

# Metabolic Surgery and Hypertension GATEWAY Trial

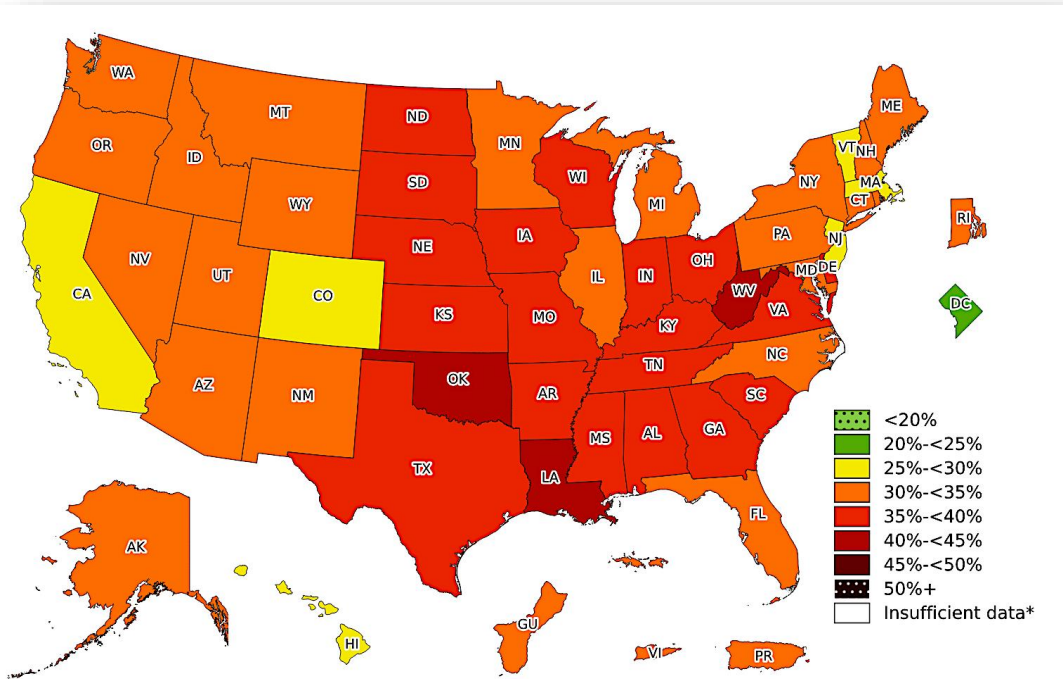
---

CARLOS A SCHIAVON, MD, FACS

## Disclosure

- **Research Grant : Ethicon Inc.  
(J&J MedTech)**

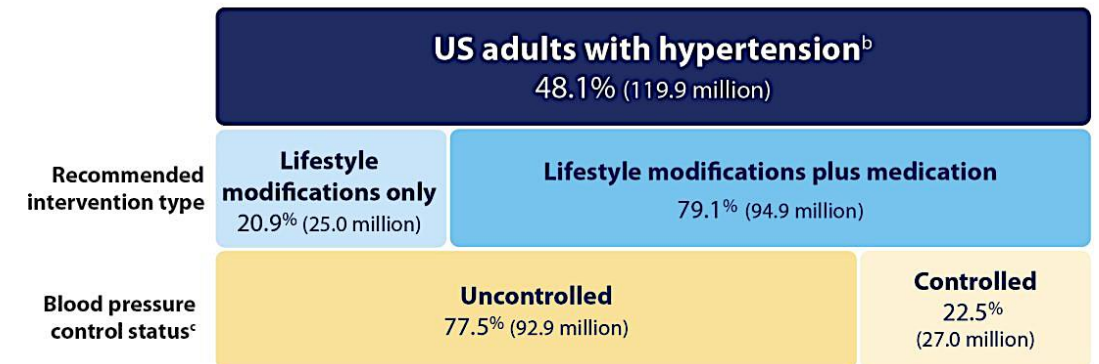
# OBESITY 2022



# HYPERTENSION 2020

## Estimated Hypertension Prevalence, Treatment, and Control (Blood Pressure <130/80 mm Hg) Among US Adults<sup>a</sup>

Applying the criteria from the American College of Cardiology and American Heart Association's (ACC/AHA) 2017 Hypertension Clinical Practice Guideline - NHANES 2017- March 2020

