Αρτηριακή Υπέρταση

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Current Guidelines

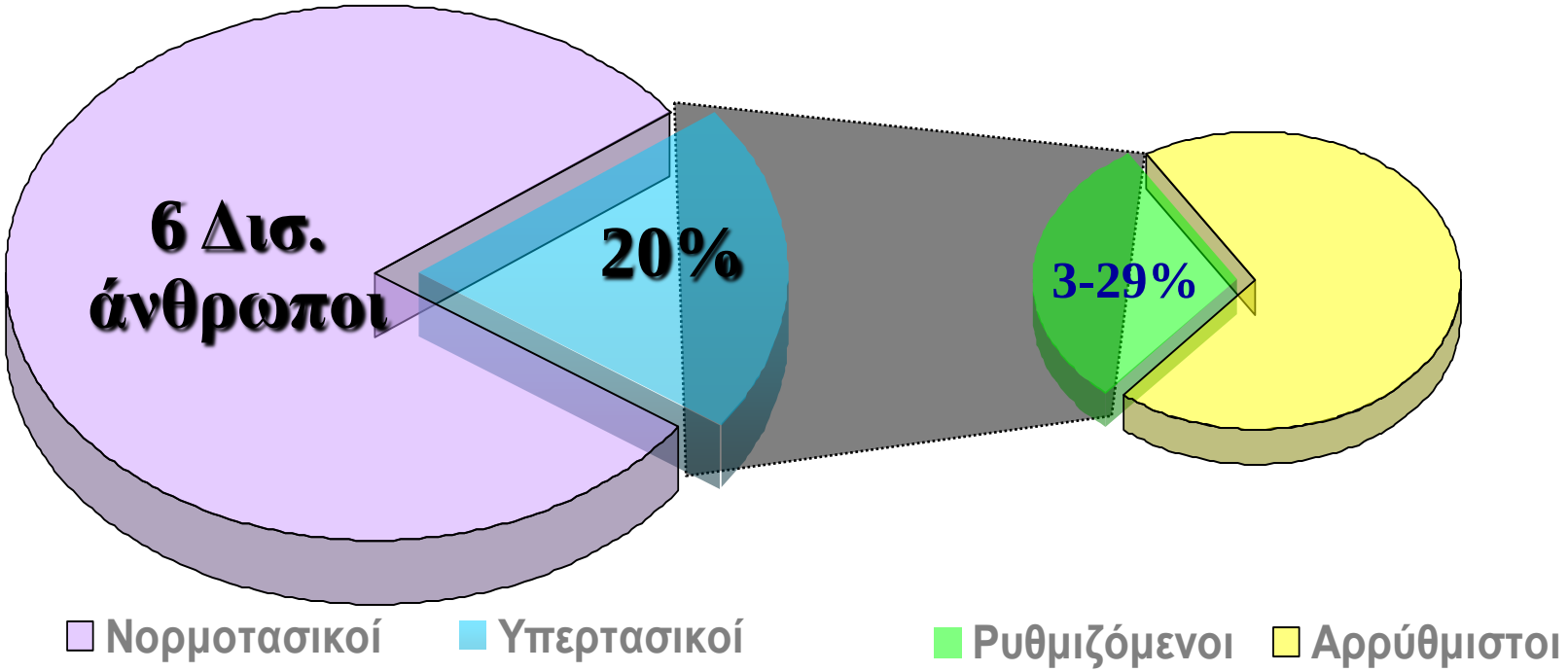
- The Urban Legend…
  - Is often told that “140/90” was chosen by insurance companies who noticed that people with BP lower than this lived longer than others…
  - JNC offers more sound clinical evidence…

Definition and Classification of BP according to Office measurement.

Category	Systolic		Diastolic
Optimal	<120	and	<80
Normal	120–129	and/or	80–84
High normal	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	160–179	and/or	100–109
Grade 3 hypertension	≥180	and/or	≥110
Isolated systolic hypertension	≥140	and	<90

