OMCeO ASTI
Ordine Provinciale dei Medici Chirurghi e degli Odontoiatri

ASTI

11 GIUGNO 2026

OSAS e Ipertensione arteriosa

Ipertensione arteriosa resistente
e
Profilo pressorio notturno

Antonio La Grotta

Numeri del problema

PREVALENZA IPERTENSIONE

49 % (m) - 39 % (f)

Progetto CUORE 2023 e 2024

PREVALENZA OSA

54 % (lieve) 27 % (moderata e grave)

Report INAIL 2021

Negli ipertesi in generale OSA è presente nel 30-50 %

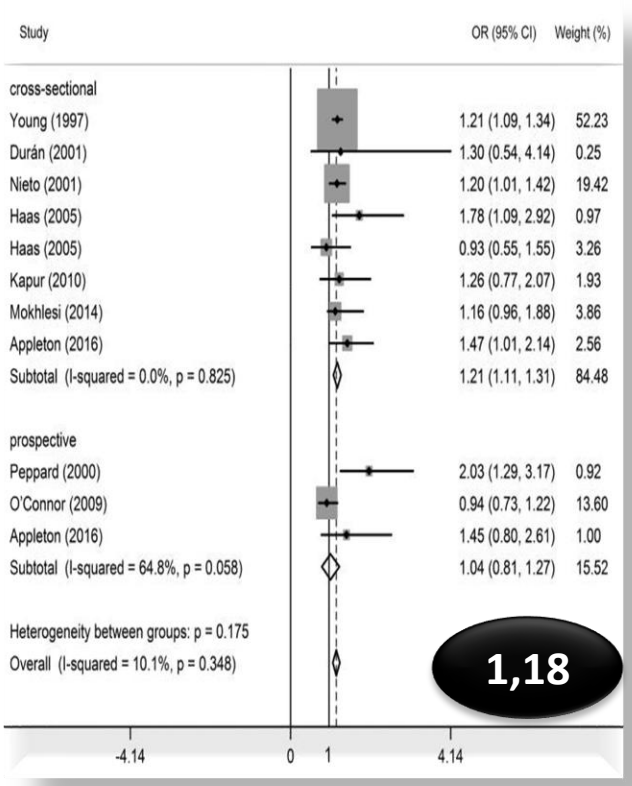
Tietjens JR e t al ***J Am Heart Assoc.*** *2019*

Negli ipertesi resistenti OSA è presente nel 80 %

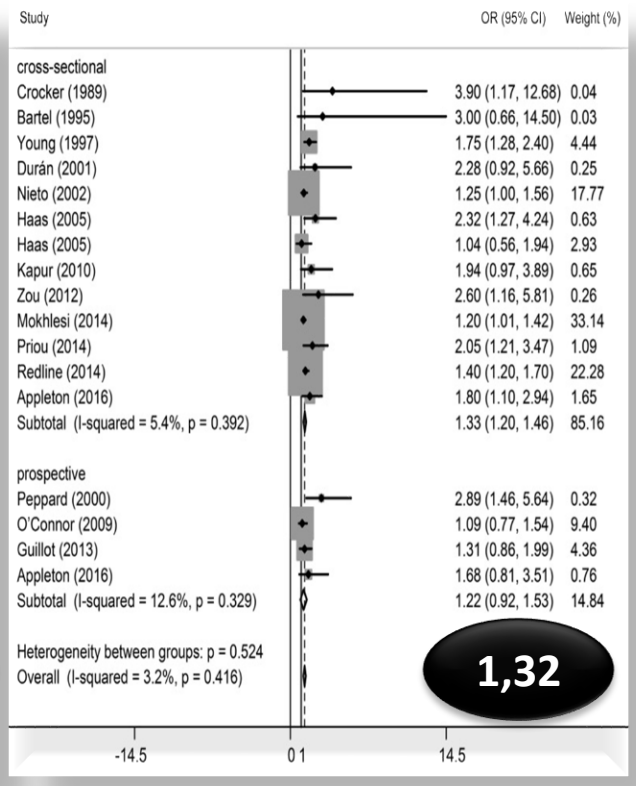
Logan AG et al - ***J Hypertens.*** *2001*

