

ACTUALITÉS NÉPHROLOGIQUES JEAN HAMBURGER 2023



Surgical Treatment of Obesity

Dr Lionel REBIBO

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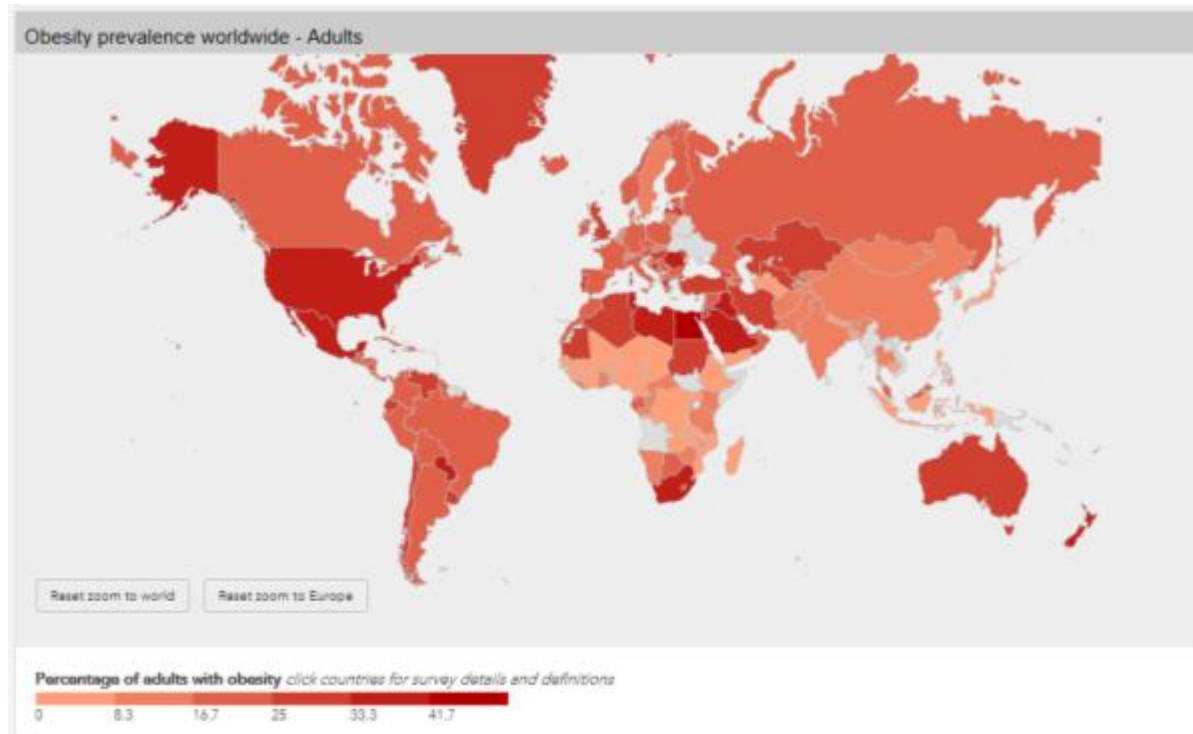
Introduction

Obesity: the greatest epidemic of the 21st century?

Obesidade: a maior epidemia do século XXI?

Paulo Manuel Pêgo-Fernandesⁱ, Benoit Jacques Bibasⁱⁱ, Mariana Deboniⁱⁱⁱ

2011



Introduction



Adults (aged 20 years and over)

	Men 2020	Men 2025	Men 2030	Men 2035
Number with obesity (millions)	347	439	553	690
Proportion of all men	14%	16%	19%	23%
	Women 2020	Women 2025	Women 2030	Women 2035
Number with obesity (millions)	466	568	693	842
Proportion of all women	18%	21%	24%	27%

813 millions

1532 millions

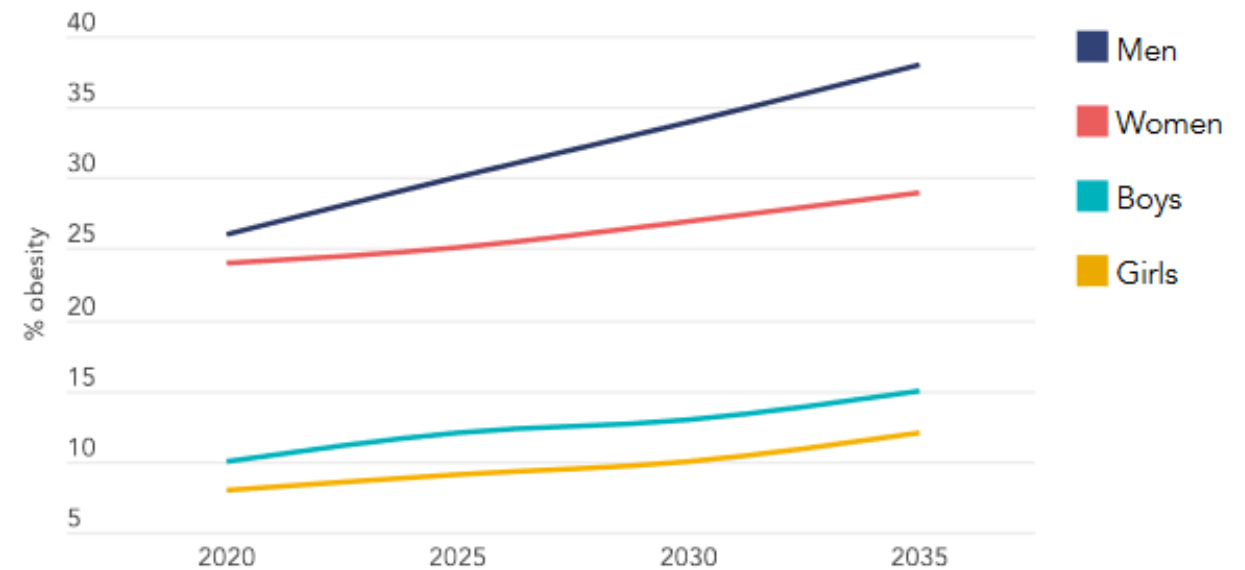
Introduction

WORLD
OBESITY

World Obesity
Atlas 2023

- **French datas:**
 - Obese population in 2035: 34%

PROJECTED TRENDS IN THE PREVALENCE OF OBESITY (BMI $\geq 30\text{kg/m}^2$)



Introduction

- Mortality linked to obesity:



Association between Class III Obesity (BMI of 40–59 kg/m²) and Mortality: A Pooled Analysis of 20 Prospective Studies

Cari M. Kitahara^{1*}, Alan J. Flint^{2,3}, Amy Berrington de Gonzalez¹, Leslie Bernstein⁴, Michelle Brotzman⁵, Robert J. MacInnis^{6,7}, Steven C. Moore¹, Kim Robien⁸, Philip S. Rosenberg¹, Pramil N. Singh⁹, Elisabete Weiderpass^{10,11,12,13}, Hans Olov Adami^{3,10}, Hoda Anton-Culver¹⁴, Rachel Ballard-Barbash¹⁵, Julie E. Buring¹⁶, D. Michal Freedman¹, Gary E. Fraser¹⁷, Laura E. Beane Freeman¹, Susan M. Gapstur¹⁸, John Michael Gaziano^{16,19}, Graham G. Giles^{6,7}, Niclas Håkansson²⁰, Jane A. Hoppin²¹, Frank B. Hu^{2,3}, Karen Koenig²², Martha S. Linet¹, Yikyung Park¹, Alpa V. Patel¹⁸, Mark P. Purdue¹, Catherine Schairer¹, Howard D. Sesso¹⁶, Kala Visvanathan^{23,24}, Emily White²⁵, Alicja Wolk²⁰, Anne Zeleniuch-Jacquotte²², Patricia Hartge¹

Plos. 2014

Decreased life expectancy of 6 to 14 years

Introduction

- **Cost of Obesity:**



▶ THE HUMAN COST

Each year, obesity is associated with **>100,000** premature deaths

Severe obesity may shorten life expectancy up to **14 YEARS¹¹**

Obesity can lead to an **INCREASED RISK** for many diseases and conditions including heart disease, stroke and diabetes, which are among the leading causes of death in the United States¹²

75% of hypertension cases are related to obesity¹³

▶ THE FINANCIAL COST

\$150B the annual cost of health care related to obesity in United States

\$5M-\$1.3B amount severe obesity costs individual state Medicaid programs

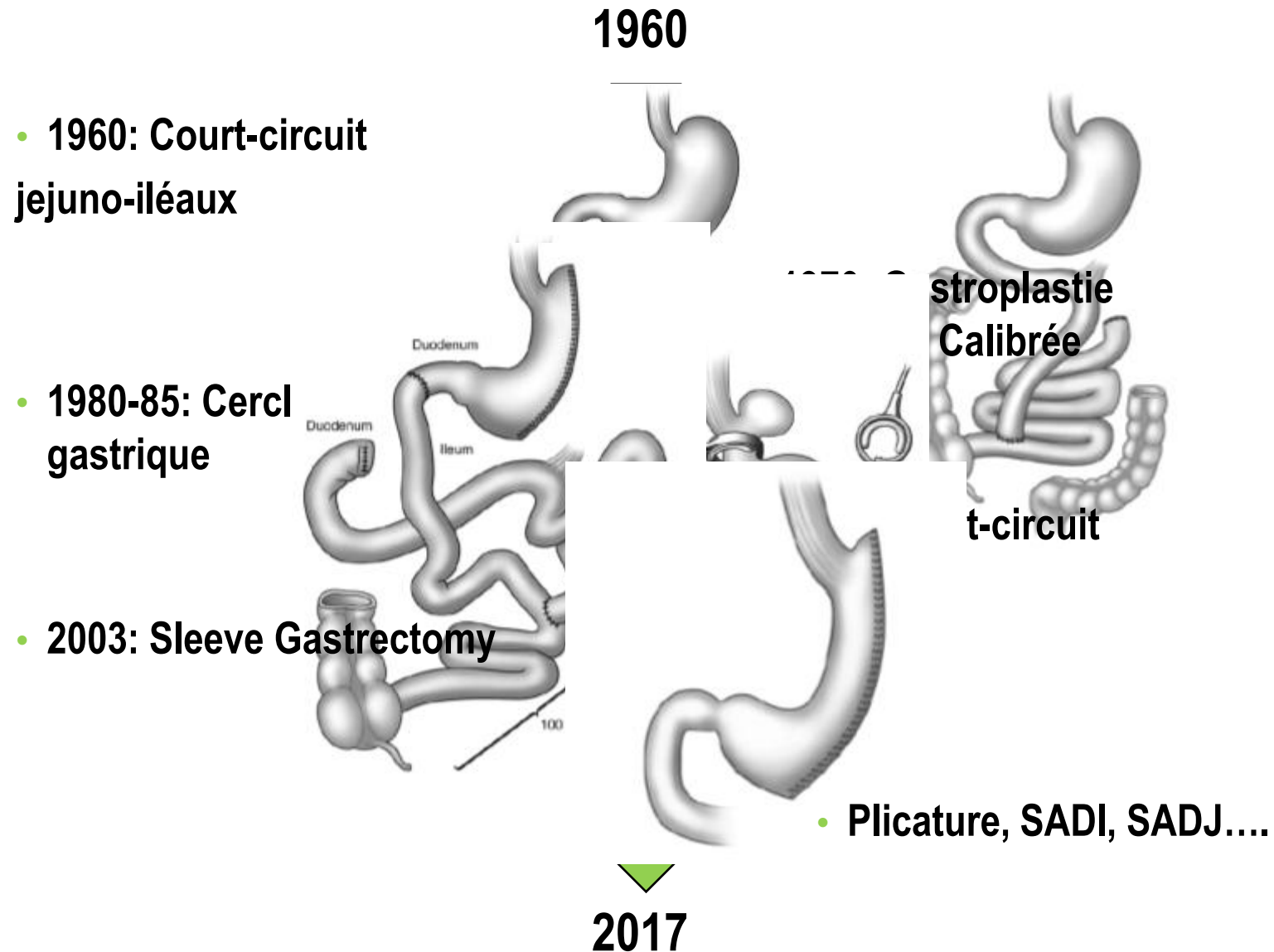
\$8B severe obesity related costs for state Medicaid programs¹⁴

\$1B the annual costs of health care and lost productivity amongst obese service members and their family