$\frac{140}{90}$

Επιπολασμός και Έλεγχος της ΑΠ σε παγκόσμιο επίπεδο



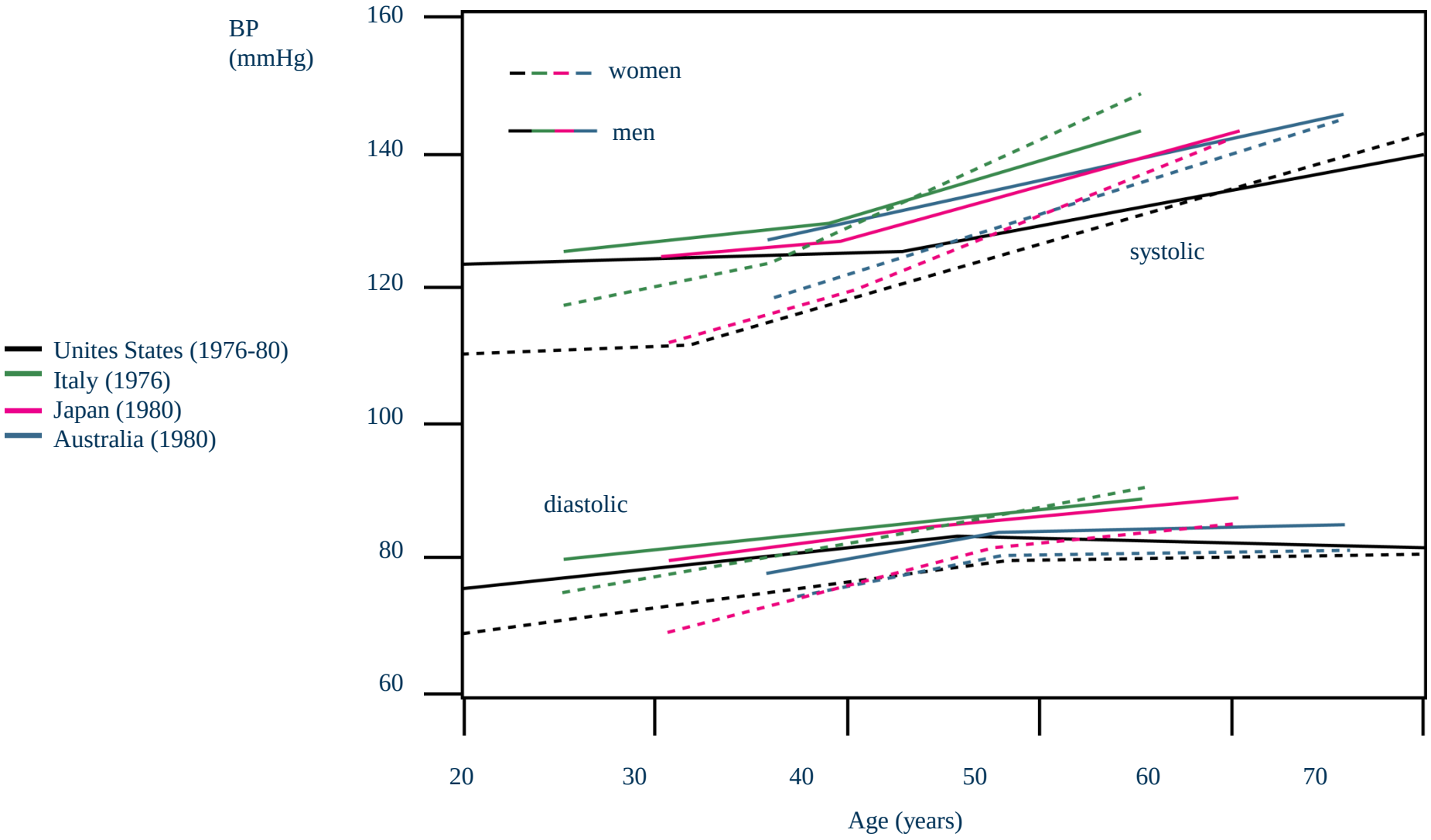
Rocella EJ. *Paper presented at ASH*. New York, May 1999

Blood Pressure Measurement

- Measure BP as accurately as possible (BHS protocol, EEMY)
- Use validated manometers
- Use proper cuff
- Home BP monitoring
- Ambulatory monitoring
- White coat effect
- Masked hypertension