Correlazione
Ipertensione arteriosa e gravità OSA

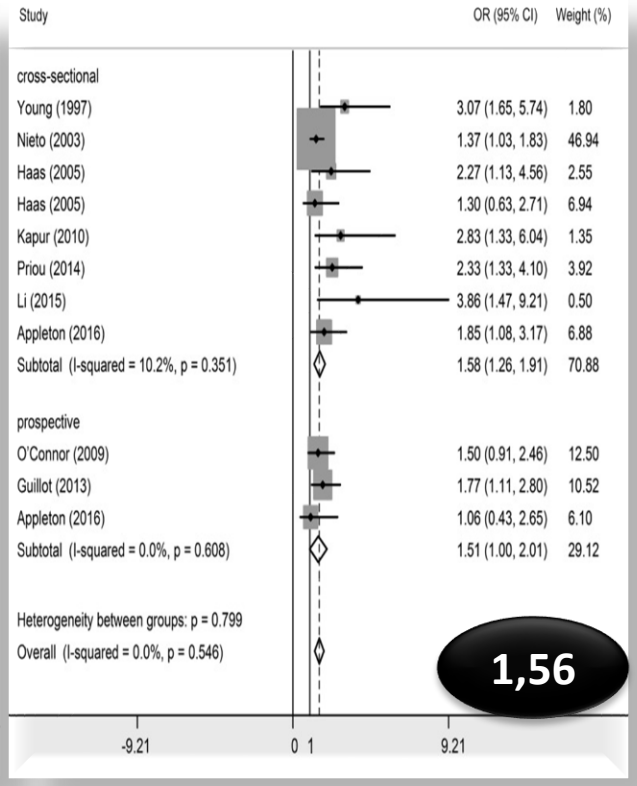
OSA lieve: *AHI 5 -15*



OSA moderata: *AHI 15-30*

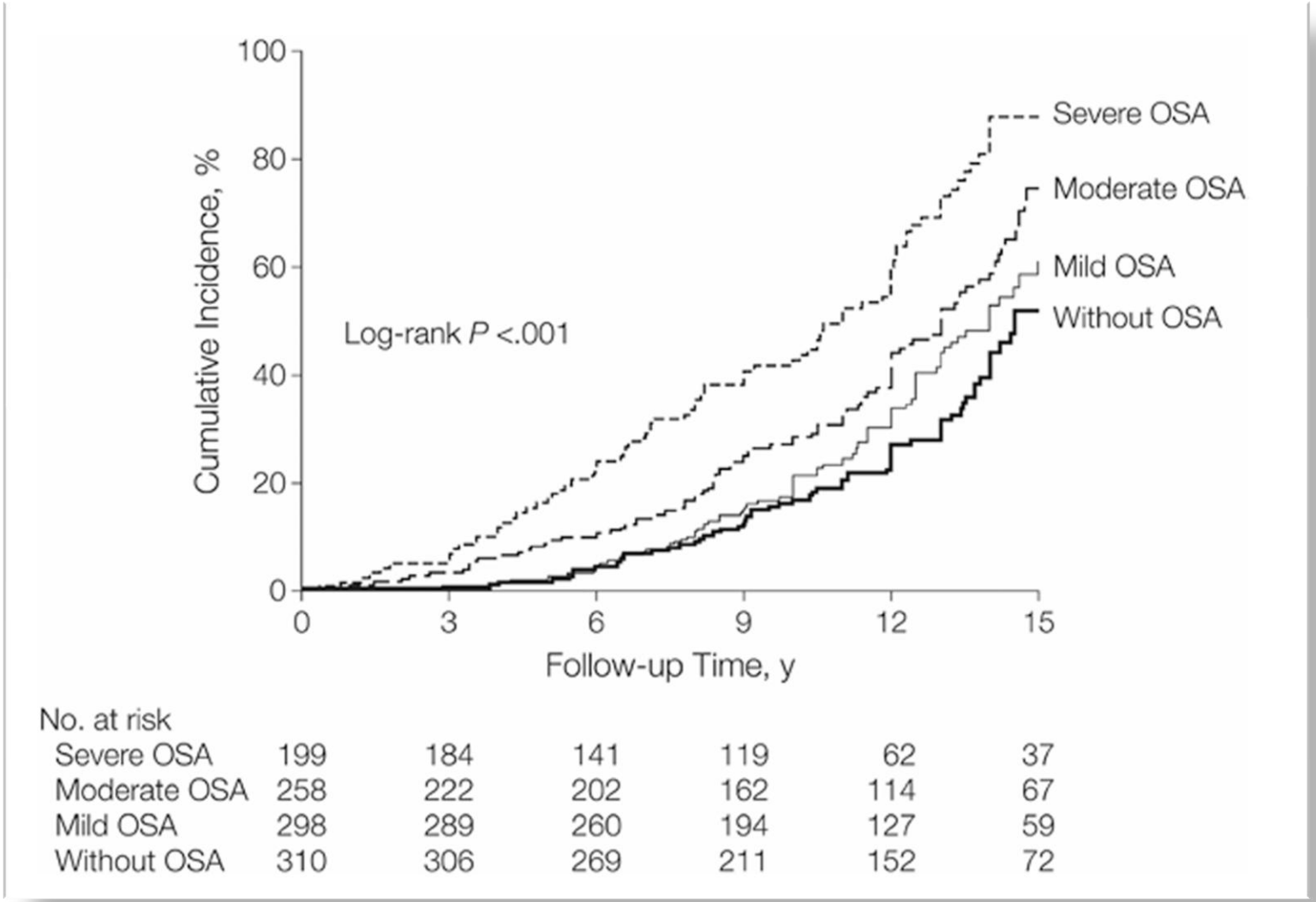


OSA severa: *AHI > 30*



Haifeng Hou *et al* - ***Journal of global*** - 2018

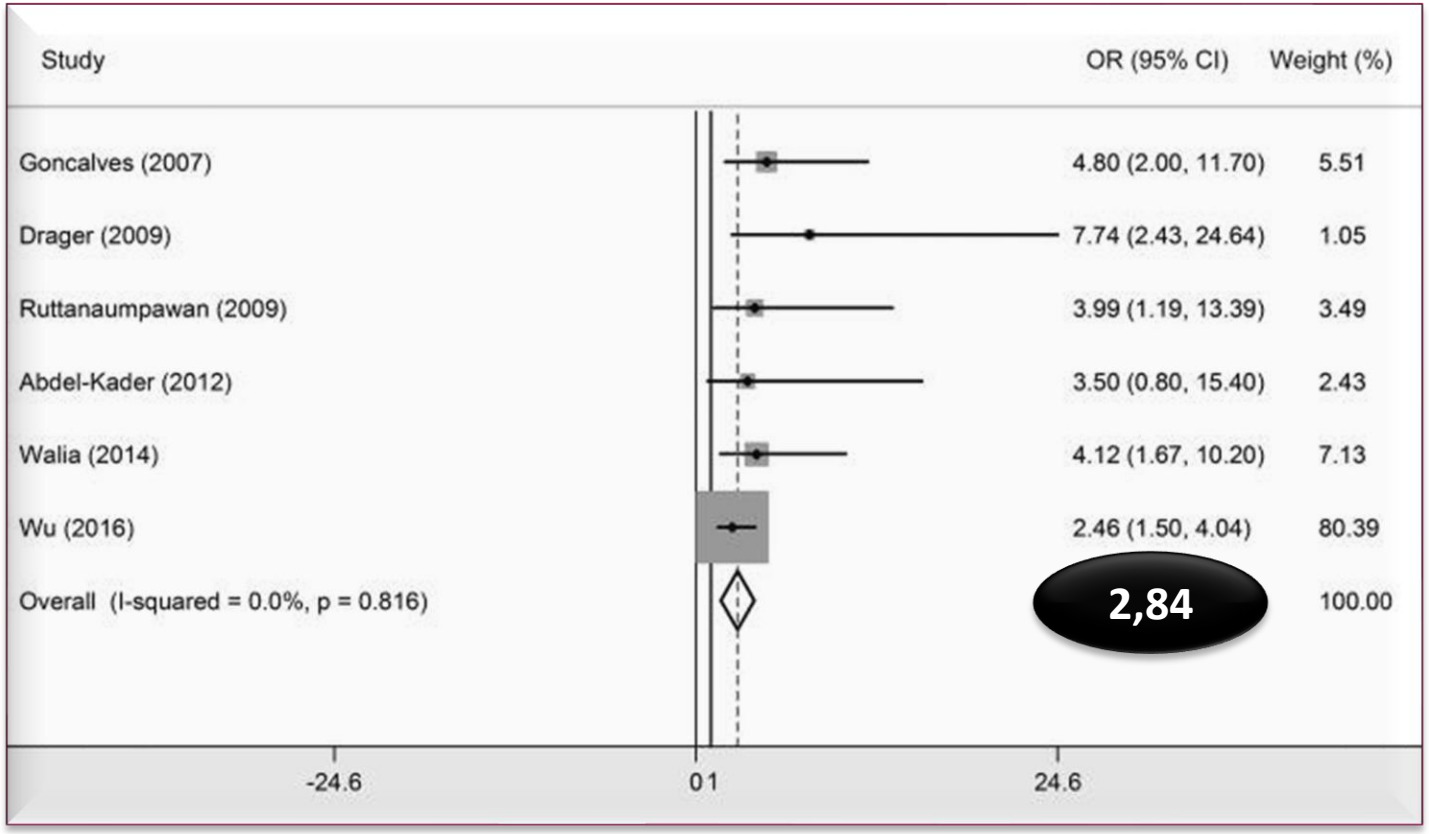
Ipertensione Arteriosa Resistente e gravità OSA



No. at risk						
Severe OSA	199	184	141	119	62	37
Moderate OSA	258	222	202	162	114	67
Mild OSA	298	289	260	194	127	59
Without OSA	310	306	269	211	152	72

Marin JM, e t al ***JAMA***. 2012

Rischio di Ipertensione arteriosa resistente in OSA



Haifeng Hou e t al. ***Journal of global*** - 2018

DEFINIZIONE Ipertensione arteriosa resistente vera (RHT) (EU e USA)

- ***IPERTENSIONE ARTERIOSA RESISTENTE (RHT)***

  Ipertensione arteriosa non a target** (> 130/80 mmHg) **nonostante l'uso concomitante di 3 farmaci di classi diverse** (un bloccante SRAA (ACEi o ARB) un Calcio antagonista a lunga azione (CCB) e diuretico tiazidico o simile) **a dosi ottimali e con distribuzione appropriata

- ***IPERTENSIONE ARTERIOSA RESISTENTE CONTROLLATA***

  Pressione arteriosa a target con ≥ 4 farmaci

E' necessario escludere cause di pseudoresistenza

- **Scorretta Misurazione della pressione arteriosa**
- **Scarsa Aderenza alla terapia antiipertensiva**
- **"*Effetto Camice Bianco*"**
- **Assunzione di Farmaci ipertensivanti**
- **Causa Secondaria di ipertensione arteriosa**

CAUSE di Ipertensione arteriosa resistente

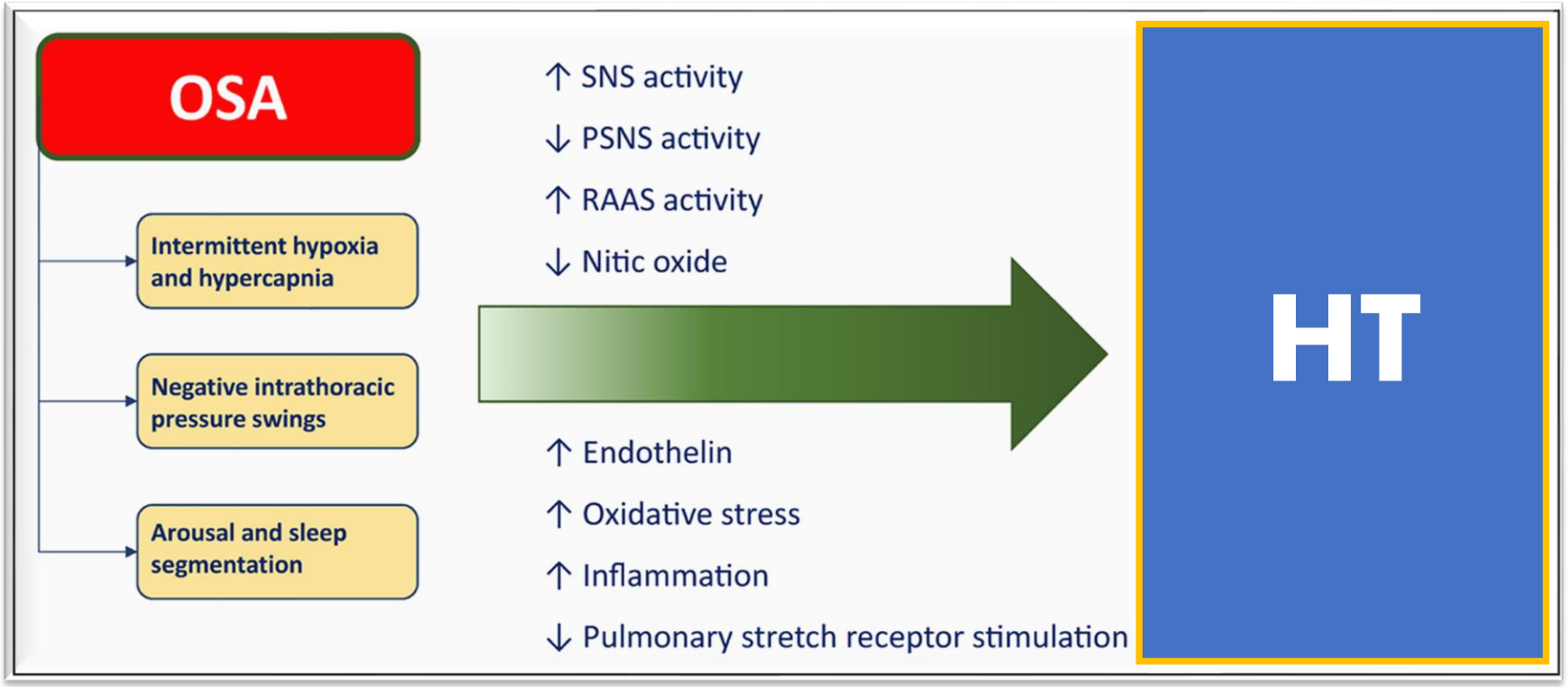
Primary aldosteronism	20–30 %	Plasma aldosterone to renin activity ratio (then, confirmatory test)	Surgery or mineralocorticoids receptors blockers
Renovascular hypertension	2–20 %	US and MRI/CT	Medical therapy, with surgery or PTA possibly reserved for refractory cases
Obstructive sleep apnea	30–70 %	Polygraphy or polysomnography	C-PAP, maxillary prosthesis, weight loss
Drug-induced (NSAID) or heavy alcohol use	36 %	History, anamnesis	Stop medication/ drinking
Renal parenchymal disease	2 %	Lab test with serum creatinine	Diuretics
Endocrinopathies: catecholamine secretor tumors, Cushing syndrome, thyroids disorders	Less than 1 %	Specific lab test Methaneprins/ normethanephrins ACTH 24-hour urinary free cortisol test. Dexamethasone suppression test Late-night salivary cortisol level Triiodothyronine/ Free T4/ Thyrotropin	Specific treatment, depending on the cause (surgery or medical treatment)

1

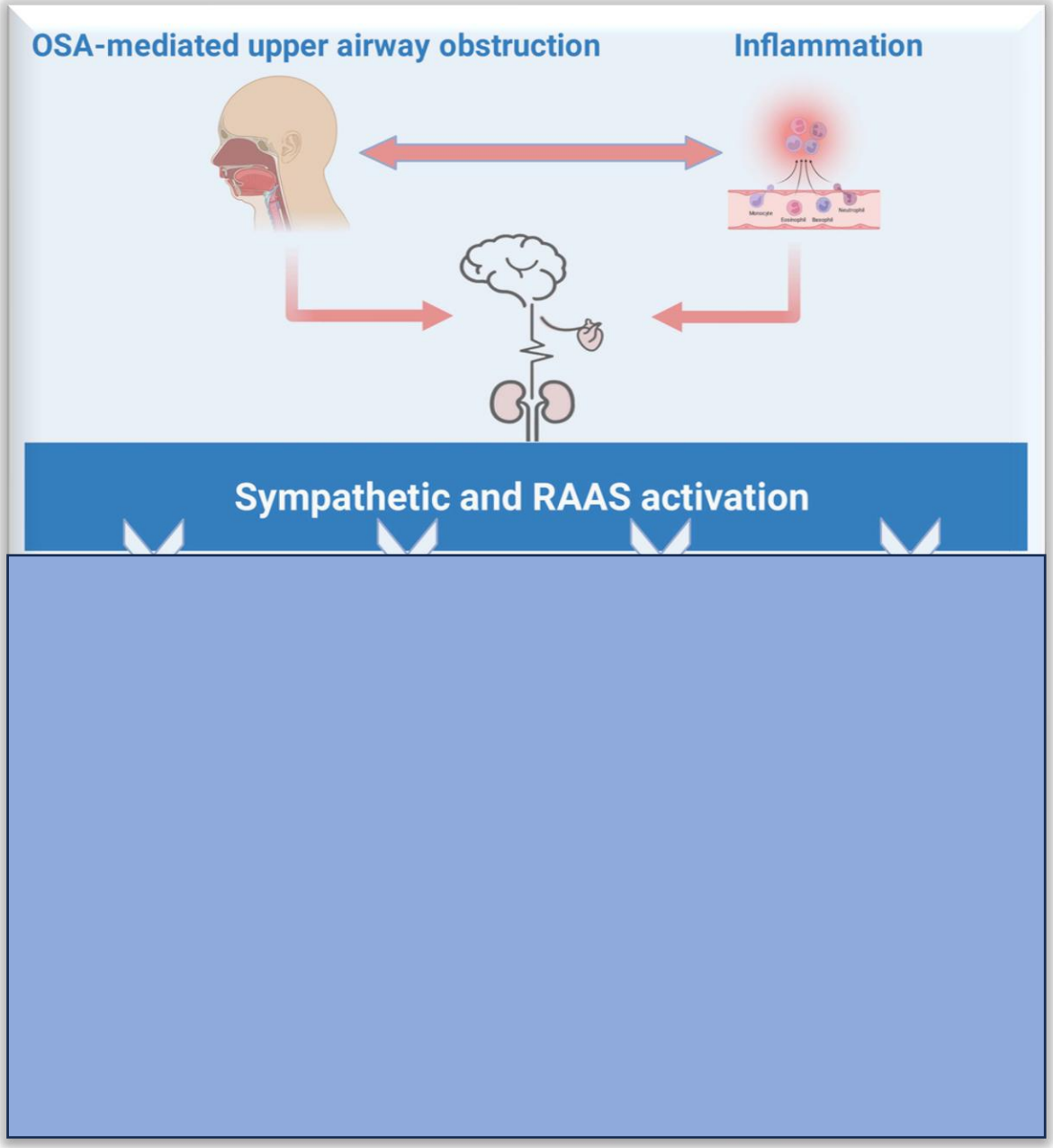
Parodi R. et al - ***European Journal of Internal Medicine*** 2024

