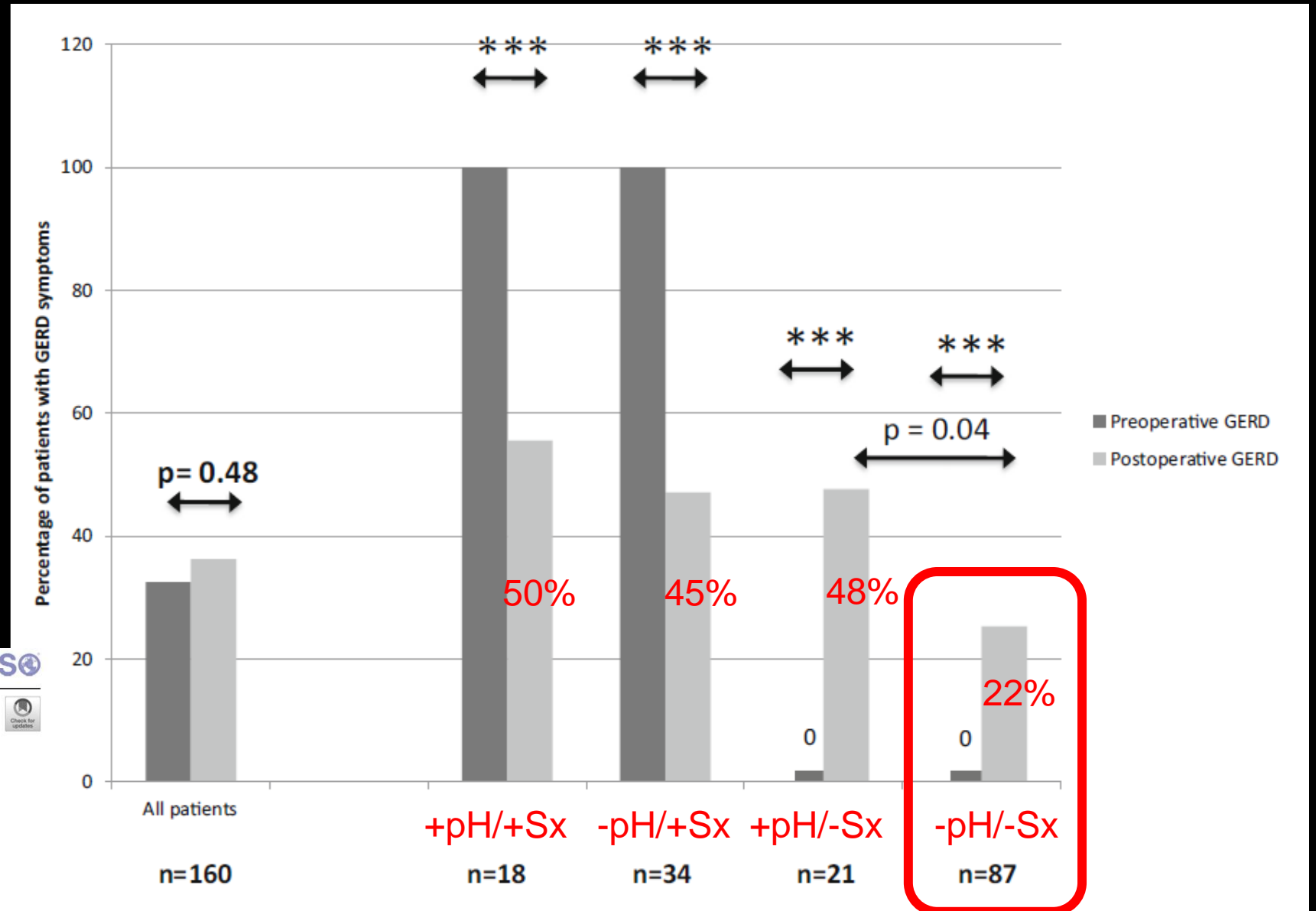
**Predictive Factors of Gastroesophageal Reflux Disease in Bariatric Surgery: a Controlled Trial Comparing Sleeve Gastrectomy with Gastric Bypass**