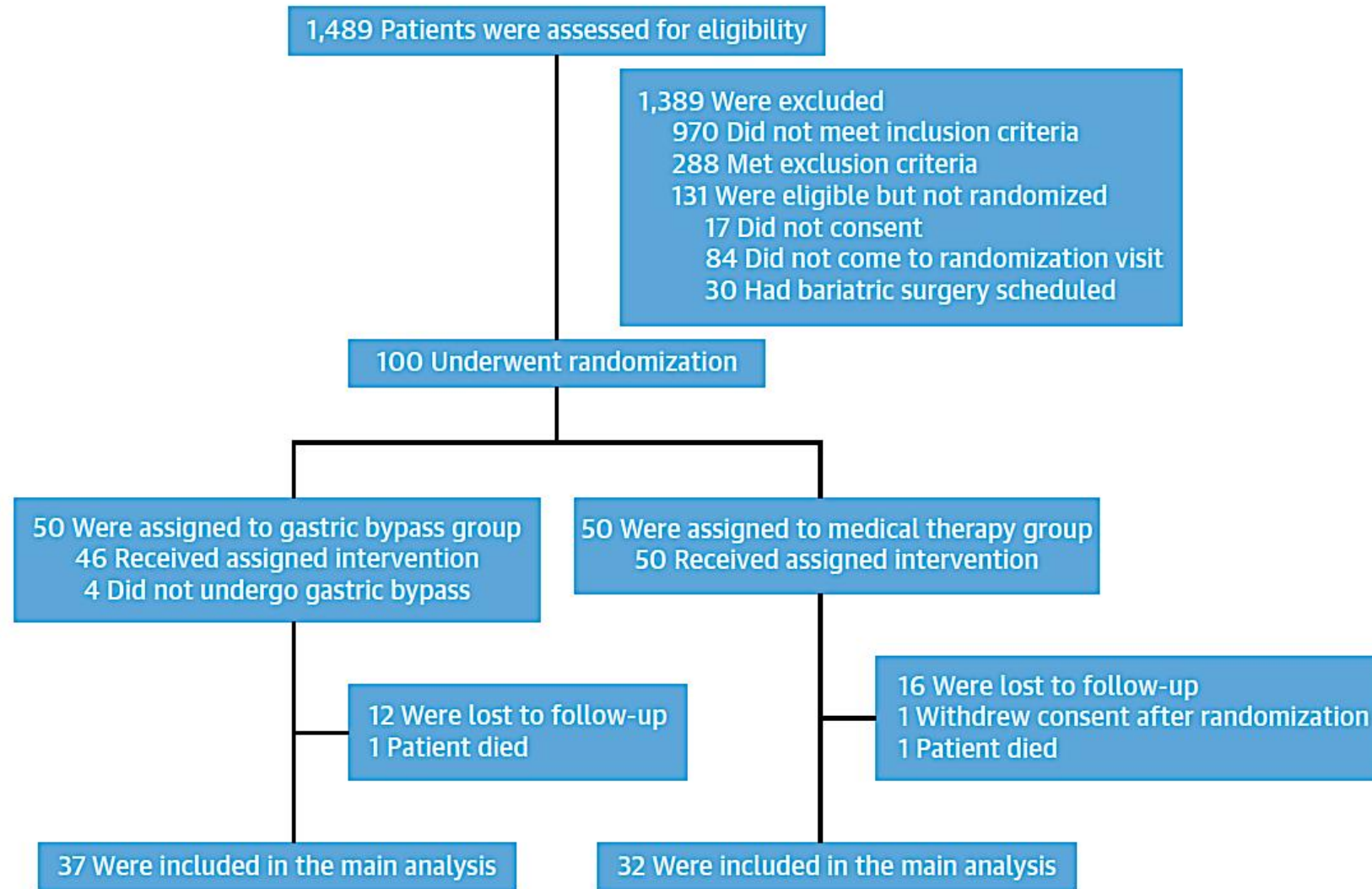




---

# Randomized Trial of Effect of Bariatric Surgery on Blood Pressure After 5 Years

**FIGURE 1** Flow of Subjects: Eligibility, Randomization, and Follow-Up



# BASELINE

<b>Characteristics</b>	<b>Gastric Bypass (n=50)</b>	<b>Medical Therapy (n=50)</b>
<b>Age - years</b>	<b>43.1 ± 9.2</b>	<b>44.6 ± 9.2</b>
<b>Female – no.(%)</b>	<b>36 (72)</b>	<b>34 (68)</b>
<b>BMI – Kg/m<sup>2</sup></b>	<b>37.4 ± 2.4</b>	<b>36.4 ± 2.9</b>

