



# Kidney Outcomes after MBS

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Metabolic Surgery (2011-2012)

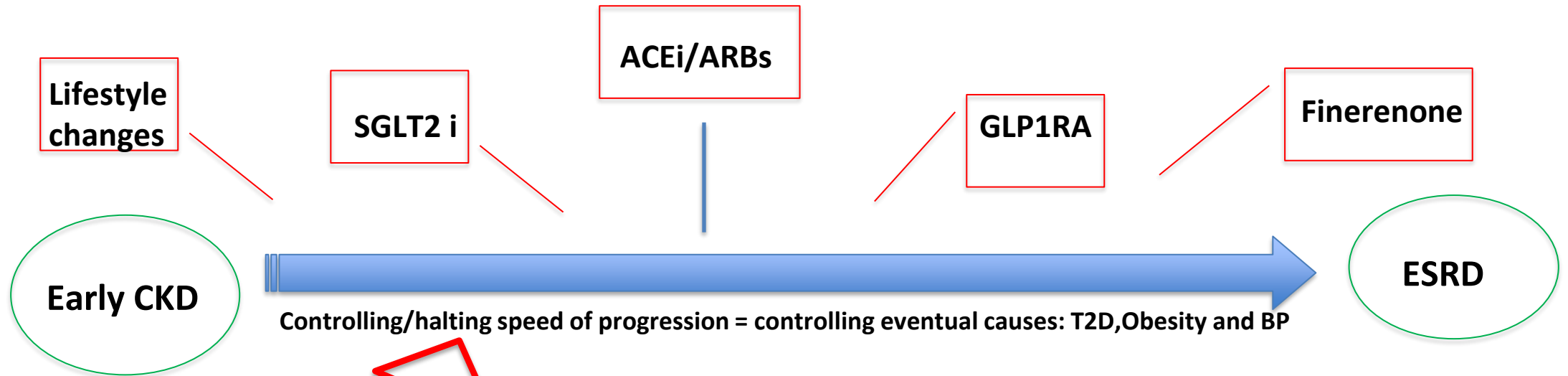


**OSWALDO CRUZ**  
CENTRO ESPECIALIZADO EM **OBESIDADE E DIABETES**

# Disclosures

- Research Grant, Johnson & Johnson
- Research Grant, Medtronic
- Research Grant, GI Dynamics
- Research Grant, Hospital Oswaldo Cruz Bioscience Institute
- Research Grant, Marlex, Brazil
- Speaker, Johnson & Johnson, Medtronic, Morphic Medical, NovoNordisk, Merck, Boston Scientific
  
- SAB: Morphic Medical, Medtronic, Johnson & Johnson, Regeneron

# Progression of CKD



**Metabolic/Bariatric surgery**

- Navis et al.,1996
- EMPA-REG OUTCOME Investigators, 2016
- LEADER Steering Committee and Investigators,2017
- Friedman&Cohen,2019

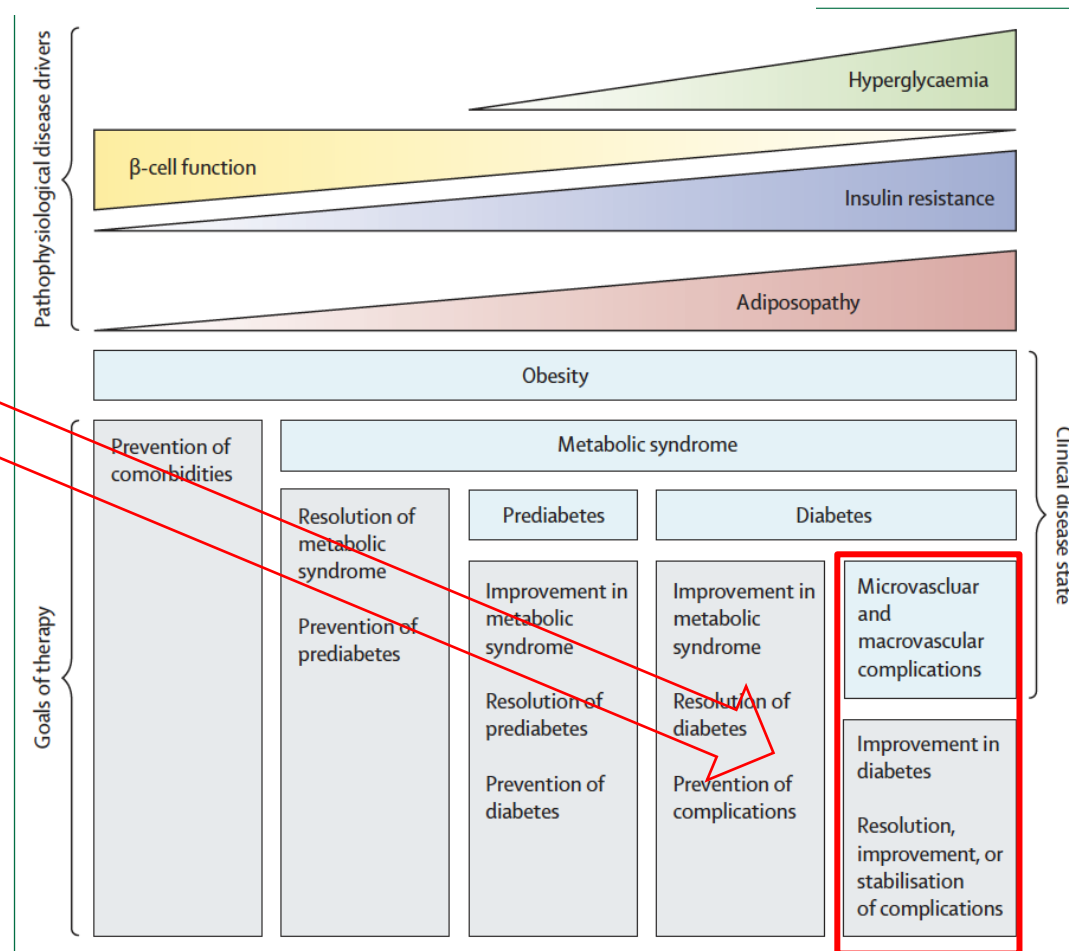
# Obesity management as a primary treatment goal for type 2 diabetes: time to reframe the conversation