Daniel Navarini<sup>1,2,3,4</sup> · Carlos Augusto S. Madalosso<sup>1,2,3,5</sup>  · Alexandre P. Tognon<sup>2</sup> · Fernando Fornari<sup>2,3</sup> · Fábio R. Barão<sup>3</sup> · Richard R. Gurski<sup>4</sup>

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# Factors Associated with Post-Sleeve GERD

- pH test



# Factors Associated with Post-Sleeve GERD

- pH test

120

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Obesity Surgery (2021) 31:3490–3497  
<https://doi.org/10.1007/s11695-021-05427-5>



ORIGINAL CONTRIBUTIONS



## Do Preoperative Esophageal pH Monitoring and High-Resolution Manometry Predict Symptoms of GERD After Sleeve Gastrectomy?

RD  
ERD

Heithem Soliman<sup>1,2</sup> • Muriel Coupaye<sup>1,3</sup> • Boris Cohen-Sors<sup>1,2</sup> • Caroline Gorbachev<sup>2</sup> • Marie Dior<sup>2</sup> • Nicoleta Nebunu<sup>2</sup> • Sofya Latrache<sup>2</sup> • Maude Le Gall<sup>1</sup> • André Bado<sup>1</sup> • Séverine Ledoux<sup>1,3</sup> • Benoit Coffin<sup>1,2</sup> • Henri Duboc<sup>1,2</sup>

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# Factors Associated with Post-Sleeve GERD



SURGERY FOR OBESITY  
AND RELATED DISEASES

Surgery for Obesity and Related Diseases ■ (2020) 1–6

Original article

## Predictive value of preoperative DeMeester score on conversion to Roux-en-Y gastric bypass for gastroesophageal reflux disease after sleeve gastrectomy

Marie De Montrichard, M.D.<sup>a</sup>, Tristan Greilsamer, M.D.<sup>a</sup>, David Jacobi, M.D., Ph.D.<sup>b,c</sup>,  
Stanislas Bruley des Varannes, M.D., Ph.D.<sup>d</sup>, Eric Mirallié, M.D.<sup>a</sup>,  
Claire Blanchard, M.D., Ph.D.<sup>a,c,\*</sup>

<sup>a</sup>*Clinique de Chirurgie Cancérologique Digestive et Endocrinienne, Institut des Maladies de l'Appareil Digestif, Centre Hospitalo-universitaire de Nantes (CHU) Hôtel-Dieu, Nantes, France*

<sup>b</sup>*L'institut du thorax, Department of Endocrinology, CHU Nantes, Nantes, France*

<sup>c</sup>*L'institut du thorax, INSERM, CNRS, UNIV Nantes, Nantes, France*

<sup>d</sup>*Service d'hépatologie et gastroentérologie, Institut des Maladies de l'Appareil Digestif, CHU Hôtel-Dieu, Nantes, France*

Received 9 July 2019; accepted 8 April 2020

# Factors Associated with Post-Sleeve GERD

- 423 had pH test before LSG (indication)
- 36 (9%) conv. RYGB vs. 387 (91%) not converted

