Είναι υποχρεωτικός ο αποκλεισμός του Πρωτοπαθούς Υπεραλδοστερονισμού κατά τη διάγνωση της ΑρτηριακήςΥπέρτασης;

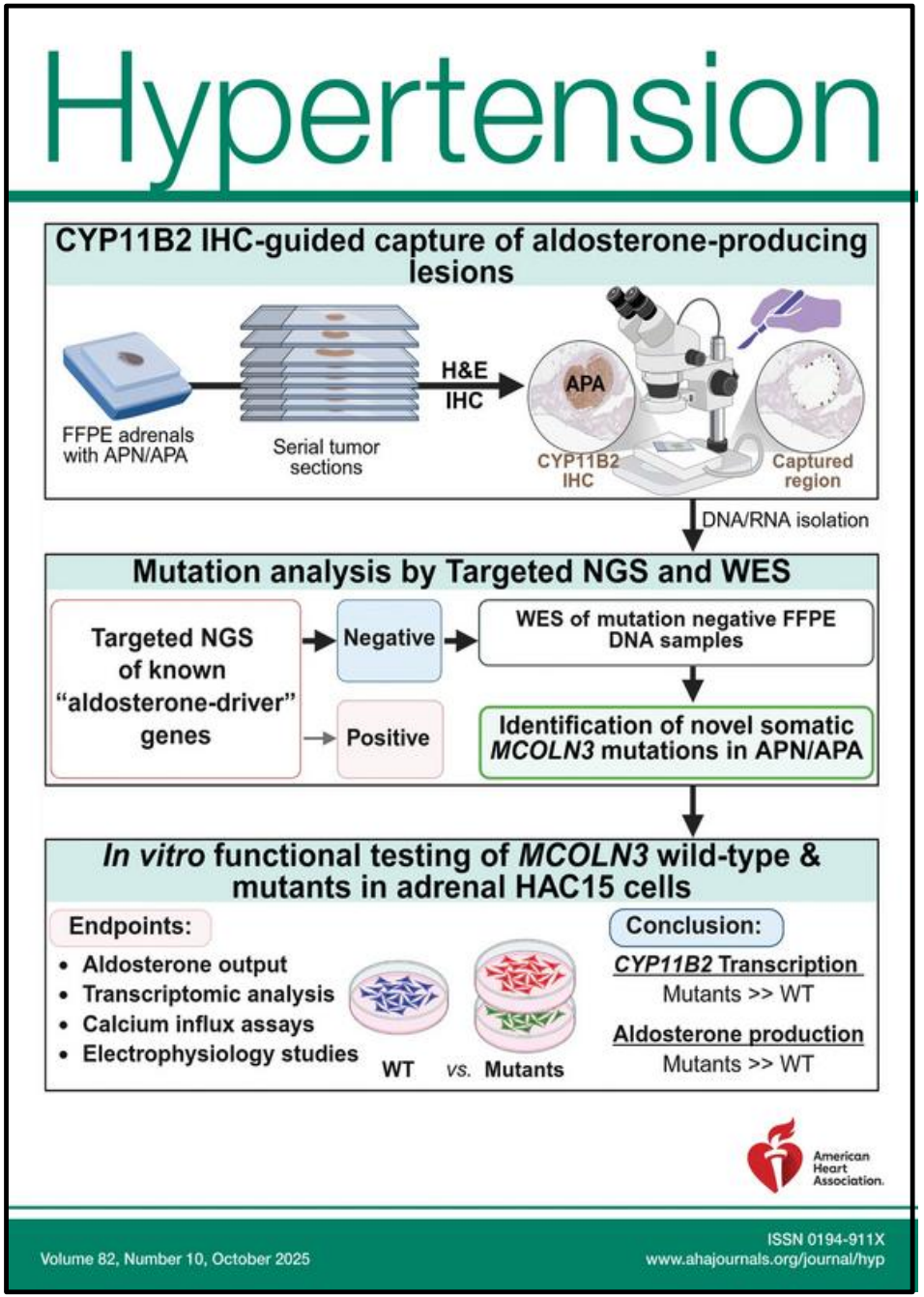
Σ.Ζιάκκα
Κοργιαλένειο-Μπενάκειο Νοσοκομείο
Αθήνα

Hypertension
Volume 82,
October 2025

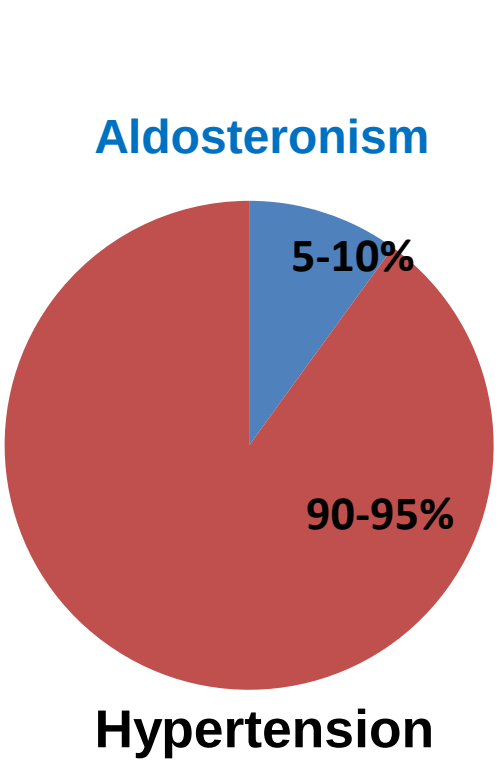
Expanding the Search for Primary Aldosteronism in Clinical Settings

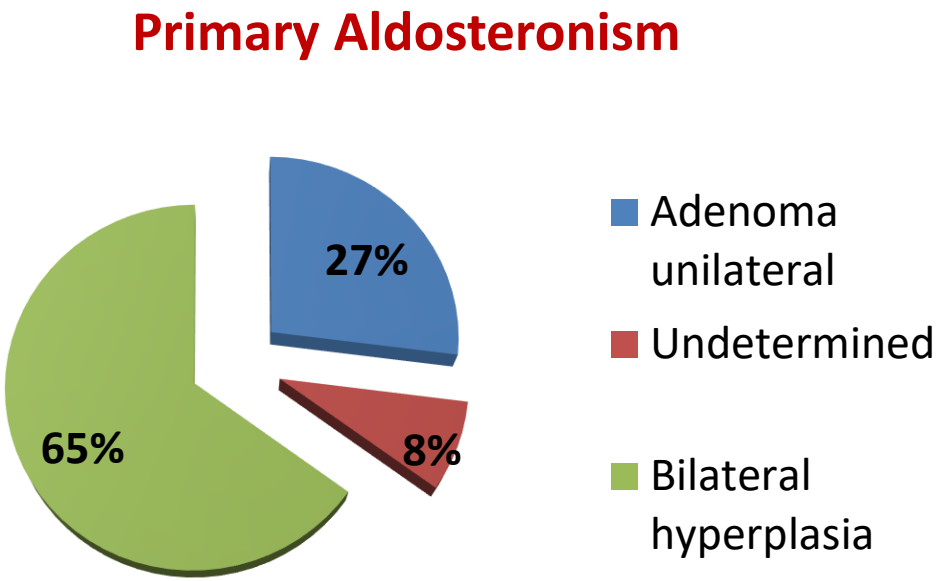
John M. Flack, Michael G. Buhnerkempe, and Garry L.R. Jennings

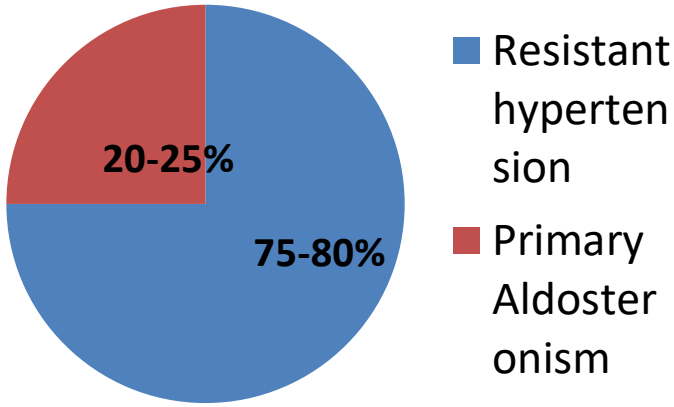
Hypertension. 2025;82:1548–1550



Prevalence and Clinical Manifestations of Primary Aldosteronism







J Am Coll Cardiol. 2017 Apr 11;69(14):1811-1820.

The Management of Primary Aldosteronism: Case Detection, Diagnosis, and Treatment: An Endocrine Society Clinical Practice Guideline

John W Funder[1], Robert M Carey[2], Franco Mantero[3], M Hassan Murad [4], Martin Reincke [5], Hirotaka Shibata [6], [7]and William F Young Jr [4]

J Clin Endocrinol Metab. 2016 May;101(5):1889-916.
doi: 10.1210/jc.2015- 4061.

Groups With High Prevalence of PA

Moderate/severe hypertension

Resistant hypertension

Family history of early (< 40 years) stroke/hypertension

Hypertensive patients with spontaneous or diuretic-induced hypokalemia.

Hypertension with adrenal incidentaloma ≥ 1 cm

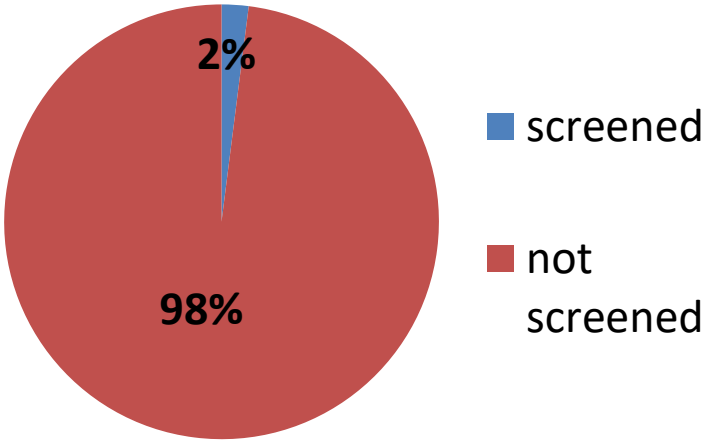
Hypertension with obstructive sleep apnea

…Παρ' όλα αυτά..