The Lancet 2022

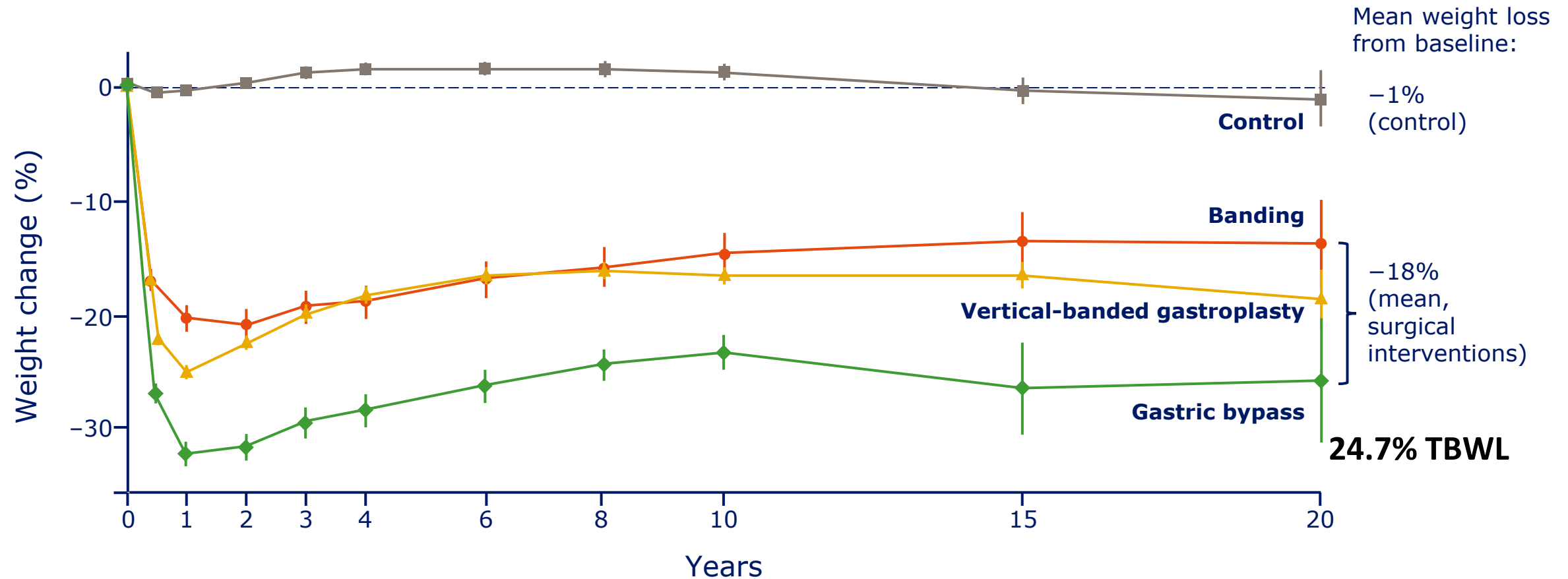
Ildiko Lingvay, Priya Sumithran, Ricardo V Cohen, Carel W le Roux

**> 15%TBWL**



**Disruption of the the disease continuum**

# Bariatric/metabolic surgery is associated with sustained weight loss over 20 years



Data are mean  $\pm$ 95% confidence interval

# RCTs of metabolic surgery x BMT, at least 2 years of FU

## MBS is great for glycemic control

	Surgical intervention	Follow-up duration, years	Glycaemic target	Proportion reaching glycaemic target (surgical intervention vs current medical treatment), %	Total bodyweight loss (surgical intervention vs current medical treatment), %
Dixon et al <sup>27</sup>	AGB	2	FPG <126 mg/dL and HbA <sub>1c</sub> <6.2% (44.3 mmol/mol), without glucose-lowering agents	73% vs 13%	20% vs 1%
Cohen et al <sup>21</sup>	RYGB	2	HbA <sub>1c</sub> <6.5% (47.5 mmol/mol), regardless of glucose-lowering agents	71% vs 51%	26% vs 5%
Simonson et al <sup>38</sup>	RYGB	3	FPG <126 mg/dL and HbA <sub>1c</sub> <6.5% (47.5 mmol/mol) regardless of glucose-lowering agents	42% vs 0%	25% vs 5%
Ikramuddin et al <sup>39</sup>	RYGB	5	HbA <sub>1c</sub> <7% (53.0 mmol/mol), regardless of glucose-lowering agents	55% vs 14%	22% vs 10%
Courcoulas et al <sup>40</sup>	RYGB vs AGB	5	HbA <sub>1c</sub> <6.5 (47.5 mmol/mol) or FPG <126 mg/dL, without glucose-lowering agents	30% (RYGB) vs 19% (AGB) vs 0%	25% (RYGB) vs 15% (AGB) vs 6%
Wentworth et al <sup>41</sup>	AGB	5	FPG <126 mg/dL and 2 h blood glucose concentration <200 mg/dL (75 g glucose oral challenge test)	23% vs 9%	12% vs 2%
Schauer et al <sup>42</sup>	RYGB vs sleeve gastrectomy	5	HbA <sub>1c</sub> <6% (42.1 mmol/mol), regardless of glucose-lowering agents	29% (RYGB) vs 23% (sleeve gastrectomy) vs 5%	23% (RYGB) vs 19% (sleeve gastrectomy) vs 5%
Mingrone et al <sup>43</sup>	RYGB vs biliopancreatic diversion	10	FPG <100 mg/dL and HbA <sub>1c</sub> <6.5% (47.5 mmol/mol), without glucose-lowering agents	25% (RYGB) vs 50% (biliopancreatic diversion) vs 5%	37% (RYGB) vs 42% (biliopancreatic diversion) vs 7%

HbA<sub>1c</sub>=glycated haemoglobin. FPG=fasting plasma glucose. AGB=adjustable gastric banding. RYGB=Roux-en-Y gastric bypass.

**Table 1: Randomised controlled trials with follow-up duration of at least 2 years comparing bariatric surgery with current medical treatment**

REVIEW

Direct podocyte/anti inflammatory mechanisms

Canney, Cohen, le Roux, 2019



# Bariatric surgery as a renoprotective intervention

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*Allon N. Friedman<sup>a</sup> and Ricardo V. Cohen<sup>b</sup>*

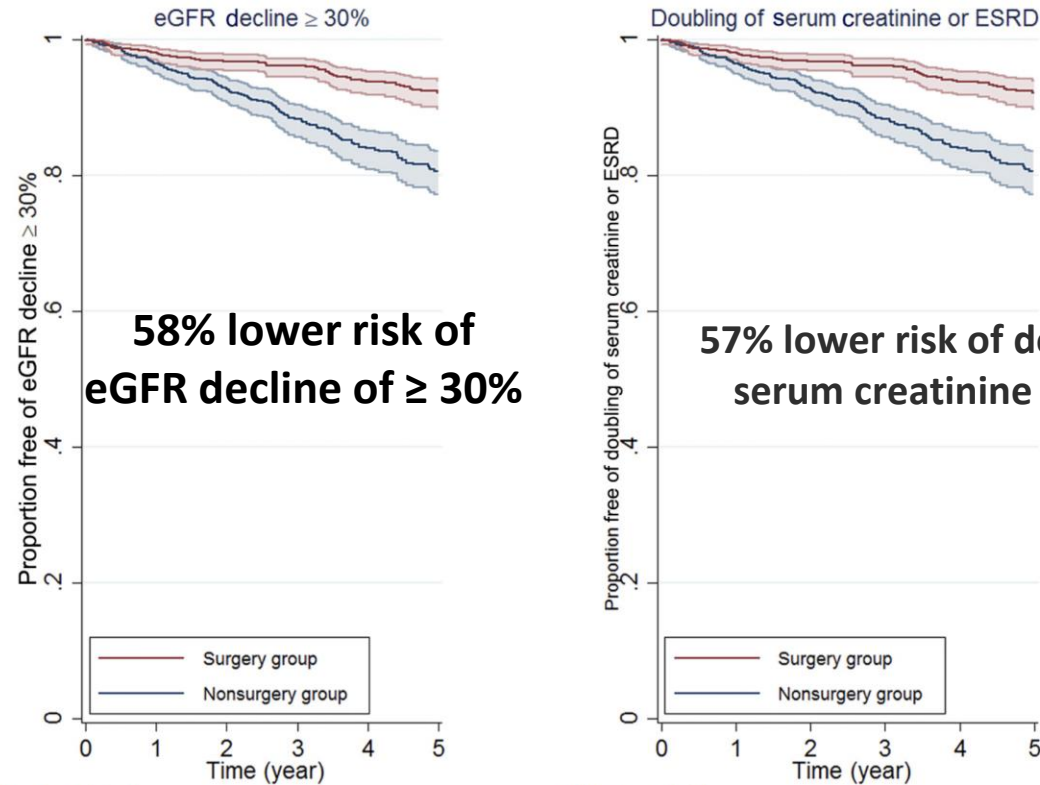
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Current Opinion Hypertension and Nephrology, Oct 2019