\$6.3B indirect costs associated with absenteeism attributable to obesity¹⁵

Bariatric Surgery

History of Bariatric Surgery



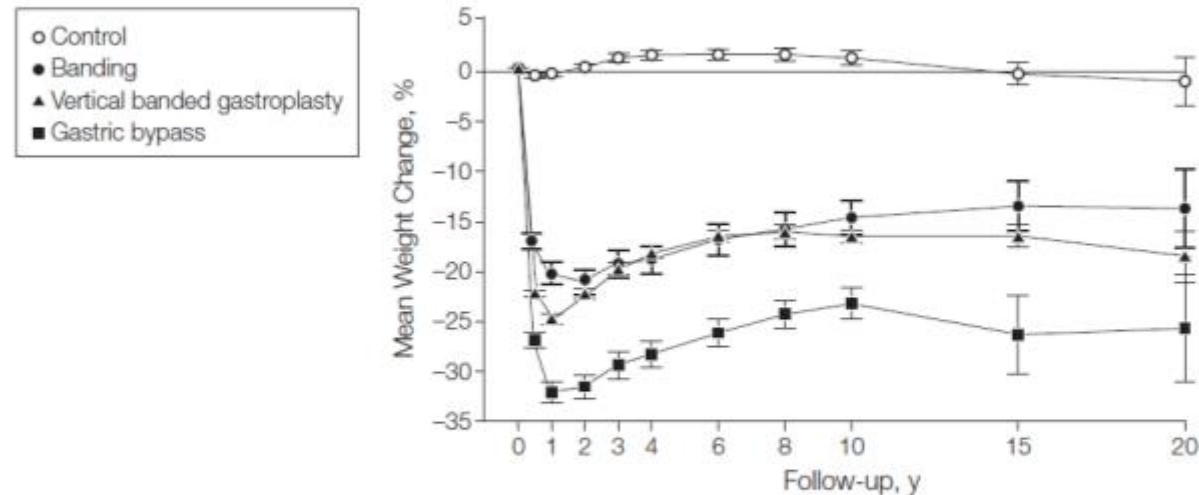
Results of Bariatric Surgery

Bariatric Surgery and Long-term Cardiovascular Events

Lars Sjöström, MD, PhD
 Markku Peltonen, PhD
 Peter Jacobson, MD, PhD
 C. David Sjöström, MD, PhD
 Kristjan Karason, MD, PhD
 Hans Wedel, PhD
 Sofie Ahlin, MD
 Åsa Anveden, MD
 Calle Bengtsson, MD, PhD
 Gerd Bergmark, BMA
 Claude Bouchard, PhD
 Björn Carlsson, MD, PhD
 Sven Dahlgren, MD, PhD
 Jan Karlsson, PhD
 Anna-Karin Lindroos, PhD
 Hans Lönroth, MD, PhD
 Kristina Narbro, PhD
 Ingmar Näslund, MD, PhD
 Torsten Olbers, MD, PhD
 Per-Arne Svensson, PhD
 Lena M. S. Carlsson, MD, PhD

JAMA. 2012

Figure 1. Mean Weight Change Percentages From Baseline for Controls and the 3 Surgery Groups Over 20 Years in the Swedish Obese Subjects Study



No. of patients	0	1	2	3	4	6	8	10	15	20
Control	2037	1490	1242	1267	556	176				
Banding	376	333	284	284	150	50				
Vertical banded gastroplasty	1369	1086	987	1007	489	82				
Gastric bypass	265	209	184	180	37	13				

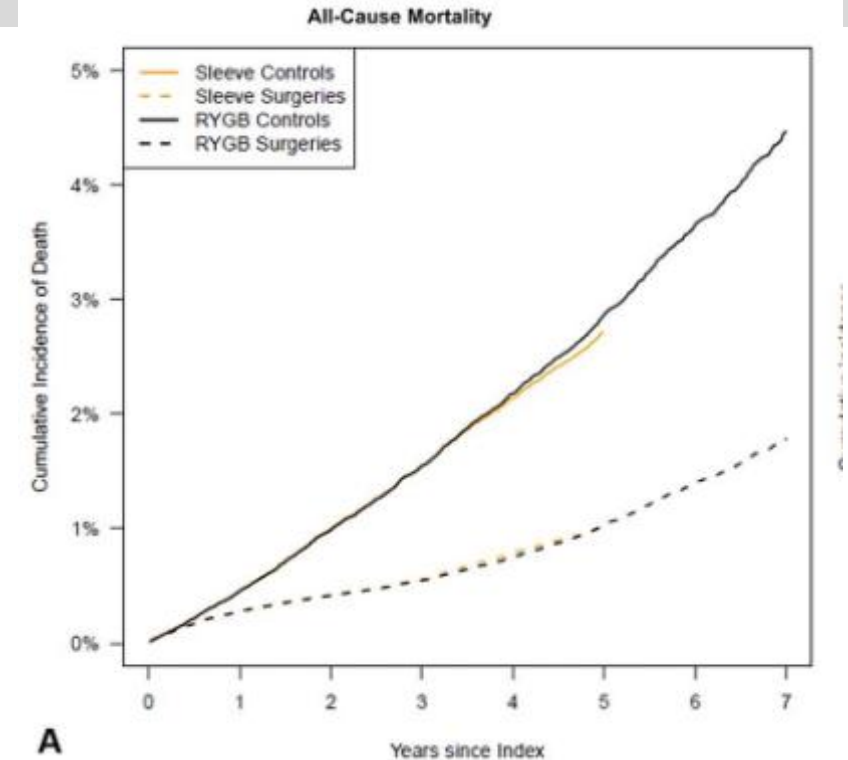
Results of Bariatric Surgery

Reduction in Long-term Mortality After Sleeve Gastrectomy and Gastric Bypass Compared to Nonsurgical Patients With Severe Obesity

Anita P. Courcoulas, MD,*[⊗] Eric Johnson, MS,† David E. Arterburn, MD,†
Sebastien Haneuse, PhD,‡ Lisa J. Herrinton, PhD,§ David P. Fisher, MD,§
Robert A. Li, MD,§ Mary Kay Theis, MS,† Liyan Liu, MS,§ Brianna Taylor, MPH,¶
Julie Cooper, MPA,† Philip L. Chin, MD,¶ Gary G. Grinberg, MD,§
Anirban Gupta, MD,† Shireesh Saurabh, MD,† Scott S. Um, MD,¶
Panduranga R. Yenumula, MD,§ Jorge L. Zelada, MD,¶ and Karen J. Coleman, PhD,¶

Ann Surg. 2022

- **Increased in life expectancy:**
 - Reduced risk of death due to cardio-vascular diseases,
 - Reduced risk of death due to cancer,
 - Reduced risk of death due to type 2 diabetes.



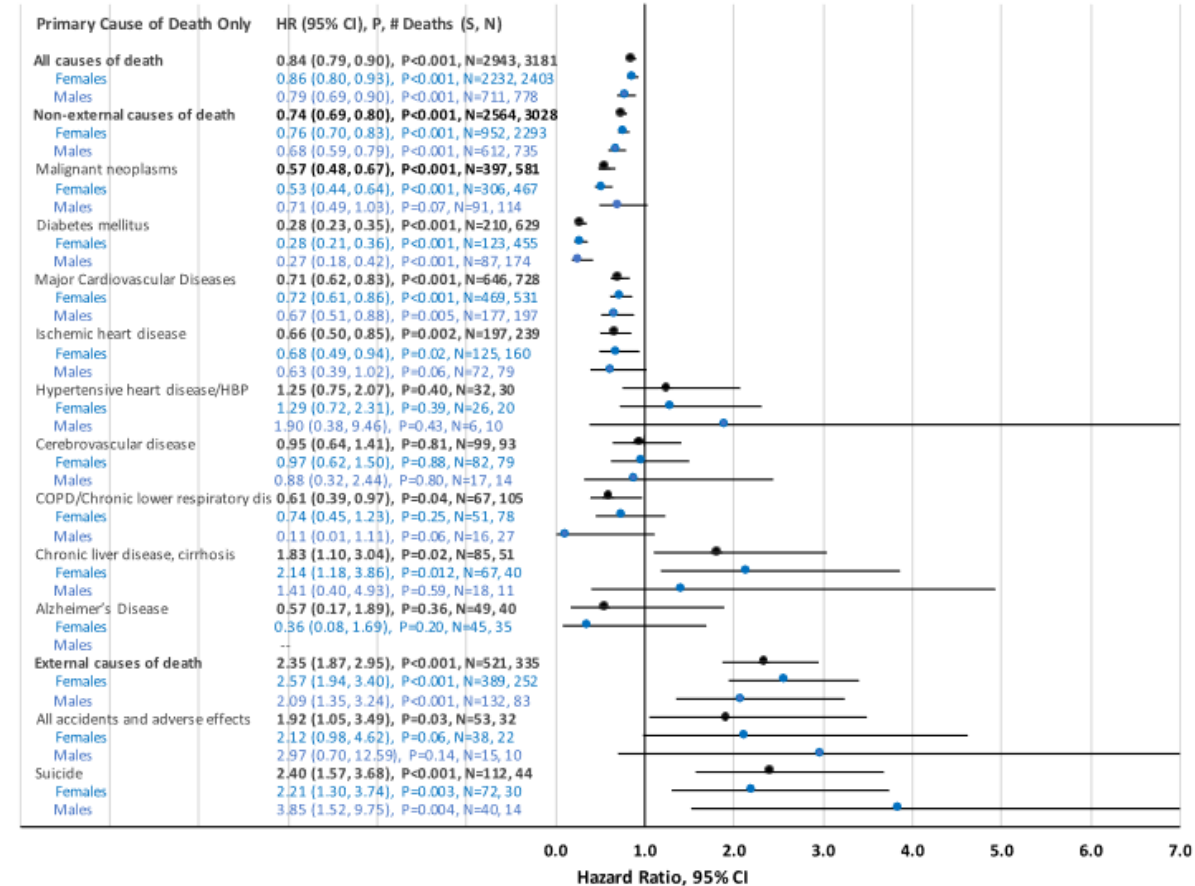
Results of Bariatric Surgery

Long-term all-cause and cause-specific mortality for four bariatric surgery procedures

Ted D. Adams^{1,2,3} | Huong Meeks⁴ | Alison Fraser⁴ | Lance E. Davidson^{2,5} |
 John Holmen⁶ | Michael Newman⁷ | Anna R. Ibele⁸ | Nathan Richards¹ |
 Steven C. Hunt^{2,9} | Jaewhan Kim¹⁰

Obesity. 2023

- However...
 - Increased suicide risk,
 - Increased accident risk,
 - In particular population ≤ 35 years old

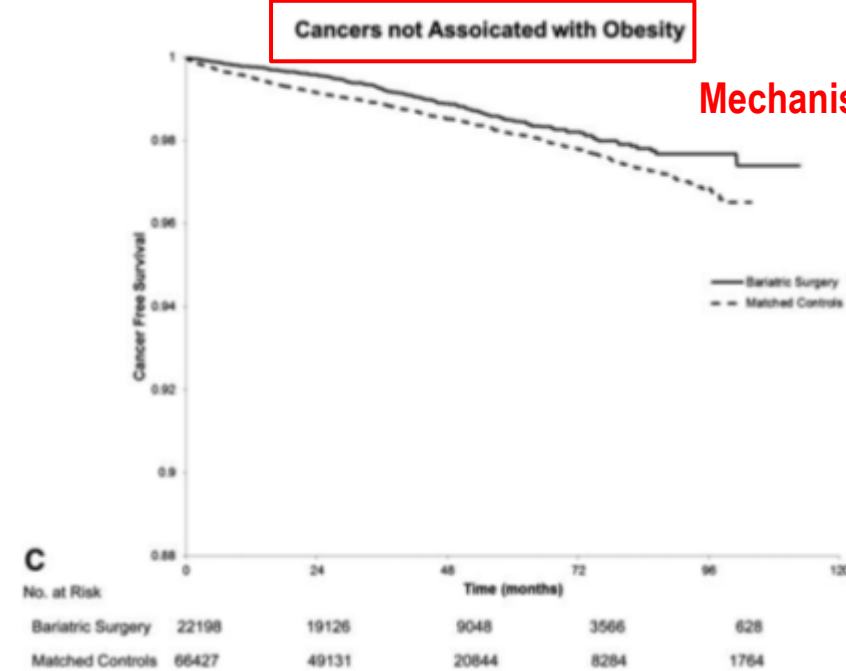
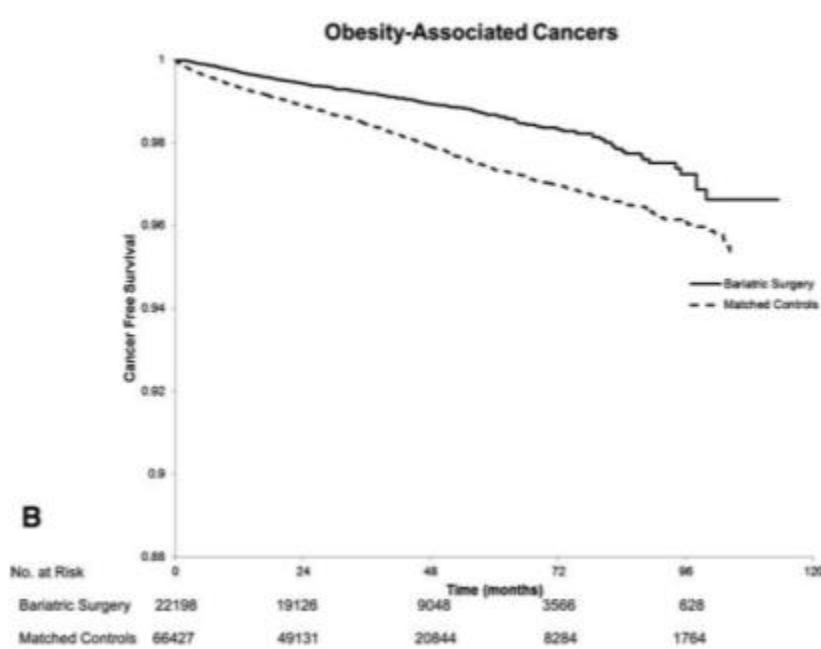