OSA
è il principale fattore di rischio
di Ipertensione arteriosa resistente

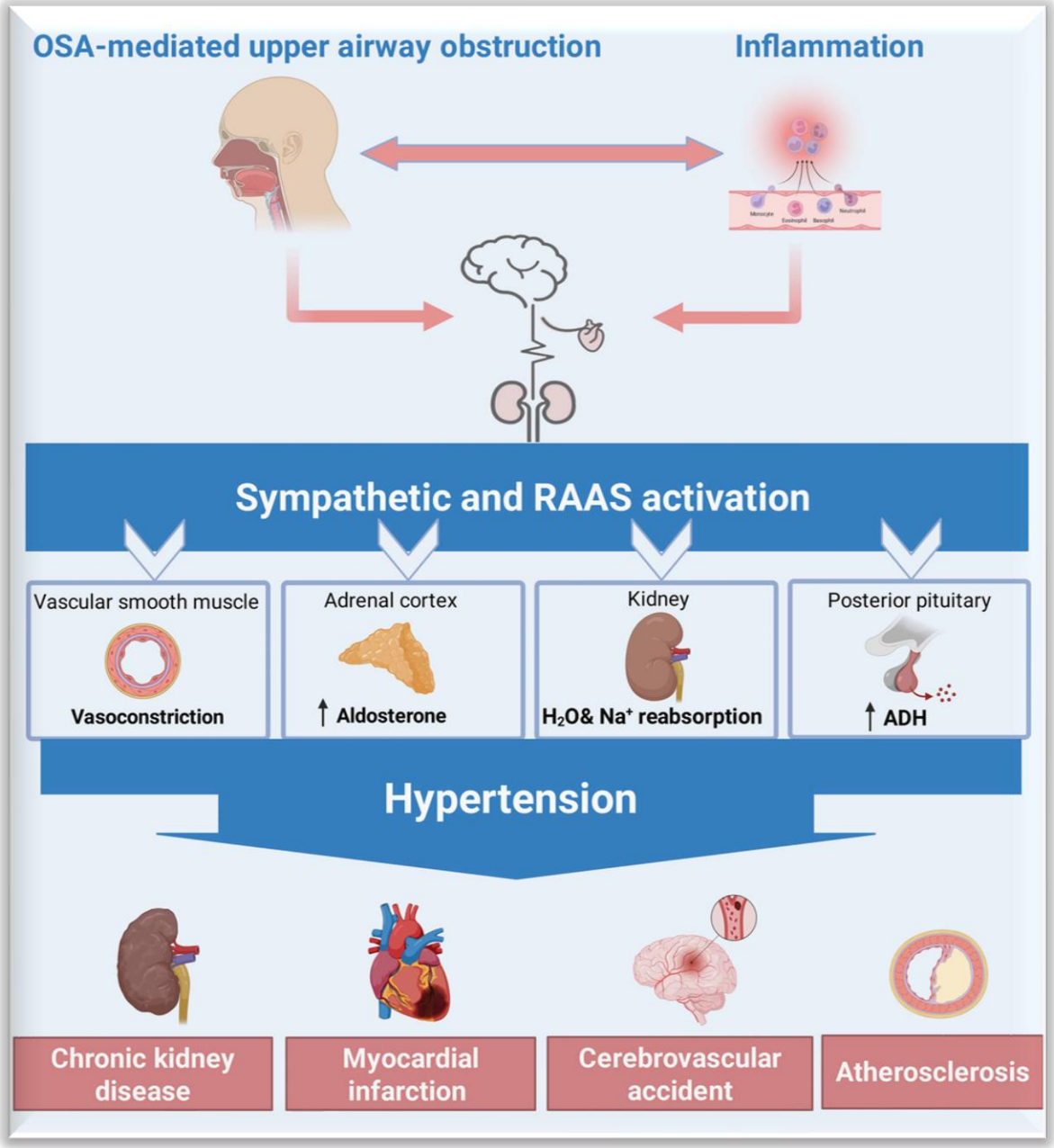
MECCANISMI EZIOPATOGENETICI



K Kario *et* al **– *Hypertension*** - 2021

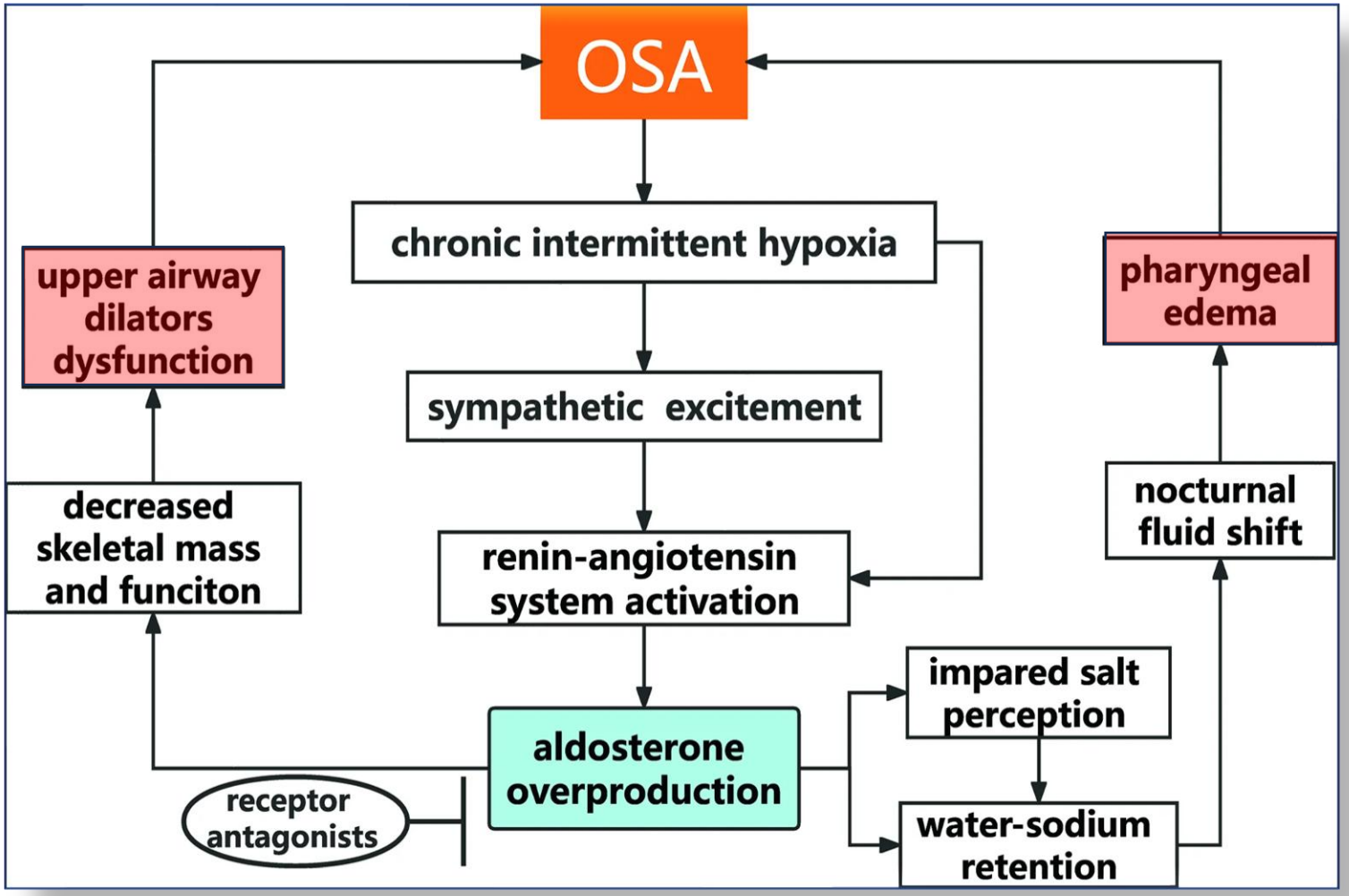


Ayman Battisha et al. ***J Clinical Medicine*** – 2025



Ayman Battisha et al. ***J Clinical Medicine*** – 2025

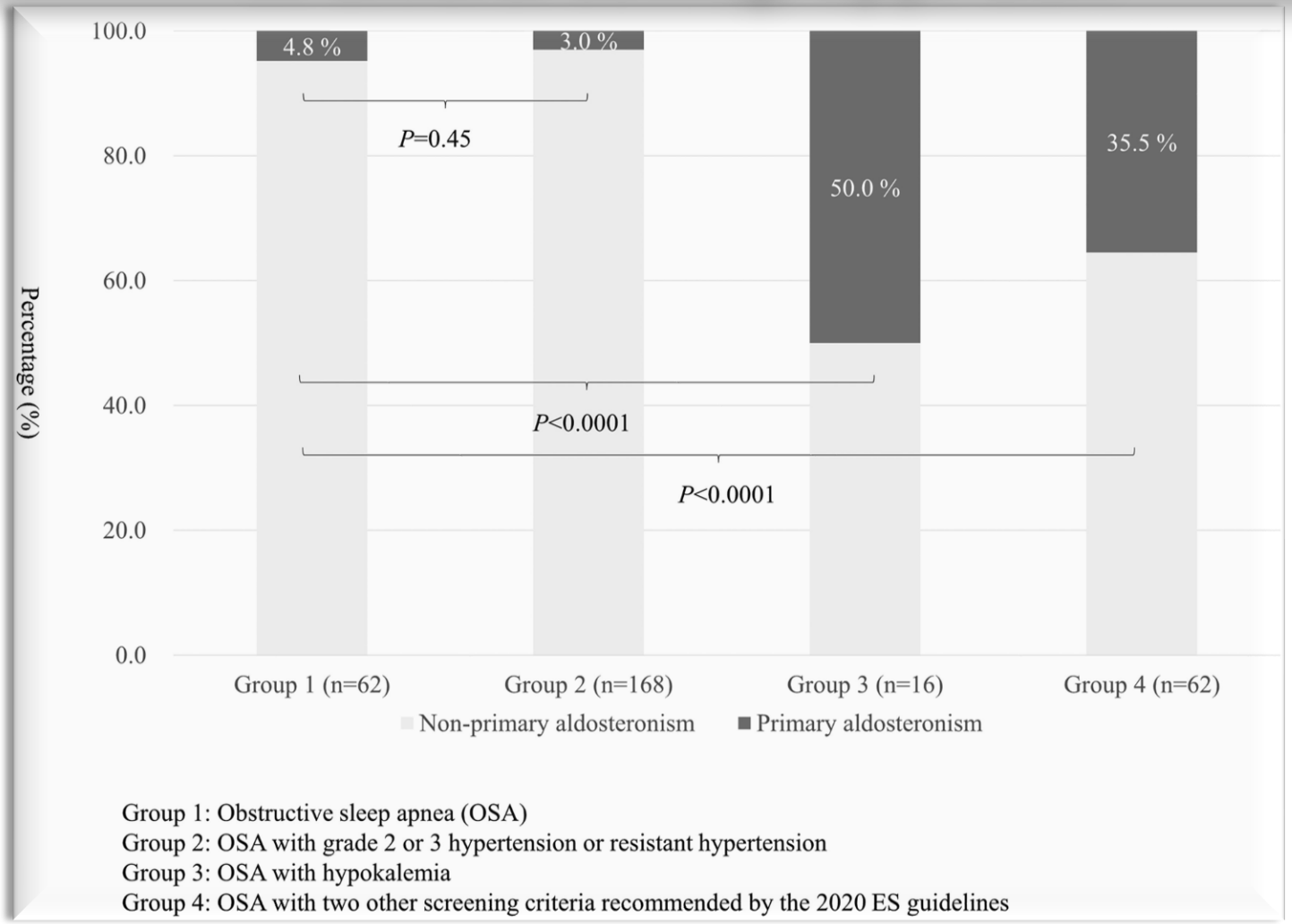
Circolo vizioso OSA e Aldosterone



Yi Wang et al- ***Frontiers in Endocrinology*** - January 2022

La Sindrome delle apnee notturne (OSA) e l'Iperaldosteronismo primario (PA) sono frequentemente associati