# Bariatric surgery is associated with improvement in kidney outcomes

Kidney Intl, 2016

Alex R. Chang<sup>1</sup> ✉, Yuan Chen<sup>2</sup>, Christopher Still<sup>3</sup>, G. Craig Wood<sup>3</sup>, H. Lester Kirchner<sup>4</sup>, Meredith Lewis<sup>4</sup>, Holly Kramer<sup>5</sup>, James E. Hartle<sup>1</sup>, David Carey<sup>4</sup>, Lawrence J. Appel<sup>2, 6</sup>, Morgan E. Grams<sup>2, 7</sup>



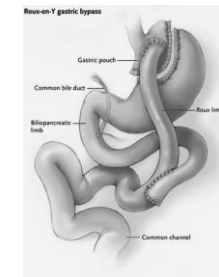
Number at risk

Surgery group	865	750	640	522	410
Control group	804	656	517	416	313

Number at risk

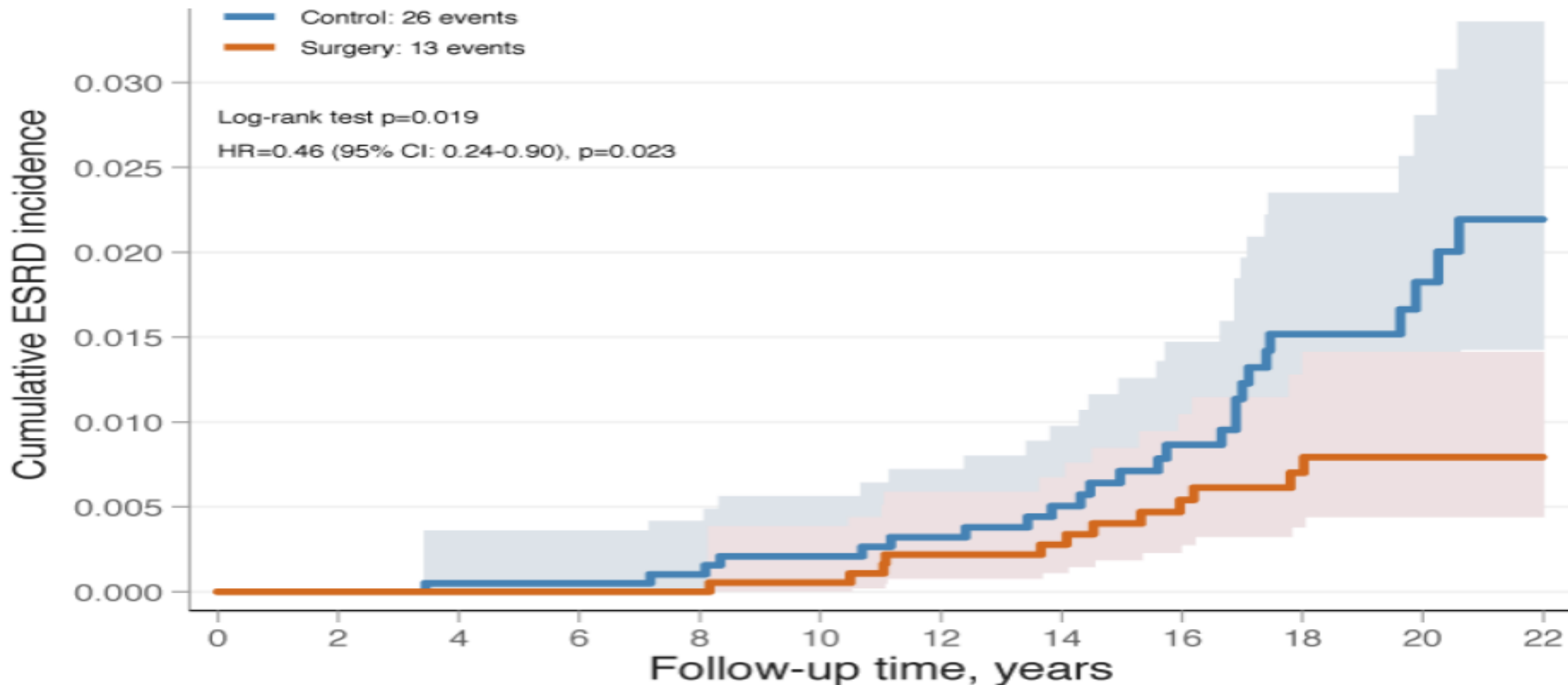
Surgery group	865	750	640	522	410
Control group	804	656	517	416	313

**985 RYGB patients  
matched with  
985 grade 3 obesity  
pts**



# Bariatric surgery reduces the incidence of ESKD

Shulman et al Int J Obes 2018



Number at risk

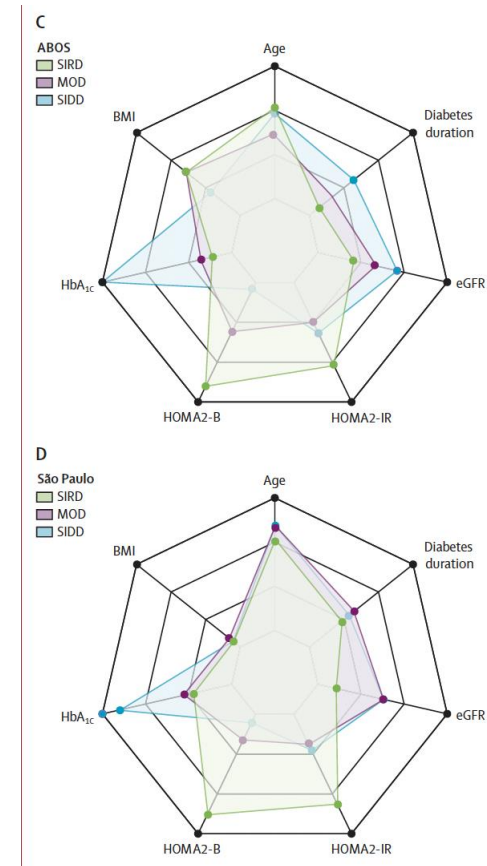
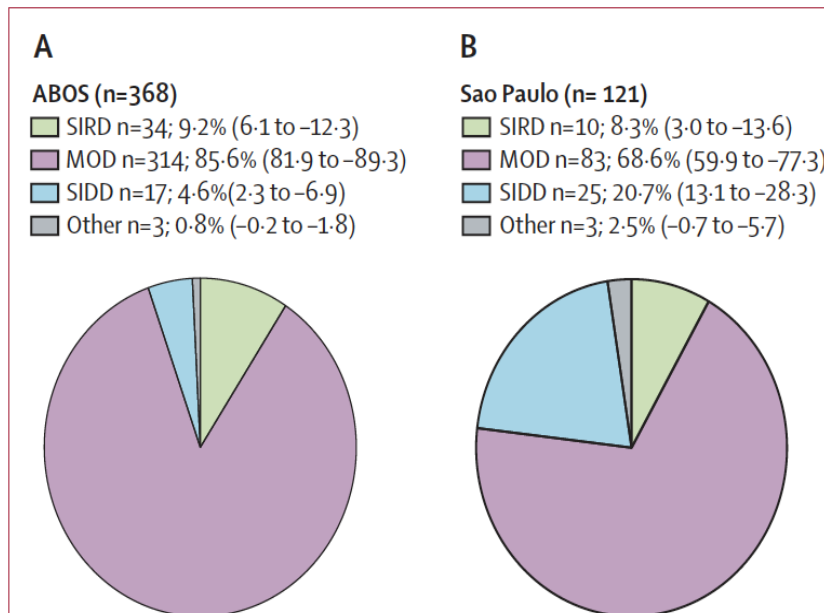
	0	2	4	6	8	10	12	14	16	18	20	22
Control	2040	2015	1981	1934	1884	1811	1732	1538	1195	949	592	319
Surgery	2007	1966	1933	1903	1871	1836	1793	1645	1400	1085	656	344