Underdiagnosis of Primary Aldosteronism: A Review of Screening and Detection

Mario Funes Hernandez · Vivek Bhalla vbhalla

Study	Criteria	Screening Rate N (%)[a]	Country
Ruhle et al (2019)[79]	HTN and hypokalemia	36,979 (2.7%)	US
Ruhle et al (2019)[79]	HTN and sleep apnea	5,018 (3%)	US
Jaffe et al (2020)[68]	Resistant HTN	4,660 (2.1%)	US
Sivarajah et al (2020)[65]	Any	6,809 (1.3%)	US
Cohen et al (2021)[69]	Resistant HTN	269,010 (1.6%)	US
Grigoryan et al (2021)[92]	Any	11,627 (3.3%)	US
Liu et al (2021)[66]	HTN	1.1 million (0.7%)	Canada
Hundemer et al (2022)[70]	HTN and hypokalemia	422 (1.6%)	Canada
Zekarias et al (2022)[93]	Resistant HTN	18,908 (4.2%)	US
Turcu et al (2022)[67]	Any: resistant HTN, HTN + hypokalemia, HTN + OSA or HTN + <35 y, HTN + adrenal mass	86,044 (3.4%)	US
Chauhan et al (2022)[76]	CKD population + indication for screening[b]	234 (14%)	Australia



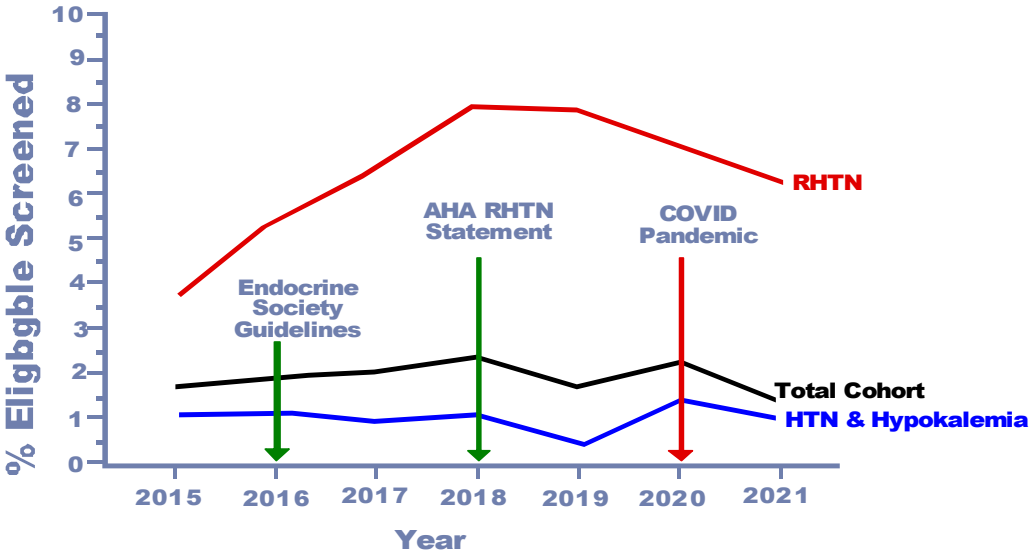
AJKD Vol 82 | Iss 3 | September 2023

Trends in Primary Aldosteronism Screening Among High-Risk Hypertensive Adults

Weerapat Kositanurit [1,2], John M Giacona [1,3,4], Donglu Xie [5], Jijia Wang [3], Daniel Feuer [6], Kyle J O'Malley [6], Ann Marie Navar [4], Anand Vaidya [7], Jordana B Cohen [8,9], Wanpen Vongpatanasin [1,4]

J Am Heart Assoc. 2024 Aug 6;13(15):e036373. doi: 10.1161/JAHA.124.036373.

UT* Southwestern Medical Center (n= 20 047)



Total Cohort	2932	3020	3076	3292	2977	2533	2217
Resistant HTN	637	529	576	562	521	325	175
HTN & Hypokalemia	2295	2491	2500	2730	2456	2208	2042

* University of Texas

The Unrecognized Prevalence of Primary Aldosteronism: A Cross-sectional Study

Jenifer M Brown et al

- ***The prevalence of primary aldosteronism is high and largely unrecognized (90% of cases)***

Annals of Internal Medicine
2020 Jul 7;173(1):10-20

- ***"Primary Aldosteronism has traditionally been perceived as a rare cause of hypertension, but recent evidence suggests that its prevalence may be higher than previously believed…"***

Annals of Internal Medicine
May 2020,Volume 173

The 2024 European Society of Cardiology (ESC) Guidelines

For the Management of Elevated Blood Pressure and Hypertension ***broaden the screening for primary aldosteronism (PA)***, recommending it as a **Class IIa** indication ***for all adults with confirmed hypertension (>140/90 mmHg)***, aiming to increase detection of this common secondary cause. Screening utilizes the **aldosterone-to-renin ratio** (ARR).

- **Expanded Screening:** The guidelines advise screening for PA in all patients (***classIIa indication)*** with confirmed hypertension, not just those with hypokalemia or resistant hypertension.

- **Screening Method:** The aldosterone-to-renin ratio (ARR) is the recommended screening test. It is recommended to check this when aldosterone is>10ng/dl or >277pmol/L,by immunoassay and renin is low

- **Optimal Conditions:** To maximize accuracy, screen with the patient ***on a standard sodium diet, with normal potassium levels, and after pausing interfering medications.***

- **Diagnostic Pathway:** Confirmed hypertension (office BP >140/90 mmHg) is the threshold for triggering this evaluation.

- **Secondary Hypertension Focus:** The guidelines also highlight Doppler examination of renal arteries as a ***classIIa indication*** for patients with hypertension and chronic kidney disease.

Int J Caediol Cardiovasc Risk Prev
2024 Oct 11;23:200341

2025 AHA/ACC Guidelines for Primary Aldosteronism:

Expanded Screening Criteria: Screening is recommended for patients with:

- Resistant hypertension (regardless of serum potassium levels).classI
- Hypokalemia (spontaneous or diuretic-induced).
- Obstructive sleep apnea (OSA).
- Adrenal incidentaloma.
- Hypertension with onset before age 40 or a family history of early-onset hypertension/stroke.
- ***Stage2 hypertension BP>140/90 classIIb***

Pre-screening Requirements:

To avoid delays and reduce barriers, patients ***should not stop most of their antihypertensive medications*** before screening (except for Mineralocorticoid Receptor Antagonists - MRAs).

Circulation Volume 152, Issue 11, 16 September 2025; Pages e114-e218

2025 Endocrine Society clinical practice guidelines

For primary aldosteronism (PA) strongly recommend universal screening ***for all individuals with hypertension***, utilizing the ***aldosterone-to-renin ratio*** (ARR). The updated guidelines simplify diagnosis, reduce reliance on confirmatory suppression tests for high-probability cases, and emphasize early, targeted therapy to mitigate high risks of cardiovascular disease.

Expanded Screening: All patients with hypertension should be screened for PA, particularly given its high prevalence (5–14% in primary care, up to 30% in referred hypertensive patients).

Simplified Diagnosis: The updated guidelines suggest *reduced reliance on conventional aldosterone suppression tests*, often allowing for diagnosis based on high-sensitivity ARR screening.

Refined Subtyping: Patients with a high *probability of lateralizing PA* may skip confirmatory tests, moving directly from screening to adrenal *venous sampling (AVS)* or Imaging/CT.

Treatment Approach:

Surgery: Unilateral adrenalectomy is the preferred treatment for patients with unilateral lateralizing PA.
Medical Management: Mineralocorticoid receptor antagonists (MRAs), such as spironolactone, are recommended for bilateral disease or patients who do not undergo surgery.
Alternative Agents: The guidelines address the use of other medications like ENaC inhibitors (e.g., amiloride) for cases when MRAs are not tolerated or aldosterone synthase inhibitors (baxdrostat).

Monitoring: The recovery of *plasma renin levels is recommended as an indicator of treatment efficacy.*

European Journal of Endocrinology, Volume 193, Issue 3, September 2025, Pages 348–358

Πού στηρίχτηκαν οι πρόσφατες επίσημες οδηγίες;

Journal of the American College of Cardiology
Vol 69, 2017

EDITORIAL COMMENT

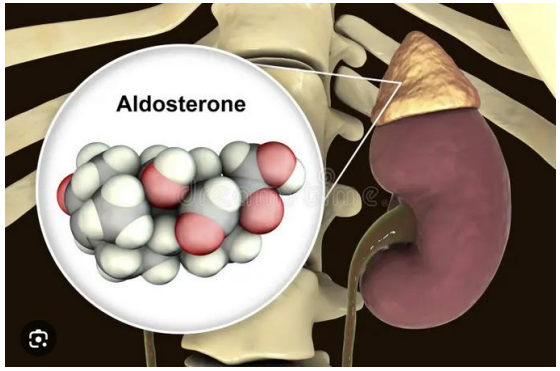
The Time has Come for Systematic Screening for Primary Aldosteronism in All Hypertensives*

Giuseppe Maiolino, MD, PhD,[a] Lorenzo A. Calò, MD, PhD,[b] Gian Paolo Rossi, MD[a]

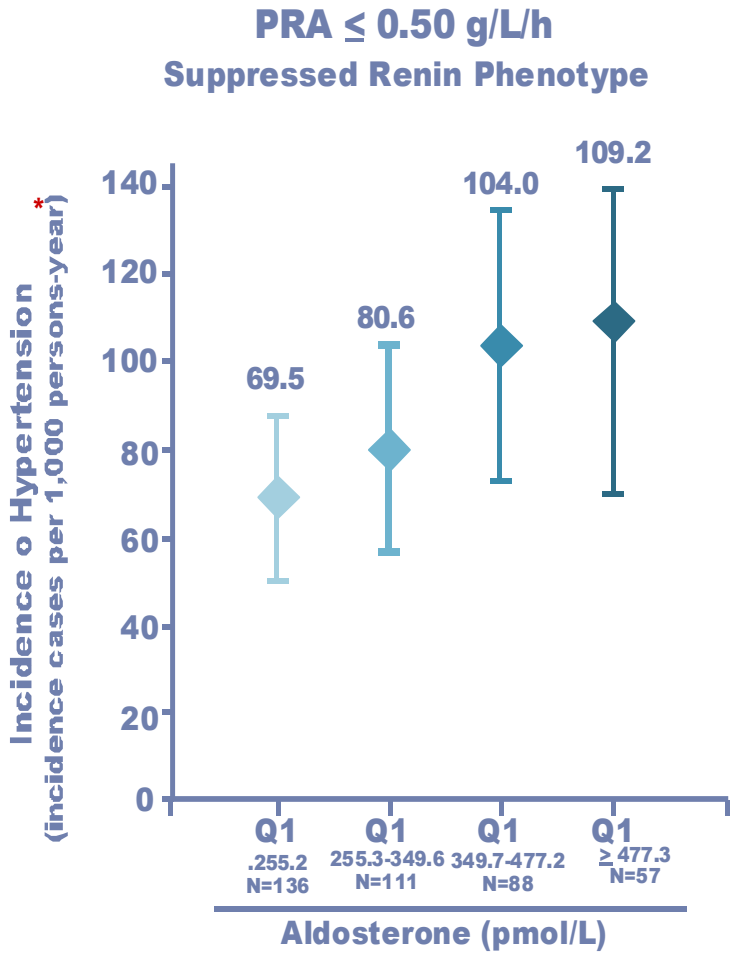
a Hypertension Unit, Department of Medicine - DIMED, University of Padua, Padua, Italy
b Nephrology Unit, Department of Medicine - DIMED, University of Padua, Padua, Italy.