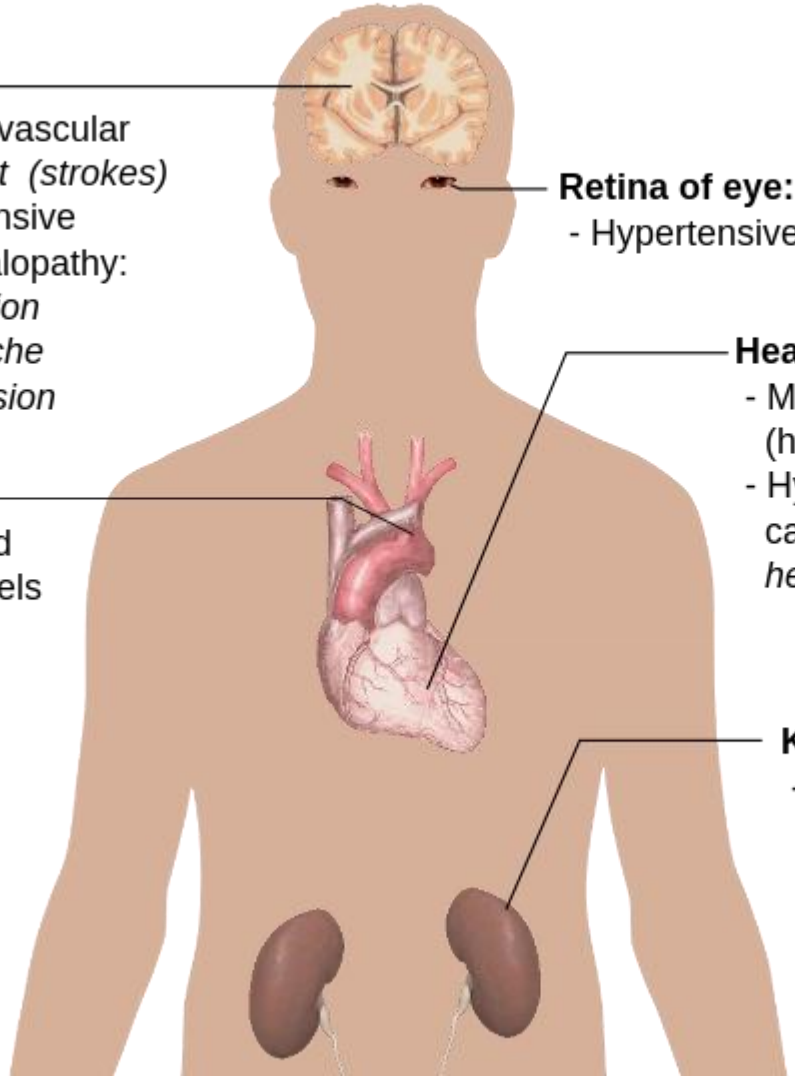
BP thresholds for definition of hypertension are different for:

	SBP	DBP
Office or clinic	140	90
24-hour	125–130	80
Day	130–135	85
Night	120	70
Home	130–135	85


BP
(mmHg)
160
140
120
100
80
60
women
men
systolic
diastolic
Unites States (1976-80)
Italy (1976)
Japan (1980)
Australia (1980)
20
30
40
50
60
70
Age (years)

Main complications of persistent

High blood pressure



Brain:
- Cerebrovascular *accident (strokes)*
- Hypertensive encephalopathy:
  -confusion
  -headache
  -convulsion

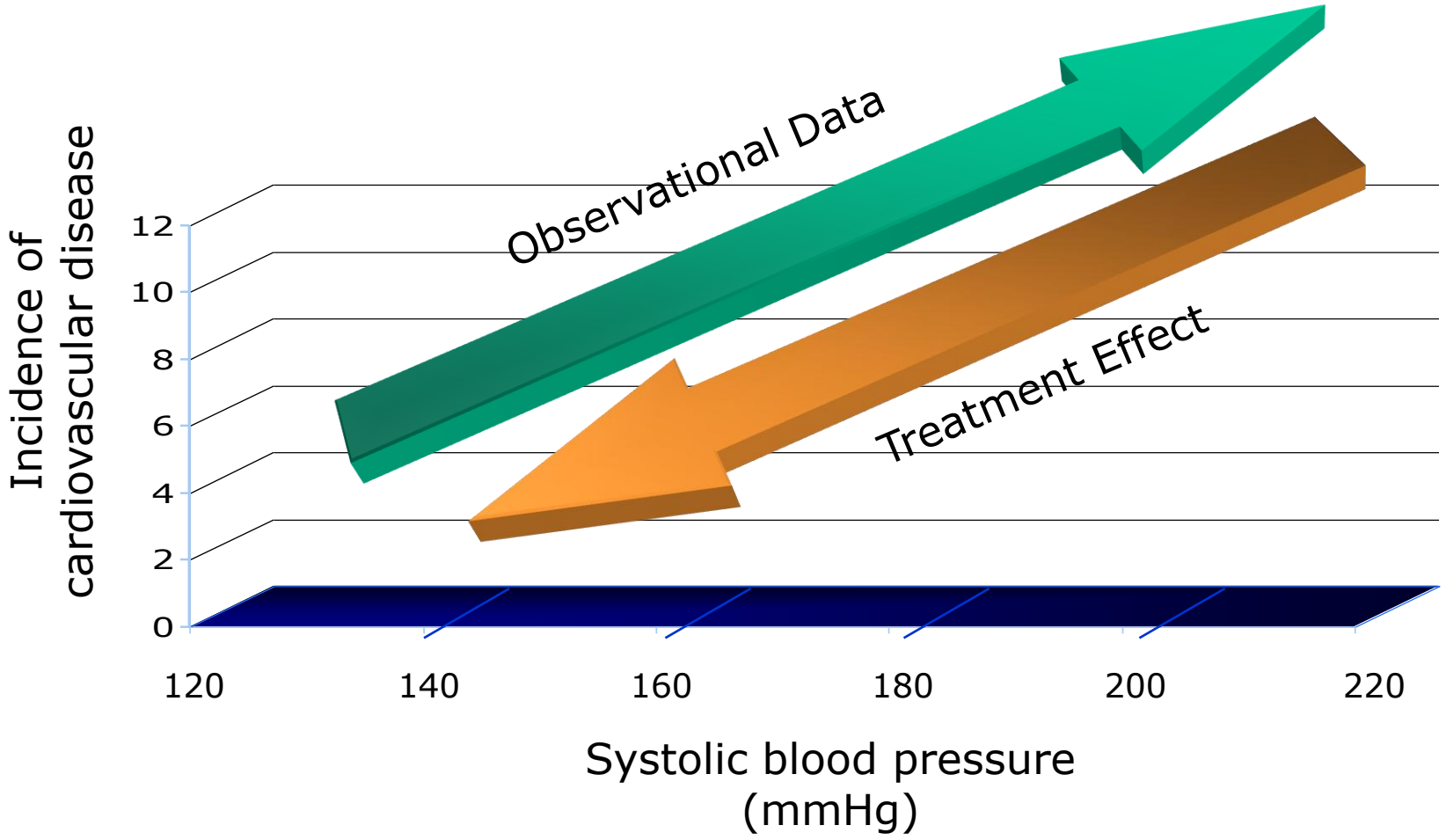
Retina of eye:
- Hypertensive retinopathy