Best candidates with T2D and obesity for  
kidney outcomes

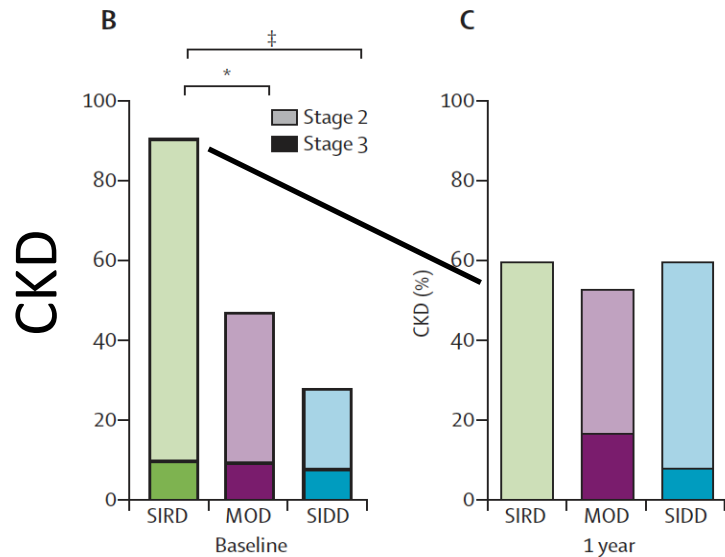
# Data-driven subgroups of type 2 diabetes, metabolic response, and renal risk profile after bariatric surgery: a retrospective cohort study



Violeta Raverdy, Ricardo V Cohen, Robert Caiazzo, Helene Verkint, Tarissa Beatrice Zanata Petry, Camille Marciniak, Benjamin Legendre, Pierre Bauvin, Estelle Chatelain, Alain Duhamel, Elodie Drumez, Naima Oukhouya-Daoud, Mikael Chetboun, Gregory Baud, Emma Ahlqvist, Niels Wierup, Olof Asplund, Blandine Laferrère, Leif Groop, François Pattou

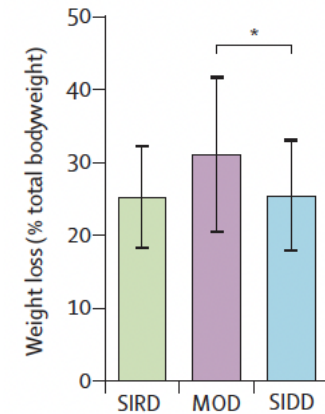
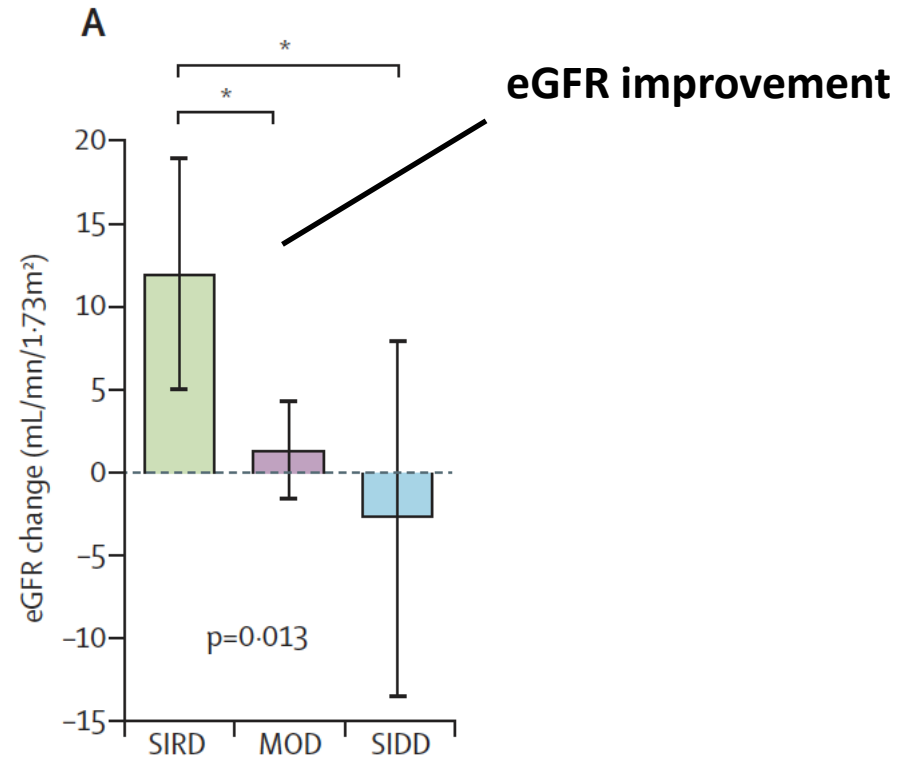


# Marked postoperative reduction of CKD stage in patients with SIRD



Significantly greater CKD remission in SIRD

# Marked eGFR improvement



Same WL

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# Gastric bypass *versus* best medical treatment for diabetic kidney disease: 5 years follow up of a single-centre open label randomised controlled trial

Ricardo V. Cohen,<sup>a,\*</sup> Tiago Veiga Pereira,<sup>b,c</sup> Cristina Mamédio Aboud,<sup>a</sup> Tarissa Beatrice Zanata Petry,<sup>a</sup> José Luis Lopes Correa,<sup>a</sup> Carlos Aurélio Schiavon,<sup>d</sup> Carlos Eduardo Pompílio,<sup>a</sup> Fernando Nogueira Quirino Pechy,<sup>a</sup> Ana Carolina Calmon da Costa Silva,<sup>a</sup> Livia Porto Cunha da Silveira,<sup>a</sup> Pedro Paulo de Paris Caravatto,<sup>a</sup> Helio Halpern,<sup>a</sup> Frederico de Lima Jacy Monteiro,<sup>a</sup> Bruno da Costa Martins,<sup>a</sup> Rogerio Kuga,<sup>a</sup> Thais Mantovani Sarian Palumbo,<sup>a</sup> Allon N. Friedman,<sup>e</sup> and Carel W. le Roux<sup>f,g</sup>