Results of Bariatric Surgery

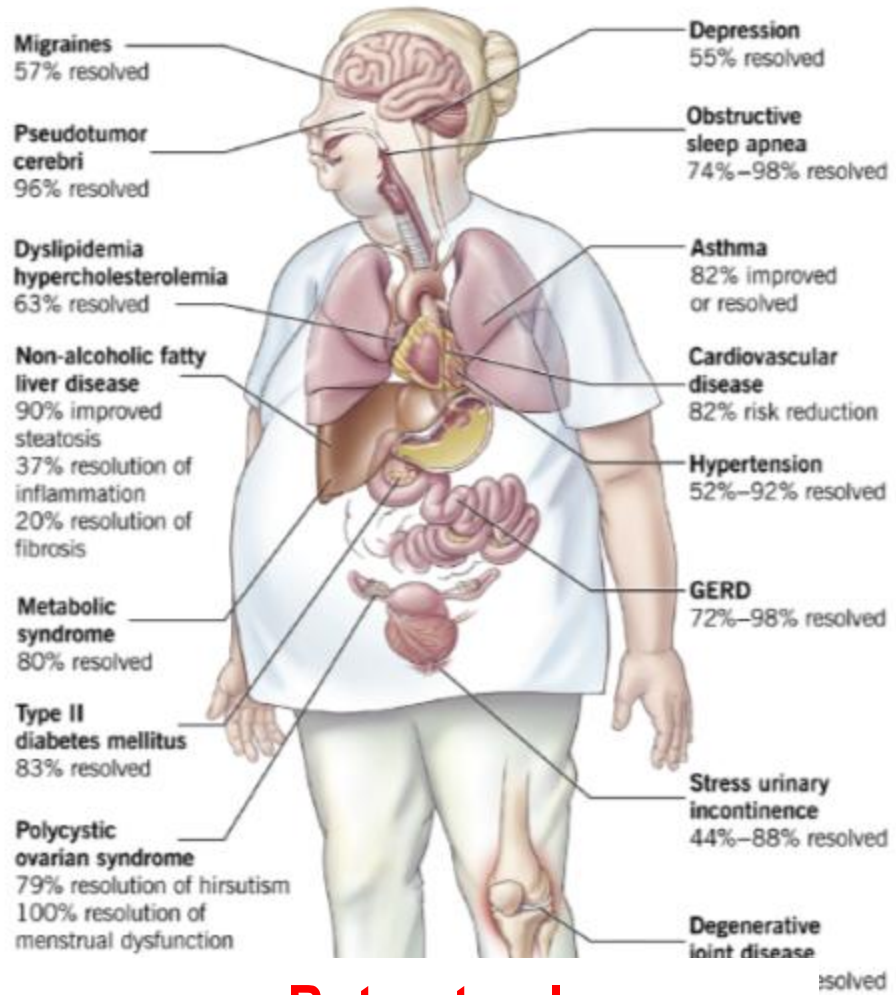
Bariatric Surgery and the Risk of Cancer in a Large Multisite Cohort

Daniel P. Schauer, MD, MSc,* Heather Spencer Feigelson, PhD, MPH,† Corinna Koebnick, MSc, PhD,‡
 Bette Caan, DrPH,§ Sheila Weinmann, PhD, MPH,¶ Anthony C. Leonard, PhD,|| J. David Powers, MS,†
 Panduranga R. Yenumula, MD,§ and David E. Arterburn, MD, MPH**

Ann Surg. 2017



Mechanism??



But not only:

Intracranial hypertension, Alzheimer's disease....

Venous thrombosis
95% resolved

Gout
77% resolved

Quality of Life-improved in 95% of patients



CCF ©2005

Mortality
89% reduction in 5-year mortality

Results of Bariatric Surgery

The Impact of Previous History of Bariatric Surgery on Outcome of COVID-19. A Nationwide Medico-Administrative French Study

Antonio Iannelli^{1,2,3,4}  • Samir Bouam⁵ • Anne-Sophie Schneck⁶ • Sébastien Frey^{1,2} • Kevin Zarca^{7,8} • Jean Gugenheim^{1,2,3} • Marco Alifano^{9,10}

Obes Surg. 2021

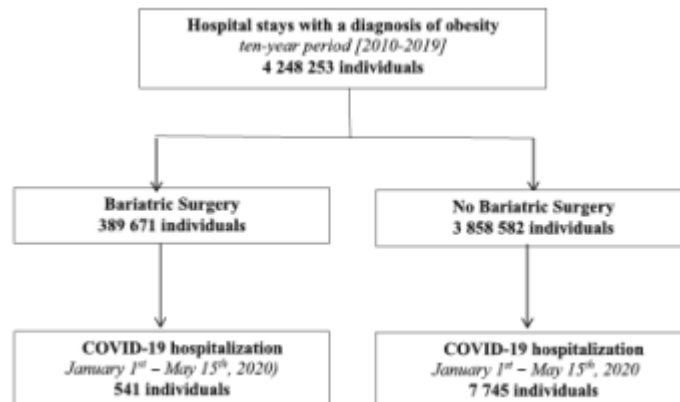
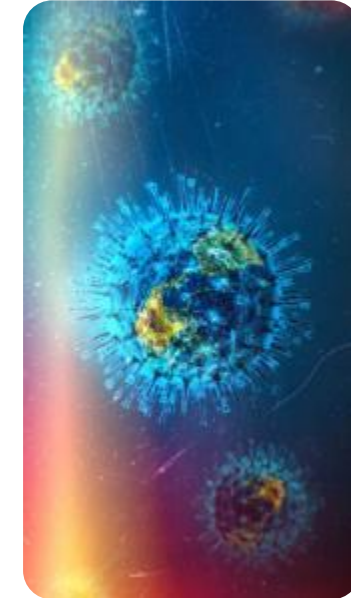


Table 5 Multivariate analysis of baseline risk factors for death. Model including the whole population

Death			
Characteristic	OR	95% CI	p value
Age, mean (SD), year			< 0.0001
15–30	Reference		
31–45	3.10	2.69–3.58	
46–60	9.63	7.25–12.79	
60–75	29.87	19.52–45.73	
Sex, M	1.48	1.28–1.69	< 0.0001
Cardiac failure	1.53	1.24–1.89	< 0.0001
Cancer	2.81	2.32–3.41	< 0.0001
Diabetes	1.33	1.16–1.52	< 0.0001
Bariatric surgery	0.50	0.31–0.80	0.0039



Recommendations for the surgical management of obesity

The logo for the Haute Autorité de Santé (HAS) features the letters 'HAS' in a blue, sans-serif font. A red, stylized wave or ribbon graphic is positioned beneath the 'A' and 'S'.

HAUTE AUTORITÉ DE SANTÉ

HAUTE AUTORITÉ DE SANTÉ

French Recommendations

HAS

HAUTE AUTORITÉ DE SANTÉ

SYNTHÈSE DES RECOMMANDATIONS DE BONNE PRATIQUE

Obésité : prise en charge chirurgicale chez
l'adulte

Janvier 2009

Janvier 2009

l'adulte

Obésité : prise en charge chirurgicale chez

French Recommendations

- **Indications:**

La chirurgie bariatrique est indiquée par décision collégiale, prise après discussion et concertation pluridisciplinaires (accord professionnel), chez des patients adultes réunissant l'ensemble des conditions suivantes :

- patients avec un IMC ≥ 40 kg/m² ou bien avec un IMC ≥ 35 kg/m² associé à au moins une comorbidité susceptible d'être améliorée après la chirurgie (notamment maladies cardio-vasculaires dont HTA, syndrome d'apnées hypopnées obstructives du sommeil et autres troubles respiratoires sévères, désordres métaboliques sévères, en particulier diabète de type 2, maladies ostéo-articulaires invalidantes, stéatohépatite non alcoolique) (grade B) ;
- en deuxième intention après échec d'un traitement médical, nutritionnel, diététique et psychothérapeutique bien conduit pendant 6-12 mois (grade B) ;
- en l'absence de perte de poids suffisante ou en l'absence de maintien de la perte de poids (grade B) ;
- patients bien informés au préalable (accord professionnel), ayant bénéficié d'une évaluation et d'une prise en charge préopératoires pluridisciplinaires (grade C) ;
- patients ayant compris et accepté la nécessité d'un suivi médical et chirurgical à long terme (accord professionnel) ;
- risque opératoire acceptable (accord professionnel).

French Recommendations

- **Surgical Techniques:**

No
consensus

Le choix de la technique chirurgicale doit être fait conjointement par l'équipe pluridisciplinaire et le patient. Il doit prendre en compte un certain nombre de critères en plus du rapport bénéfique/risque de chaque intervention, tels que :

- l'expérience et l'environnement technique du chirurgien et de l'équipe pluridisciplinaire et notamment de l'équipe d'anesthésie (grade B) ;
- l'importance de l'obésité, l'IMC, l'âge (grade B) ;
- les antécédents médicaux et chirurgicaux (grade C) ;
- les pathologies digestives associées (grade C) ;
- la présence d'un diabète de type 2 (accord professionnel) ;
- les traitements en cours (AVK, etc.) (accord professionnel) ;
- les troubles du comportement alimentaire (accord professionnel).

Surgical Indications

« Classic » indications

- **Weight loss**




- **Correction of one or more comorbidities**



Less "classic" indications

- **As a bridge to...**
 - Kidney transplant
 - Heart transplant
 - Lung transplant

A 5-year propensity-matched analysis of perioperative outcomes in patients with chronic kidney disease undergoing bariatric surgery

Mohamed A. Aboueisha¹ · Leah Evans¹ · Jonathan K. Allotey¹ · Emily K. Biagini¹ · Meredith Freeman¹ · Michael Z. Caposole¹  · John W. Baker¹ · Carlos Galvani¹ · Shauna Levy¹

Surg Endosc. 2023

- **Medically assisted procreation**
- **Large incisional hernia....**

Original article

Ventral hernia surgery in morbidly obese patients, immediate or after bariatric surgery preparation: Results of a case-matched study

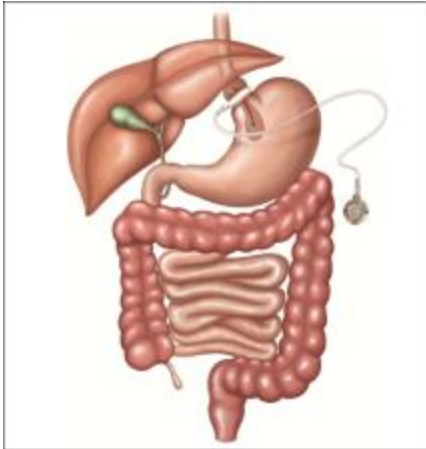
Marie-Maëlle Chandeze, M.D.^a, David Moszkowicz, M.D., Ph.D.^{a,b,*}, Alain Beauchet, M.D.^c, Karina Vychnevskaja, M.D.^a, Frédérique Peschaud, M.D., Ph.D.^{a,b}, Jean-Luc Bouillot, M.D., Ph.D.^{a,b}