Prevalenza di Iperaldosteronismo I (PA) in diversi sottogruppi OSA



Group 1: Obstructive sleep apnea (OSA)
Group 2: OSA with grade 2 or 3 hypertension or resistant hypertension
Group 3: OSA with hypokalemia
Group 4: OSA with two other screening criteria recommended by the 2020 ES guidelines

Zhe Hu [1], Xin Chen - ***Blood Press*** . Dicembre 2025

Prevalenza Sindrome apnee notturne (OSA) nell'Iperaldosteronismo Primitivo (PA)

TABLE 1 | The prevalence of OSA in PA patients.

Author	Study design	Nation	Subjects	Assessment of PA	Assessment of OSA	Prevalence of OSA
Nakamura (11)	Cross-sectional	Japan	71 PA	Screening test (ARR > 20 ng/dl: ng/ml/h) and confirmatory test including CCT (ARR ≥ 20), FUT (PRA < 2.0 ng/ml/h), and SIT (aldosterone level ≥ 6.0 ng/dl). PA was diagnosed if ≥1 of the 3 tests were positive.	Smart Watch PMP-300E (REI ≥ 15 or REI ≥ 5 together with symptoms)	55%
Li (12)	Retrospective	China	677 PA	Screening test (ARR > 24 ng/dl: ng/ml/h) and confirmatory test (SIT: aldosterone level ≥ 6.0 ng/dl)	PSG (used only in snoring patients with PA) (AHI ≥ 5)	10%
Buffolo (13)					hy	64.40%
Wang (1	sectional study			level (>12 ng/L) or an elevated ARR (>20 ng/dl: ng/ml/h) and a confirmation test by saline infusion test (aldosterone level was >5 ng/dl)	SA underwent full-night PSG (AHI ≥5)	70% 45.80%
Prejbisz (15)	Cross-sectional	Poland	32 PA and 172 non-PA amid 204 RHTN	screening test (ARR > 30 ng/dl: ng/ml/h, PAC > 15 ng/dl) and confirming test (CCT: aldosterone level fails to decrease by more than 30%)	All patients irrespective of the symptoms of OSA were evaluated by PSG (AHI ≥ 15)	59.4% in PA; 42.4% in non-PA, $P = 0.058$
Sim (16)[a]	Retrospective	USA	3,428 HTN (575 had HA	HA was defined as ARR >30 (ng/dl: ng/ml/h) and PAC >20 ng/dl or ARR >50	Sleep apnea was defined by ICD-9 coding or procedural coding for dispensation of positive airway devices.	18% in HA vs. 9% in non-HA (P<0.001)

Prevalenza OSA nel PA dal 10 al 70 %
Odd Ratio 2

Yi Wang et al- ***Frontiers in Endocrinology*** - January 2022

Condizioni per lo screening Iperaldosteronismo Primitivo

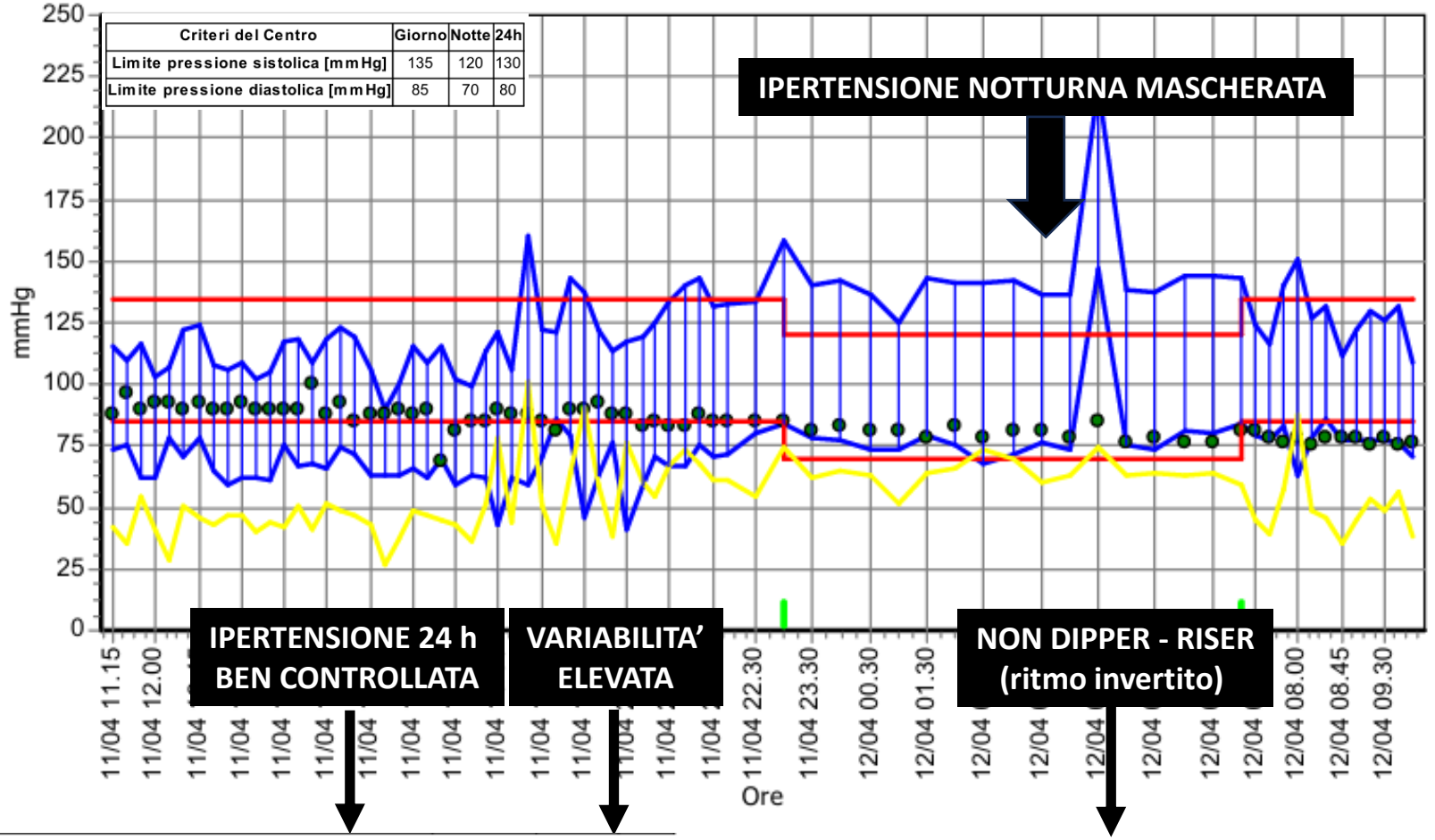
- Severe hypertension
- Resistant hypertension
- Patients with hypertension associated with (permanent or intermittent) spontaneous or diuretic-induced hypokalemia
- Hypertension or hypokalemia associated with adrenal incidentaloma
- Normal potassium levels (3.5 to 5.0 mmoL/l) associated with another of the above-mentioned indications for PA screening
- When hypertension-mediated organ damage and cardiovascular or renal morbidity are more severe than expected from the level and duration of hypertension
- ***Hypertension and sleep apnea***
- Hypertension and atrial fibrillation
- Hypertension and a family history of early onset hypertension and/or cerebrovascular accident at a young age (< 40 years) and of first-degree relatives with primary aldosteronism
- Newly-presenting patients with hypertension and a high chance of cure with adrenalectomy, as, for example, young, women, with a short duration of hypertension

SIIA 2020

Fenotipi Ipertensione nell'OSA

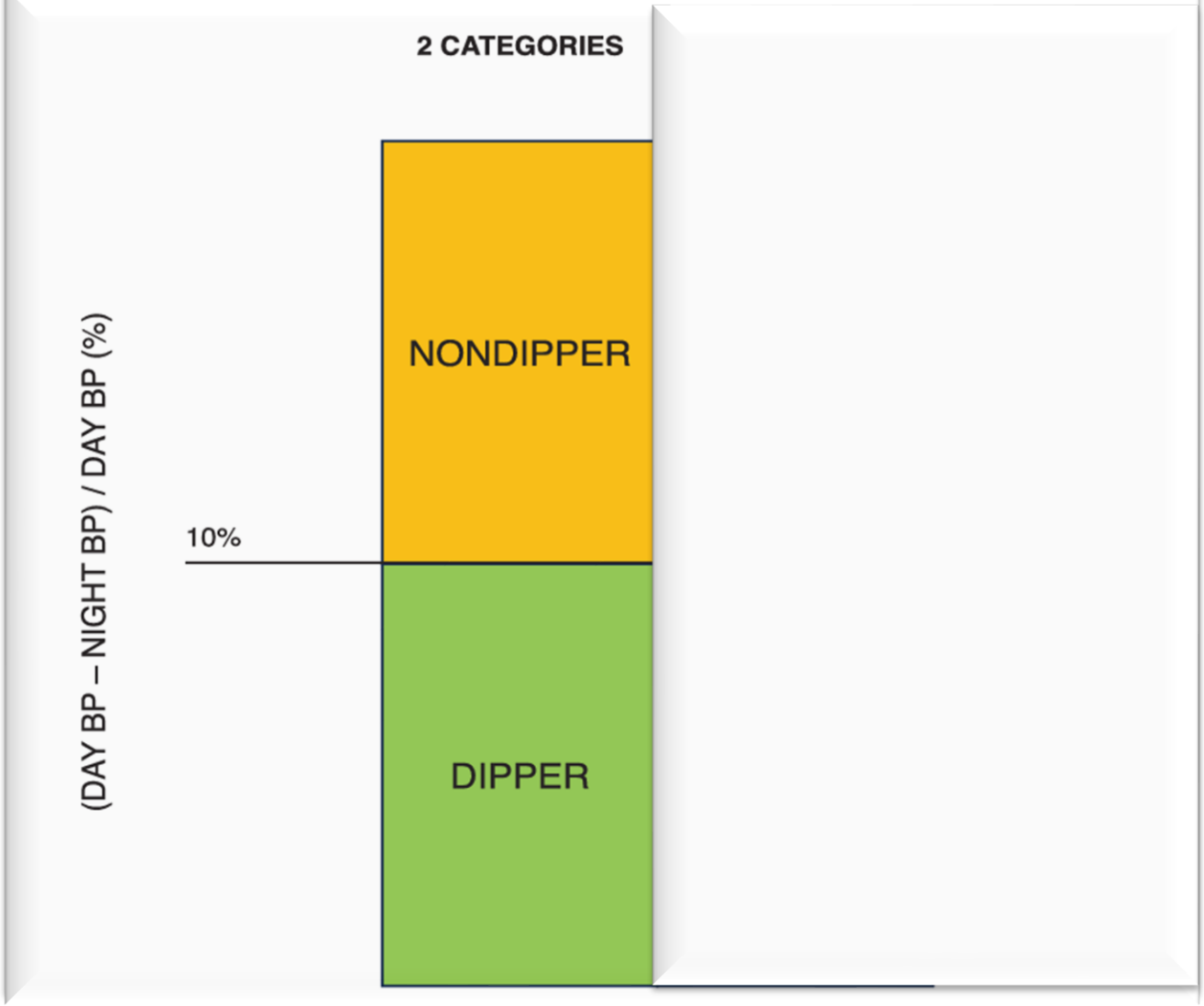
- Ipertensione notturna
- Mancato calo fisiologico notturno