Heart:
- Myocardial infarction (heart attack)
- Hypertensive cardiomyopathy: *heart failure*

Blood:
- Elevated sugar levels

Kidneys:
- Hypertensive nephropathy: *chronic renal failure*

Hypertension Treatment Effect Mirrors Observational Data



- **Physical examination**
- • Signs suggesting secondary hypertension
- • Signs of organ damage (brain, retina, heart, peripheral arteries,
- **Laboratory investigations**
- Routine tests
- • Plasma glucose (preferably fasting)
- • Serum total and high-density lipoprotein (HDL)
- cholesterol; fasting serum triglycerides
- • Serum creatinine
- • Serum uric acid
- • Serum potassium
- • Haemoglobin and haematocrit
- • Urinalysis (dipstick test and urinary sediment)
- • Electrocardiogram
- **Recommended tests**
- • Echocardiogram
- • Carotid (and femoral) ultrasound
- • Postprandial plasma glucose (when fasting value
- > 6.1 mmol/l or 110 mg/l)
- • C-reactive protein (high sensitivity)
- • Microalbuminuria (essential test in diabetics)

Markers	CV predictive value	Availability	Cost
Electrocardiography	++	++++	+
Echocardiography	+++	+++	++
Carotid Intima-Media Thickness	+++	+++	++
Arterial stiffness (Pulse wave velocity)	+++	+	++
Ankle-Brachial index	++	++	+
Coronary calcium content	+	+	++++
Cardiac/Vascular tissue composition	?	+	++
Circulatory collagen markers	?	+	++
Endothelial dysfunction	++	+	+++
Cerebral lacunae/White matter lesions	?	++	++++
Est. Glomerular Filtration Rate or Creatinine Clearance	+++	++++	+
Microalbuminuria	+++	++++	+