SOARD. 2019

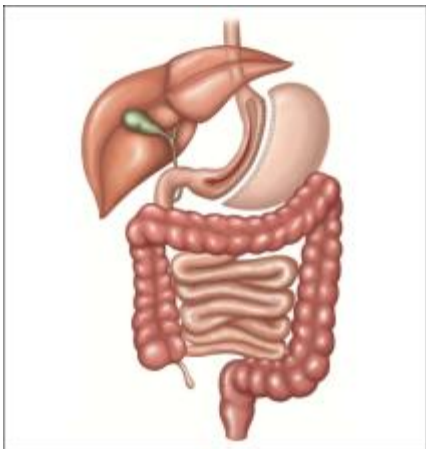
Surgical Techniques

Validated Surgical Techniques

Restrictive Surgery

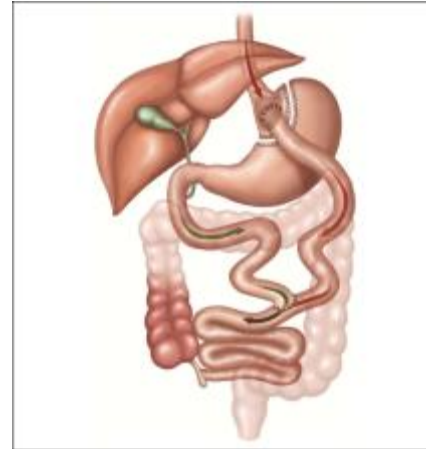


Gastric Banding



Sleeve Gastrectomy

Malabsorptive Surgery

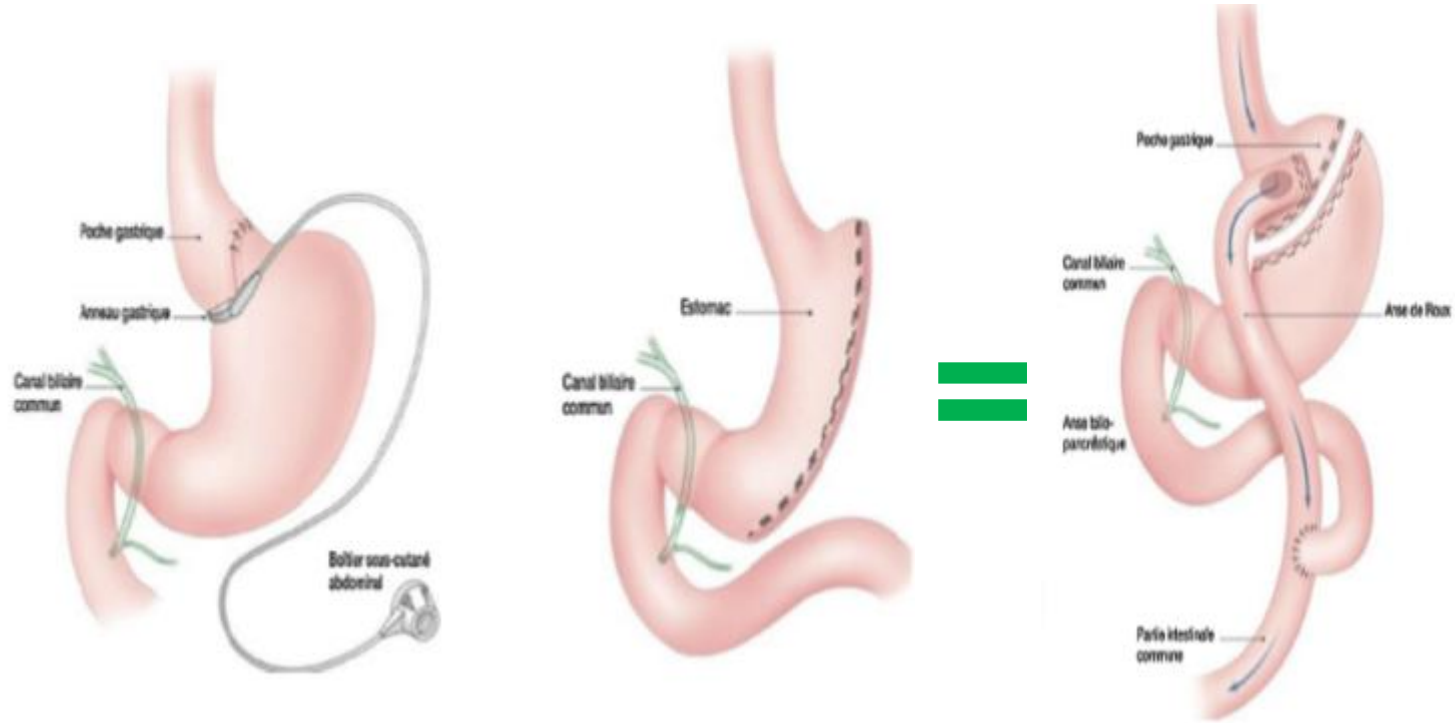


Roux-en-Y Gastric Bypass



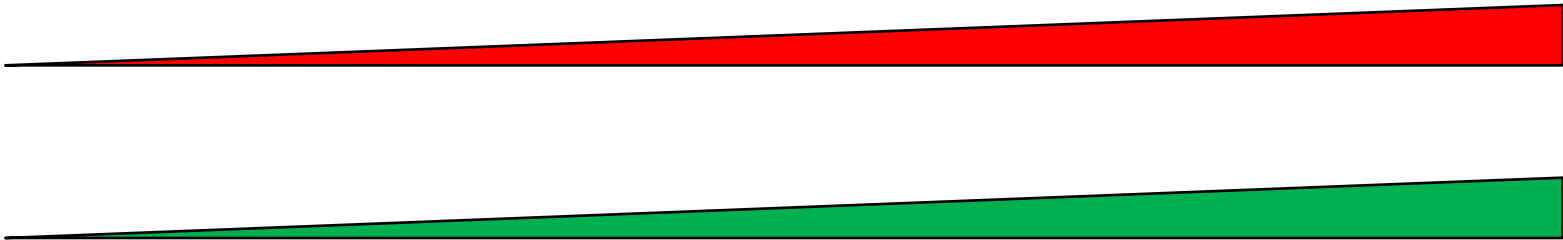
Duodenal Swich

Mortality / Efficiency



Mortality/
Morbidity

Efficiency



Bariatric Surgery Worldwide

IFSO Worldwide Survey 2016: Primary, Endoluminal, and Revisional Procedures

Luigi Angrisani¹  · A. Santonicola² · P. Iovino² · A. Vitiello¹ · K. Higa^{3,4} · J. Himpens⁵ · H. Buchwald⁶ · N. Scopinaro⁷

Obes Surg. 2018



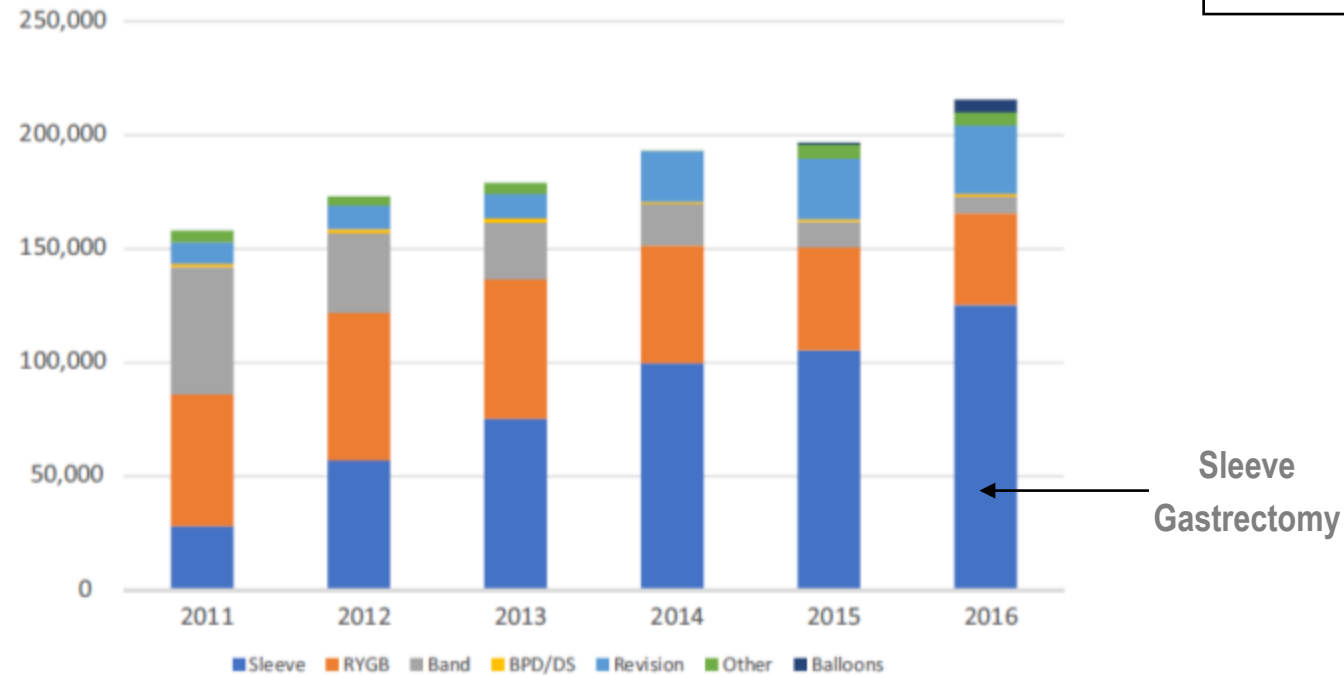
Bariatric Surgery - USA

Original article

American Society for Metabolic and Bariatric Surgery estimation of metabolic and bariatric procedures performed in the United States in 2016

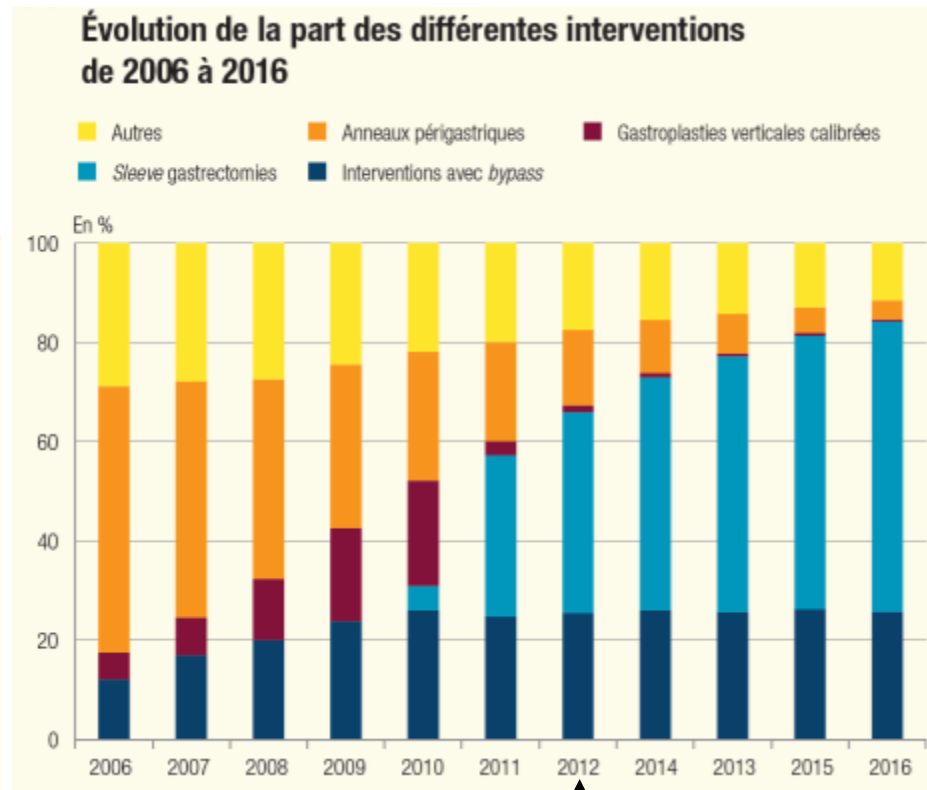
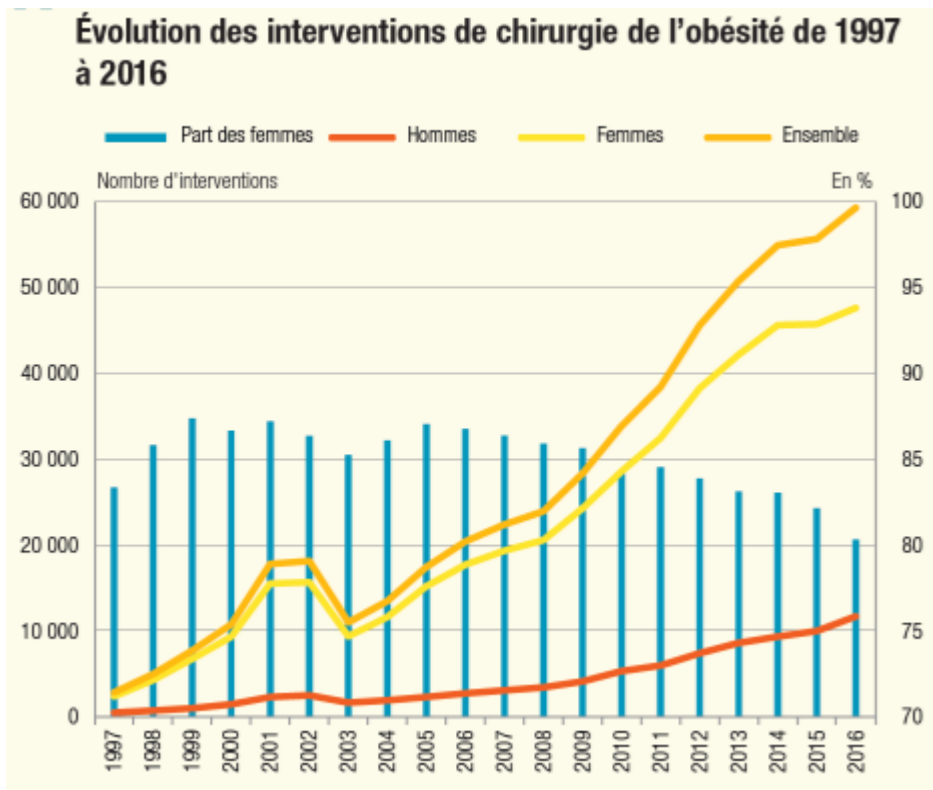
Wayne J. English, M.D., F.A.C.S.^{a,*}, Eric J. DeMaria, M.D., F.A.C.S.^b,
Stacy A. Brethauer, M.D., F.A.C.S.^c, Samer G. Mattar, M.D., F.A.C.S.^d,
Raul J. Rosenthal, M.D., F.A.C.S.^e, John M. Morton, M.D., M.P.H., F.A.C.S.^f

SOARD. 2018



Bariatric Surgery - France

600 000 operated patients



6000 Gastric Band implemented

6000 Gastric Band removal

Mortality Bariatric Surgery

Original articles

Trends of bariatric surgery in France during the last 10 years:
analysis of 267,466 procedures from 2005–2014

Tarek Debs*, Niccolo Petrucciani, Radwan Kassir, Antonio Iannelli, Imed Ben Amor,
Jean Gugenheim

Division of Digestive Surgery and Liver Transplantation, Hôpital Archet 2, Nice, France

Received February 6, 2016; accepted May 8, 2016

SOARD. 2016

Table 3
In-hospital mortality rates after bariatric surgery in France, 2012–2014

	2012				2013				2014			
	Total	Public	Private	P value	Total	Public	Private	P value	Total	Public	Private	P value
AGB	0%	0%	0%	—	.018%	0%	.023%	.46	0%	0%	0%	—
RYGB	.07%	.12%	.04%	.30	.09%	.16%	.05%	.09	.1%	.21%	.03%	.003
SG	.03%	.05%	.01%	.23	.04%	.08%	.007%	.01	.01%	.03%	.006%	.27
BPD	1.6%	2.08%	1.30%	.69	.64%	2.04%	0%	.92	0%	0%	0%	—
Total	.04%	.07%	.02%	.04	.05%	.10%	.02%	.0008	.038%	.08%	.01%	.0003

AGB = adjustable gastric banding; RYGB = Roux-en-Y gastric bypass; SG = sleeve gastrectomy; BPD = biliopancreatic diversion.