~~*Ο Πρωτοπαθής Αλδοστερονισμός παραδοσιακά πιστευόνταν ότι είναι μια σπάνια νόσος που συνοδιάζεται μόνον με ανθεκτική υπέρταση με υποκαλιαιμία*~~

Ο Πρωτοπαθής Αλδοστερονισμός αποτελεί ένα συνεχές φάσμα νόσου(από υποκλινικό εως κλινικό στάδιο) διότι υπάρχει μια συνεχής παραγωγή αλδοστερόνης, ανεξάρτητα από την ρενίνη, η οποία προβλέπει αλλά και ακολουθεί τα στάδια της υπέρτασης



The Spectrum of Subclinical Primary Aldosteronism and Incident Hypertension: A Cohort Study



Cohort study . National community-based study. 850 untreated normotensive participants in the Multi-Ethnic Study of Atherosclerosis with measurements of serum aldosterone, plasma renin activity (PRA).

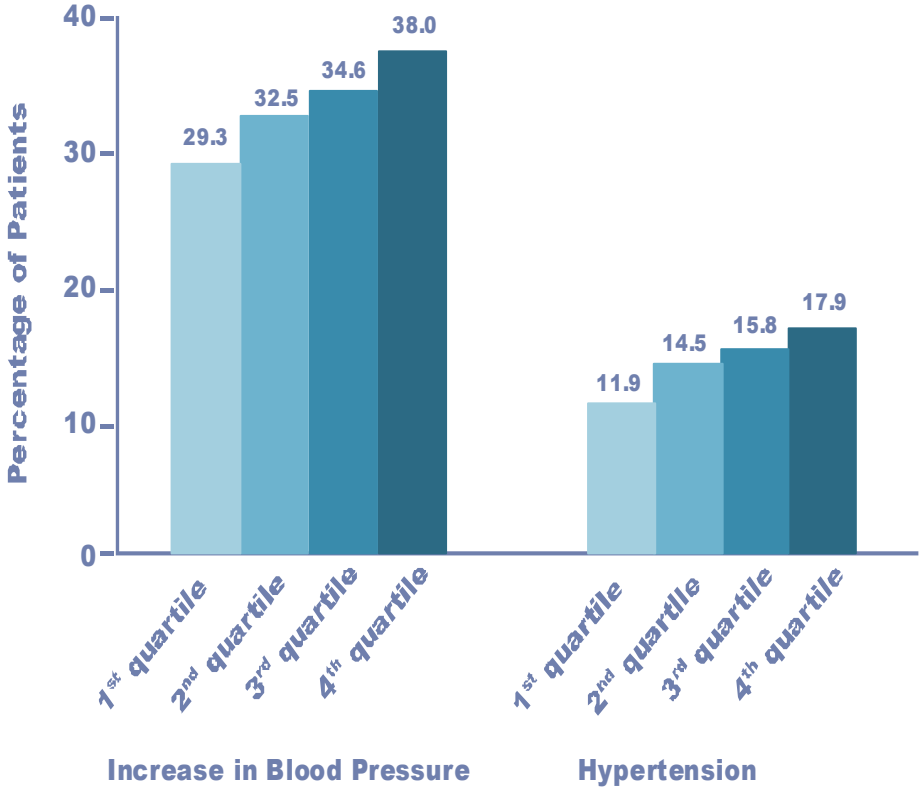
Ann Intern Med 2017,Nov 7,167(9):630-641

Serum Aldosterone and the Incidence of Hypertension in Nonhypertensive Persons

Ramachandran S Vasan , Jane C Evans, Martin G Larson, Peter W F Wilson, James B Meigs, Nader Rifai, Emelia J Benjamin, Daniel Levy

National Heart, Lung, and Blood Institute Framingham Heart Study, Framingham, Mass 01702-5827, USA

We investigated the relation of baseline serum aldosterone levels to increases in blood pressure and the incidence of hypertension after four years in 1688 nonhypertensive participants in the Framingham Offspring Study (mean age, 55 years), 58 percent of whom were women

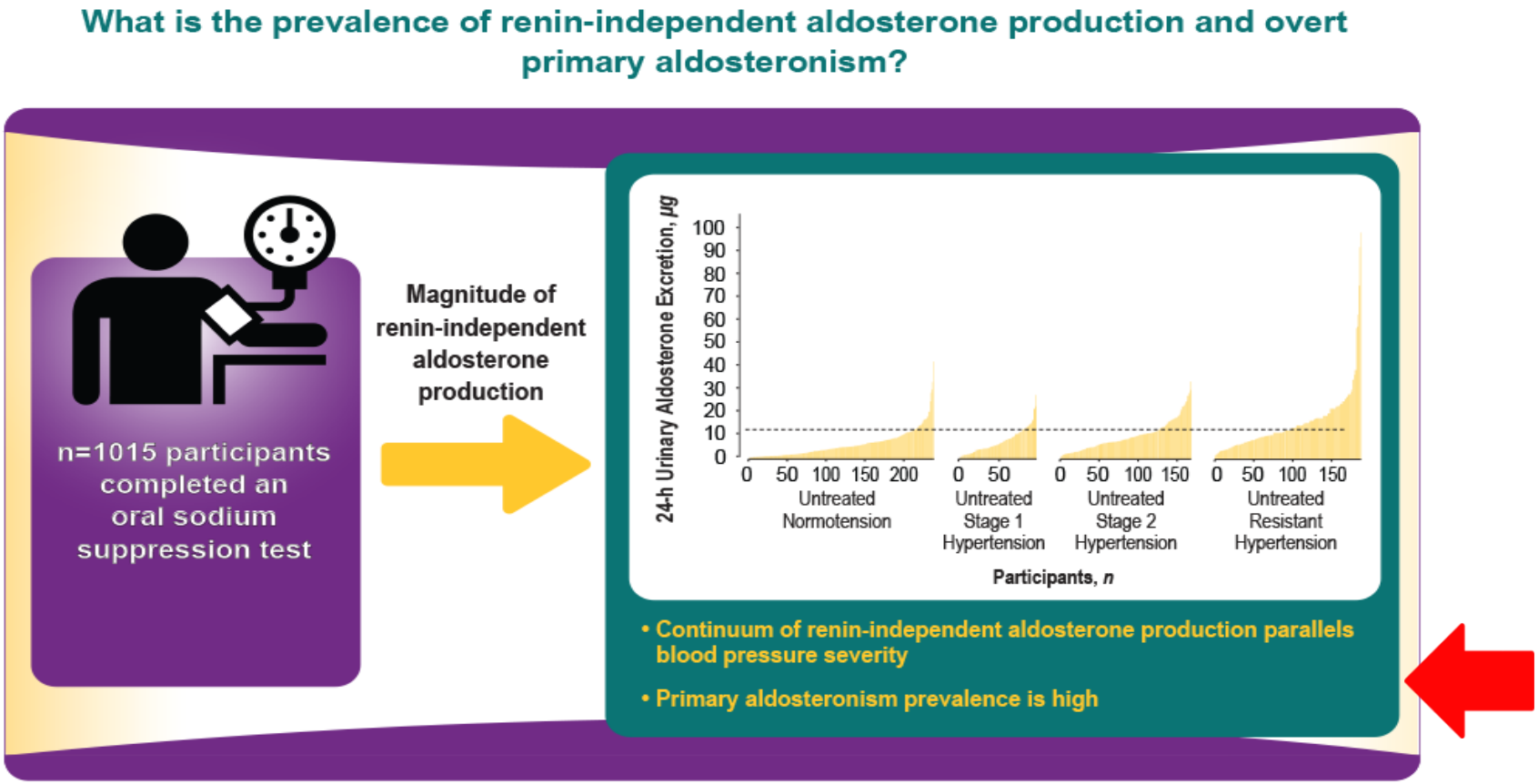


New Engl J Med 2004,Jul 1,351:33-41)

Primary aldosteronism has traditionally been perceived as a rare cause of hypertension, but recent evidence suggests that its prevalence may be higher than previously believed.