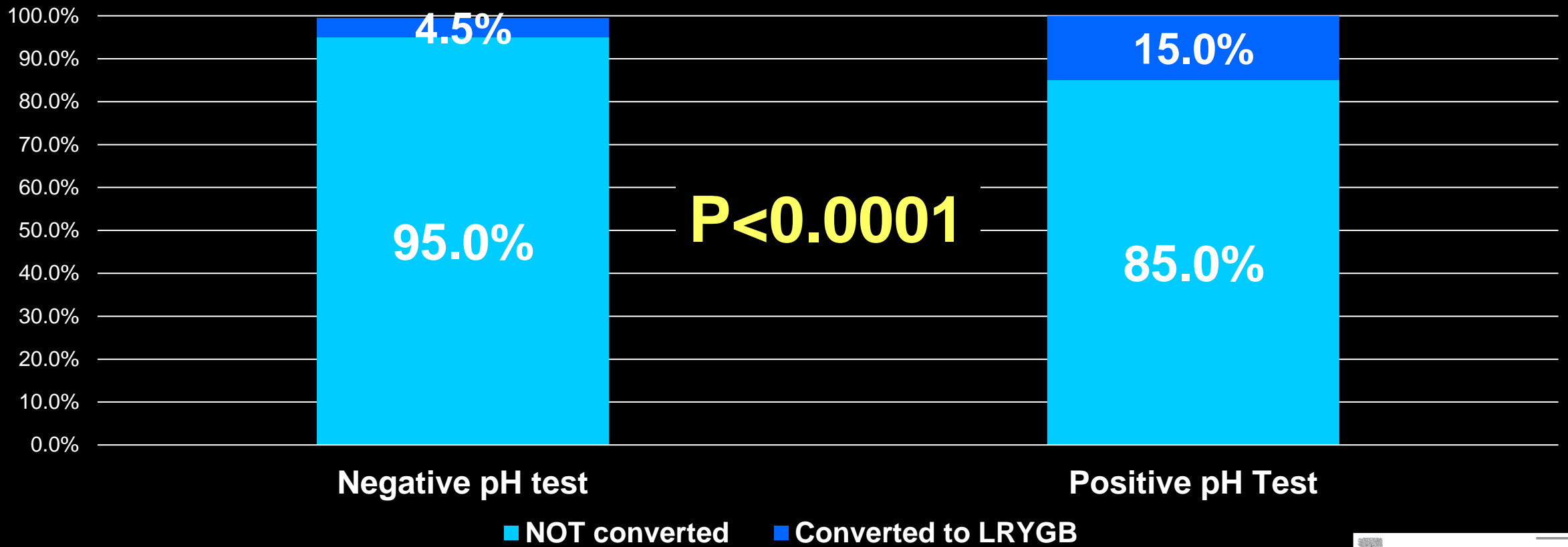
No difference between preop DMS

(16.1 ± 22 vs 13.7 ± 14, p=.37)

- Preop DMS alone is not predictive of the risk of conversion of SG to RYGB for GERD.

# Factors Associated with Post-Sleeve GERD

Rate of Conversion LSG LRYGB stratified by pH test



# Factors Associated with Post-Sleeve GERD

Obesity Surgery

<https://doi.org/10.1007/s11695-023-06732-x>



ORIGINAL CONTRIBUTIONS



## Role of Preoperative High-Resolution Manometry in the Identification of Patients at High Risk of Postoperative GERD Symptoms 1 Year After Sleeve Gastrectomy

Marta Bonaldi<sup>1</sup> · Carolina Rubicondo<sup>1</sup> · Valentina Andreasi<sup>1,2</sup> · Riccardo Giorgi<sup>1</sup> · Giovanni Cesana<sup>1</sup> · Francesca Ciccarese<sup>1</sup> · Matteo Uccelli<sup>1</sup> · Adelinda Zanoni<sup>1</sup> · Roberta Villa<sup>1</sup> · Stefano De Carli<sup>1</sup> · Alberto Oldani<sup>1</sup> · Dusanka Dokic<sup>1</sup> · Stefano Olmi<sup>1,2</sup>

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# Factors Associated with Post-Sleeve GERD

- 164 pts, No (n=34) or LA Grade A (n=117) and B (n=13) esophagitis
  - With (n=89) or without (n=75) GERD symptoms
  - Preop HRM and LSG - GERD Questionnaire at 1 year

- 164 pts, preop LA Grade A and B esophagitis
- With (n=89) or without (n=75) GERD symptoms
- Preop HRM and LSG - GERD Questionnaire at 1 year

Variable	Overall <i>n</i> = 164 (%)	No postop. GERD <i>n</i> = 104 (%)	Postop. GERD <i>n</i> = 60 (%) <b>35%</b>	<i>p</i>
Gender				< 0.001
Male	59 (36)	48 (46)	11 (18)	
Female	105 (64)	56 (54)	49 (82)	
Age, years*	42 (32–50)	42 (35–49)	44 (32–50)	0.830
BMI, kg/m <sup>2</sup> *	43.6 (40.3–49.0)	44.2 (40.5–49.5)	42.9 (39.3–47.6)	0.207
Diabetes mellitus	13 (9)	6 (6)	7 (13)	0.226
Arterial hypertension	38 (26)	21 (22)	17 (33)	0.172
OSAS	78 (48)	61 (59)	17 (28)	< 0.001