Mortality ≈ 1/1000 patients

Efficiency / Surgical procedures

Genser at al. *Soins*. 2016

	Gastric Band	Sleeve gastrectomy	Roux-en-Y Gastric Bypass	Duodenal switch
Excess weight loss (%)	50% [33-75]	60% [46-70]	66% [65-70]	75% [65-100]
Failure of surgery (EWL<50%)	50%	33%	23%	5%
Type 2 Diabetes remission	70% [36-96]	74% [54-81]	80% [67-96]	95% [85-100]
Hypertension remission	53% [12-90]	82% [68-92]	81% [68-91]	81% [67-90]

Gastric Banding

- **Historic**

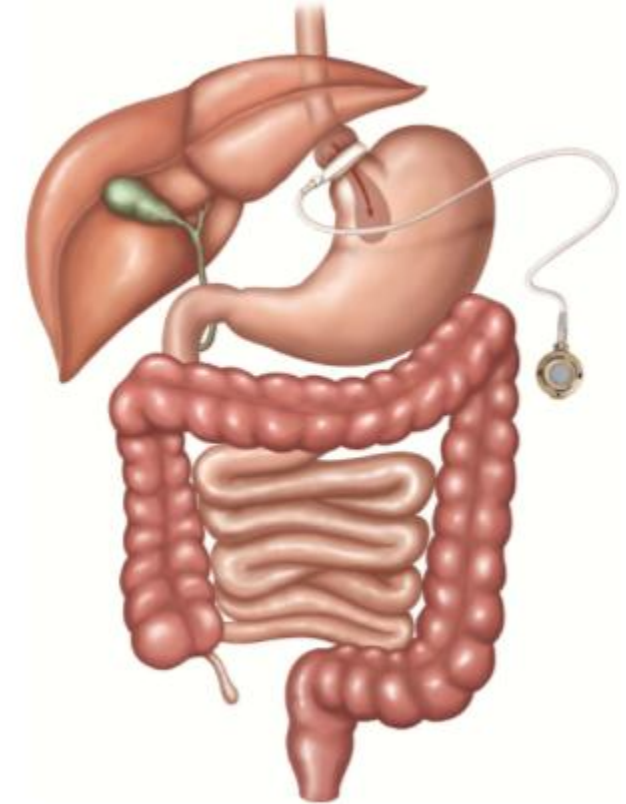
- First series in 1980-85.

A Review of Seven Years' Experience with Silicone Gastric Banding

Lubomyr I. Kuzmak, MD, ScD

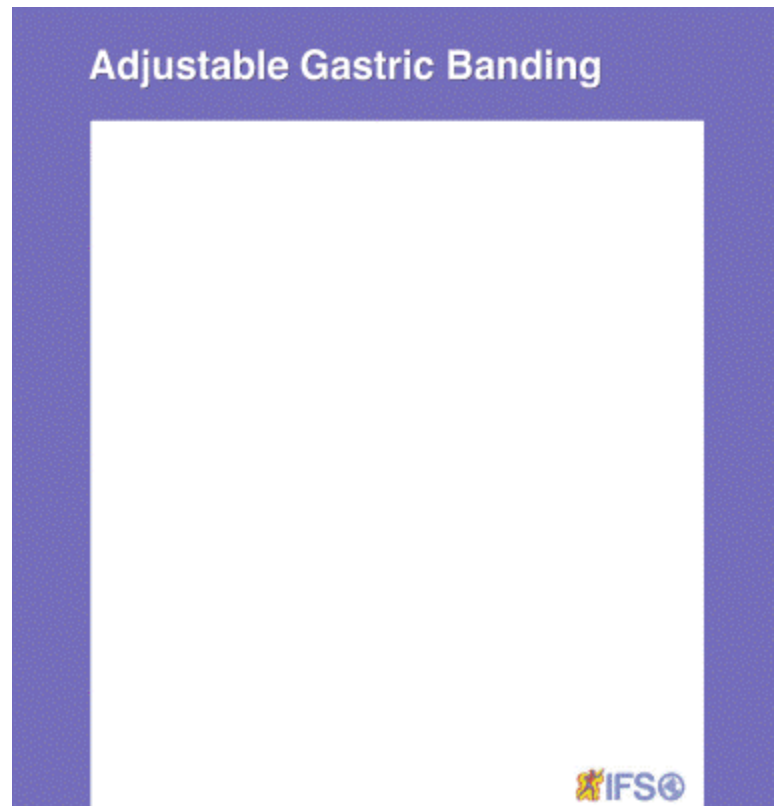
Obes Surg . 1991

- First laparoscopic series in 1993



Anneau Gastrique

- **Montage Chirurgical**



Gastric Banding

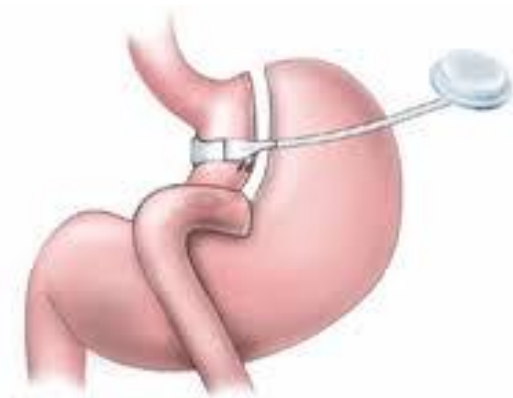
- **Indications**

- First intention:
 - Increasingly limited.
 - Good patients:
 - *Age < 40 years-old*
 - *BMI < 50 kg/m²*
 - *In a center performing more than 2 procedures per week*
 - In practice: adolescents, elderly patients
- Second intention after RYGBP
 - Few series.
 - In case of insufficiency after RYGBP.

Predictive Factors of Outcome After Gastric Banding
*A Nationwide Survey on the Role of Center Activity
and Patients' Behavior*

Jean-Marc Chevallier, MD, PhD,† Michel Paita, MD,‡ Marie-Hélène Rodde-Dunet, MD,‡
Michel Marty, MD,‡ Françoise Nogues, MD,‡ Karem Slim, MD,§
and Arnaud Basdevant, MD, PhD¶||***

Ann Surg. 2007



Gastric Banding

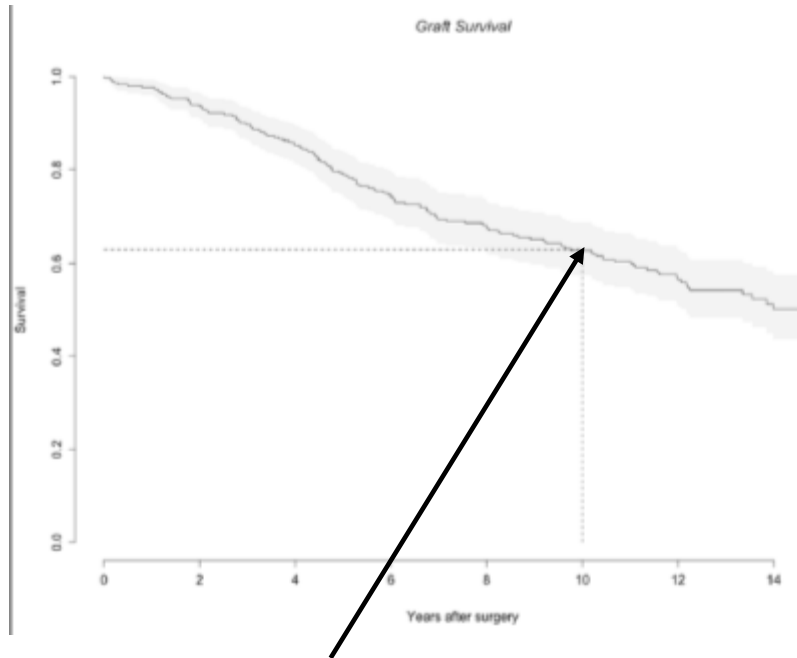
- **Contraindications:**
 - Major gastroesophageal reflux.
 - Hiatal hernia.
 - Barrett's Esophagus.
 - Compliance issues.

Why decrease in Gastric Banding?

Long-Term Outcomes of the Laparoscopic Adjustable Gastric Banding: Weight Loss and Removal Rate. A Single Center Experience on 301 Patients with a Minimum Follow-Up of 10 years

Sergio Carandina¹ • Malek Tabbara¹ • Leila Galiay¹ • Claude Polliand¹ • Daniel Azoulay² • Christophe Barrat¹ • Andrea Lazzati²

Obes Surg. 2016



64% Band in place

Year after surgery	BMI	%EWL	%TWL	EWL <25 % ^a	EWL 25–50 % ^a	EWL >50 % ^a
1	37.5 ± 6.8	40.1 ± 23.4	16.9 ± 9.1	74 (24.6)	109 (36.2)	79 (26.2)
2	36.5 ± 6.8	45.5 ± 25.5	19.2 ± 9.8	57 (18.9)	98 (32.6)	90 (29.9)
3	36.5 ± 6.9	44.5 ± 25.9	18.9 ± 10.5	55 (18.3)	94 (31.2)	83 (27.6)
4	36.4 ± 6.6	43.9 ± 25.4	18.8 ± 10.8	54 (17.9)	82 (27.2)	80 (26.6)
5	36.8 ± 6.8	41.4 ± 26.1	17.6 ± 11	61 (20.3)	75 (24.9)	64 (21.3)
6	36.7 ± 6.8	40.7 ± 26.6	17.3 ± 11.3	57 (18.9)	66 (21.9)	59 (19.6)
7	36.7 ± 6.5	39.2 ± 28.2	16.6 ± 11.6	55 (18.3)	60 (19.9)	50 (16.6)
8	37.1 ± 6.6	37.7 ± 28	15.9 ± 11.5	58 (19.3)	50 (16.6)	45 (15)
9	36.7 ± 6.3	38 ± 28.7	16 ± 11.7	47 (15.6)	52 (17.3)	43 (14.3)
10	36.5 ± 5.9	38.8 ± 26.7	16.2 ± 11	43 (14.3)	51 (16.9)	42 (14)
11	36.4 ± 6.1	38.9 ± 27.1	16.3 ± 11.2	38 (14.1)	48 (17.8)	35 (13)
12	36.4 ± 6	38.4 ± 27.4	16.2 ± 11.5	32 (14.2)	35 (15.5)	30 (13.3)
13	35.9 ± 5.7	38.1 ± 28.2	15.9 ± 11.9	22 (13)	20 (11.8)	21 (12.4)
14	35.2 ± 5.4	40.1 ± 30.9	17.1 ± 13	11 (9.7)	16 (14.2)	13 (11.5)
15	34.8 ± 5.8	38 ± 42.2	16.1 ± 15.9	3 (9.7)	2 (6.5)	6 (19.4)
16	33.9 ± NA	7.2	7.8 %	1 (20)	0 (0)	0 (0)

Why decrease in Gastric Banding?

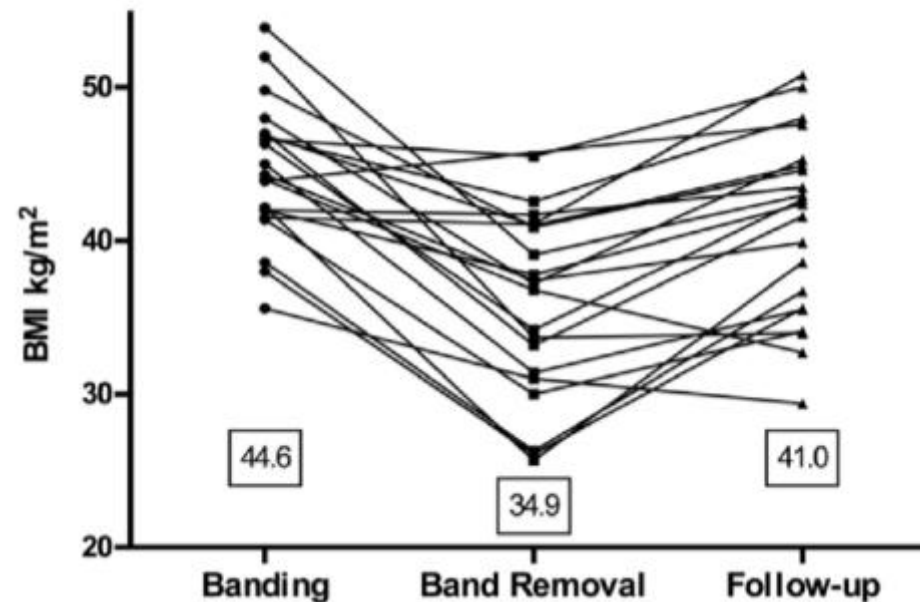
Original article

Long-term outcomes of gastric band removal without additional bariatric surgery

Andreas Rohner, Jeannette D. Widmer, M.D., Jennifer Klasen, M.D., Anita Scheiwiller, M.D., Dominik Muller, M.D., Markus K. Muller, M.D.*

Obes Surg. 2016

BMI from banding until follow-up



Why decrease in Gastric Banding?