- The Lancet EClin , online Nov 11,2022



# MOMS TRIAL

100 pts



+ BMT

T2D

uACR > 30 mg/g

BMI 30-35 kg/m<sup>2</sup>

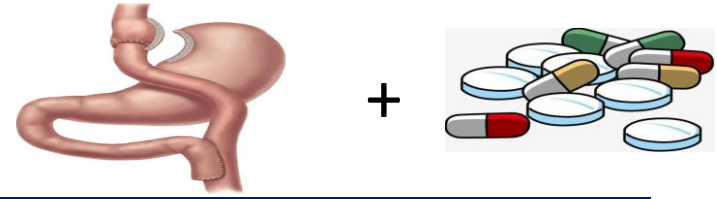
Early stage kidney disease

# MOMS trial



## • Best Medical Treatment

- ✓ Metformin
- ✓ **GLP1 RA**
- ✓ **SGLT-2 i**
- ✓ Insulin
- ✓ Glitazones
- ✓ DPP4 i
- ✓ ACEi/ARB
- ✓ Statins
- ✓ Diuretics



## • RYGB + BMT

- ✓ ACE/ARB
- ✓ Statins
- ✓ Metformin
- ✓ Multivitamins

# MOMS trial

## Endpoints

- **Primary endpoint**

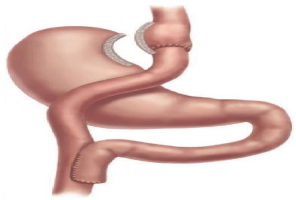
- uACR < 30 mg/g

- **Secondary endpoints**

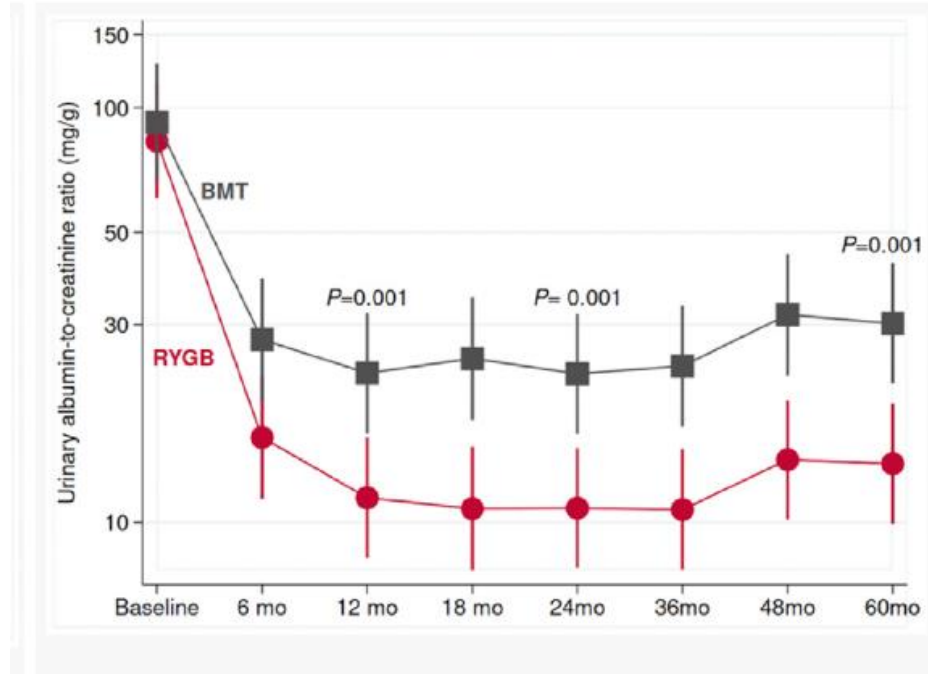
- CKD remission
- Metabolic control ( A1c < 6%; FPG < 100 mg/dl; LDL < 100 mg/dl (< 70 if CV+); HDL > 50; TG < 150 mg/dl; SBP < 130 mmHg ; DBP < 80 mmHg
- Weight-loss
- Use of T2D medications
- Neuropathy/Retinopathy
- QOL

# MOMS trial – 5 years outcomes

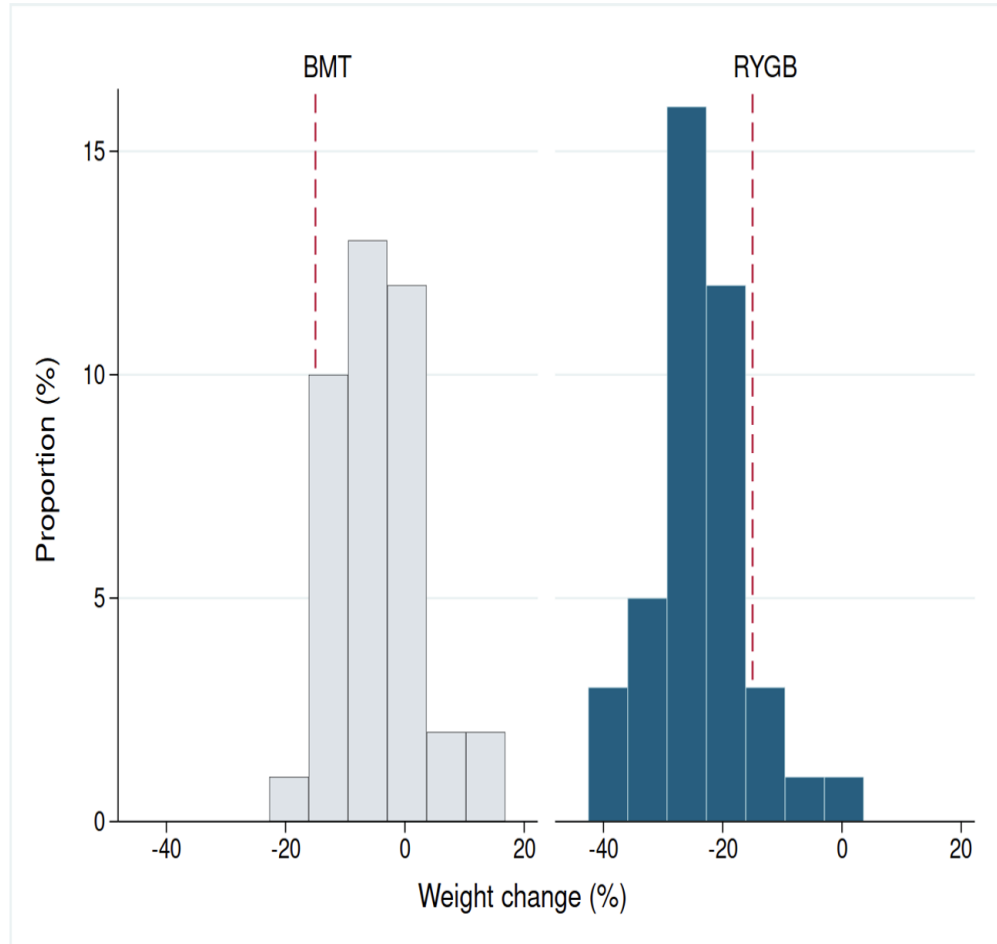
Primary outcome – uACR- continuous variable  
**B**