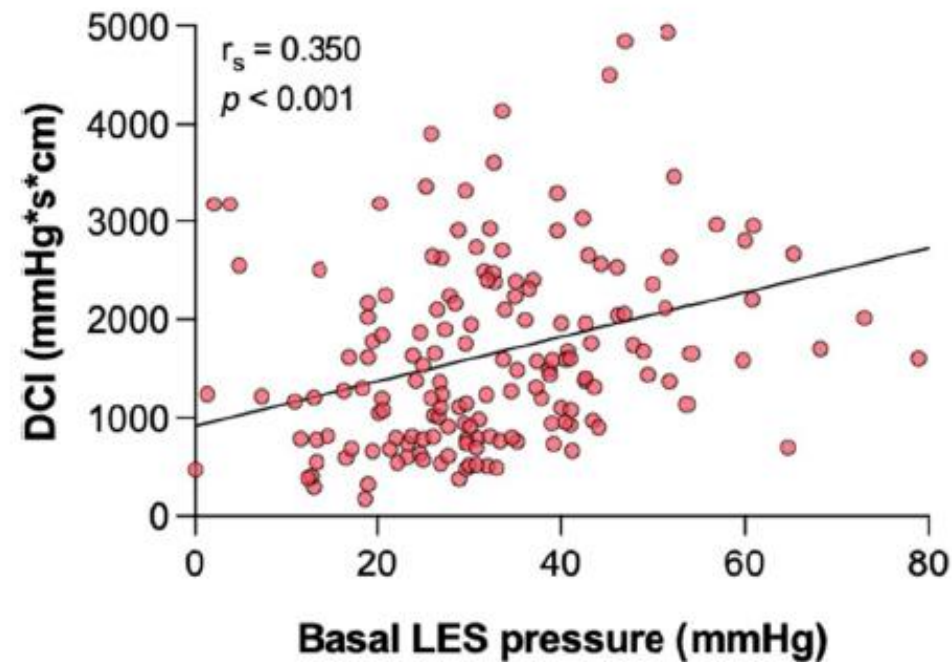
Variable	Overall <i>n</i> = 164 (%)	No postop. GERD <i>n</i> = 104 (%)	Postop. GERD <i>n</i> = 60 (%) <b>35%</b>	<i>p</i>
Preop. GERD symptoms				0.007
No	75 (45)	56 (53)	19 (32)	
Yes	89 (55)	48 (47)	41 (68)	
Cardia				0.715
Contenance	87 (55)	54 (53)	33 (57)	
Incontinence	30 (19)	21 (21)	9 (16)	
Hiatal hernia <sup>§</sup>	42 (26)	26 (26)	16 (28)	
Preoperative esophagitis	130 (79)	89 (86)	41 (68)	0.009
Preoperative esophagitis <sup>°</sup>				0.198
Grade A	117 (90)	82 (92)	35 (85)	
Grade B	13 (8)	7 (7)	6 (10)	

Variable	Overall <i>n</i> = 164 (%)	No postop. GERD <i>n</i> = 104 (%)	Postop. GERD <i>n</i> = 60 (%) <b>35%</b>	<i>p</i>
EGJ-CI, mmHg/cm/s*	63 (47–90)	64 (48–88)	62 (45–94)	0.781
Basal p LES, mmHg*	31.8 (24–41)	31.2 (23.8–42.5)	30.8 (25–39.1)	0.766
Hypotonic LES (< 13 mmHg)	12 (7)	6 (6)	6 (10)	0.359
Median IRP, mmHg*	10.3 (7.4–14.3)	10.3 (7.4–14.9)	10.5 (7.5–13.7)	0.999
DCI, mmHg*s*cm*	1462 (811–2244)	1644 (837–2468)	1211 (791–1731)	0.021
Ineffective esophageal motility (DCI < 450 mmHg*s*cm)	6 (4)	4 (4)	2 (3)	1.000