Simultaneous conversion of gastric band to sleeve gastrectomy is associated with increased postoperative complications: an analysis of the American College of Surgeons National Surgical Quality Improvement Program

Zachary C. Dietch¹ · Bruce D. Schirmer¹ · Peter T. Hallowell¹

Surg Endosc. 2017

Variable	n	LSG	CONV	p
Total	35,307	34,364	943	
Mortality	36	0.10%	0.11%	0.97
Serious complications	1195	3.36%	4.35%	0.10
Unplanned reoperation	457	1.29%	1.48%	0.60
Intraoperative or postoperative transfusion	328	0.93%	0.95%	0.93
Surgical site infections (SSI)				
Superficial SSI	233	0.60%	1.40%	0.006
Deep SSI	20	0.05%	0.40%	<0.001
Organ/space SSI	157	0.5%	0.2%	0.28
Pneumonia	100	0.28%	0.53%	0.15
Urinary tract infection	184	0.51%	0.74%	0.34
Postoperative sepsis	105	0.29%	0.53%	0.18
Postoperative septic shock	46	0.13%	0.21%	0.48
Unplanned re-intubation	79	0.20%	0.30%	0.53
Deep venous thrombosis	115	0.32%	0.42%	0.59
Pulmonary embolism	54	0.15%	0.11%	0.71
Ventilator support >48 h	59	0.17%	0.11%	0.64
Progressive renal insufficiency	58	0.16%	0.32%	0.24
Acute renal failure requiring dialysis	26	0.07%	0.21%	0.11
Stroke	5	0.01%	0.00%	0.71
Cardiac arrest	18	0.05%	0.11%	0.45
Myocardial infarction	23	0.06%	0.21%	0.07

Variable	Odds of serious complication	p value
Band to sleeve gastrectomy	1.44 (1.03–1.97)	<0.001
Age	1.01 (1.01–1.02)	<0.001
Body mass index	1.02 (1.01–1.02)	<0.001
Functional status-partially dependent	2.58 (1.5–4.22)	<0.001
Insulin-dependent diabetes	1.31 (1.07–1.59)	0.009
COPD	1.6 (1.12–2.24)	0.008
Dyspnea	1.31 (1.12–1.53)	<0.001
Hypertension	1.2 (1.05–1.37)	0.008
Chronic steroid use	1.53 (1.06–2.14)	0.02

Surgery after gastric banding

=

Increased morbidity

Sleeve Gastrectomy

- **Marceau**

Biliopancreatic Diversion with a New Type of Gastrectomy

**Picard Marceau, MD, PhD; Simon Biron, MD, MSc; Roch-André Bourque, MD;
Martin Potvin, MD, MSc; Frédéric-Simon Hould, MD; Serge Simard, MSc**

Obesity Surgery, 3, 1993

- **Gagner**

Early Experience with Two-Stage Laparoscopic Roux-en-Y Gastric Bypass as an Alternative in the Super-Super Obese Patient

J.P. Regan, MD; W. B. Inabnet, MD; M. Gagner, MD; A. Pomp, MD

Obesity Surgery, 13, 2003

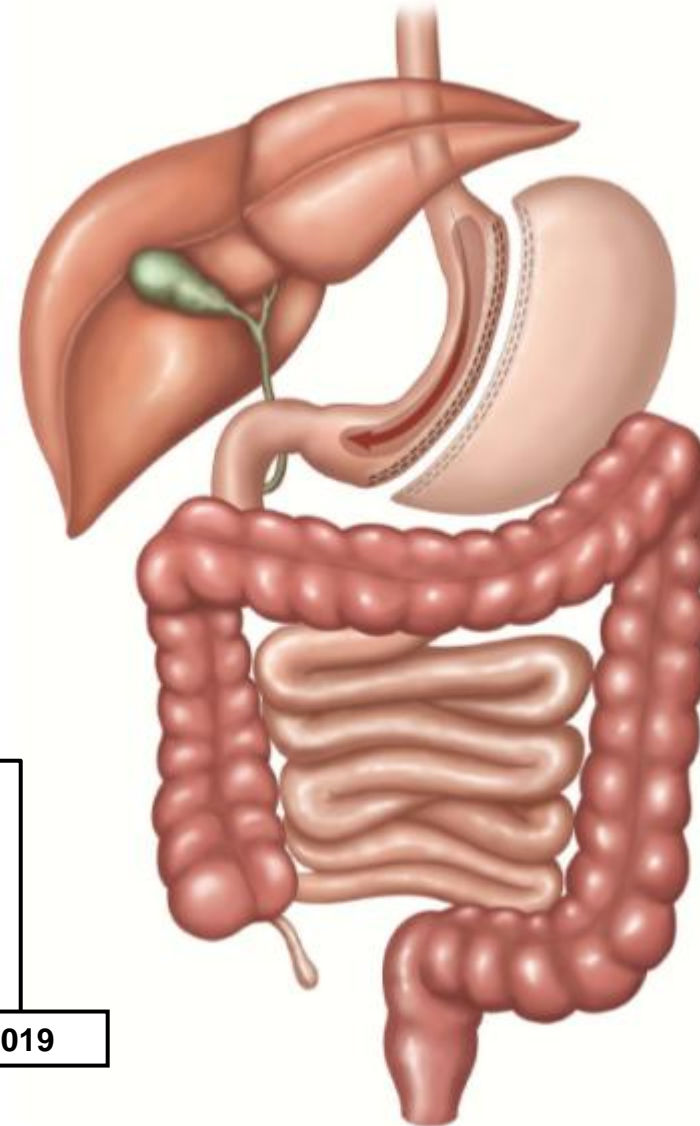


Sleeve Gastrectomy

- **Principles of Sleeve Gastrectomy**

- Tubulization of the stomach
- Calibration tube
- Resection of 2/3 of the stomach
- No anastomosis

- Short operating time (40 minutes)
- Short hospitalization stay (day-case surgery)



Original article

Laparoscopic sleeve gastrectomy as day-case surgery: a case-matched study

Lionel Rebibo, M.D.^a, Abdennaceur Dhahri, M.D.^a, Rachid Badaoui, M.D.^b,
Vincent Hubert, M.D.^b, Emmanuel Lorne, M.D., Ph.D.^{b,c}, Jean-Marc Regimbeau, M.D.,
Ph.D.^{a,c,*}

SOARD. 2019

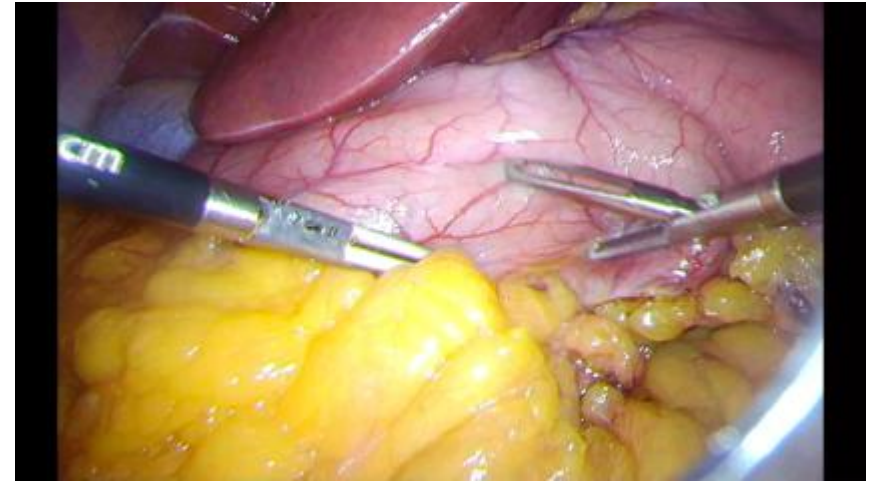
Sleeve Gastrectomy

- **Indications**

- First intention:
 - As sole procedure.
 - Before malabsorptive surgery (Super-super Obese)
- Second intention after gastric banding failure
 - One or two-step procedure.

- **Contraindications**

- ~~Gastroesophageal reflux.~~
- ~~Hiatal hernia.~~
- Barrett's Esophagus.
- Portal hypertension.



Roux-en-Y Gastric Bypass

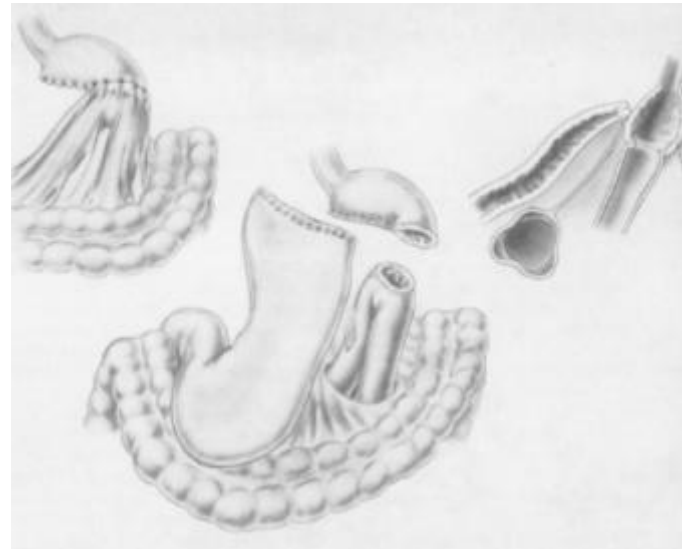
- **Mason**

Gastric Bypass

Annals of Surgery
September 1969

EDWARD E. MASON, M.D., CHIKASHI ITO, * M.D.

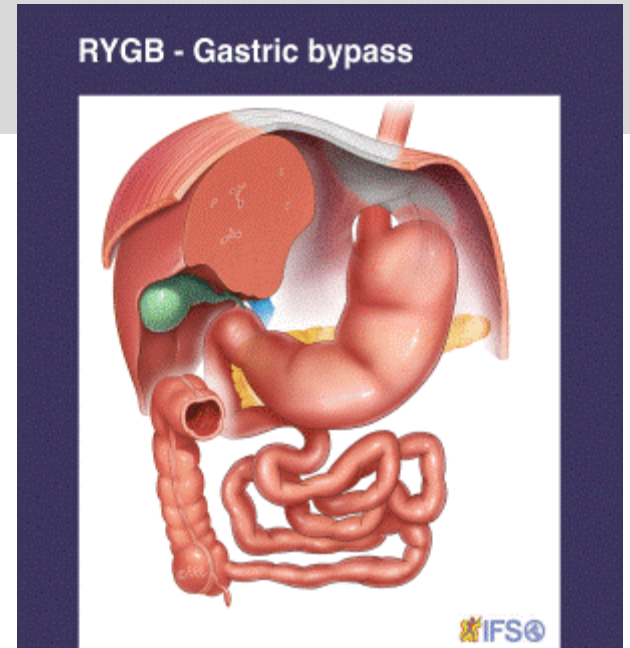
From the Department of Surgery, University of Iowa, Iowa City, Iowa



Roux-en-Y Gastric Bypass

- **Principles of Roux-en-Y Gastric Bypass**

- Creation of a small gastric pouch (40 ml)
- No gastric resection
- Two digestive anastomosis
 - Biliary limb: 70cm
 - Alimentary limb: 150cm
- Short operating time (90 min)
- Short hospitalization stay



Roux-en-Y Gastric Bypass

- **Indications**

- First intention:
 - As sole procedure.
 - Type 2 diabetes patients
 - Major gastroesophageal reflux/ Barrett's Esophagus

- Second intention after failure of gastric banding or sleeve gastrectomy



- **Contraindications**

- Major abdominal surgery (adhesiolysis).
- Need for stomach monitoring (gastric remnant).
- Crohn's Disease?
- Alcohol addiction
- Use for some medications?

Why Sleeve >> Gastric Bypass?



• Contraindications

• Absolute:

- Barrett's Esophagus
- Portal Hypertension

• Relatives:

- Reflux

• Absolute:

- Need for stomach monitoring

• Relatives:

- Some medications
- Major abdominal surgery
- Previous small bowel resection
- Crohn's Disease?

Why Sleeve >> Gastric Bypass?



- Réversibilité

Sleeve gastrectomy: not reversible → **Problem in practice?**

Gastric bypass: reversible → **In theory, rarely done**

Why Sleeve >> Gastric Bypass?



- Simplicity (learning curve)

Two lessons from a 5-year follow-up study of laparoscopic sleeve gastrectomy: Persistent, relevant weight loss and a short surgical learning curve

Flavien Prevot, MD, Pierre Verhaeghe, MD, PhD, Aurelien Pequignot, MD, Lionel Rehibo, MD, Cyril Cosse, MD, Abdennaceur Dhahri, MD, and Jean-Marc Regimbeau, MD, PhD, Amiens, France

Surgery. 2014

Between 30 et 50 patients

Establishing Laparoscopic Roux-en-Y Gastric Bypass: Perioperative Outcome and Characteristics of the Learning Curve

Torgeir T. Sovik · Erlend T. Aasheim · Jon Kristinsson · Carl Fredrik Schou · Lien My Diep · Arild Nesbakken · Tom Mala

Obes Surg. 2009

> 100 patients

Why Sleeve >> Gastric Bypass?