# BASELINE

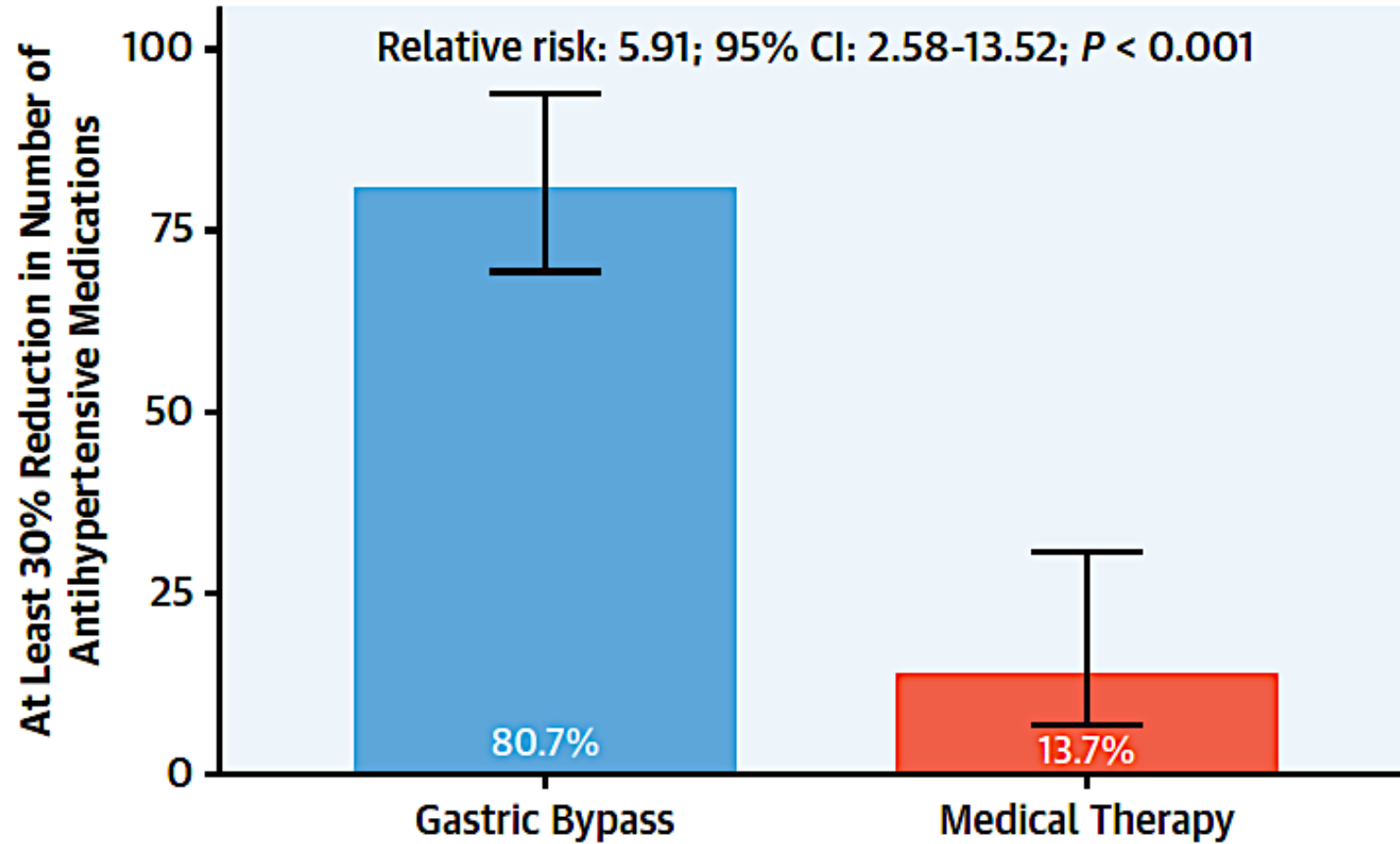
<b>Characteristics</b>	<b>Gastric Bypass (n=50)</b>	<b>Medical Therapy (n=50)</b>
<b>Office SBP – mm Hg</b>	<b>123.0 ± 11.6</b>	<b>122.8 ± 12.9</b>
<b>Office DBP – mm Hg</b>	<b>77.6 ± 7.0</b>	<b>78.0 ± 9.3</b>
<b>Number of Antihypertensive Drugs - Median (IQR)</b>	<b>3 (2 to 3)</b>	<b>3 (3 to 3)</b>
<b>Number of Antihypertensive</b>	<b>2.8 ± 0.6</b>	<b>3.1 ± 0.7</b>

# Primary Endpoint

Reduction of at least 30%  
of the total  
antihypertensive drugs,  
maintaining BP < 140/90  
mm Hg.

**GATEWAY  
TRIAL**



**A****Primary Endpoint****PRIMARY ENDPOINT**

# Secondary Endpoints

- Metabolic and inflammatory profile;
- Apparent Resistant hypertension;
- Adverse events;
- Office BP and ABPM;
- Remission of hypertension.

**GATEWAY  
TRIAL**

# Body Mass Index, Kg/m<sup>2</sup>

## Gastric Bypass

## Medical Therapy

Baseline	37.35 (36.34 to 38.37)	36.44 (35.43 to 37.46)
5 years	28.01 (26.95 to 29.08)	36.40 (35.28 to 37.52)

# Insulin - pmol/L

## Gastric Bypass

## Medical Therapy

**Baseline** 127.64 (105.16 to 150.13) 130.05 (107.5 to 152.61)

**5 years** 43.14 (34.88 to 51.4) 153.75 (122.99 to 184.52)

# Glycated hemoglobin - %

**Gastric Bypass**

**Medical Therapy**

**Baseline**

**5.7 (5.5 to 5.9)**

**5.73 (5.53 to 5.92)**

**5 years**

**5.38 (5.18 to 5.57)**

**5.97 (5.76 to 6.19)**

	GB - Baseline	MT - baseline	GB – 5 years	MT – 5 years	p
Glucose-lowering drugs – n (%)	5/50 (10%)	9/50 (18%)	2/38 (5.3%)	13/33 (39.4%)	0.001

# Low-density lipoprotein cholesterol - mg/dL

**Gastric Bypass**

**Medical Therapy**

**Baseline 119.15 (106.98 to 131.32) 115.5 (103.98 to 127.02)**

**5 years 92.46 (82.43 to 102.49) 103.14 (91.69 to 114.6)**

	GB - Baseline	MT - baseline	GB – 5 years	MT – 5 years	p
Statin - n (%)	10/50 (20%)	13/50 (26%)	4/38 (10.5%)	19/33 (57.6%)	<0,001