The Unrecognized Prevalence of Primary Aldosteronism: A Cross-sectional Study

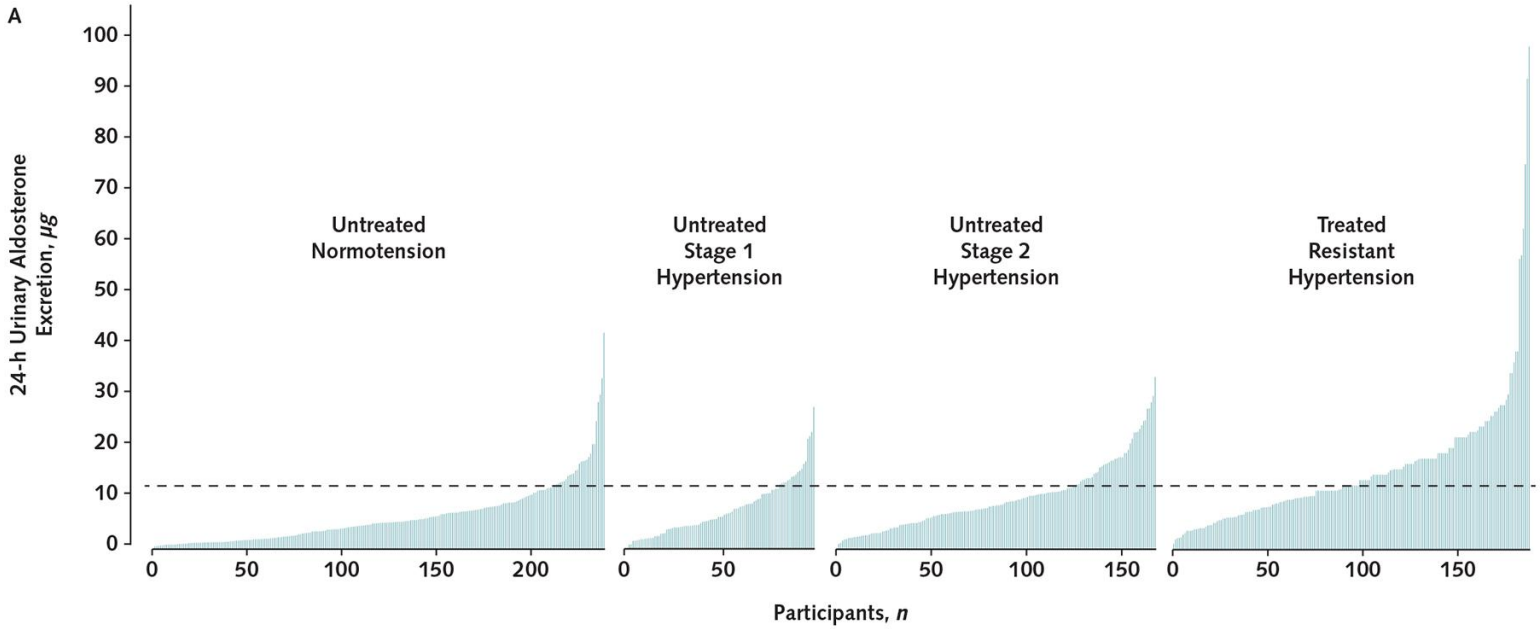
Jenifer M. Brown, et al

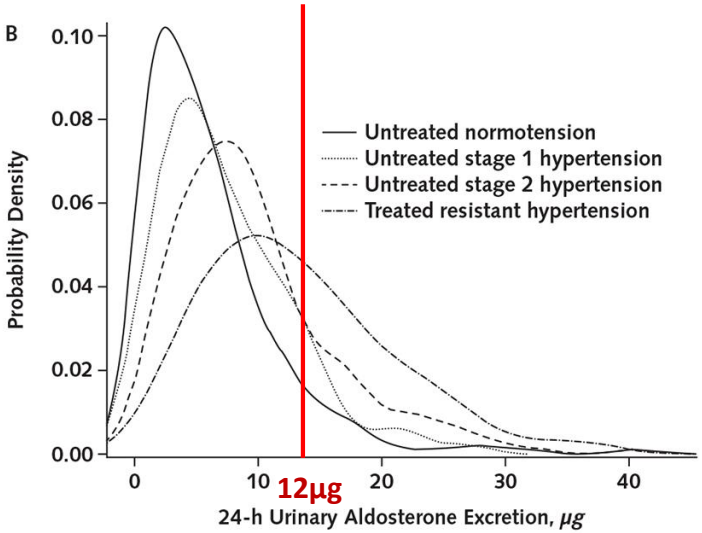


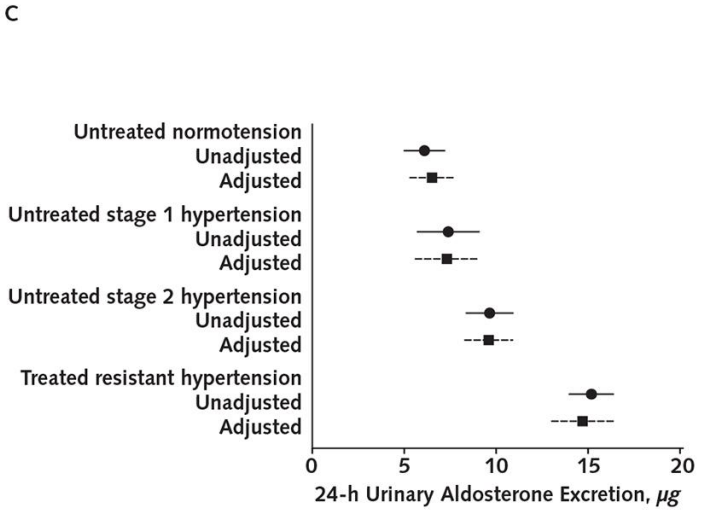
Annals of Internal Medicine

Brown JM, Siddiqui M, Calhoun DA, et al. The unrecognized prevalence of primary aldosteronism.A cross-sectional study.Ann Intern Med. 26 May 2020. [Epub ahead of print]. doi:10.7326/M20-0065
http://annals.org/aim/article/doi/10.7326/M20-0065

Annals of Internal Medicine
May 2020,Volume 173 Number





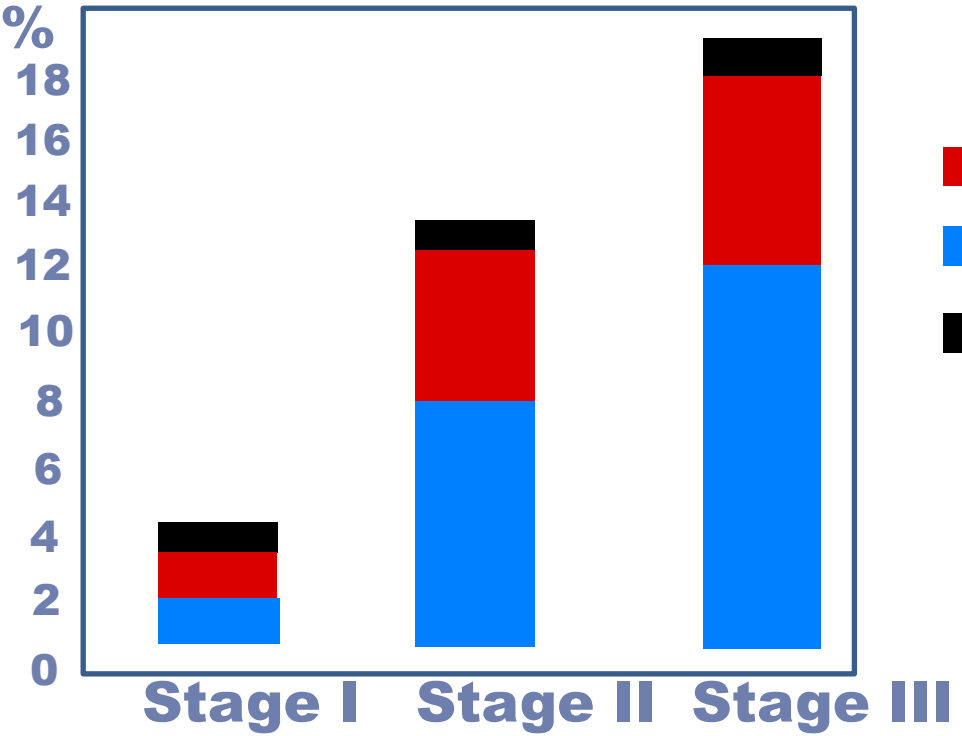


Annals of Internal Medicine
May 2020,Volume 173 Number

Prevalence and Clinical Manifestations of Primary Aldosteronism Encountersd in primary care ptactice

Silvia Monticone et al

Prevalence of PA by Hypertension stage



Aldosterone-producing adenoma

BAH bilateral adrenal hyperplasia

Untetermined

Stage I:5%
Stage II:11-22%
StageIII:>20%
Resistant Hypertension:40-50%

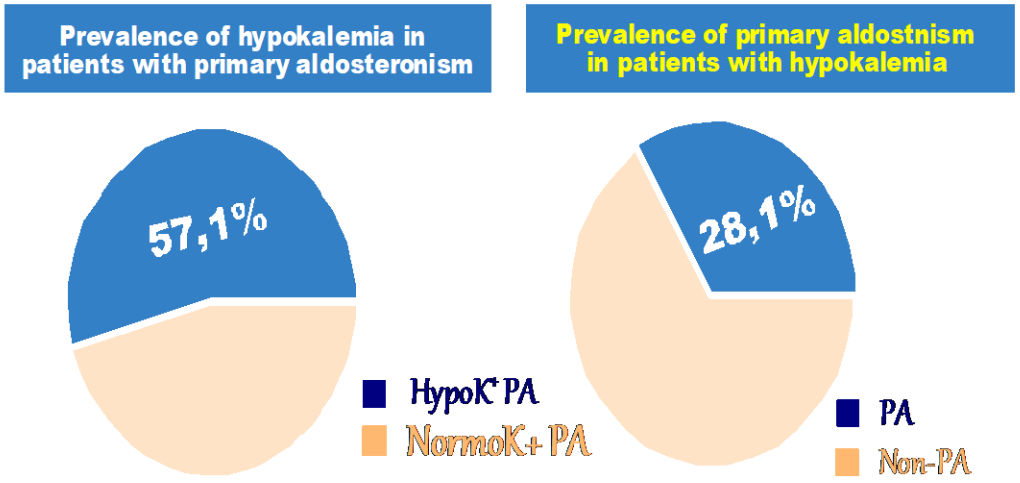
J Am Coll Cardiol. 2017 Apr 11;69(14):1811-1820

Ο έλεγχος για ΠΑ δεν πρέπει να περιορίζεται μόνο στις περιπτώσεις υποκαλιαιμίας

Prevalence of Hypokalemia and Primary Aldosteronism in 5100 Patients Referred to a Tertiary Hypertension Unit

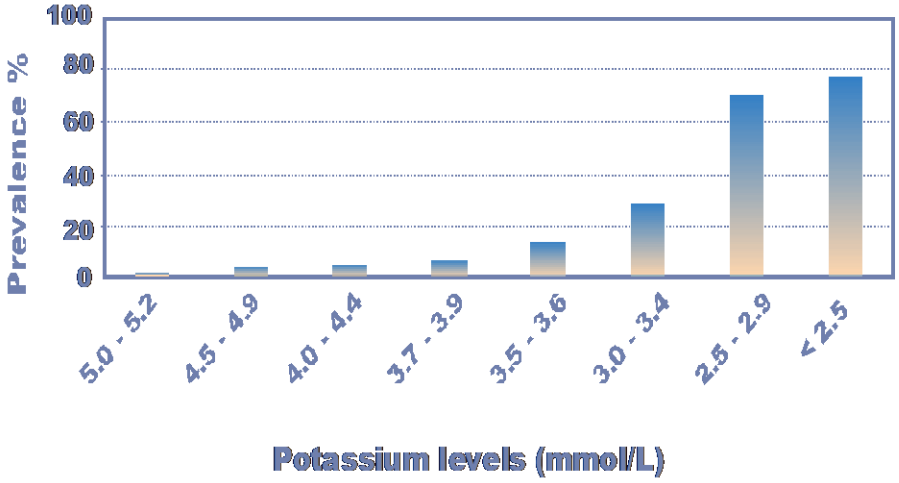
Jacopo Burrello [1], Silvia Monticone [1], Isabel Losano [1], Giovanni Cavaglià [1], Fabrizio Buffolo [1], Martina Tetti [1], Michele Covella [1], Franco Rabbia [1], Franco Veglio [1], Barbara Pasini [2], Tracy Ann Williams [13], Paolo Mulatero [1]

Hypokalemia and Primary Aldosteronism in Hypertensive patiens



Ο Πρωτοπαθής Υπεραλδοστερονισμός
δεν συνοδεύεται
σε μεγάλο ποσοστό από
Υποκαλιαιμία

Increasing prevalence with decreasing potassium levels



Hypertension 2020 Apr,75(4):1025-1033

Γιατί μας ενδιαφέρει τόσο πολύ η έγκαιρη διάγνωση του πρωτοπαθούς υπεραλδοστερονισμού;

Διότι…

✓ ***Η αλδοστερόνη αποτελεί υψηλό παράγοντα κινδύνου για το καρδιαγγειακό σύστημα και τους νεφρούς ανεξάρτητα από τα επίπεδα αρτηριακής πίεσης***

✓ ***Έχουμε τη δυνατότητα για στοχευμένη θεραπεία***

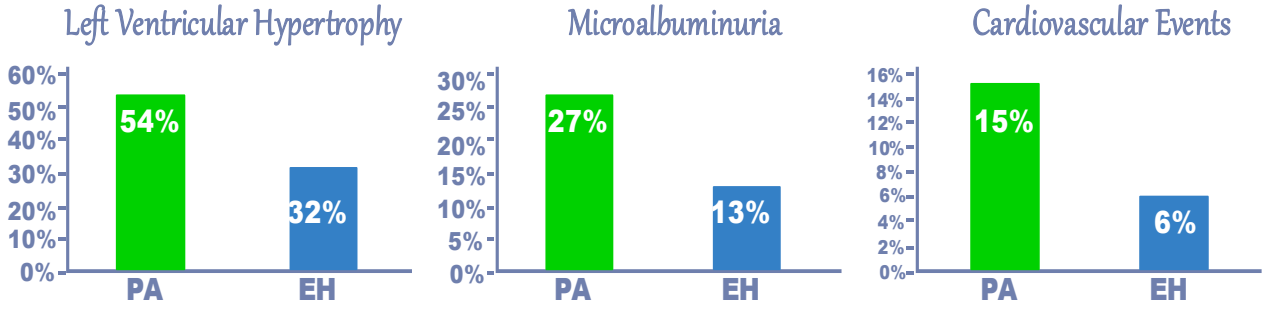
Prevalence and Clinical Manifestations of Primary Aldosteronism Encountered in Primary Care Practice

Silvia Monticone [1], Jacopo Burrello [1], Davide Tizzani [1], Chiara Bertello [1], Andrea Viola [1], Fabrizio Buffolo [1], Luisa Gabetti [2], Giulio Mengozzi [3], Tracy A Williams [4], Franco Rabbia [1], Franco Veglio [1], Paolo Mulatero [5]

J Am Coll Cardiol. 2017 Apr 11;69(14):1811-1820.
doi: 10.1016/j.jacc.2017.01.052.