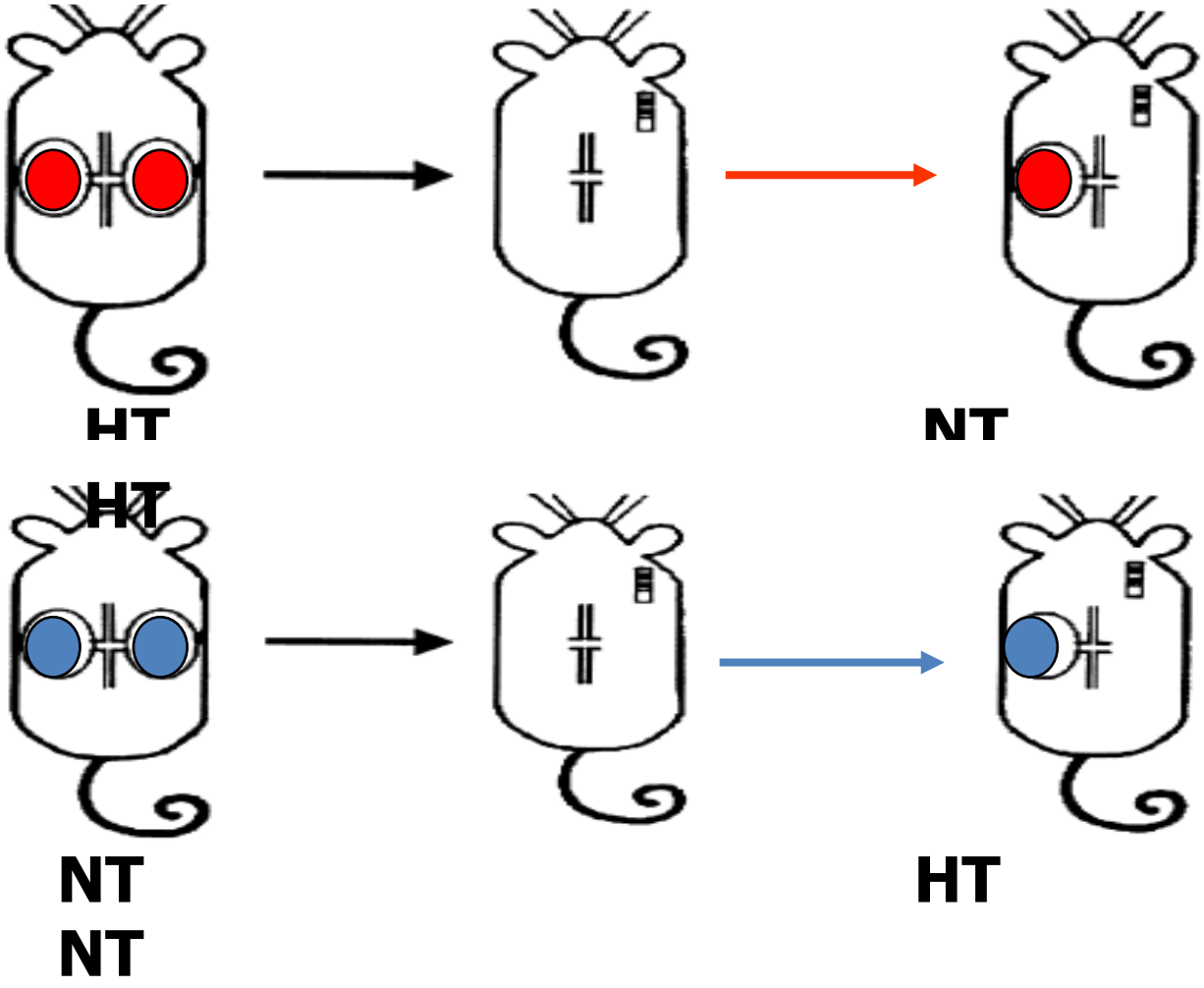
Sensitivity To Detect Treatment-induced Changes, Time To Change And Prognostic Value Of Change By Markers Of Asymptomatic OD

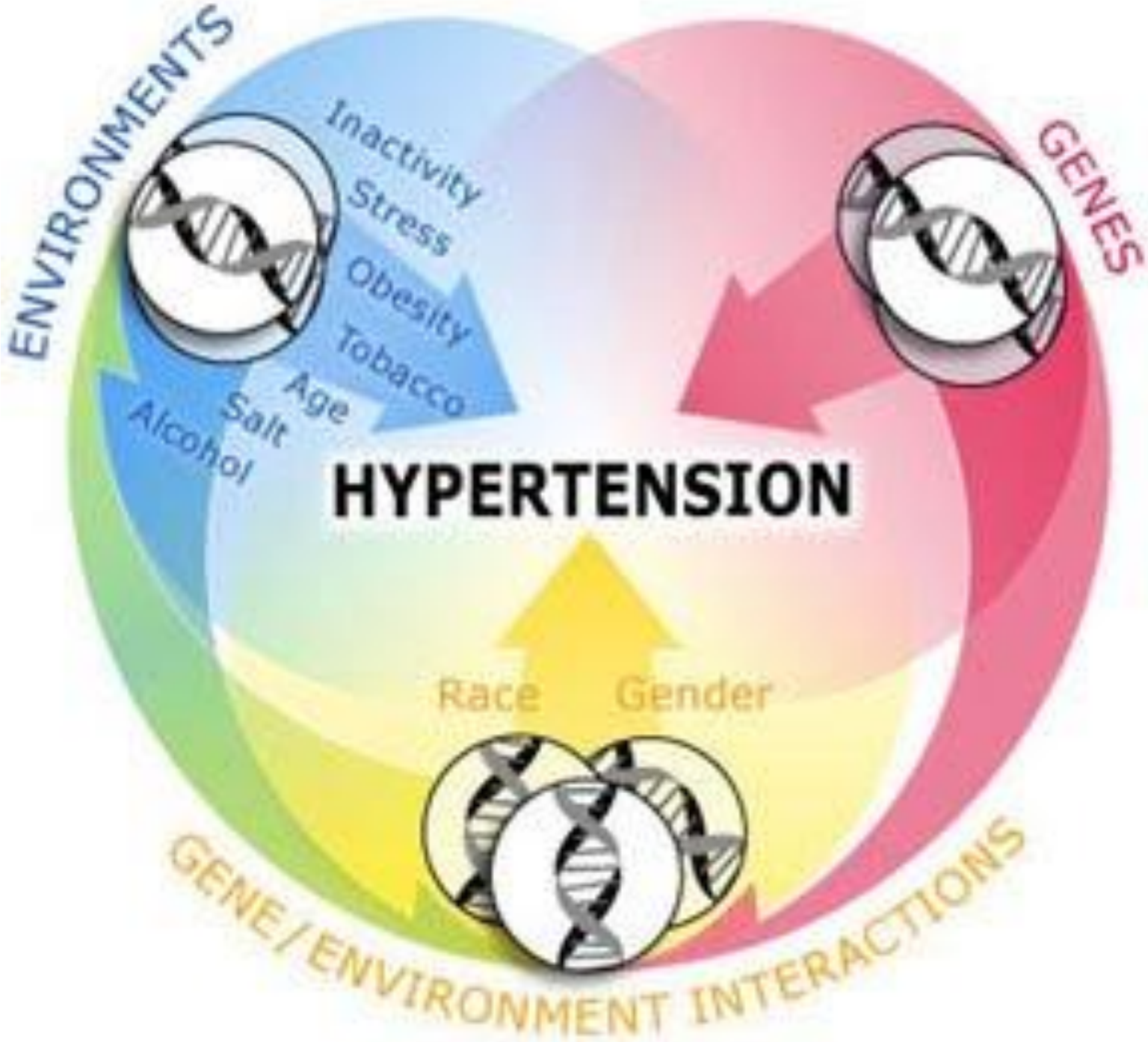
Marker of organ damage	Sensitivity for changes	Time to change	Prognostic value of changes
LVH/ECG	Low	Moderate (>6 months)	Yes
LVH/echo	Moderate	Moderate (>6 months)	Yes
LVH/cardiac magnetic resonance	High	Moderate (>6 months)	No data
eGFR	Moderate	Very slow (years)	No data
Urinary protein excretion	High	Fast (weeks–months)	Moderate
Carotid wall thickness	Very low	Slow (>12 months)	No
Pulse wave velocity	High	Fast (weeks–months)	Limited data
Ankle/ brachial index	Low	No data	No data