+ BMT



***The geometric mean for albuminuria levels  
was 46%  
lower after RYGB (P = 0.001)***



***Only 22.5% BMT achieved >15% TBWL***  
***90% RYGB >15% TBWL***

# MOMS trial

## ADA triple endpoint

<b>A1c</b>	<b>&lt; 7%</b>
<b>Blood Pressure</b>	<b>&lt;130/80 mmHg</b>
<b>Lipids</b>	
<b>LDL cholesterol</b>	<b>&lt;100 mg/dl</b>



**22%\***



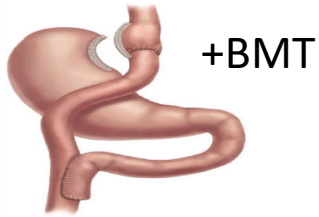
**7.3%**

\*p=0.05

# MOMS trial, 5 years FU

## Medication use

*Considering all diabetes, blood pressure, and cardiovascular drugs*

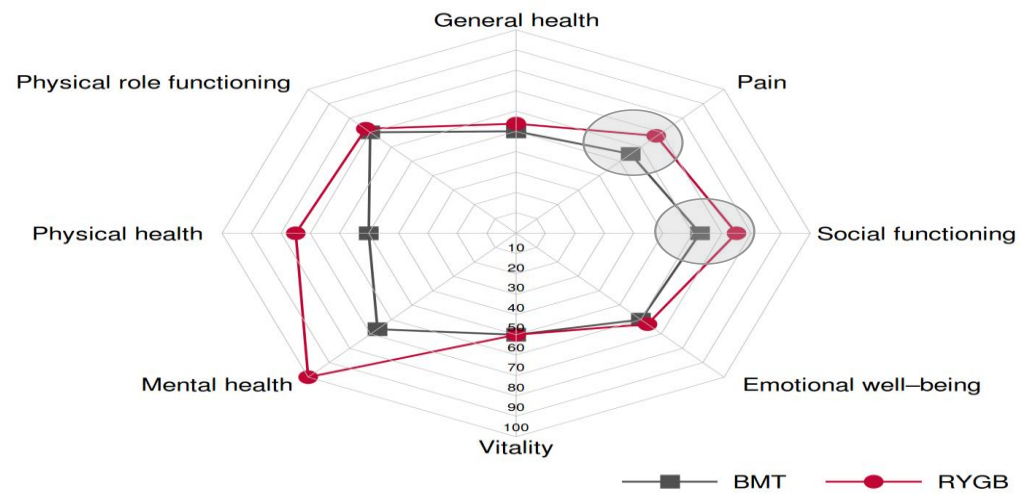


**1/2** medication when compared to BMT



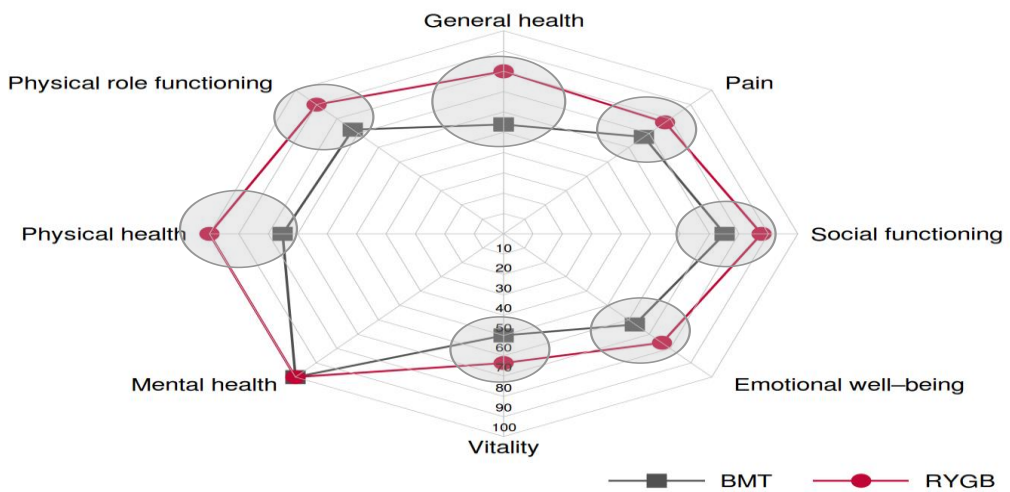
# Quality of Life

A



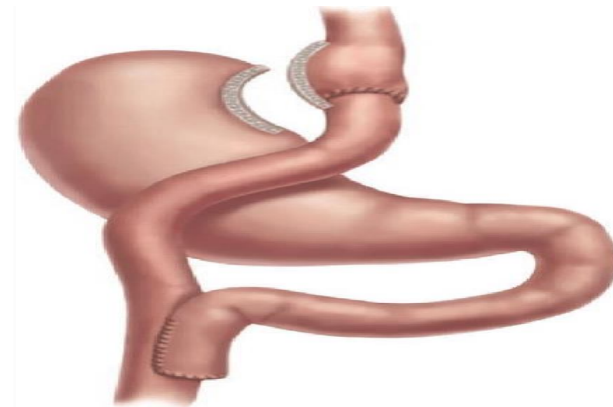
Baseline

B



60 mo FU

# Metabolic/bariatric surgery safety in pts with CKD



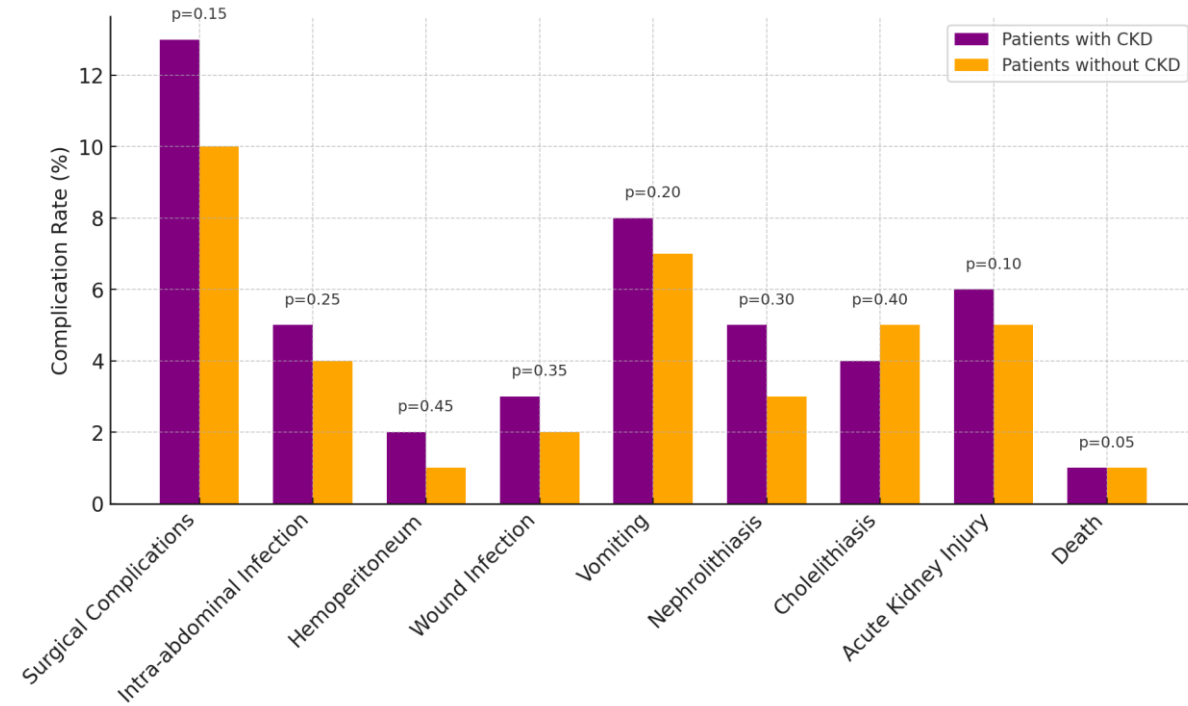


# Metabolic/Bariatric Surgery is Safe and Effective in People with Obesity, Type 2 Diabetes Mellitus and Chronic Kidney Disease: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