This study sought to determine the prevalence and clinical phenotype of PA in a large cohort of unselected patients with hypertension, consecutively referred to our hypertension unit, by 19 general practitioners from Torino, Italy. A total of 1,672 primary care patients with hypertension (569 newly diagnosed and 1,103 patients already diagnosed with arterial hypertension) were included in the study

Target Organ Damage and Cardiovascular Events

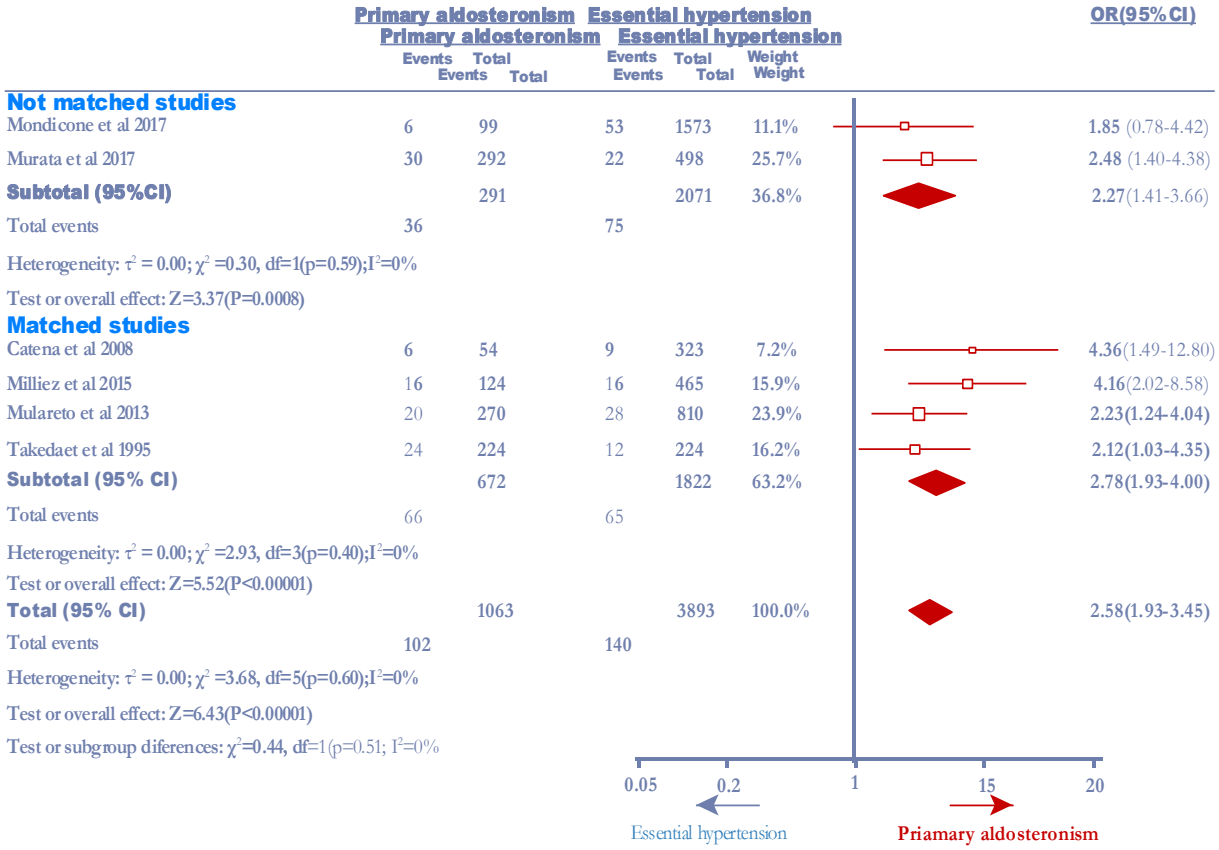


Cardiovascular events and target organ damage in primary aldosteronism compared with essential hypertension: a systematic review and meta-analysis

Silvia Monticone [1], Fabrizio D'Ascenzo [2], Claudio Moretti [2], Tracy Ann Williams [3], Franco Veglio [1], Fiorenzo Gaita [2], Paolo Mulatero [4]

Lancet Diabetes Endocrinol. 2018 Jan;6(1):41-50.
doi: 10.1016/S2213- 8587(17)30319-4.

Stroke in patients with priamary aldosteronism versus essential hypertension



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Lancet Diabetes Endocrinol. 2018 Jan;6(1):41-50.
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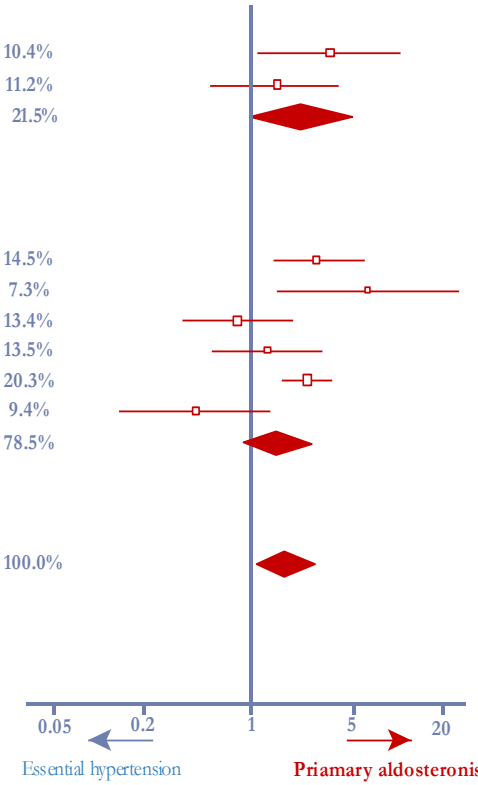
Coronary artery disease in patients with priamary aldosteronism versus essential hypertension

	Primary aldosteronism		Essential hypertension			OR(95%CI)
	Events	Total	Events	Total	Weight	
Not matched studies						
Mondicone et al 2017	4	99	19	1573	10.4%	1.85 (0.78-4.42)
Murata et al 2017	7	292	8	498	11.2%	2.48 (1.40-4.38)
Subtotal (95%CI)		391		2071	21.5%	2.27(1.41-3.66)
Total events	11		27			
Heterogeneity: $\tau^2 = 0.05$; $\chi^2 = 1.17$, df=1(p=0.28);I^2=14%						
Test or overall effect: Z=1.93(P=0.05)						
Matched studies						
Catena et al 2008	11	54	27	323	14.5%	2.80 (1.30-6.06)
Milliez et al 2015	5	124	3	465	7.3%	6.47(1.2-27.46)
Mulareto et al 2013	7	270	28	810	13.4%	0.84 (0.36-1.95)
Reincke et al 2012	13	281	10	281	13.5%	1.31 (0.57-3.05)
Savard et al 2013	46	459	58	1290	20.3%	2.37 (1.58-3.54)
Takedaet et al 1995	4	224	9	224	9.4%	0.43 (0.13-1.43)
Subtotal (95% CI)		1412		3393	78.5%	1.65 (0.92-2.95)
Total events	86		132			
Heterogeneity: $\tau^2 = 0.33$; $\chi^2 = 15.08$, df=5(p=0.01);I^2=67%						
Test or overall effect: Z=1.67(P=10)						
Total (95% CI)		1803		5464	100.0%	1.77 (1.10-283)
Total events	97		159			
Heterogeneity: $\tau^2 = 0.24$; $\chi^2 = 16.41$, df=7(p=0.02);I^2=57%						
Test or overall effect: Z=2,38: (p=0.02)						
Test or subgroup diferences: χ^2=0.35, df=1(p=0.56; I^2=0%						



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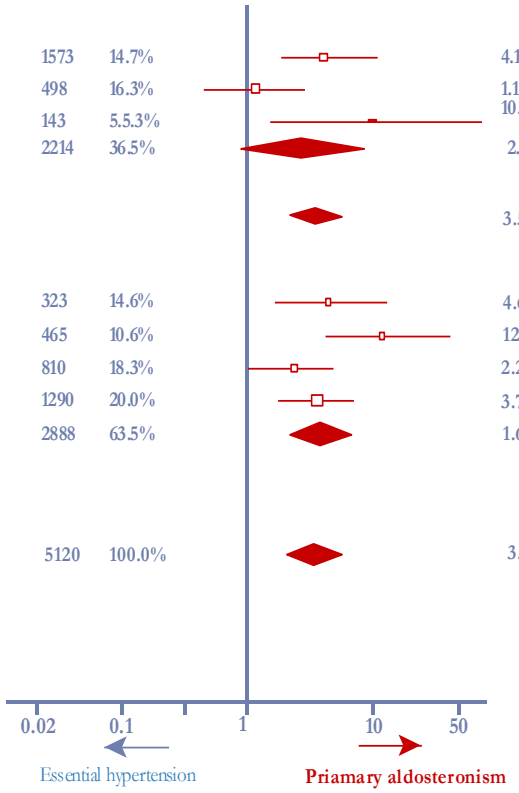
Lancet Diabetes Endocrinol. 2018 Jan;6(1):41-50.
doi: 10.1016/S2213- 8587(17)30319-4.