**Table 2** Multivariable logistic regression analysis evaluating determinant of postoperative gastroesophageal reflux disease (GERD)

Variable	OR	95% CI	<i>p</i>
Gender, female	3.402	1.540–7.513	0.002
DCI, > 1623 mmHg*cm*s	0.335	0.161–0.696	0.003
Preoperative esophagitis	–	–	–
Preoperative GERD symptoms	2.489	1.210–5.123	0.013



# Factors Associated Post-Sleeve GERD

## Objective Diagnose GERD

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ORIGINAL CONTRIBUTIONS



**Predictive Factors of Gastroesophageal Reflux Disease in Bariatric Surgery: a Controlled Trial Comparing Sleeve Gastrectomy with Gastric Bypass**

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5. Video: Modified Sleeve + Toupet

# Results – ‘Nissen’ LSG


Obesity Surgery (2022) 32:2148–2154  
<https://doi.org/10.1007/s11695-022-06066-0>



ORIGINAL CONTRIBUTIONS



## Peri-operative Morbidity of Nissen Sleeve Gastrectomy: Prospective Evaluation of a Cohort of 365 Patients, Beyond the Learning Curve

David Nocca<sup>1,2</sup> · Florence Galtier<sup>1,3</sup> · Sulaiman Taleb<sup>1</sup> · Marie-Christine Picot<sup>2,3,4</sup> · Audrey Jausse<sup>4</sup> · Marta Silvestri<sup>5</sup> · Patrick Lefebvre<sup>1</sup> · Audrey de Jong<sup>1</sup> · Thomas Gautier<sup>6</sup> · Marcelo Loureiro<sup>1,7</sup> · Marius Nedelcu<sup>8,9</sup> 

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**Conclusion** Following the initial learning curve and additional technical modifications, the Nissen-Sleeve appears to be a safe surgical technique with an acceptable early postoperative complication rate.

# 'Nissen' Sleeve



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<https://doi.org/10.1007/s11695-022-06066-0>



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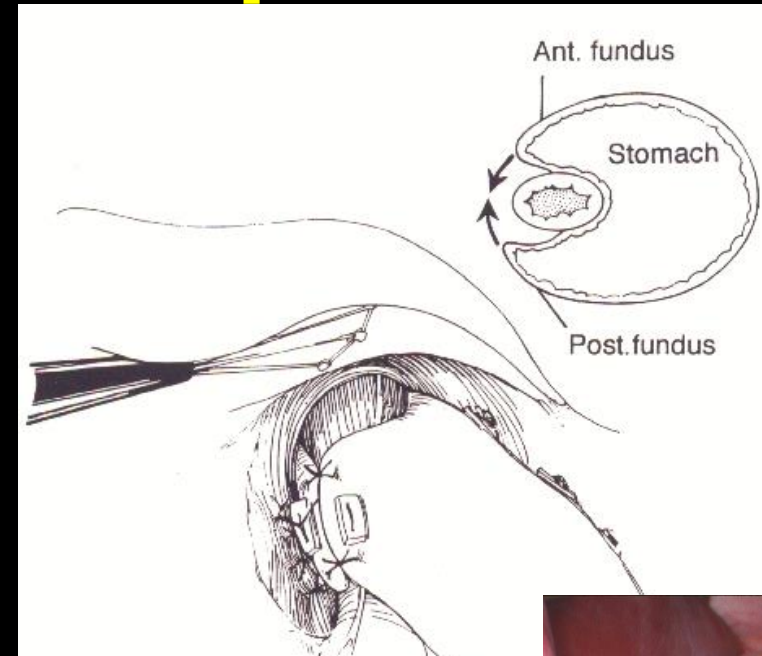
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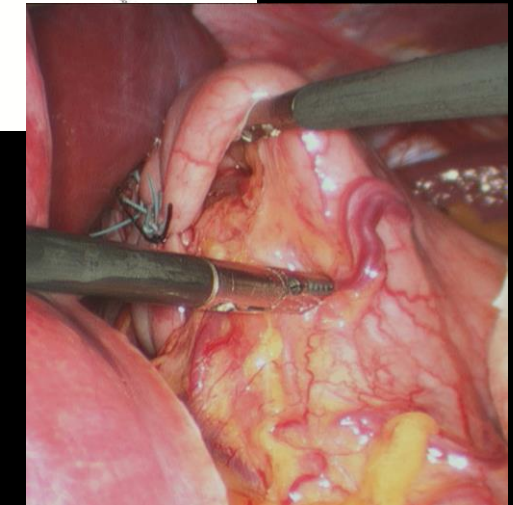
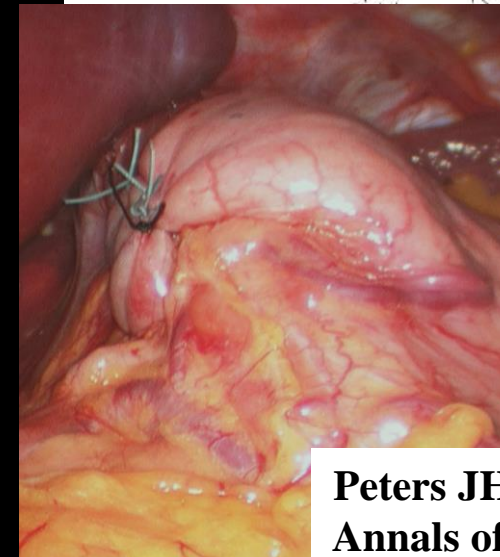
# 'Nissen'-Sleeve