# High-sensitive C-reactive protein - nmol/L

## Gastric Bypass

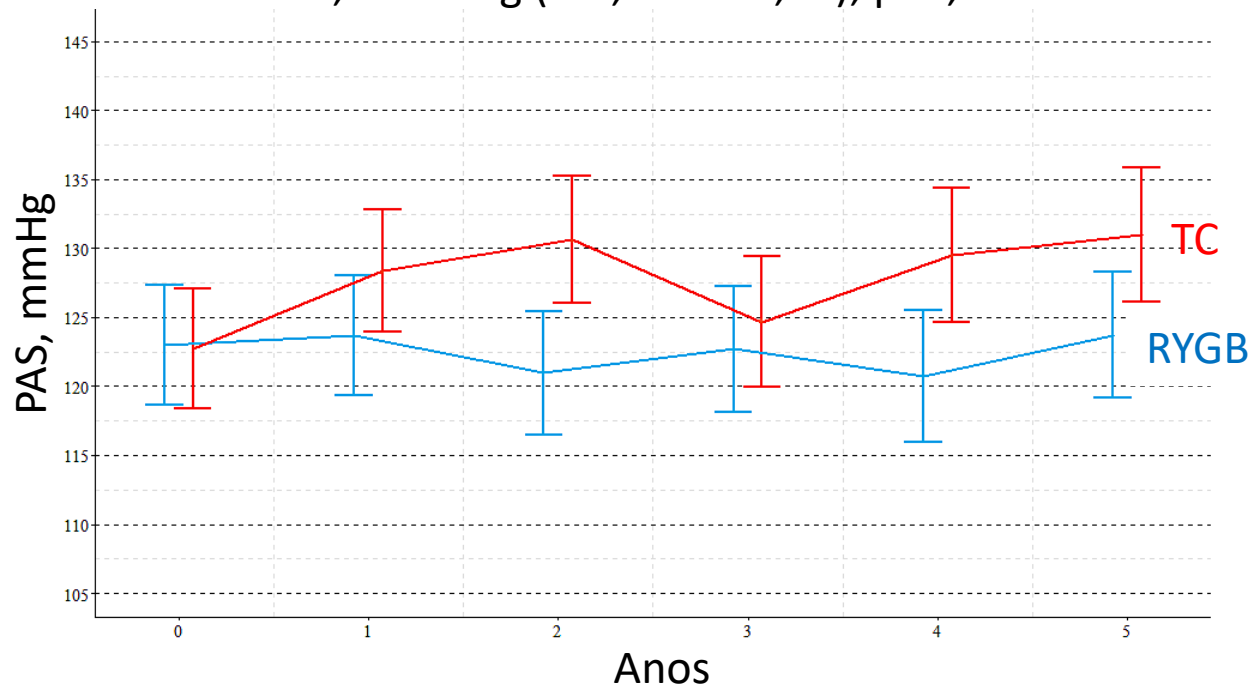
## Medical Therapy

<b>Baseline</b>	<b>100.99 (70.51 to 131.46)</b>	<b>72.82 (51.25 to 94.39)</b>
<b>5 years</b>	<b>6.05 (4.09 to 8.01)</b>	<b>40 (26.54 to 53.46)</b>

# PAS e PAD

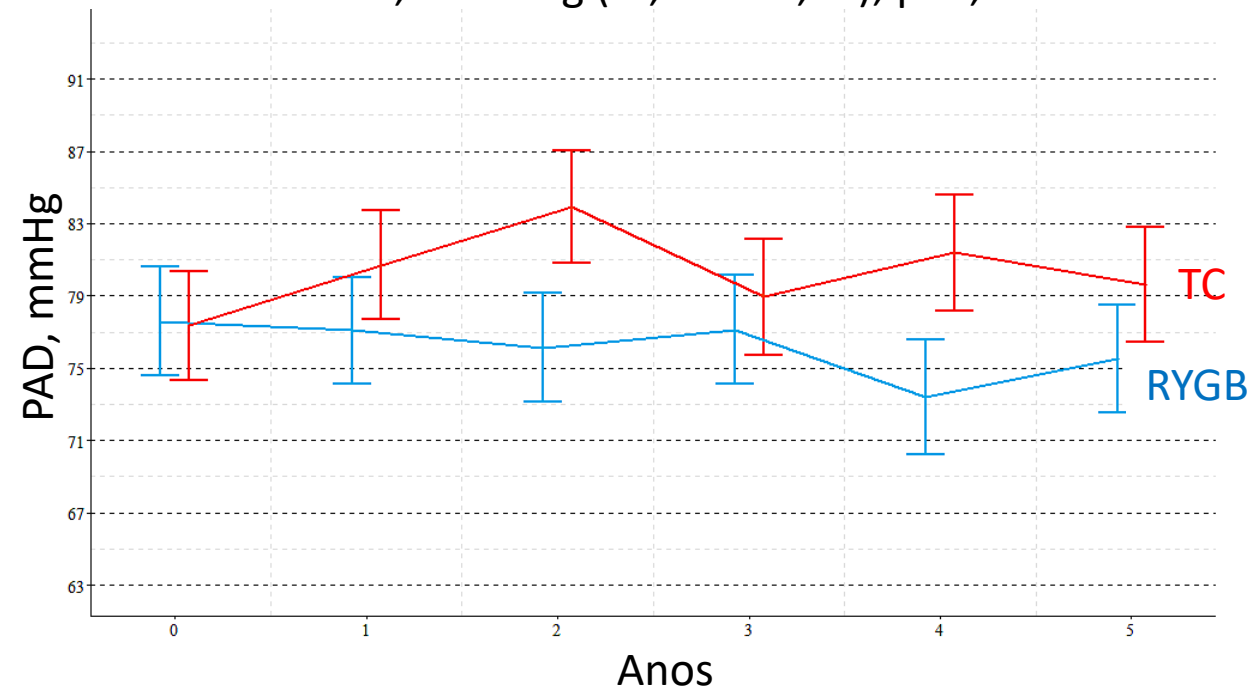
# CONSULTÓRIO

-7,48mmHg (-14,78 to -0,18); p=0,045



0.8 [0.51 – 1.09]