Atrial fibrillation in patients with priamary aldosteronism versus essential hypertension

	Primary aldosteronism		Essential hypertension			OR(95%CI)
	Events	Total	Events	Total	Weight	
Not matched studies						
Mondicone et al 2017	5	99	20	1573	14.7%	4.13 (1.52-11.25)
Murata et al 2017	8	292	12	498	16.3%	1.14(0.46-2.82)
Rosi et al 2013	12	180	1	143	5.5.3%	10.3(1.30-78.96)
Subtotal (95%CI)		5771		2214	36.5%	2.93 (0.91-9.47)
Total events	25		33			
Heterogeneity: τ^2 = 0.66; χ^2 =5.61, df=1(p=0.06);I^2=64%						3.52 (2.06-5.99)
Test or overall effect: Z=1.80(p=0.07)						
Matched studies						
Catena et al 2008	7	54	10	323	14.6%	4.66 (1.69-12.84)
Milliez et al 2015	9	124	3	465	10.6%	12.05 (3.21-45.23)
Mulareto et al 2013	11	270	15	810	18.3%	2.25 (1.02-4.96)
Savard et al 2013	18	459	14	1290	20.0%	3.72 (1.83-7.54)
Subtotal (95% CI)		907		2888	63.5%	1.65 (0.92-2.95)
Total events	45		42			
Heterogeneity: τ^2 = 0.13; χ^2 =14.77, df=3 (p=0.19);I^2=37%						
Test or overall effect: Z=4.72 (p<000001)						
Total (95% CI)		1478		5120	100.0%	3.52 (2.06-5.99)
Total events	70		75			
Heterogeneity: τ^2 = 0.24; χ^2 =11.5, df=6(p=0.07;I^2=49%						
Test or overall effect: Z=6.43: (p <00001)						
Test or subgroup diferences: χ^2=0.22, df=1(p=0.64); I^2=0%						



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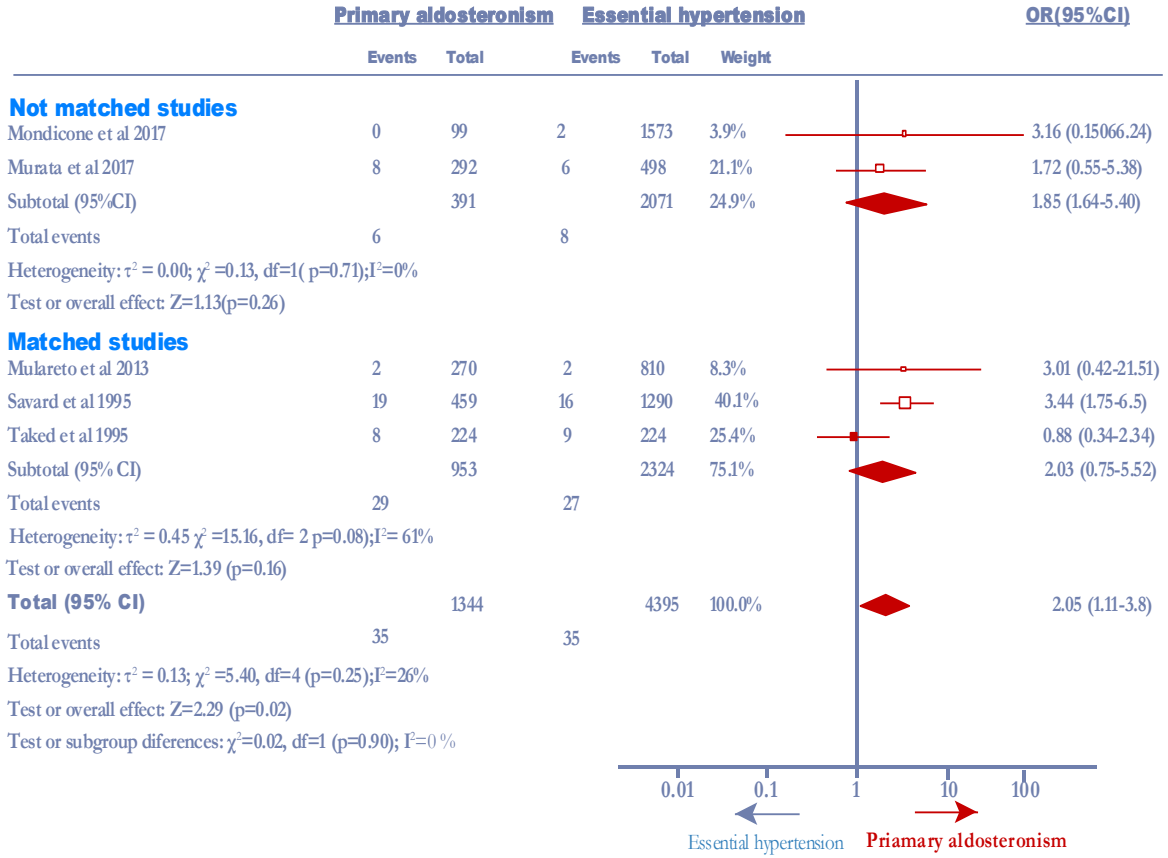
doi: 10.1016/S2213- 8587(17)30319-4.

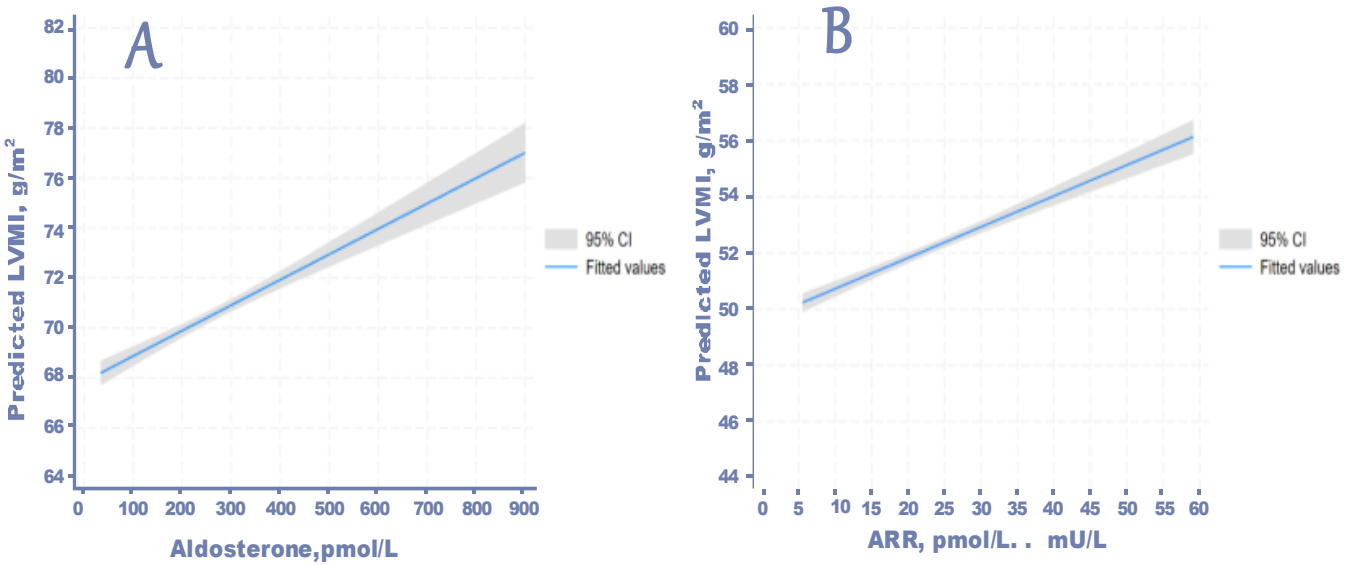
Heart ailure in patients with priamary aldosteronism versus essential hypertension



Relationship Between Renin, Aldosterone, Aldosterone-to-Renin Ratio and Arterial Stiffness and Left Ventricular Mass Index in Young Adults

Roshan A Ananda [1], StellaMay Gwini [2], Lawrence J Beilin [3], Markus P Schlaich [4], Michael Stowasser [5], Morag J Young [6 7], Brendan Adler [8], Peter J Fuller [1], Trevor A Mori [3], Jun Yang [1 9 10]

Circulation . 2024 Dec 17;150(25):2019-2030.
doi:10.1161/CIRCULATIONAHA.124.070039.



A, Association between aldosterone concentrations and left ventricular mass index (LVMI) among males at 27 years of age.
B, Association between aldosterone-to-renin ratio (ARR) and LVMI among females at 27 years of age. Adjusted for age, body mass index, smoking, alcohol, physical activity, homeostatic model assessment for insulin resistance, non–high-density lipoprotein, and high-sensitivity C-reactive protein.

ΥΠΕΡΤΑΣΗ

ΑΛΔΟΣΤΕΡΟΝΙΣΜΟΣ

Genetic and Genomic Mechanisms of Primary Aldosteronism

Trends Mol Med. 2020 Sep;26(9):819-832.
doi: 10.1016/j.molmed.2020.05.005.

Οικογενείς και Κληρονομούμενες μορφές Πρωτοπαθούς Υπεραλδοστερονισμού

	Ηλικία εμφάνισης	Ειδικά χαρακτηριστικά	Γονίδιο	Κληρονομικότητα	Θεραπεία
FH-I	Συνήθως πριν 20 χρ	ΑΕΕ πριν 30 χρ	Χιμαιρική $CYP11B1/B2$[1]	Επικρατής αυτοσωματική	Γλυκοκορτοκοειδή# Ανταγωνιστές MR
FH-II	Ποικίλη.Νέοι με μεταλλαξη των $CLCN2$	Κανένα	$CLCN2$[2]	Επικρατής αυτοσωματική	Ανταγωνιστές MR
FH-III	Συνήθως πριν 20 χρ	Μεγάλη αμφοτερόπλευρη υπερπλασία	$KCNJ5$[3]	Επικρατής αυτοσωματική	Ανταγωνιστές MR Αμοτερόπλευρη Επιν/εκτομη
FH-IV	Συνήθως πριν 20 χρ	Καθυστέρηση ανάπτυξης σε ορισμένους	$CACNA1H$[4]	Επικρατής αυτοσωματική	Ανταγωνιστές MR
PASNA*	Παιδική	Σπασμοί νευρολογικές εκδηλ.	$CACNA1D$[5]	?	Ανταγωνιστές MR Αναστολείς Ca++

 # η παραγωγή ALDO ελέγχεται από την ACTH

*Primary aldosteronism with seizures and neurologic abnormalities

[1]CYP11β1 υδροχυλάση: Συνθετάση της κορτιόλης.CYP11β2 υδροξυλάση:Συνθετάση της αλδοστερόνης
[2]Δίαυλος χλωρίου
[3]G protein-activated inwardly rectifying potassium channel, γνωστό και ως GIRK4
[4]alpha-1H subunit του CaV3.2 T-type voltage-gated calcium channel
[5]alpha-1 subunit, των διαύλων ασψβεστίουγνωστή και ως CaV1.3

Επιγενετικές Μεταλλάξεις Υπεραλδοστερονισμού

PRCAKA: Ελέγχει την παραγωγή της α-καταλυτικής ομάδας της PKA

GNAs: Ομάδα γόνων που ελέγχει την παραγωγή της άλφα υπομονάδας των πρωτεϊνών G

CADM-1: Ελέγχει την παραγωγή του μορίου προσκόλησης TSLC1(Tumor Suppressor in Lung Cancer 1), ή CADM1 (Cell Adhesion Molecule 1)

KCNJ5 : G protein-activated inward rectifier potassium channel (GIRK4)-ιδίως στην καρδιά και τα επινεφρίδια

SCN : Ελέγχει την παραγωγή της α-υποομάδας των voltage-gated sodium channels

ATP1A1 : Ελέγχει την παραγωγή a-1 υποομάδας της K^+/Na^+-ATPασης

CLCN2 : Ελέγχει την παραγωγή ClC-2 chloride channel

ATP2B3 : Ελέγχει την παραγωγή membranik;hw Ca^{++}-ATPασης (PMCA3)