≠

# Lap. Nissen



≠



Peters JH, DeMeester TR, Crookes P et al.  
Annals of Surgery; 1998 Jul; 228(1):40-50.

# Results – ‘Nissen’ Sleeve

365 pts.: 42% GERD sx, 20% any esophagitis, 14% HH

Jan-2018 to 9-2020 (Initial 25 case series: 9/2013 to 3/2014)

75% Female, Average BMI 41.2 (SD 5.4) (Max BMI 50)

16 (4.4%) Major Surgical Complications (Clavien-Dindo  $\geq$  3)

# Results – ‘Nissen’ Sleeve

365 pts. (42% GERD sx, 20% any esophagitis, 14% HH)  
(Jan-2018 to 9-2020)

- **6 (1.6%) “Acute Wrap Perforations” = Leak (5 ‘wrap resection’ / 1 suture/drain)**
- **1 (0.3%) “Wrap Dilation/Ischemia) = ‘wrap resection’**
- **7 (1.9%) Acute “Wrap Perforations/Ischemia” / ‘Leak’ rate**

- 2 (0.6%) “Wrap Perforations” 8 and 9 months postop = ‘wrap resection’

- **9 (2.5%) Total “Wrap Perforations/Ischemia” / (Leak rate)**

- **20 pts with dysphagia (5.5%)**

- **Total: 19 (5%) surgical re-intervention**





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AND RELATED DISEASES

Surgery for Obesity and Related Diseases 14 (2018) 264–270

Original article

## Is laparoscopic sleeve gastrectomy safer than laparoscopic gastric bypass? a comparison of 30-day complications using the MBSAQIP data registry

Sandhya B. Kumar, M.D.\*, Barbara C. Hamilton, M.D., Stephanie G. Wood, M.B.B.Ch.,  
Stanley J. Rogers, M.D., Jonathan T. Carter, M.D., Matthew Y. Lin, M.D.

Department of Surgery, University of California San Francisco, San Francisco, California