-4,37mmHg (-9,51 to 0,76); p=0,095

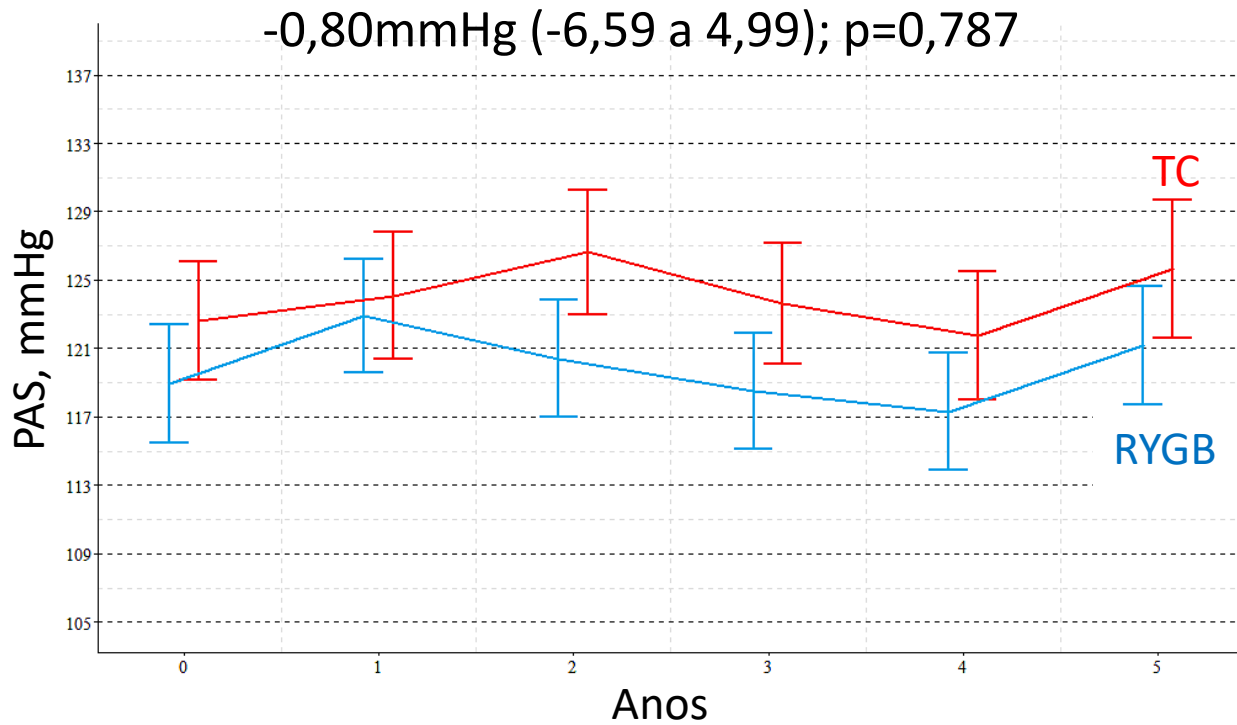


2.97 [2.33 – 3.6]