SLC30A1: Ελέγχει την παραγωγή του μεταφορέα ψευδαργύρου Tzn-1

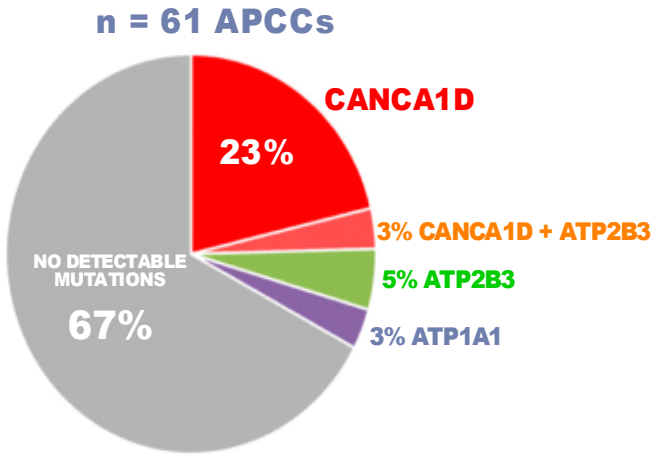
CACNA1D και CACNA1H : Ελέγχουν την παραγωγή της α-1 υποομάδος των διαύλων ασβεστίου

Aldosterone-Producing Cell Clusters Frequently Harbor Somatic Mutations and Accumulate With Age in Normal Adrenals

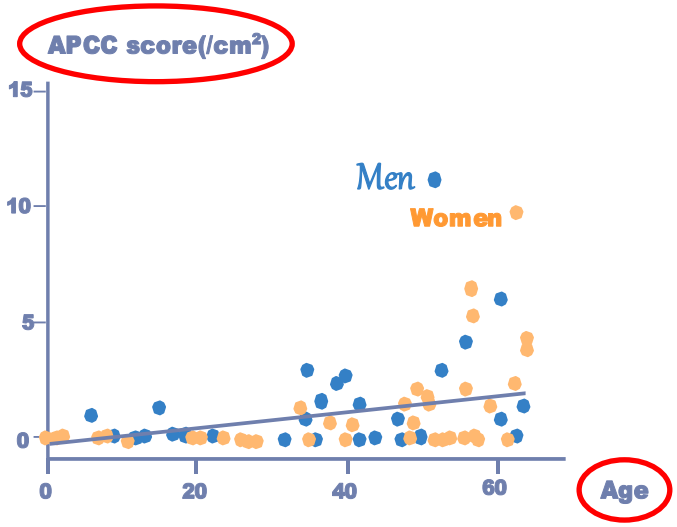
Kei Omata, [1,2,3] Sharath K. Anand, [1] Daniel H. Hovelson, [4] Chia-Jen Liu, [1] Yuto Yamazaki, [5] Yasuhiro Nakamura, [5] Sadayoshi Ito, [2] Fumitoshi Satoh, [2,3] Hironobu Sasano, [5] William E. Rainey, [6,7] and Scott A. Tomlins1, [8,9,10]

J Endocr Soc. 2017 May 12;1(7):787-799.
doi: 10.1210/js.2017-00134. eCollection 2017 Jul 1.

Adrenals from 837 consecutive autopsies at a Japanese institution, Tohoku University Hospital, were screened to select 107 unilateral adrenal glands from nonhypertensive patients. APCC score (APCC number/adrenal cortex area per case) was assessed by CYP11B2 immunohistochemistry. DNA from all APCCs and adjacent adrenal cortex was subjected to NGS using two panels targeting aldosterone-regulating genes.



Somatic mutations identified in APCCs by NGS. (a) Somatic mutations in CACNA1D, ATP2B3, ATP1A1, and KCNJ5 were observed in 16 of 61 (26%), 5 of 61 (8%), 2 of 61 (3%), and none of 61 (0%) of the 61 total APCCs in our Japanese normotensive cohort, respectively. Two APCCs (26A1 and 39A1) harbored both CACNA1D and ATP2B3 somatic mutations.

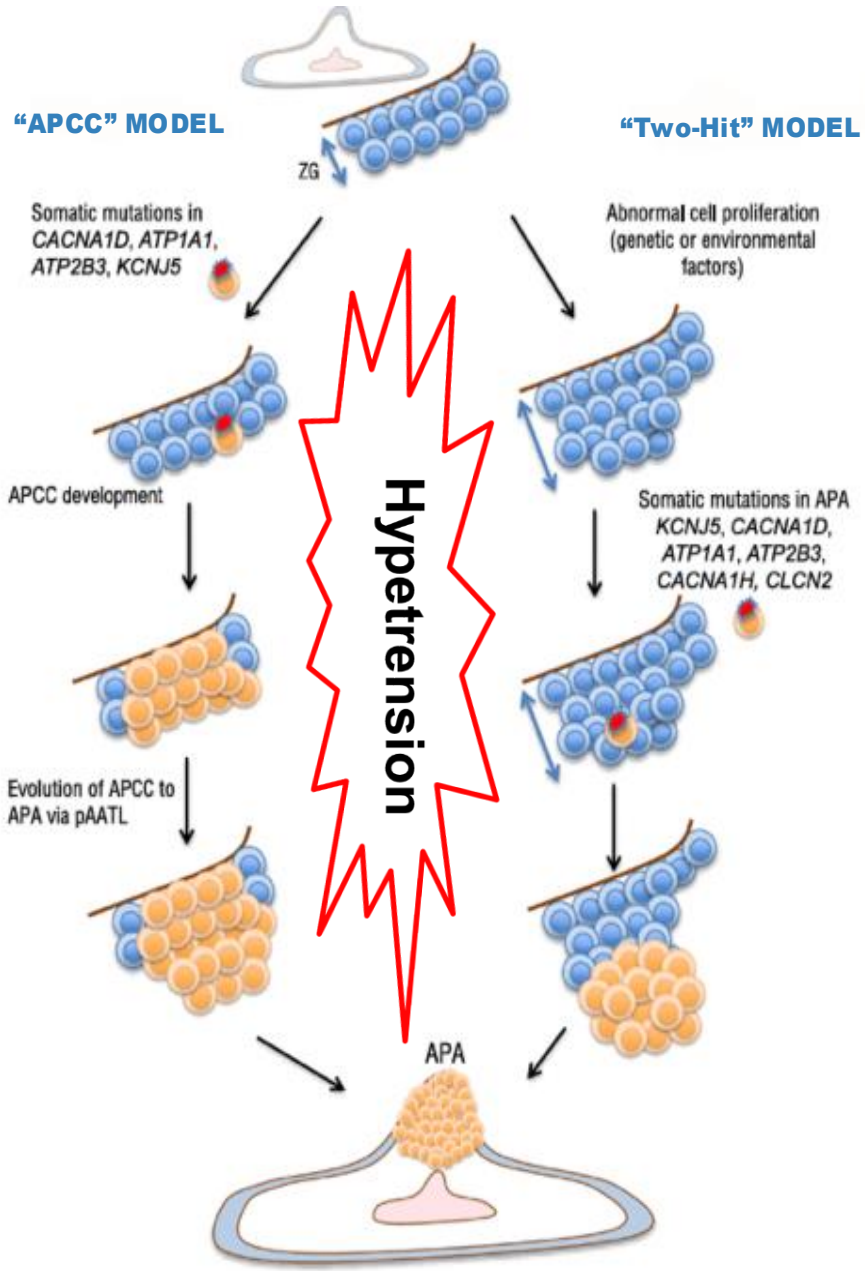


Age-associated increase in APCC score. APCC score (APCC number per adrenal/ adrenal cortex area) for each of our 107 nonhypertensive cases were plotted vs age. A significant positive correlation was observed (Spearman rank correlation, r = 0.50, P , 0.0001). Men and women are shown in blue and red, respectively.

Genetic and Genomic Mechanisms of Primary Aldosteronism

Fabio L Fernandes-Rosa [1],
Sheerazed Boulkroun [1],
Maria-Christina Zennaro [2]

Trends Mol Med 2020 Sep;26(9):819-832



"... Potentially, hypertension and unrecognised enviromental factors release PA somatic mutations.."

Είναι εφικτό στην κλινική πράξη να γίνεται screening για ΠΑ σε όλους τους υπερτασικούς ασθενείς;

Putative Benefits of and Likely Barriers to Increasing PAH Screening

Benefits of increased PAH screening
More PAH cases identified
More patients will receive targeted* therapy
Barriers to and potential consequences of increased PAH screening
Resource limitations
Diagnostic bottlenecks†
PAH expertise capacity overwhelmed or not available
Low PAH awareness among primary care providers
Absence of primary care–based implementation strategies

AVS indicates adrenal vein sampling; MRA, mineralocorticoid receptor antagonist; and PAH, primary aldosteronism in hypertension.

* Adrenalectomy in patients with unilateral PAH and MRA treatment in those with bilateral PAH.

† AVS specialized centers of expertise are overwhelmed with confirmed patients with PAH and are simply not available.

Hypertension Volume 82,Number 10

Examble..

United States

122,4million **hypertension**

61,2 million **stage II** hypertension

9,5million **PAH**(15%)

1/942 expert/patients with PAH

Ελλάδα

3εκ υπερτασικοί

1,5εκ **στάδιο II** υπέρτασης

220.000 PAH

?/? expert/patients

Daunting dilemma for the optimal medical care of patients with PAH

Expanding the Search for Primary Aldosteronism in Clinical Settings

John M. Flack, Michael G. Buhnerkempe, and Garry L.R. Jennings

Proposed Solutions and Alternatives:

✓ Adopting alternative PAH diagnostic strategies (e.g., ***scoring algorithms*** based on common clinical data).

✓Utilizing ***noninvasive*** PAH subtyping techniques.

✓***Avoiding adrenal vein sampling*** in those with a low probability of lateralization.

Hypertension. 2025;82:1548–1550

The 2024 European Society of Cardiology (ESC) Guidelines

- **Screening Method:** The aldosterone-to-renin ratio **(ARR)** is the recommended screening test
- **Optimal Conditions:** To maximize accuracy, screen with the patient on a standard sodium diet, with normal potassium levels, and after ***pausing interfering medications*** **(continued drugs:non dihydropyridines calcium blockers ,a-adrenergic antagonists)**

2025 Endocrine Society clinical practice guidelines

Full medication withdrawal remains the ideal condition

2025 AHA/ACC Guidelines for Primary Aldosteronism:

To avoid delays and reduce barriers, patients ***should not stop most of their antihypertensive medications*** before screening (**except for Mineralocorticoid Receptor Antagonists - MRAs**).