- Simplicity (learning curve)

Original article
 Thirty-day outcomes of sleeve gastrectomy versus Roux-en-Y gastric bypass: first report based on Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program database
 Maher El Chaar, M.D., F.A.C.S., F.A.S.M.B.S.^{1,2,3,4,*}, Peter Lundberg, M.D.⁵, Jill Stoltzfus, Ph.D.⁶

Operative and 30-day outcomes for primary SG versus GB

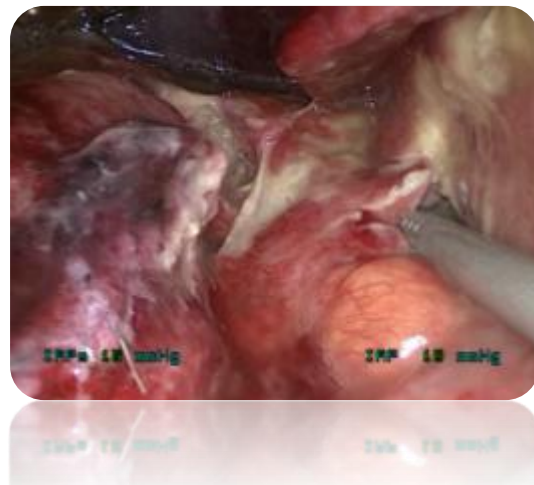
	Roux-en-Y gastric bypass (n = 43,354)	Sleeve gastrectomy (n = 98,292)	P value	Total (N = 141,646)
Length of stay (median, range)	2 (0-139)	2 (0-124)	N/A	2 (0-139)
Operative duration (median, range)	113 (1-711)	69 (1-720)	<.0001	80 (1-720)
Unplanned ICU stay within 30 d (n, %)	576 (1.3)	568 (.6)	<.0001	1144 (.8)
30-d mortality (n, %)	73 (.2)	88 (.1)	<.0001	161 (.1)
30-d reoperation (n, %)	1104 (2.5)	940 (1)	<.0001	2044 (1.4)
30-d readmission (n, %)	2807 (6.5)	3396 (3.5)	<.0001	6203 (4.4)
30-d reintervention (n, %)	1207 (2.8)	1131 (1.2%)	<.0001	2338 (1.7)
Surgical drain present at 30 d (n, %)	195 (.4)	250 (.3)	<.0001	445 (.3)

SOARD. 2018

Why Sleeve >> Gastric Bypass?



- Early post-operative complications



Early post-operative complications?

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.

SOARD. 2017

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

Early post-operative complications?

Original article

Thirty-day outcomes of sleeve gastrectomy versus Roux-en-Y gastric bypass: first report based on Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program database

Maher El Chaar, M.D., F.A.C.S., F.A.S.M.B.S.^{a,b,*}, Peter Lundberg, M.D.^b, Jill Stoltzfus, Ph.D.^a

SOARD. 2018

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Why Sleeve >> Gastric Bypass?



- Weight loss

Weight loss

Laparoscopic Roux-en-Y gastric bypass versus laparoscopic sleeve gastrectomy: 5-year outcomes of merged data from two randomized clinical trials (SLEEVEPASS and SM-BOSS)

B. K. Wölnerhanssen^{1,2}, R. Peterli^{2,3}, S. Hurme⁴, M. Bueter⁵, M. Helmiö^{6,7}, A. Juuti⁸, A. C. Meyer-Gerspach^{1,2}, M. Slawik⁹, P. Peromaa-Haavisto^{10,11}, P. Nuutila^{12,13} and P. Salminen^{6,7,14,*}

BJS. 2021

Table 2 Model-based means for primary and secondary outcomes after sleeve gastrectomy or Roux-en-Y gastric bypass at 1, 3, and 5 years

	Model-based mean in operations	Baseline	1 year	3 years	5 years	P
% excess BMI loss* (primary outcome)						0.317¶
Sleeve gastrectomy	59.9 (44.6, 75.1)		64.8 (48.3, 81.3)	60.7 (47.8, 73.5)	54.1 (43.1, 65.1)	< 0.001#
Gastric bypass	66.8 (51.5, 82.2)		70.2 (53.7, 86.8)	68.1 (55.3, 81.0)	62.2 (51.1, 73.2)	< 0.001**
Difference	-7.0 (-10.5, -3.5)					
Model-based mean in time points			67.5 (41.5, 93.5)	64.4 (43.9, 84.9)	58.1 (41.1, 75.2)	
% total weight loss*						0.431¶
Sleeve gastrectomy	26.1 (20.8, 31.5)		28.2 (22.3, 34.1)	26.5 (22.1, 30.9)	23.7 (19.9, 27.6)	< 0.001#
Gastric bypass	29.3 (24.0, 34.6)		30.8 (24.9, 36.7)	29.9 (25.5, 34.3)	27.2 (23.4, 31.1)	< 0.001**
Difference	-3.2 (-4.7, -1.6)					
Model-based mean in time points			29.5 (19.7, 39.3)	28.2 (21.0, 35.4)	25.5 (19.6, 31.4)	

• Bypass > Sleeve

- Statistically +
- Clinically
 - At 5 years follow-up, difference of 4,4 kilos

Perte de poids / amélioration comorbidités

Effect of Laparoscopic Sleeve Gastrectomy vs Roux-en-Y Gastric Bypass on Weight Loss, Comorbidities, and Reflux at 10 Years in Adult Patients With Obesity The SLEEVEPASS Randomized Clinical Trial

Paulina Salminen, MD, PhD; Sofia Grönroos, MD; Mika Helmiö, MD, PhD; Saija Hurme, MSc; Anne Juuti, MD, PhD; Risto Juusela, MD; Pipsa Peromaa-Haavisto, MD, PhD; Marja Leivonen, MD, PhD; Pirjo Nuutila, MD, PhD; Jari Ovaska, MD, PhD

JAMA Surg. 2022

Table 1. Model-Based Estimates of Percentage Excess Weight Loss (EWL), Body Mass Index (BMI), Percentage Excess BMI Loss, and Percentage Total Weight Loss^a

Time	LSG	LRYGB	LRYGB vs LSG difference (95% CI)	P value
%EWL, No.^{b,c,d}				
Baseline	121	119	NA	NA
0.5 y	119	111	4.7 (-0.4 to 9.7)	NA
1 y	111	108	5.7 (0.6 to 10.8)	NA
3 y	108	100	8.6 (3.4 to 13.7)	NA
5 y	98	95	8.4 (3.1 to 13.7)	NA
7 y	91	91	9.0 (3.6 to 14.3)	NA
10 y	98	95	8.4 (3.1 to 13.6)	NA
BMI, mean estimate (95% CI)^{c,e,f}				
Baseline	47.3 (46.2 to 48.4)	48.4 (47.2 to 49.5)		
0.5 y	35.8 (34.7 to 37.0)	35.3 (34.1 to 36.5)	-0.5 (-2.1 to 1.1)	.54
1 y	34.4 (33.3 to 35.6)	33.6 (32.4 to 34.8)	-0.9 (-2.5 to 0.8)	.30
3 y	35.3 (34.2 to 36.5)	34.0 (32.8 to 35.2)	-1.3 (-2.9 to 0.3)	.12
5 y	36.5 (35.4 to 37.7)	35.4 (34.2 to 36.6)	-1.1 (-2.8 to 0.6)	.19
7 y	37.1 (36.0 to 38.3)	35.8 (34.6 to 37.0)	-1.3 (-3.0 to 0.4)	.13
10 y	37.8 (36.6 to 39.0)	36.5 (35.3 to 37.7)	-1.3 (-3.0 to 0.4)	.13
%EBL, mean estimate (95% CI)^{c,e,g}	50.8 (48.0 to 53.7)	58.2 (55.3 to 61.2)	7.4 (3.4 to 11.5)	<.001
%TWL, mean estimate (95% CI)^{c,e,h}	23.4 (22.1 to 24.7)	26.9 (25.6 to 28.2)	3.5 (1.6 to 5.4)	<.001

• Bypass > Sleeve

- Statistically +
- Clinically.....
 - Women: 1,60m / 120kg
 - Difference at 10 years: 3kg

Why Sleeve >> Gastric Bypass?



- Late post-operative complications

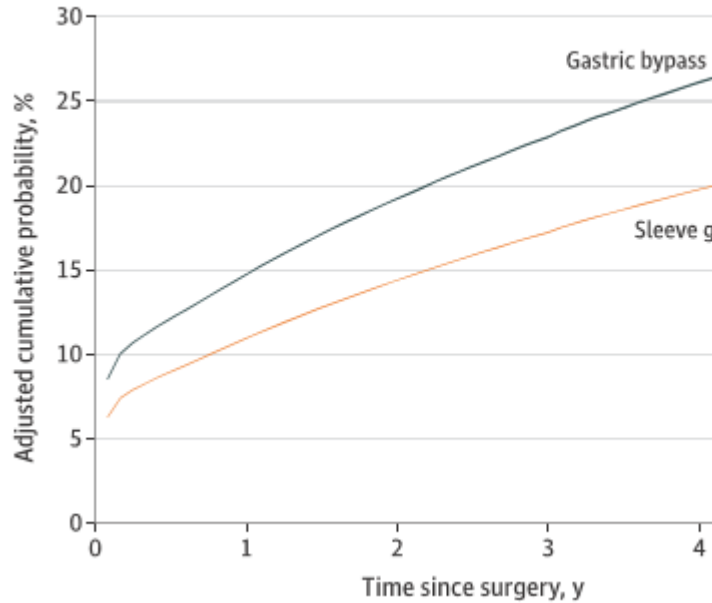
Late post-operative complications

Comparative Safety of Sleeve Gastrectomy and Gastric Bypass Up to 5 Years After Surgery in Patients With Severe Obesity

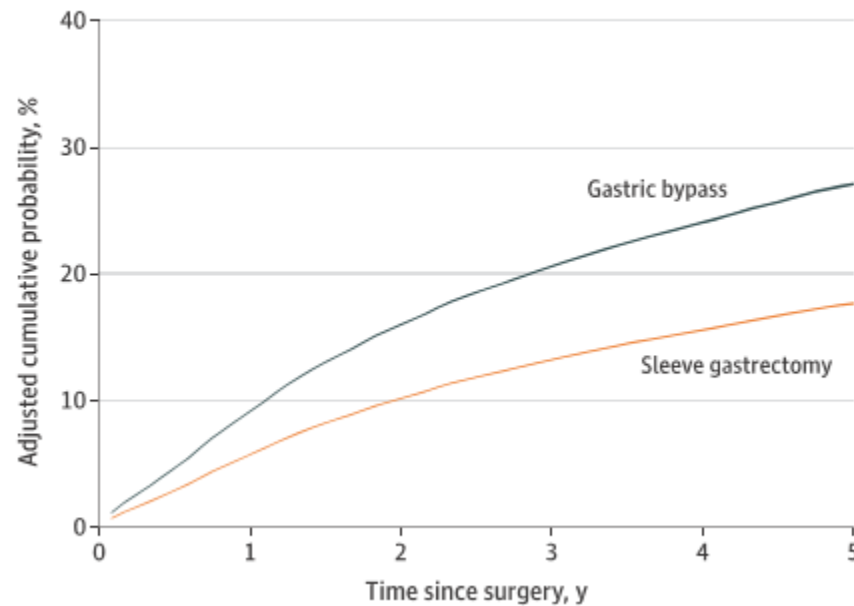
Ryan Howard, MD; Grace F. Chao, MD, MSc; Jie Yang, PhD; Jyothi Thumma, MPH; Karan Chhabra, MD, MSc; David E. Arterburn, MD, MPH; Andrew Ryan, PhD; Dana A. Telem, MD, MPH; Justin B. Dimick, MD, MPH

JAMA Surg. 2021

B Complication



B Reoperation



• Causes for reoperation

- Internal hernia / occlusions
- Incisional hernia
- Biliary disease
- And others...

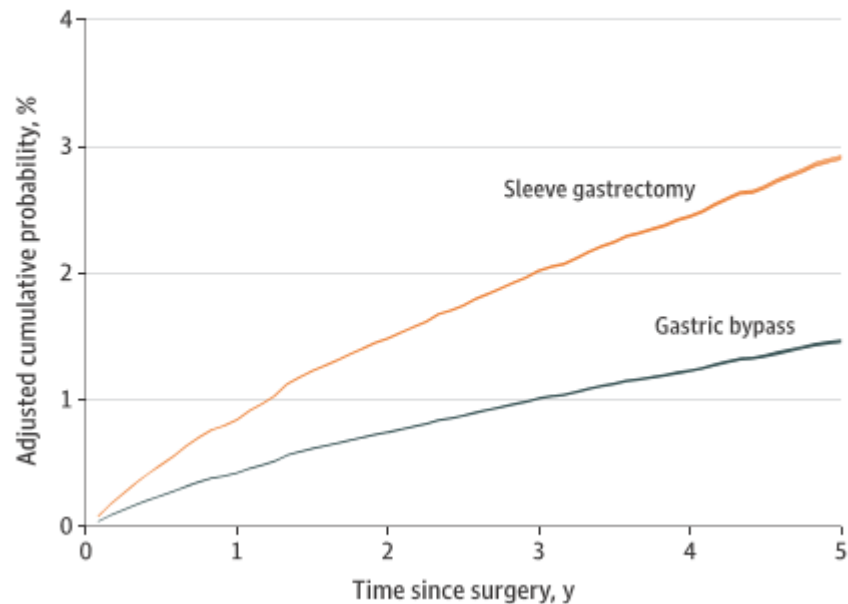
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JAMA Surg. 2021

C Revision



• Causes for revision

- Gastroesophageal reflux
- Post-operative hiatal hernia

Why Sleeve >> Gastric Bypass?