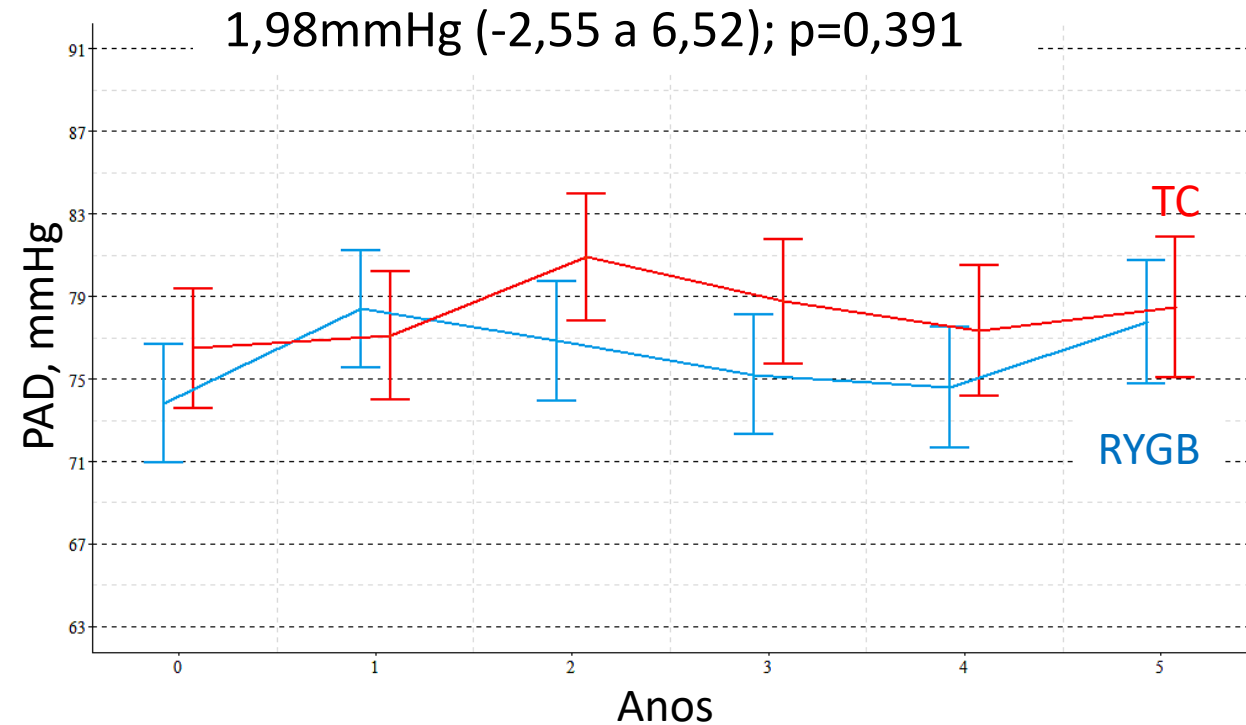


# PAS e PAD 24 horas

# MAPA

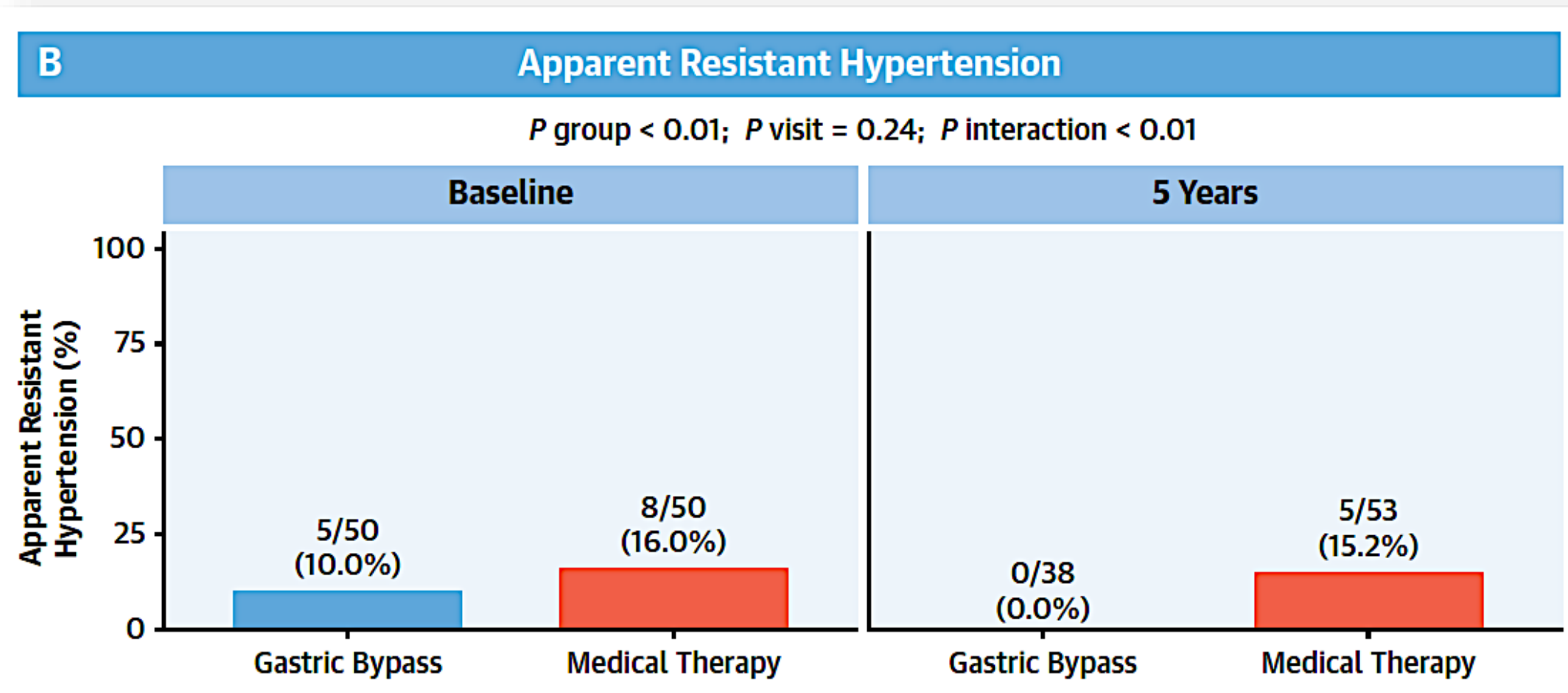


0.8 [0.51 – 1.09]



2.97 [2.33 – 3.6]