ΣΤΟΙΧΕΙΑ ΠΑΘΟΦΥΣΙΟΛΟΓΙΑΣ ΤΗΣ ΥΠΕΡΤΑΣΗΣ

In this short paper, I have tried to explain the elation that we felt when we first realized that the kidney-fluid mechanism for controlling the arterial pressure has an infinite feedback gain property. Because of this, all the other pressure control mechanisms, none of which has ever been shown to have a similar infinite gain property, must themselves alter the kidney-fluid mechanism if they are to succeed in causing long-term changes in the arterial pressure. We have not been able to refute this principle despite many experiments over the

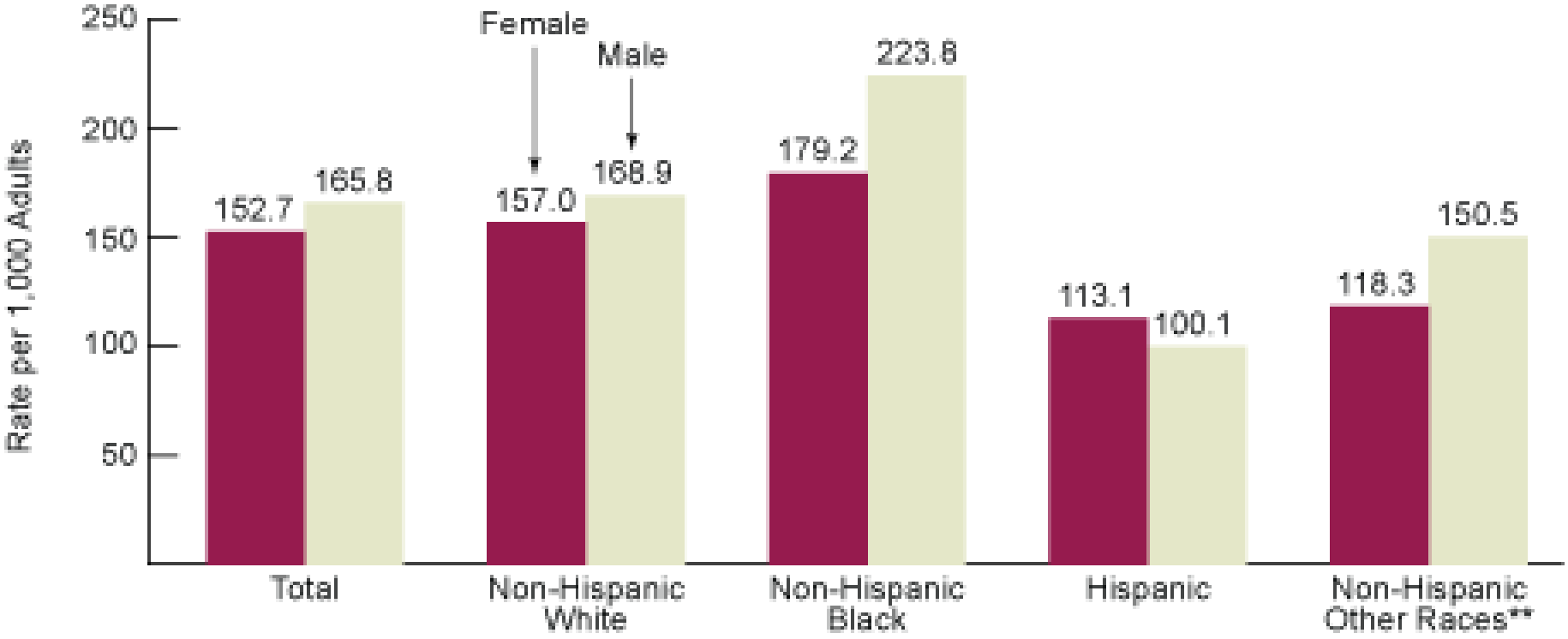
Hypertension travels along with the kidney!