  (non dipping – riser dipping)
- Ampia ed anomala variabilità pressoria



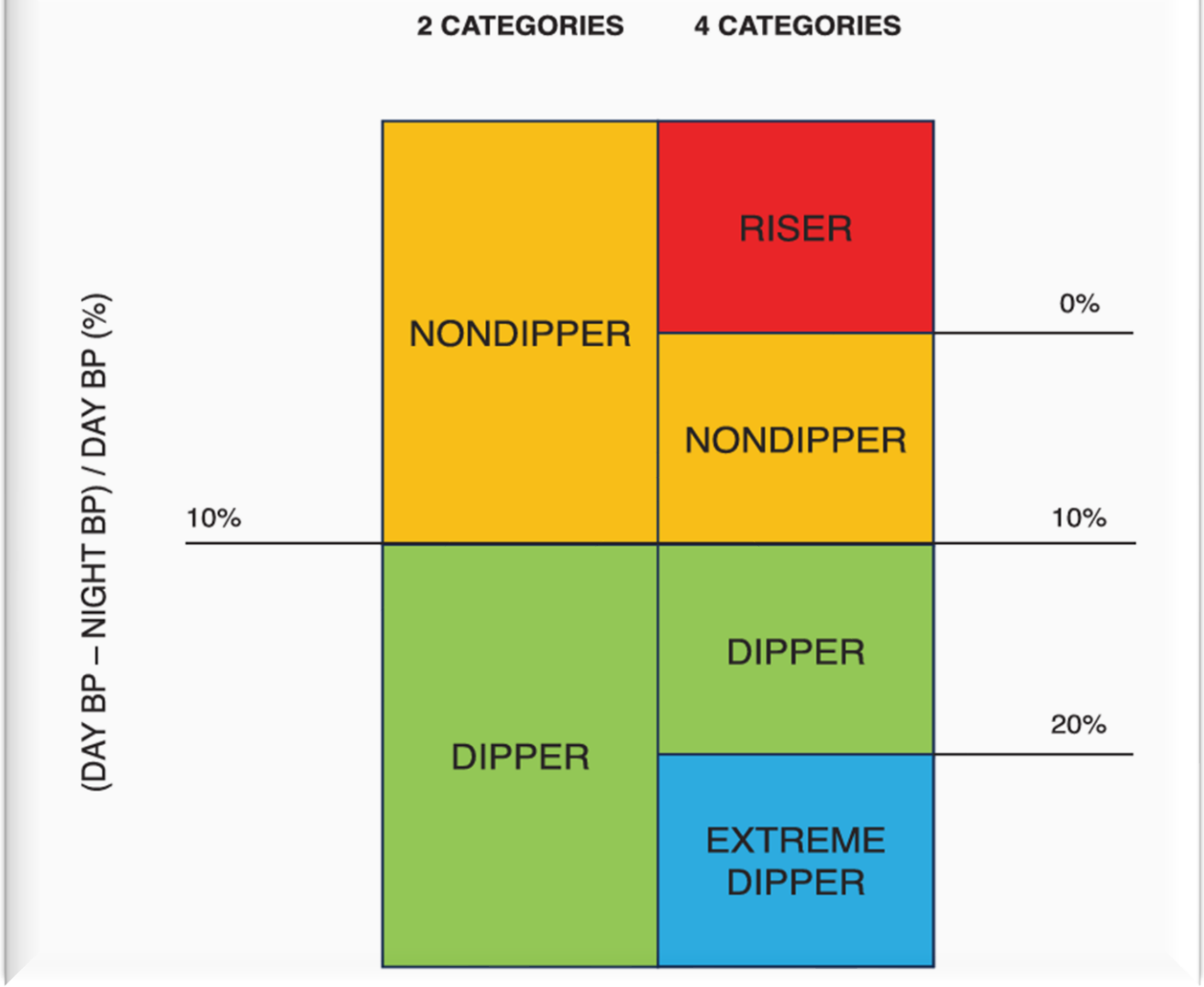
24 ore	Min	Max	Media	Differenza	Dev. std.	Varianza	Err. std.	Diff G-N	Diff G-N(%)	Dev. std G-N	Dev. std G-N(%)
Sistolica [mmHg]	90	221	125,57	131	18,69	349,27	14,00	25,11	- 20,90	6,72	48,43
Diastolica [mmHg]	41	147	71,32	106	12,65	160,03	8,06	11,39	- 16,54	8,17	86,01
Media [mmHg]	66	171	89,07	105	13,31	177,17	8,66	16,02	- 18,72	9,61	109,35
Pulsazioni [bpm]	69	100	84,49	31	6,09	37,03	5,14	5,64	6,59	3,24	52,54
Pulsatoria [mmHg]	27	101	54,24	74	14,28	204,02	11,50	13,72	26,77	9,10	62,57

DIPPING PATTERN



ESH Working Group on Blood Pressure Monitoring and Cardiovascular Variability
G. Parati e t al - *Journal of Hypertension* 2025

DIPPING PATTERN

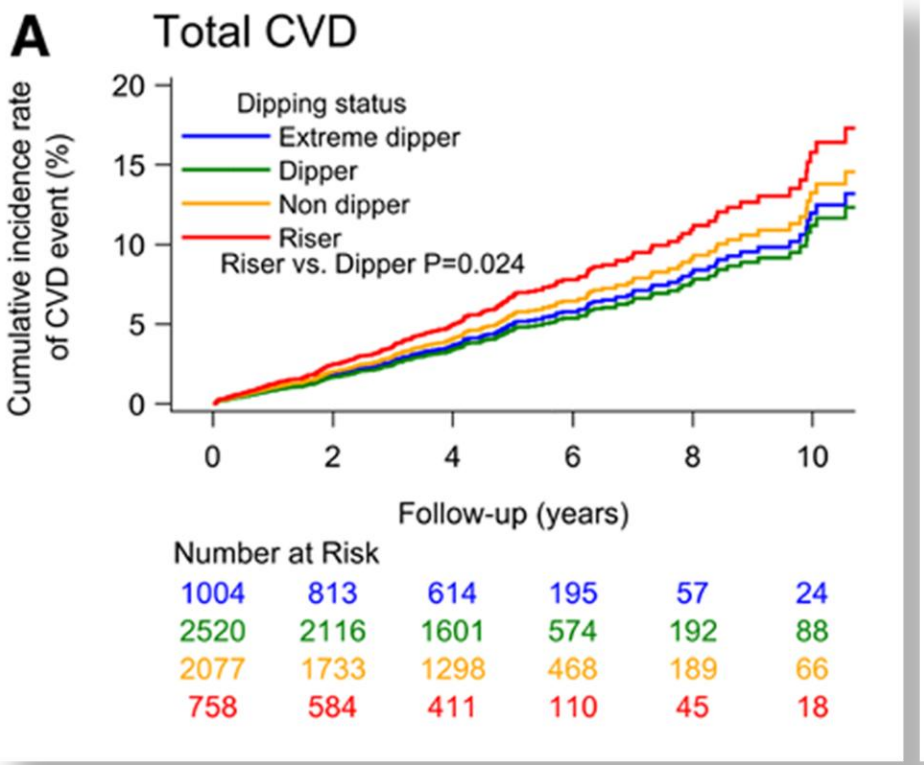


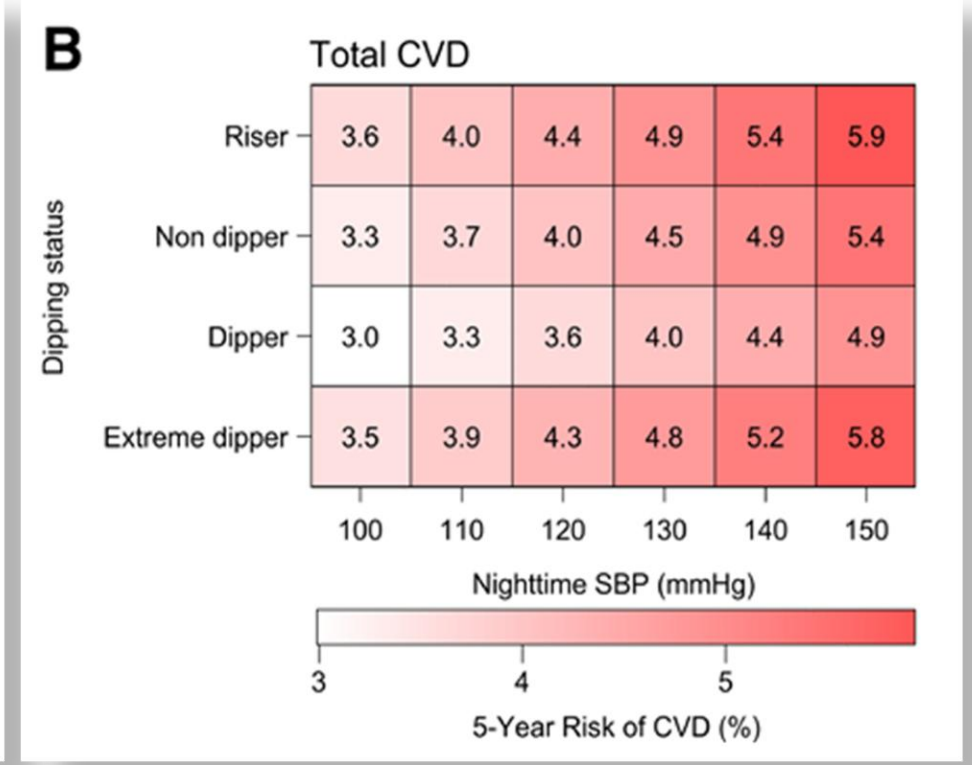
ESH Working Group on Blood Pressure Monitoring and Cardiovascular Variability
G. Parati e t al - *Journal of Hypertension* 2025