# APPARENT RESISTANT HYPERTENSION



**47% x 2%**

**REMISSION OF  
HYPERTENSION  
BP < 140/90**





**OSA**

---

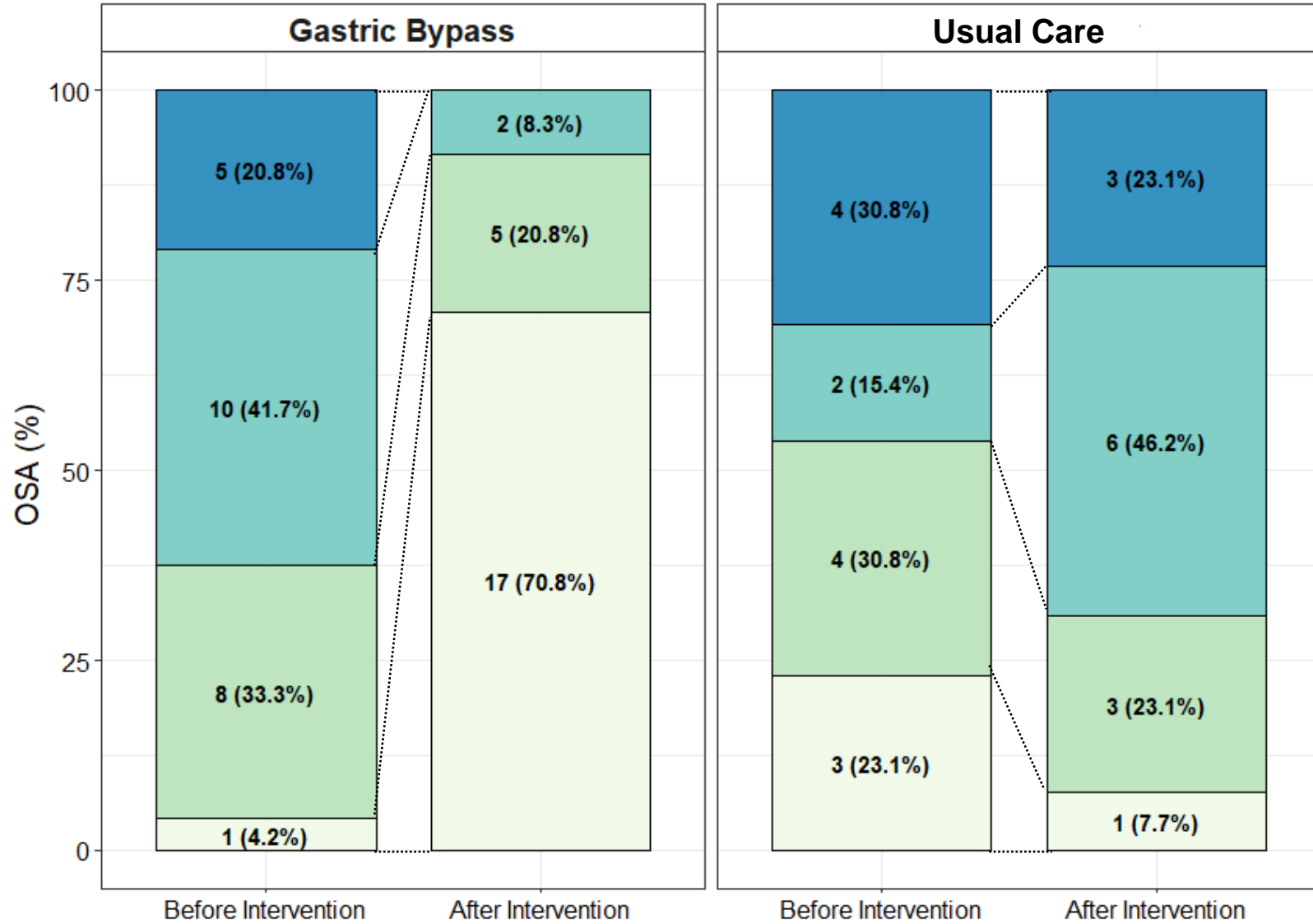
Brief Communication | Published: 15 February 2021

Epidemiology and Population Health

## Three-year effects of bariatric surgery on obstructive sleep apnea in patients with obesity grade 1 and 2: a sub-analysis of the GATEWAY trial

Sofia F. Furlan, Luciano F. Drager , Renato Nakagawa Santos, Lucas P. Damiani, Angela Cristine Bersch-Ferreira, Tamiris A. Miranda, Rachel Helena V. Machado, Eliana V. Santucci, Luiz A. Bortolotto, Geraldo Lorenzi-Filho, Otavio Berwanger, Alexandre B. Cavalcanti & Carlos A. Schiavon 