ENVIRONMENTS
Inactivity
Stress
Obesity
Tobacco
Age
Salt
Alcohol
GENES
HYPERTENSION
Race
Gender
GENE / ENVIRONMENT INTERACTIONS

Adults Aged 18 and Older with Hypertension,* by Race/Ethnic and Sex, 2005–2006

Source: Centers for Disease Control and Prevention, National Center for Health Statistics, N Health and Nutrition Examination Survey



*At the time of examination had a systolic pressure (during heartbeats) of 140 or higher, and/or a diastolic pressure (between heartbeats) of 90 or higher. Rates are not age-adjusted. **Includes Asian/Pacific Islander, American Indian/Alaska Native, persons of more than one race, and persons of other races not specified.

Disorder	Mode of inheritance	Genes	Mutation and functional consequences	References
Glucocorticoid-remediable aldosteronism	Autosomal dominant	*CYP11b1* and *CYP11b2*	Ectopic expression of aldosterone synthase activity in adrenal fasciculata	29,34,35, 42,43
Apparent mineralocorticoid excess	Autosomal recessive	*11bHSD*	Loss-of-function mutation resulting in excess stimulation of the mineralocorticoid receptor (MR); hypertension mediated by increased renal cortical collecting tubule epithelial sodium channel (ENaC) activity	29,34,36, 42,43
Mutations in mineralocorticoid receptor	Autosomal dominant	*NR3C2*	S810L missense mutation in the ligand-binding domain converts receptor antagonists (such as progesterone) to agonists; pregnancy exacerbates hypertension	37
Liddle syndrome	Autosomal dominant	*SCNN1B*	*De novo* missense mutation of the β-subunit of ENaC	38,39,42, 43
Liddle syndrome	Autosomal dominant	*SCNN1G*	Mutation in the γ-subunit of ENaC that deletes the cytoplasmic C terminus, resulting in excess sodium retention	38,39,42, 43
Pseudohypoaldosteronism type II	Autosomal dominant	*WNK1* and *WNK4*	*WNK* serine–threonine kinase defects resulting in hyperkalaemia and hypertension	29,31,32, 40, 42,43
Mutations in peroxisome proliferator-activated receptor-γ	Autosomal dominant	*PPARG*	Loss-of-function mutation resulting in insulin resistance, diabetes mellitus and hypertension	41
Syndrome of hypertension, hypercholesterolaemia and hypomagnesaemia	Mitochondrial inheritance	Not yet identified	Maternal inheritance of a homoplasmic mutation causes a cytidine substitution in the mitochondrial tRNA	33,43