Associazione misure ABPM - Dipping notturno e Rischio Malattie Cardiovascolari

	Total cardiovascular disease (atherosclerotic cardiovascular disease + heart failure)		Atherosclerotic cardiovascular disease						Heart failure	
			Stroke + coronary artery disease		Stroke		Coronary artery disease			
	HR (95% CI)	*P* value	HR (95% CI)	*P* value	HR (95% CI)	*P* value	HR (95% CI)	*P* value	HR (95% CI)	*P* value
Office blood pressure measures*										
Office SBP	0.93 (0.83–1.05)	0.244	0.98 (0.85–1.12)	0.765	1.09 (0.91–1.30)	0.360	0.85 (0.69–1.05)	0.124	0.81 (0.65–1.02)	0.069
Ambulatory blood pressure measures†										
24-hour SBP	1.25 (1.06–1.47)	0.007	1.27 (1.04–1.54)	0.018	1.30 (1.00–1.69)	0.046	1.23 (0.92–1.64)	0.171	1.20 (0.88–1.62)	0.246
Daytime SBP	1.16 (0.98–1.37)	0.078	1.22 (1.00–1.48)	0.048	1.28 (0.99–1.66)	0.064	1.15 (0.86–1.53)	0.345	1.01 (0.74–1.37)	0.947
Nighttime SBP	1.26 (1.10–1.43)	<0.001	1.21 (1.03–1.41)	0.017	1.18 (0.96–1.46)	0.115	1.25 (0.99–1.58)	0.064	1.36 (1.08–1.71)	0.009
Dipping, %	0.84 (0.75–0.95)	0.006	0.92 (0.80–1.07)	0.287	1.00 (0.82–1.21)	0.968	0.84 (0.68–1.05)	0.118	0.68 (0.55–0.85)	<0.001
Dipping status‡										
Model 1										
Extreme dipper	1.07 (0.73–1.56)	0.726	1.14 (0.75–1.73)	0.552	1.38 (0.79–2.40)	0.258	0.90 (0.47–1.73)	0.754	0.90 (0.38–2.13)	0.820
Dipper	1.00 (Reference)	—	1.00 (Reference)	—	1.00 (Reference)	—	1.00 (Reference)	—	1.00 (Reference)	—
Nondipper	1.23 (0.94–1.61)	0.140	1.14 (0.84–1.94)	0.435	1.29 (0.84–1.99)	0.246	0.98 (0.61–1.57)	0.929	1.59 (0.93–2.72)	0.090
Riser	1.58 (1.13–2.21)	0.007	1.28 (0.84–1.94)	0.249	1.12 (0.62–2.03)	0.707	1.50 (0.83–2.71)	0.174	2.53 (1.40–4.56)	0.002

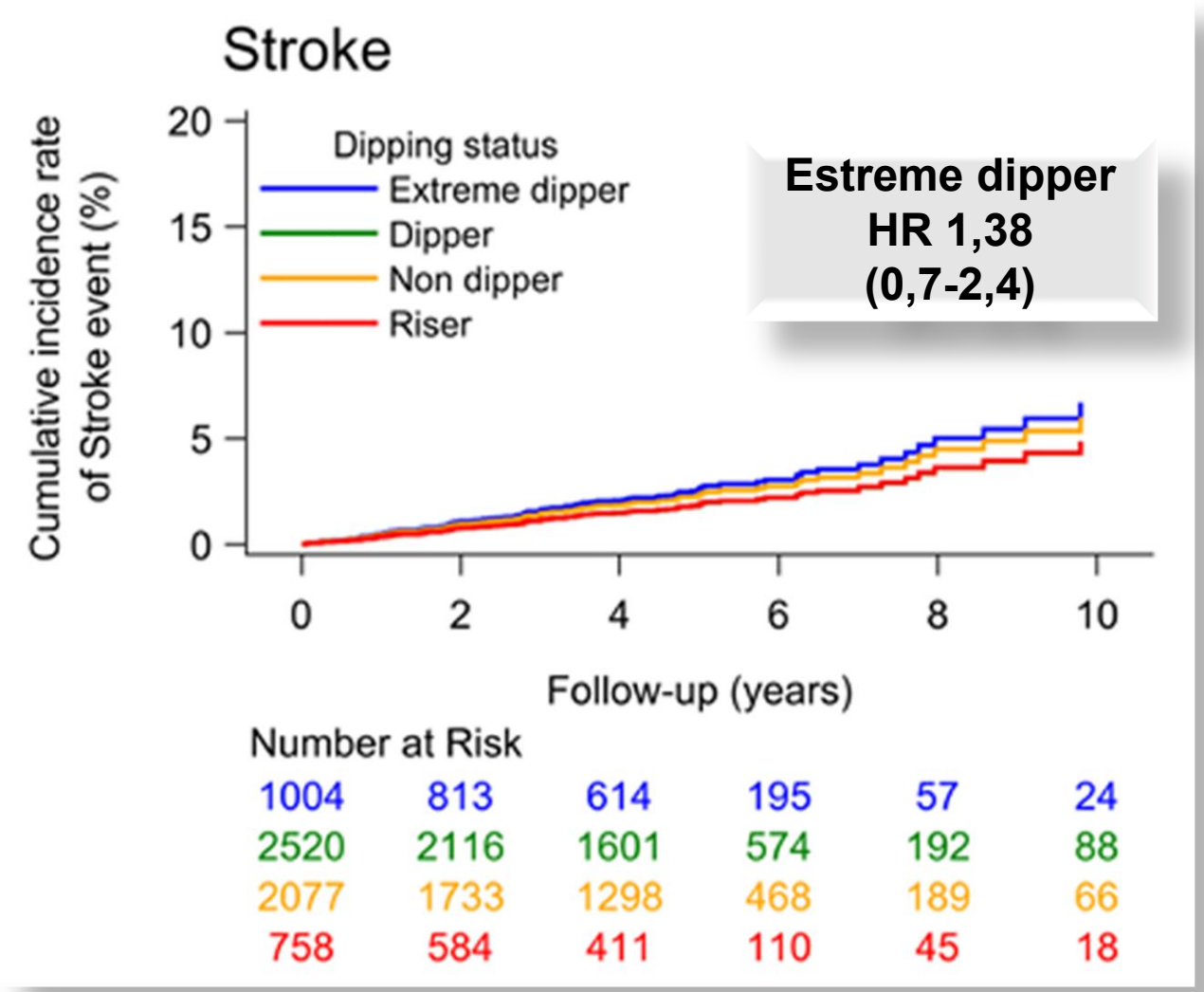
JAMP Study - Kario *et al* - ***Circulation*** 2020





L'associazione Riser dipping e Pressione sistolica notturna aumenta il rischio di eventi CV

JAMP Study - Kario *et al* - ***Circulation*** 2020



JAMP Study - Kario *et al* - ***Circulation*** 2020

Terapia Ipertensione correlata all'OSA

- **TERAPIA NON FARMACOLOGICA**

  (perdita di peso – dieta iposodica)

- **TERAPIA FARMACOLOGICA**

  Farmaci antiipertensivi convenzionali (*Beta bloccanti, Inibitori RAAS (Acei/Sartani), CCB, Diuretici (Tiazidici e simili), MRA steroidei e non*

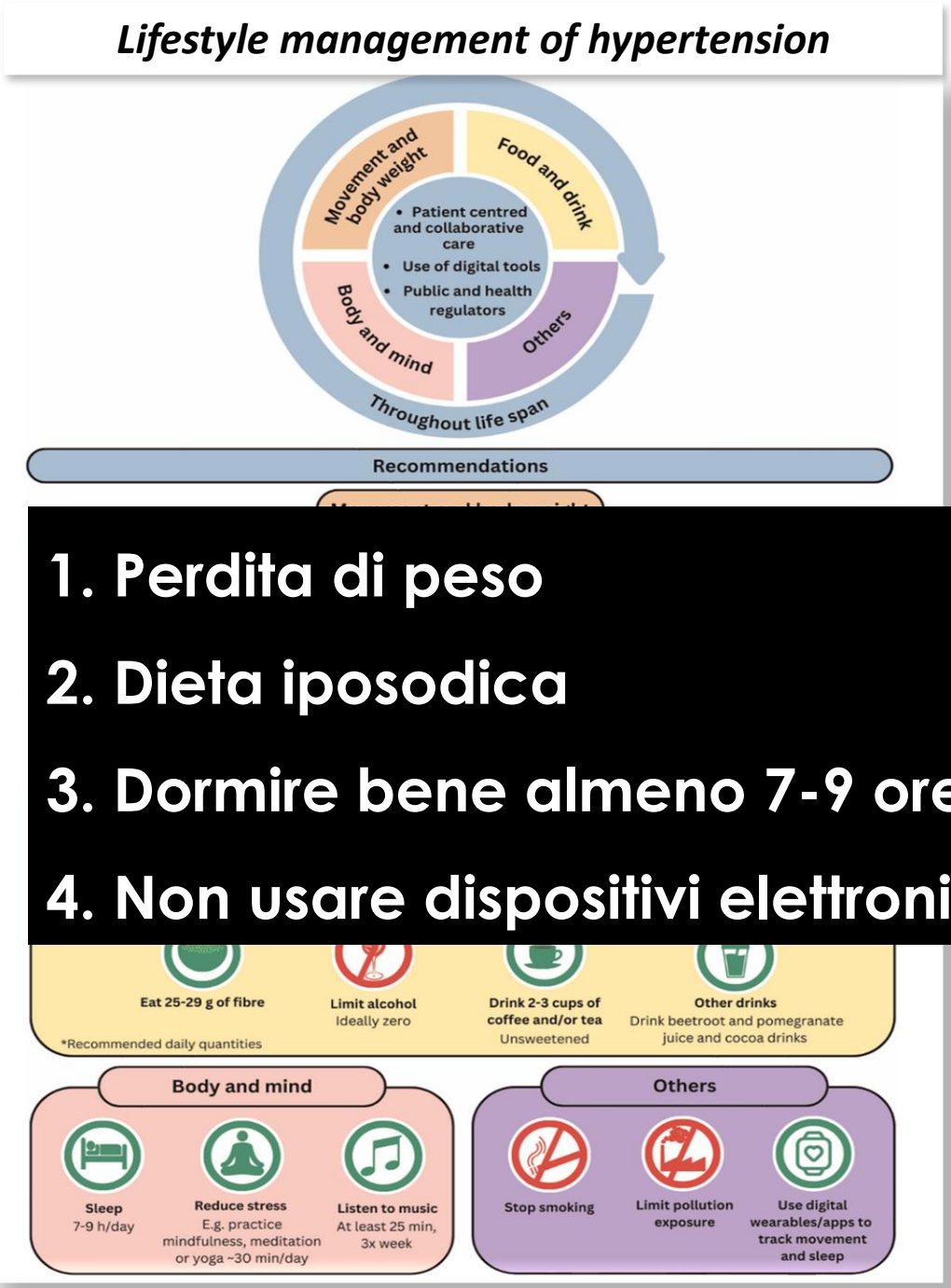
  Farmaci antiipertensivi nuovi *(inibitori del recettore angiotensina-neprilisina (ARNI) – Glifozine: inibitori cotrasportatore sodio- glucosio 2 (SGLT2i) - agonista recettore polipeptidico insulinotropo e del recettore peptidico-simile al glucagone (GIP/GLP-1 RA) – agonisti recettori Endotelina 1 (ARE: aprocitentan) – ASI - siRNA*