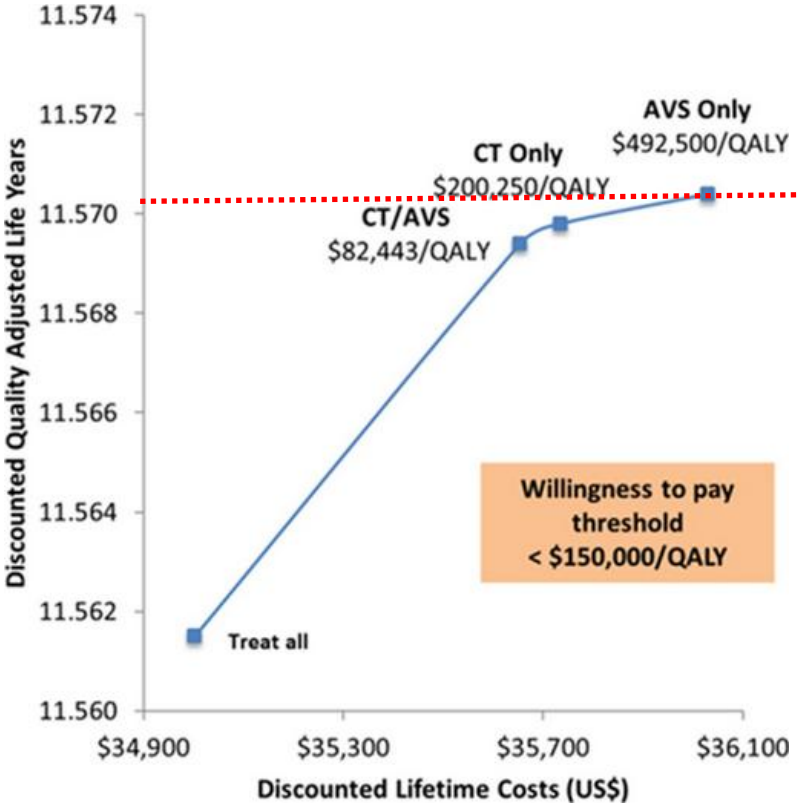
!

Η αρχική μέτρηση μπορεί να γίνει ακόμα και χωρίς την διακοπή των MRAS!

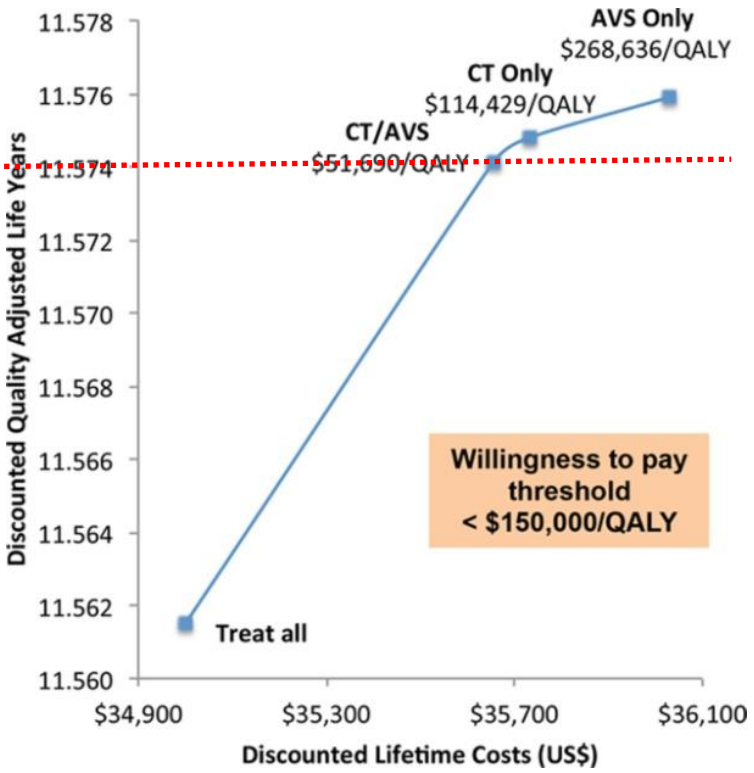
(aldosterone is>10ng/dl or >277pmol/L and Ren low)

Πόσο θα κοστίσει στα συστήματα υγείας το screening για ΠΑ σε 1,3δισ. υπερτασικά άτομα;

Cost-Effectiveness of Screening for Primary Aldosteronism and Subtype Diagnosis in the Resistant Hypertensive Patients



*Efficiency frontier for base-case analysis unadjusted for health-related quality-of-life adjustment for patients with primary aldosteronism not **undergoing surgery**. Only nondominated strategies are shown. AVS indicates adrenal venous sampling; CT, computerized tomography; and QALY, quality-adjusted life year.*



*Efficiency frontier for secondary analysis with HRQoL adjustment for PA patients **treated with mineralocorticoid-receptor antagonist alone**. Only non-dominated strategies shown.*

Circulation: Cardiovascular Quality and Outcomes
Volume 8, Issue 6, November 2015; Pages 621-630

Cost-effectiveness of screening for primary aldosteronism in hypertensive patients in Australia: a Markov modelling analysis

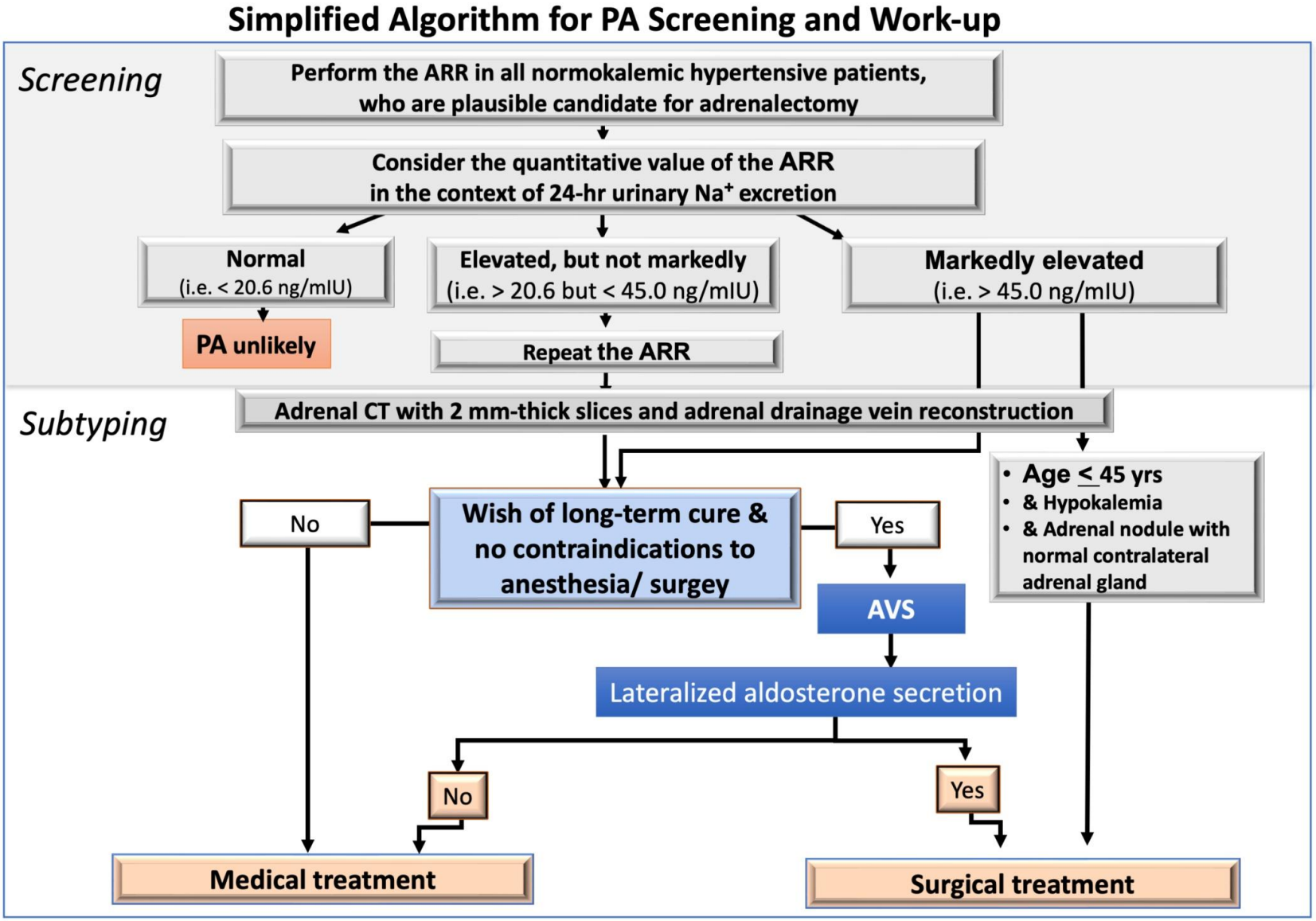
Screening hypertensive patients for primary aldosteronism compared with not screening attained an ICER of **AU$35 950.44** per quality-adjusted life year (QALY) gained. The results were robust to different sensitivity analyses. Probabilistic sensitivity analysis demonstrated that in 73% of the cases, it was cost-effective to screen at the commonly adopted willingness-to-pay (WTP) threshold of **AU$50 000**.

Conclusion:

The results from this study demonstrated that screening all hypertensive patients for primary aldosteronism from age 40 is cost-effective..

Journal of Hypertension
41(10):p 1615-1625, October 2023

Clinical Management of Primary Aldosteronism: An Update

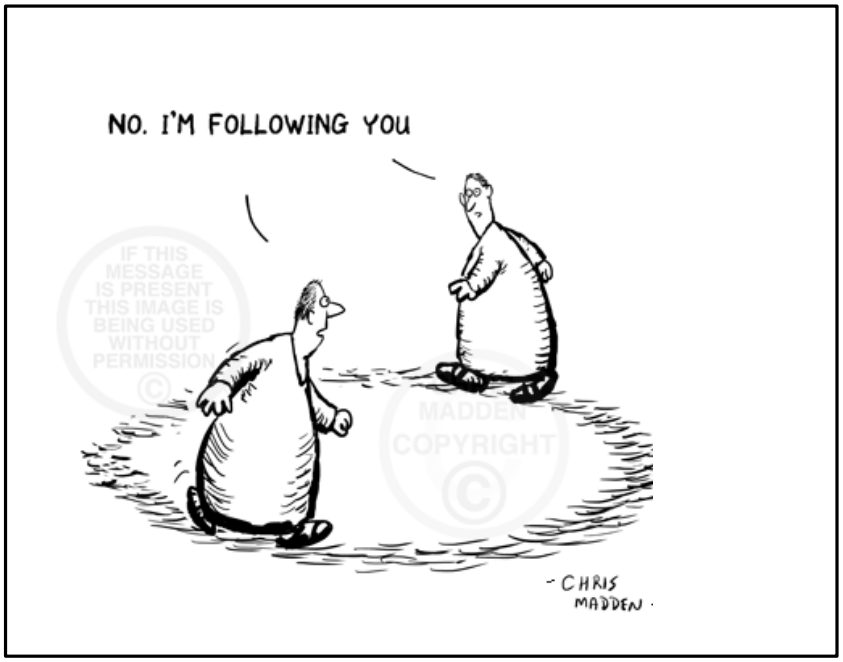


Hypertension
Volume 81, Number 9

“Τελικό συμπέρασμα”

Αντίθετα με τον παραδοσιακό ορισμό του πρωτοπαθούς αλδοστερονισμού, φαίνεται οτι υπάρχει μια συνεχής παραγωγή αλδοστερόνης, ανεξάρτητης από τη ρενίνη, η οποία ακολουθεί τη βαρύτητα και την επίπτωση της υπέρτασης.

Αυτά τα ευρήματα επαναπροσδιορίζουν το σύνδρομο πρωτοπαθούς αλδοστερονισμού και το εμπλέκουν ίσως στην παθογένεια της «ιδιοπαθούς» υπέρτασης, όπως και το αντίστροφο.



Ευχαριστώ πολύ!