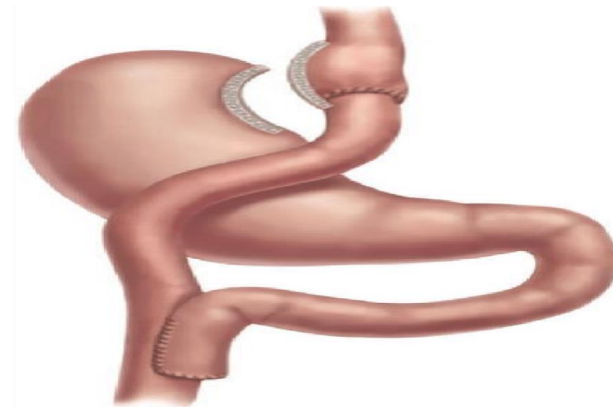
Ricardo V. Cohen<sup>1</sup> · Mauricio A. Azevedo<sup>2</sup> · Carel W. Le Roux<sup>3</sup> · Lorraine PMLP Caldeon<sup>2</sup> · Alexandre Luque<sup>2</sup> · Dhiago A. Fayad<sup>2</sup> · Tarissa B. Z. Petry<sup>1</sup>

Received: 6 August 2024 / Revised: 30 September 2024 / Accepted: 5 October 2024

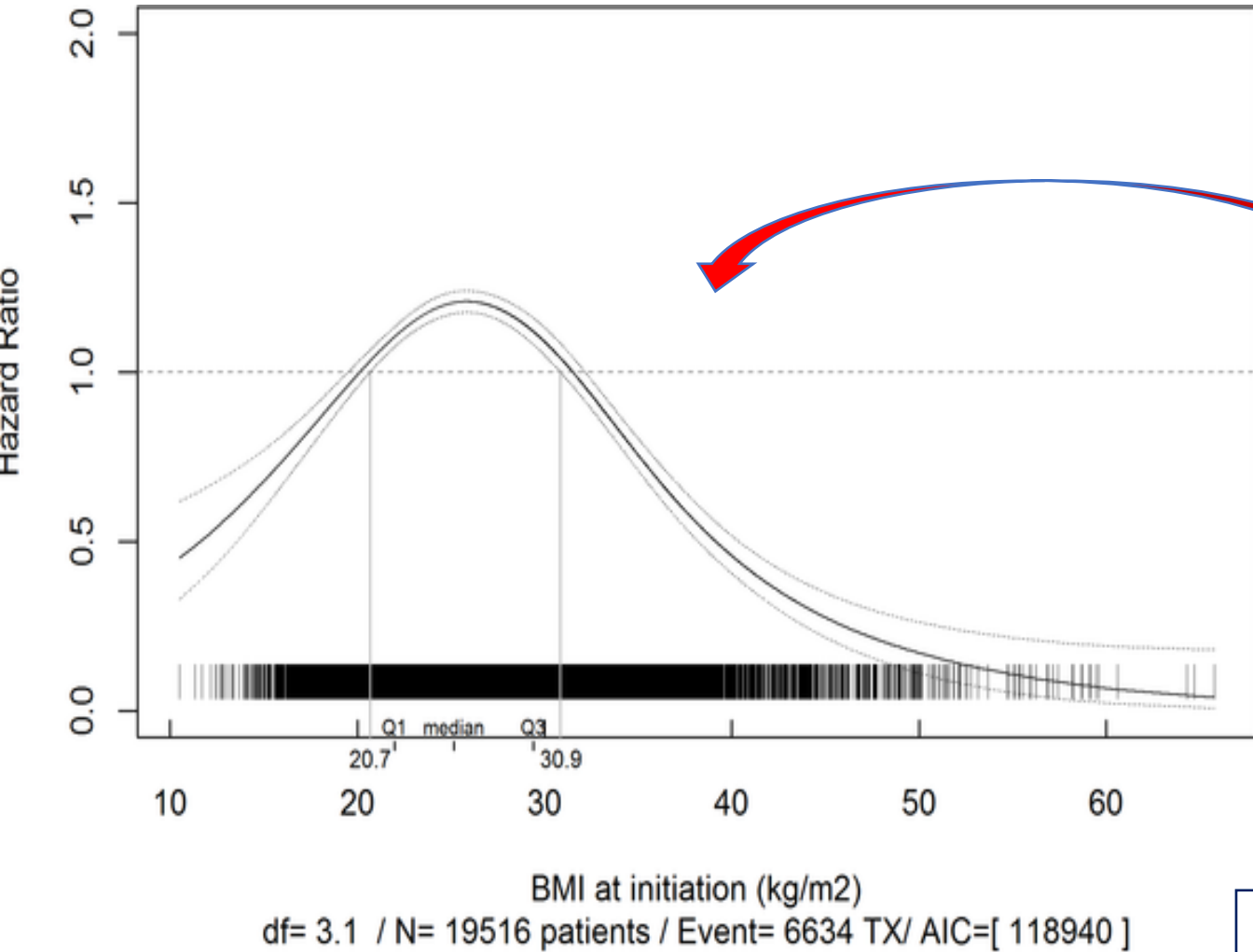
## Same positive clinical outcomes and safety in people with and without CKD



# Metabolic/bariatric surgery & access to transplantation



# Obesity 3<sup>rd</sup> leading reason in US for not being listed for transplant



Patients with a BMI  $\geq 31$  kg/m<sup>2</sup> at the start of dialysis are less likely to receive a kidney transplant and this probability decreased as the BMI increased



Lassalle M, Fezeu LK, Couchoud C, Hannedouche T, Massy ZA, et al. (2017) Obesity and access to kidney transplantation in patients starting dialysis: A prospective cohort study. PLOS ONE 12(5): e0176616.