- **DENERVAZIONE RENALE (RDN)**

- **BITE ANTIRUSSAMENTO (MAD)**

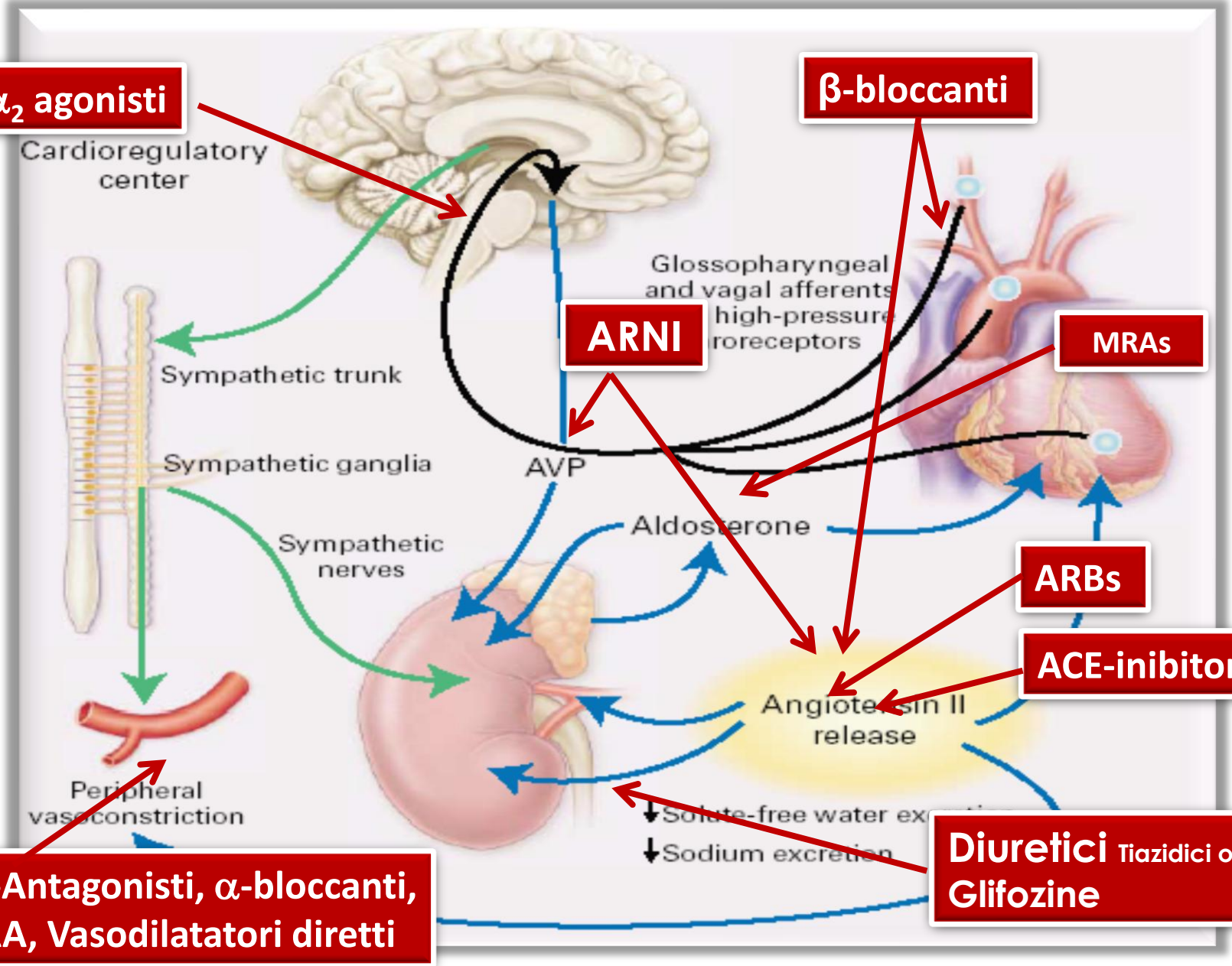
- **PRESSIONE POSITIVA VIE AEREE CONTINUA (cPAP)**

International Society of Hypertension Position Paper 2024



1. Perdita di peso
2. Dieta iposodica
3. Dormire bene almeno 7-9 ore
4. Non usare dispositivi elettronici prima di dormire

PRINCIPALI CLASSI DI FARMACI ANTI-IPERTENSIVI

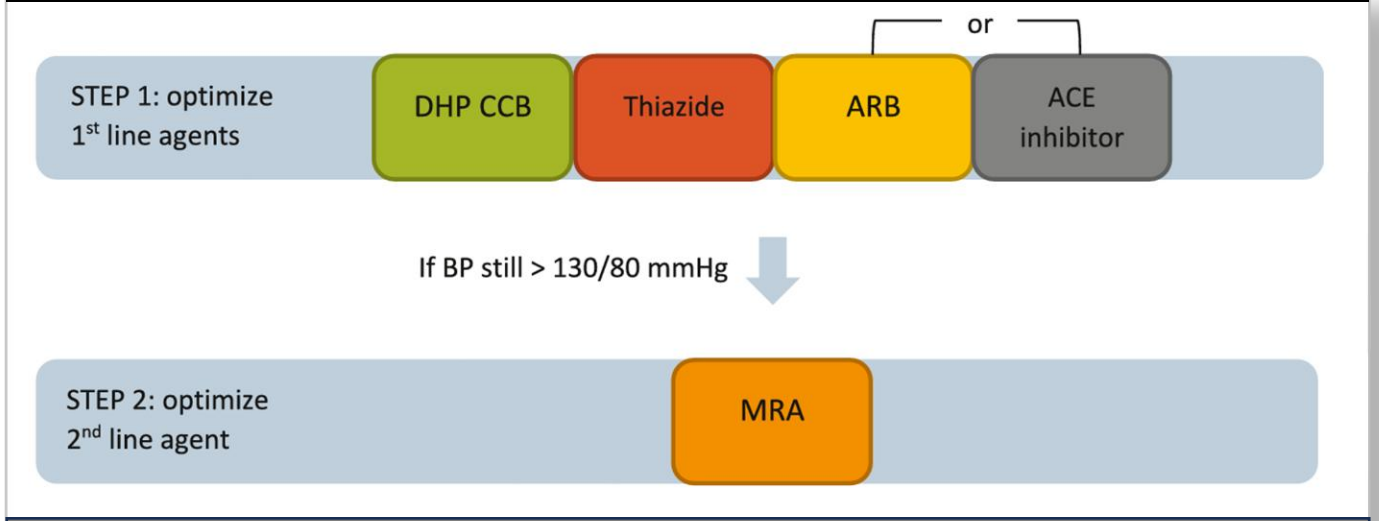


Terapia a STEP Ipertensione arteriosa resistente

Gold trio

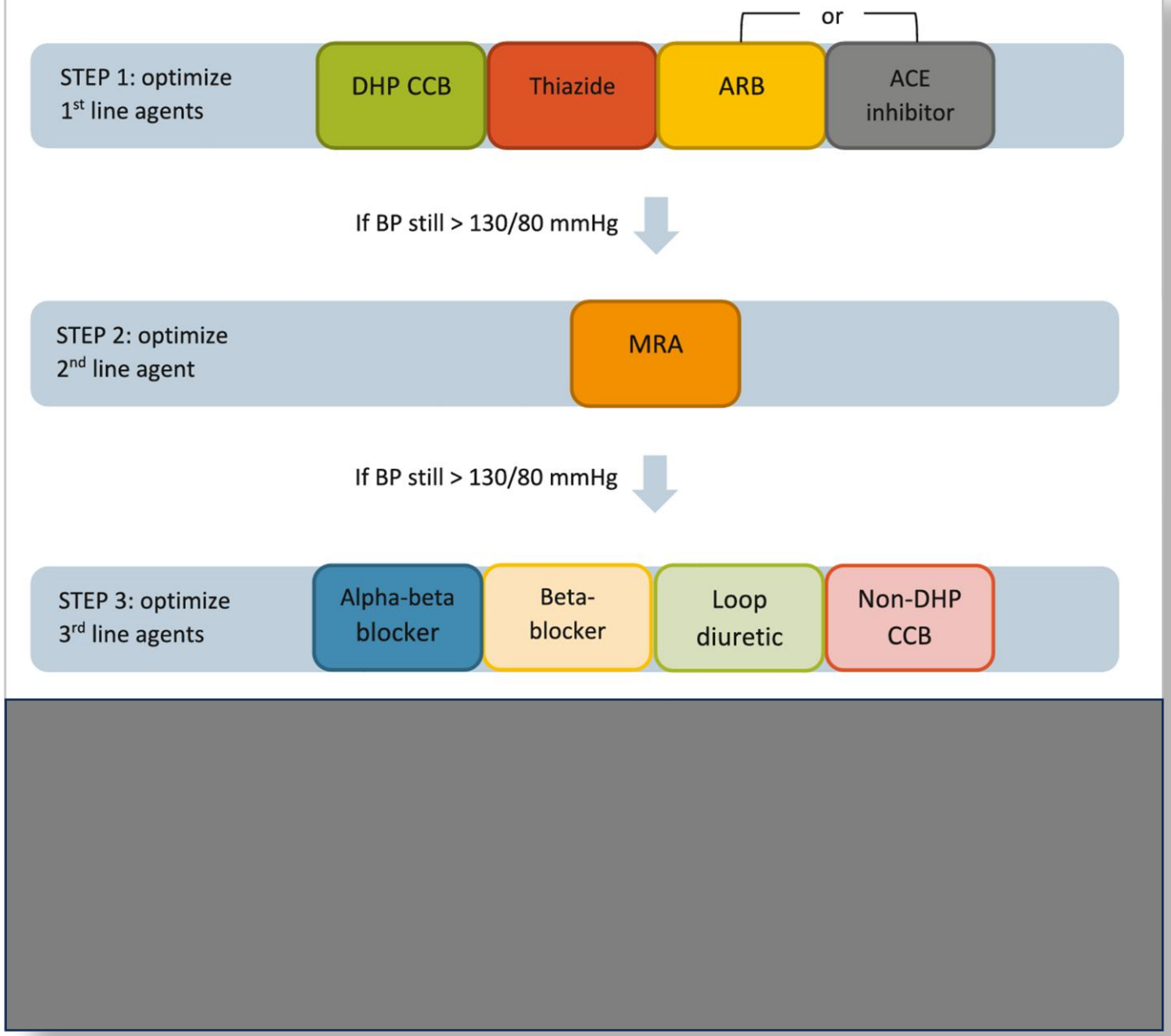
J. L. Cluett and J. H. William - AJKD - 2024