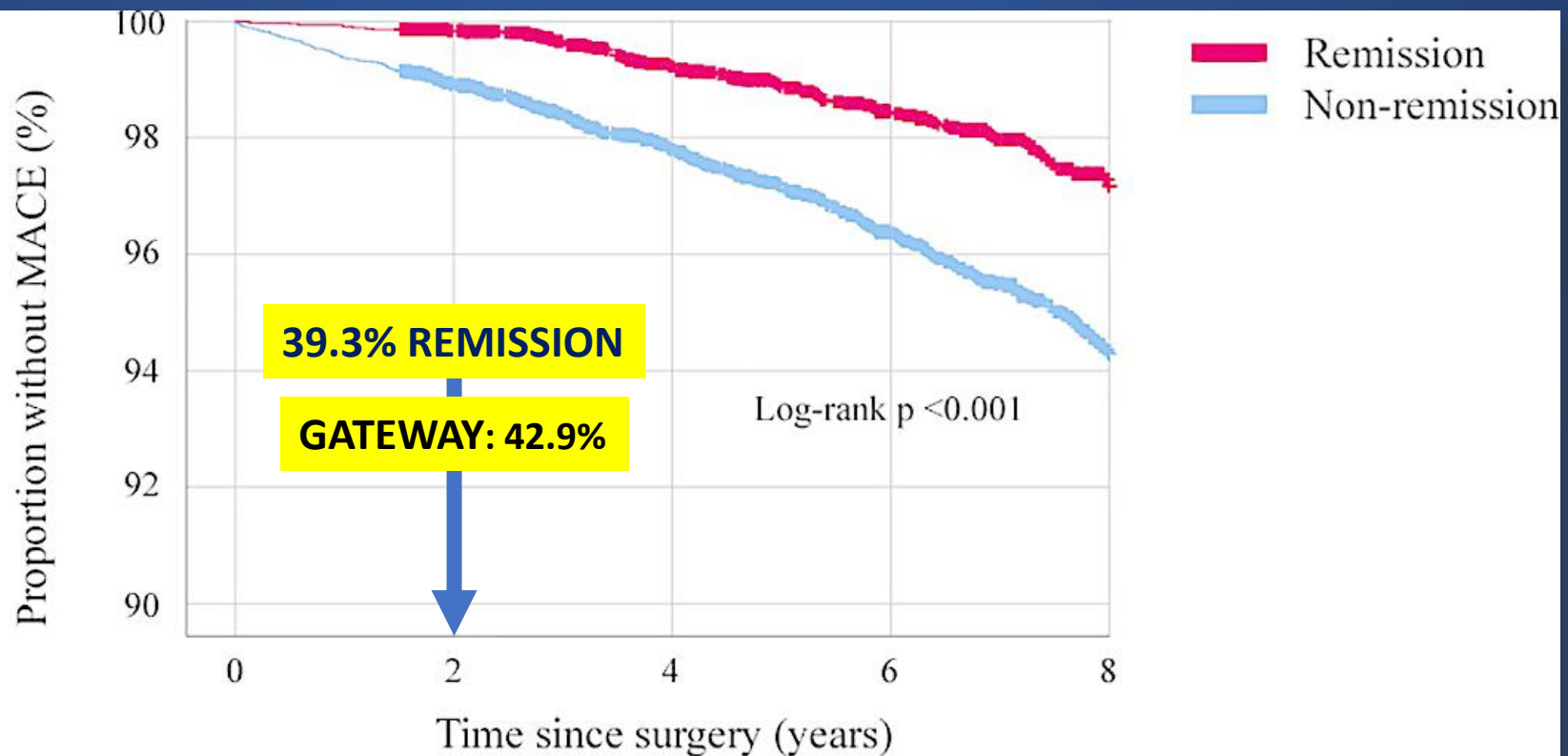


3 Anos de seguimento  
 24 pacientes – Bypass  
 13 pacientes –  
 Tratamento clínico

OSA Severe Moderate Mild Normal



**METABOLIC SURGERY CAN  
REDUCE MACE IN PATIENTS  
WITH HYPERTENSION AND  
PREDICTORS OF REMISSION**



Number at risk	0	2	4	6	8
Remission	6292	5961	4466	2742	875
Non-remission	9698	8984	6689	4104	1313

## MACE-free survival in patients experiencing remission of hypertension at 2 years and those not experiencing remission



# Association with:

LOWER REMISSION RATE	HIGHER RISK OF RELAPSE
<b>The duration of disease</b>	<b>The duration of disease</b>
<b>Number of antihypertensive drugs</b>	<b>Number of antihypertensive drugs</b>
<b>Age</b>	<b>Age</b>
<b>BMI</b>	<b>Sleeve Gastrectomy</b>
<b>Dyslipidemia, and cardiovascular disease</b>	

# Predictors of Hypertension Remission After RYGB in The GATEWAY TRIAL – 3 Years

Variables	OR	CI 95%	p Value
Age	0.95	0.85 - 1.05	0.36
<b>Duration of Hypertension (years)</b>	<b>0.85</b>	<b>0.70 – 0.97</b>	<b>0.04</b>
Number of antihypertensive drugs (baseline)	0.72	0.17 – 2.5	0.62
<b>Fasting insulin</b>	0.90	0.80 – 0.99	<b>0.07</b>
Race (black and brown)	2.27	0.28 – 26.4	0.45
Waist circumference	1.10	0.98 – 1.26	0.11

# GATEWAY

**EDITORIAL COMMENT**

---

## **Bariatric Surgery for Obesity Hypertension**

**A Gateway for Durable Blood Pressure Control\***

Michael E. Hall, MD, MSc,<sup>a,b</sup> Hunter P. Mace, BS,<sup>a</sup> John E. Hall, PhD<sup>b</sup>

**THANK YOU  
OBRIGADO  
GRACIAS  
MERCI  
DANK  
GRAZIE**