Received September 18, 2017; accepted December 11, 2017

Table 2

### Complications by surgery type

Complication	LSG (n = 93,062)	LRYGB (n = 41,080)	P value
Urinary tract infection	288 (.31%)	193 (.47%)	< .001
Superficial SSI	223 (.24%)	382 (.93%)	< .001
Deep SSI	27 (.03%)	83 (.20%)	< .001
Organ space infection	270 (.29%)	246 (.60%)	< .001
Wound disruption	24 (.03%)	40 (.1%)	< .001
Sepsis	202 (.22%)	250 (.61%)	< .001
Renal failure	175 (.19%)	157 (.38%)	< .001
Bleeding requiring transfusion	530 (.57%)	489 (1.19%)	< .001
Pneumonia	173 (.19%)	210 (.51%)	< .001
Venous thromboembolism	215 (.23%)	95 (.23%)	.994
Pulmonary embolism	99 (.11%)	60 (.15%)	.052
Myocardial infarction	32 (.03%)	31 (.08%)	.001
Cardiac arrest	45 (.05%)	38 (.09%)	.003
Cerebrovascular accident	13 (.01%)	4 (.01%)	.526
Coma	5 (.01%)	0 (.00%)	0.137
Unplanned intubation	148 (.16%)	164 (.40%)	< .001
ICU admission	664 (.71%)	679 (1.65%)	< .001
Ventilator >48 hr	102 (.11%)	160 (0.39%)	< .001
Intervention within 30 d	1405 (1.51%)	1369 (3.33%)	< .001
Reoperation within 30 d	1135 (1.22%)	1310 (3.19%)	< .001
Readmission within 30 d	3376 (4.05%)	3007 (7.32%)	< .001
30-d outcomes			
Leak	705 (.76%)	637 (1.55%)	< .001
Morbidity	5354 (5.75%)	4,791 (11.66%)	< .001
Mortality	96 (.10%)	82 (.20%)	< .001

# Results – ‘Nissen’ Sleeve

365 pts.

75% female

Average BMI 41.2 (SD 5.4) (Max BMI 50)

- At 12 months (85.7% follow-up rate – 313 patients)

%EWL: 77.3 (SD 26.3)

- GERD OUTCOMES

12 pts (5.8%) were suffering from GERD

10 pts (4.4%) regularly taking PPIs therapy

# Results – Rossetti Sleeve



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Surgery for Obesity and Related Diseases 18 (2022) 1199–1208

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SURGERY FOR OBESITY  
AND RELATED DISEASES

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Original article

## Laparoscopic sleeve gastrectomy with Rossetti fundoplication: long-term (5-year) follow-up

Matteo Uccelli, M.D.<sup>a,\*</sup>, Giovanni Carlo Cesana, M.D.<sup>a</sup>, Francesca Ciccarese, M.D.<sup>a</sup>,  
Alberto Oldani, M.D.<sup>a</sup>, Riccardo Giorgi, M.D.<sup>a</sup>, Stefano Maria De Carli, M.D.<sup>a</sup>,  
Roberta Villa, M.D.<sup>a</sup>, Adelinda Angela Giulia Zanoni, M.D.<sup>a</sup>, Ayman Ismail, M.D.<sup>a</sup>,  
Francesco Di Capua, M.D.<sup>a</sup>, Marta Bonaldi, M.D.<sup>a</sup>, Carolina Rubicondo, M.D.<sup>a</sup>,  
Davide Moioli, M.D.<sup>a,b</sup>, Stefano Olmi, M.D.<sup>a,c</sup>

<sup>a</sup>General and Oncologic Surgery Department, Centre of Bariatric Surgery, San Marco Hospital, Zingonia, Italy

<sup>b</sup>School of General Surgery, University of Milan, Milan, Italy

<sup>c</sup>Vita-Salute San Raffaele, University of Milan, Milan, Italy

Received 9 February 2022; accepted 10 May 2022

# Results – Rossetti Sleeve

127 pts. (75% with GERD sx, 22% any esophagitis, 34% HH)

75% Female, Average BMI 43 (SD 6.1) (Max BMI 63)

7 (5.5%) Major Surgical Complications (Clavien-Dindo  $\geq$  3)

- 7 (5.5%) “Acute Wrap Perforations” = Leak (7 ‘wrap resection’)

# Results – Rossetti Sleeve

127 pts. (75% with GERD sx)

75% Female, Average BMI 43 (SD 6.1) (Max BMI 63)

- Follow-up 24 to 60 months (35% follow-up rate – 44 patients)

- WEIGHT LOSS: Average BMI: Initial 43 – at 60 mo BMI 33

- GERD Symptoms OUTCOMES

- 95/127 (75%) Baseline GERD Sx

- 2/44 pts (4.4%) With GERD Sx

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