Terapia a STEP Ipertensione arteriosa resistente



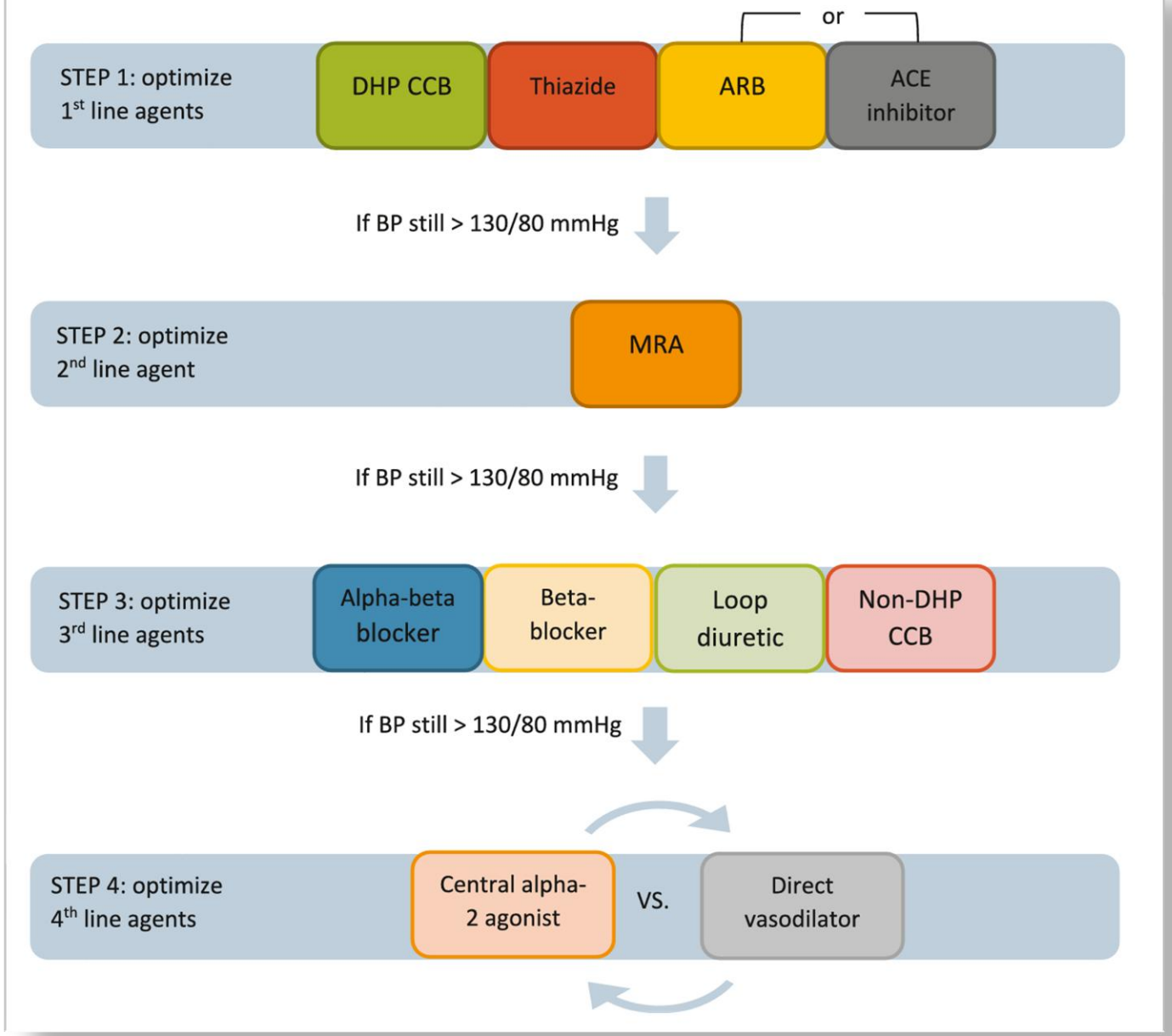
J. L. Cluett and J. H. William - AJKD - 2024

Terapia a STEP Ipertensione arteriosa resistente



J. L. Cluett and J. H. William - AJKD - 2024

Terapia a STEP Ipertensione arteriosa resistente



J. L. Cluett and J. H. William - **AJKD** - 2024

Effetti SGLT2 inhibitors

	Empagliflozin 10 mg[1]	Canagliflozin 100 mg[2]	Dapagliflozin 10 mg[3]	Ertugliflozin 5 mg[4]
HbA1c, %	-0.7*	-0.7†	-0.8*	-0.7‡
Weight, kg	-2.1*	-3.3†	-2.9*	-3.0‡
Systolic blood pressure, mmHg	-4.5*	-3.5†	-5.1§	-4.4‡
Diastolic blood pressure, mmHg	-2.0*	-1.8†	-1.8§	-1.6‡

1. Häring H-U *et al.* *Diabetes Care* 2014;37:1650;
2. Lavelle-Gonzalez FJ *et al.* *Diabetologia* 2013;56:2582;
3. Bailey CJ *et al.* *Lancet* 2010;375:2223;
4. Rosenstock J *et al.* *Diabetes Obes Metab* 2018;20:520

Hypertension
Volume 72, Issue 2, August 2018; Pages 381-390
https://doi-org.bvsp.idm.oclc.org/10.1161/HYPERTENSIONAHA.118.11180

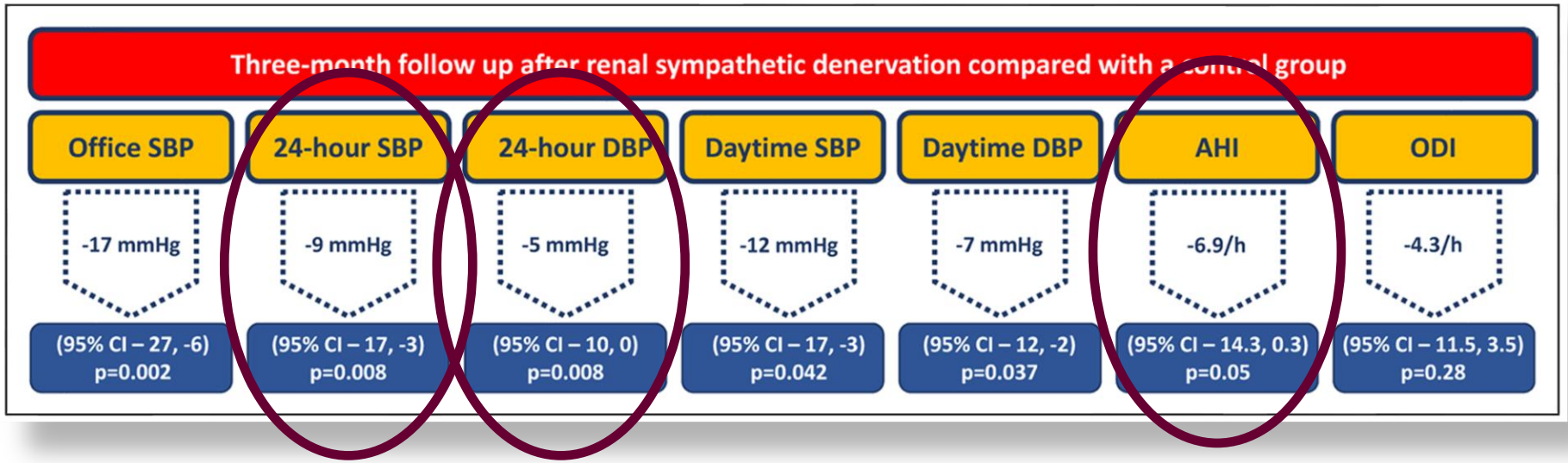
RENAL DENERVATION

Renal Denervation in Resistant Hypertension and Obstructive Sleep Apnea

Randomized Proof-of-Concept Phase II Trial

See Editorial Commentary, pp 281–282

Ewa Warchol-Celinska*, Aleksander Prejbisz*, Jacek Kadziela, Elzbieta Florczak, Magdalena Januszewicz, Ilona Michalowska, Piotr Dobrowolski, Marek Kabat, Pawel Sliwinski, Anna Klisiewicz, Roman Topor-Madry, Krzysztof Narkiewicz, Virend K. Somers, Paul A. Sobotka, Adam Witkowski†, and Andrzej Januszewicz†



***Hypertension* 2018**

Effetti cPAP sulla Pressione Arteriosa

CPAP effect	Pengo *et al.* Studies: 26 RCTs Hypertensive and normotensive individuals	Labarca *et al.* Studies: 10 RCTs Resistant hypertensive individuals
24-h SBP	−2.52 (−3.44 to −1.60)	−5.06 (−7.89 to −2.13)
Diurnal SBP	−1.84 (−2.80 to −0.88)	−2.34 (−6.94 to +2.27)
Nocturnal SBP	−3.89 (−4.89 to −2.89)	−4,15 (−7.01 to −1,29)
24-h DBP	−2.50 (−3.25 to −1.75)	−4.21 (−6.50 to −1.93)
Diurnal DBP	−1.77 (−2.47 to −1.06)	−2.14 (−4.96 to −0.67)
Nocturnal DBP	−2.62 (−3.72 to −1.53)	−1.95 (−3.32 to v0.57)

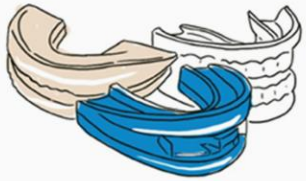
Pengo et al. Eur Resp J 2020 – Labarca et al. Sleep Med Rev 2021

Riduzione pressoria ottenuta con differenti opzioni terapeutiche

CPAP

24-hour BP
-4.78/-2.95 mmHg

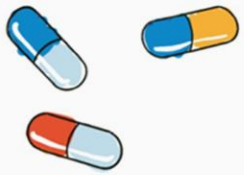
Nocturnal BP
-1.89/-1.53 mmHg



MAD

24-hour BP
-2.7/-2.7 mmHg

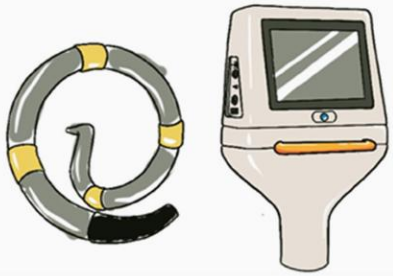
Nocturnal BP
-2.0/-1.7 mmHg



ANTIHYPERTENSIVES*

24-hour BP
-9.0 mmHg

Nocturnal BP
-7.4 mmHg



RENAL DENERVATION**

Mean office BP
-6.5/-6.5 mmHg

Mean ambulatory BP
-8.3/-6.2 mmHg

K Kario e t al – *Hypertension* - 2021

TAKE HOME MESSAGES

OSA e Ipertensione arteriosa sono molto frequenti e spesso coesistono, pertanto nei pazienti con OSA bisogna escludere uno stato ipertensivo e negli ipertesi escludere l'OSA

La terapia ottimale per la riduzione pressoria nell'OSA consiste nella combinazione di un corretto stile di vita, perdita di peso, agenti farmacologici antipertensivi e terapia respiratoria con MAD o cPAP


thank you
danke
謝謝
ngiyabonga
teşekkür ederim
gracias
merci
obrigado
спасибо
Баярлалаа
рахмат
bedankt
dziękuję
go raibh maith agat
mochchakkeram
sukriya
kop khun krap
terima kasih
grazie
arigatô
dakujem
takk
tapadh leat
dank je
mersi
barka
welalin
tack
faafetai lava
vinaka
спасибі
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matondo
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tenki
murakoze
kiitos
dankie
dhanyavad
hvala
maururu
köszönöm
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nandri
bayarlalaa
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dhanyavadagalu
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rahmat
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