# New ASMBS / IFSO Guidelines on Indications for Metabolic and Bariatric Surgery 2022

## Developed to Replace the NIH Consensus Guidelines from 1991

### Methods



1991 consensus guidelines

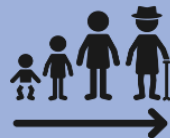
National Institutes of Health



Literature review & update



Procedure type



Age limit

Indications



### Results



Special population



Bridge to joint replacement > 2 yrs prior



Bridge to abdominal wall hernia



Bridge to organ transplant

SURGERY FOR OBESITY AND RELATED DISEASES

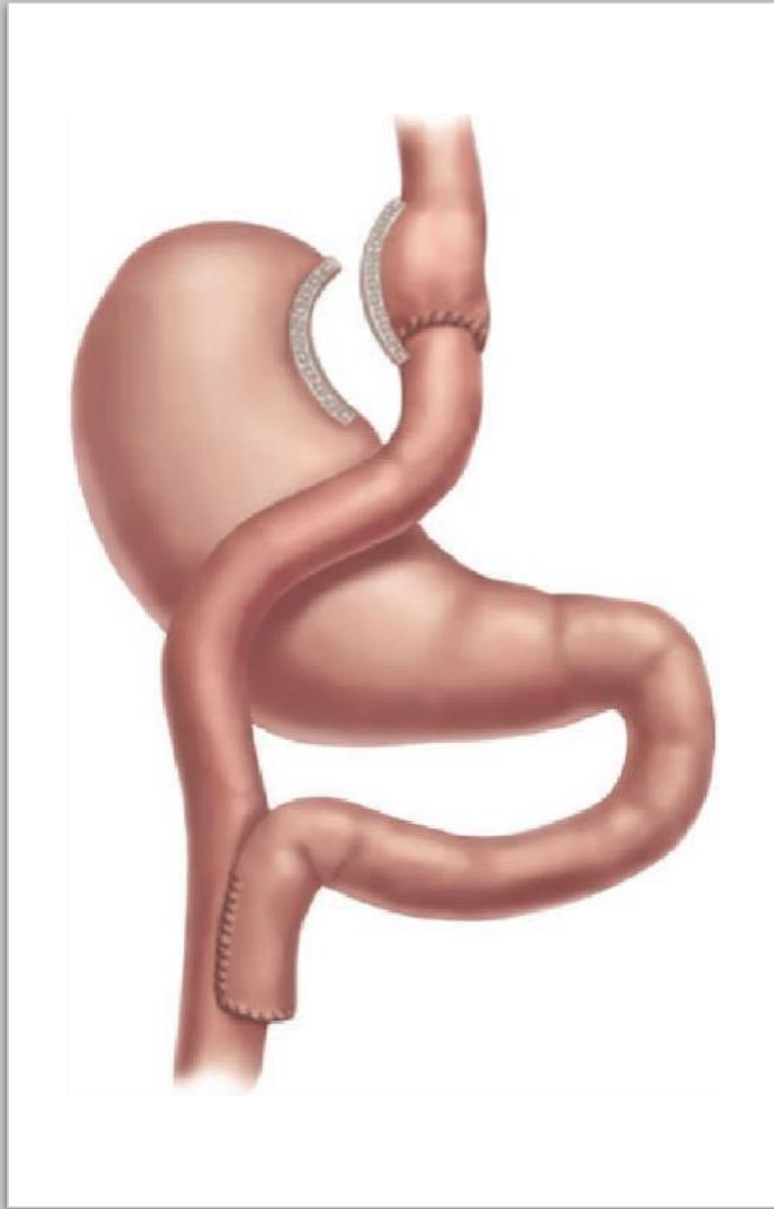


Dan Eisenberg MD, MS, Scott A. Shikora MD, Edo Aarts MD, PhD, Ali Aminian MD, Luigi Angrisani MD, **Ricardo V. Cohen MD**, PhD, Maurizio de Luca MD, Silvia L. Faria PhD, Kasey P.S. Goodpaster PhD, Ashraf Haddad MD, Jacques M. Himpens MD, PhD, Lilian Kow BMBS, PhD, Marina Kurian MD, Kamal Mahawar MBBS, MS, MSc, FRCSEd, Ken Loi MBBS, BSc (Med), Abdelrahman Nimeri MD, MBBCh, Mary O’Kane MSc, RD, Pavlos K. Papasavas MD, Jaime Ponce MD, Janey S.A. Pratt MD, Ann M. Rogers, MD, Kimberley E. Steele, MD, PhD, Michel Suter, MD, Shanu N. Kothari MD Oct 2022 OBSU SOARD

OBESITY SURGERY

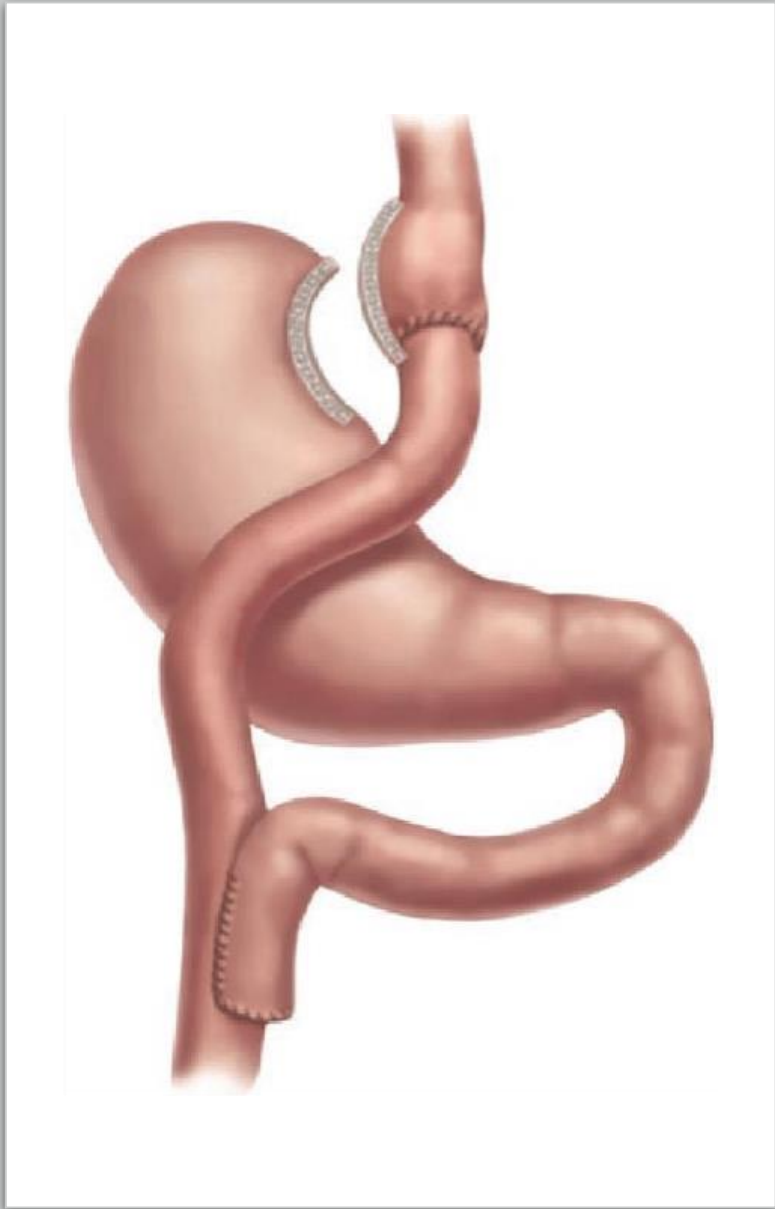
The Journal of Metabolic Surgery and Allied Care





# Metabolic/bariatric surgery for CKD

- *Induces significant and long-term weight loss*
- *Improves glycemia*
- *Improves BP*
- *Improves lipids*
- *Safe and effective option for DKD*
- *Improves urinary metabolomic profile*



# Metabolic/ bariatric surgery for CKD

- *May halt or delay the progression of CKD*
- *Insulin resistance = “better responders”*
- *Reasonable safety profile*
- *Bridge to kidney transplant*

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[@rvcohen](https://twitter.com/rvcohen)(twitter)

Thank you



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