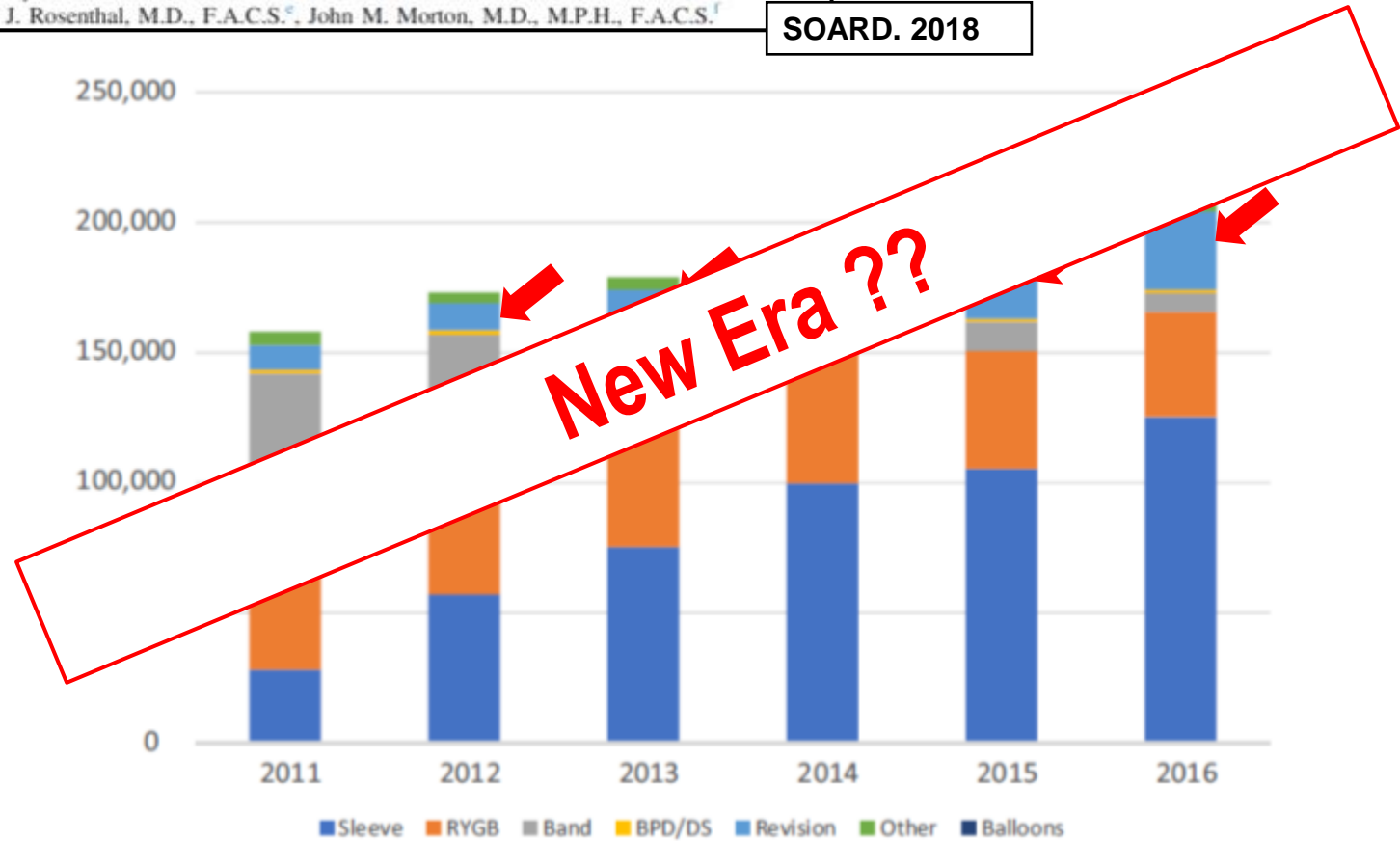


- Revision of surgical patterns

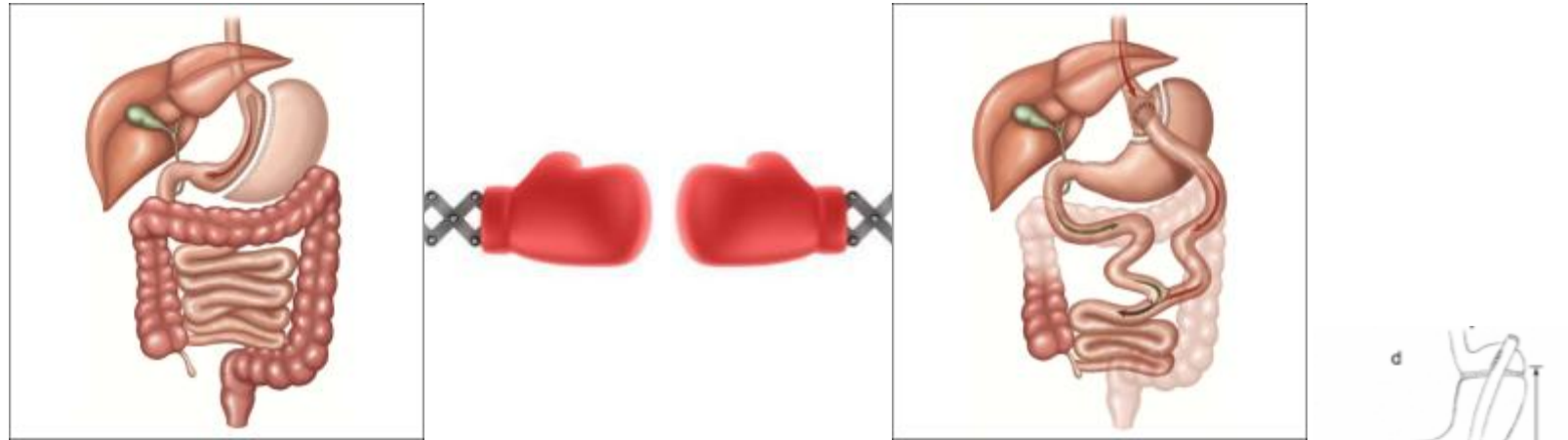
Revisional surgery

Original article
American Society for Metabolic and Bariatric Surgery estimation of
metabolic and bariatric procedures performed in the United States in 2016
Wayne J. English, M.D., F.A.C.S.^{a,*}, Eric J. DeMaria, M.D., F.A.C.S.^b,
Stacy A. Brethauer, M.D., F.A.C.S.^c, Samer G. Mattar, M.D., F.A.C.S.^d,
Raul J. Rosenthal, M.D., F.A.C.S.^e, John M. Morton, M.D., M.P.H., F.A.C.S.^f

SOARD. 2018



Why Sleeve >> Gastric Bypass?



- Revision of surgical patterns
- Repeat Sleeve gastrectomy.
- Gastric bypass.
- Duodenal switch.
- Others.....
- Banding
- Gastric
- Distal

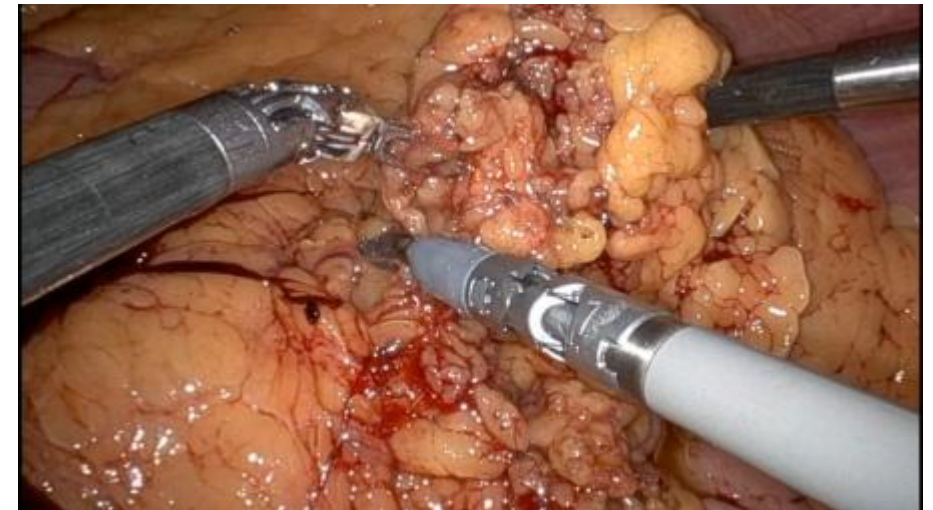
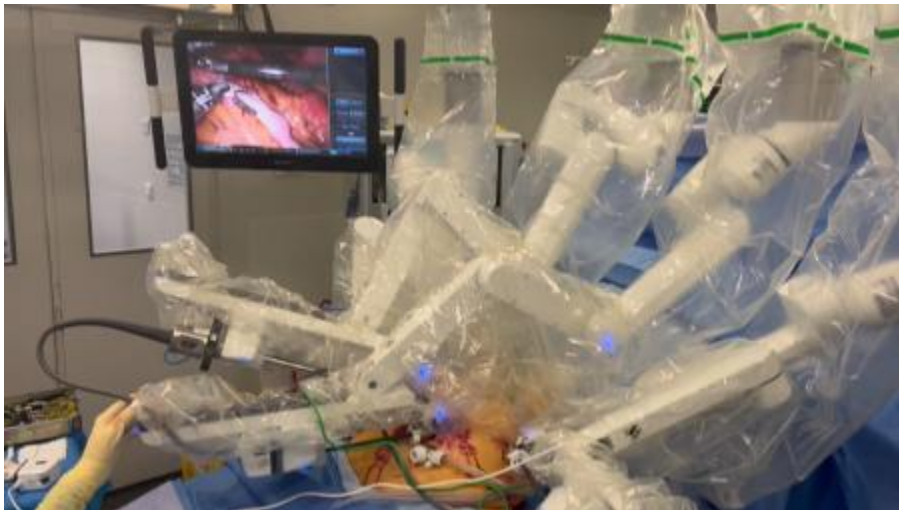


What's new?

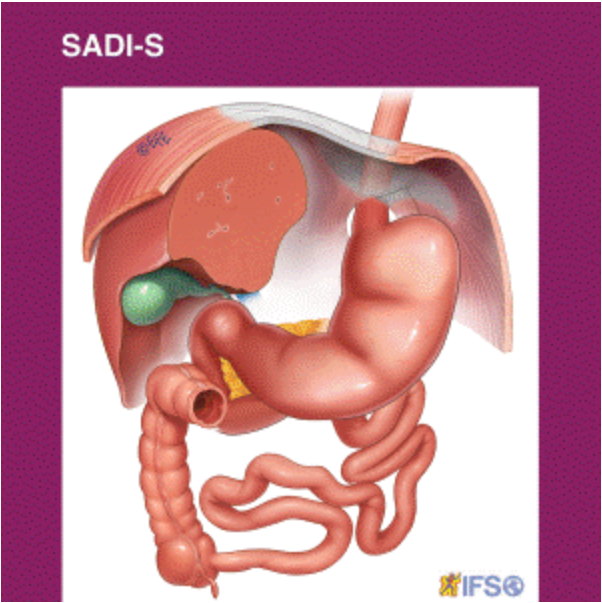
Robotic Surgery

- **Developed in USA**

- Work in progress in France
- Advantages:
 - Post-operative morbidity ► Not demonstrated
 - Less pain ++
 - Interest: during more complex surgeries



New surgical techniques



Single-Anastomosis
Duodenal-Ileal Bypass
(SADI)



Sleeve
Gastrectomy +
Transit
Bipartition



Single-Anastomosis
Sleeve-Ileal Bypass
(SASI)

National Guidelines

- **Indications for surgery in Type 2 diabetes**
 - Grade I Obesity (BMI between 30 et 35 kg/m²)
 - Optimal medical care for at least twelve months
 - All surgical techniques can be proposed



RAPPORT
D'ÉVALUATION

Chirurgie
métabolique :
traitement
chirurgical du
diabète de type 2

Validé par le Collège le 6 octobre 2022

National Guidelines



In theater in 2023

RECOMMANDER
LES BONNES PRATIQUES

ARGUMENTAIRE

**Obésité de l'adulte :
prise en charge de
2e et 3e niveaux**

PARTIE II : pré et post chirurgie
bariatrique

Conclusions

- **Development of bariatric surgery**
 - New guidelines
 - Better framed
- **Sleeve gastrectomy currently the most performed procedure**
- **Entering a New Era: Revisional Surgery**
 - For weight regain
 - For side effects related to a previous intervention
- **New Surgical Procedures appear :**
 - Need for prospective randomized studies for their evaluation
 - New interventions = advocacy for sleeve gastrectomy

Thank you for your attention