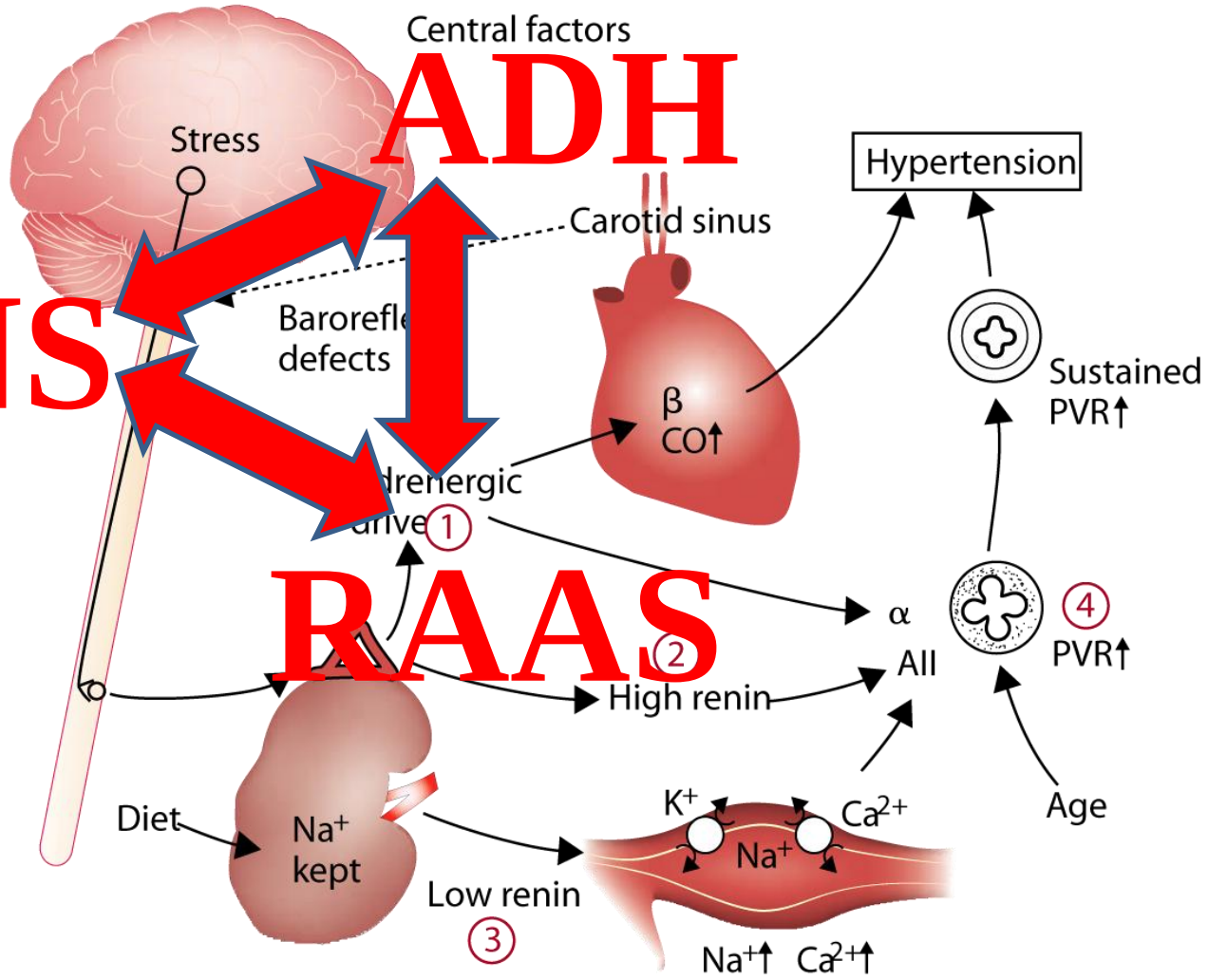
CYP11b1, cytochrome P450, subfamily 11B, polypeptide 1; *CYP11b2*, cytochrome P450, subfamily 11B, polypeptide 2; *NR3C2*, mineralocorticoid receptor (aldosterone receptor); *PPARG*, peroxisome proliferator activated receptor-γ; *SCNN1B*, sodium channel non-voltage-gated 1β (epithelial); *SCNN1G*, sodium channel, non-voltage-gated 1γ; *WNK1*, protein kinase, lysine deficient 1; *WNK4*, protein kinase, lysine deficient 4; *11bHSD*, hydroxysteroid 11-β dehydrogenase.

Cowley Nature Reviews Genetics 7, 829–840 (November 2006) | doi:10.1038/nrg1967

nature REVIEWS GENETICS

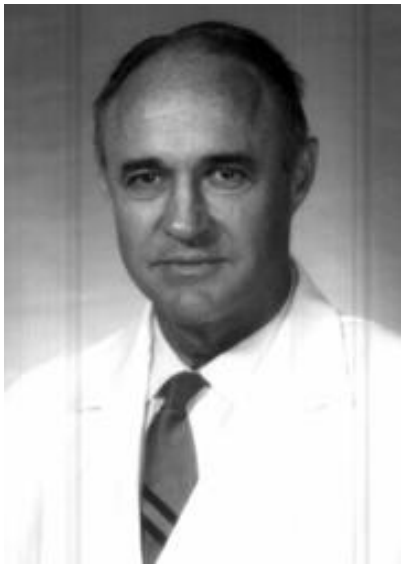
Multifactorial origin of Hypertension

- Major mechanisms
  - (1) increased adrenergic drive, as often found in young people (aged 30–49 years);
  - (2) high-renin hypertension, as seen in individuals with renal dysfunction;
  - (3) low-renin hypertension, as recorded in individuals with inherently raised aldosterone concentrations;
  - (4) increased peripheral vascular resistance (PVR), as seen in elderly patients. CO=cardiac output. β=β-adrenergic stimulation α=α-adrenergic stimulation. AII=angiotensin II.

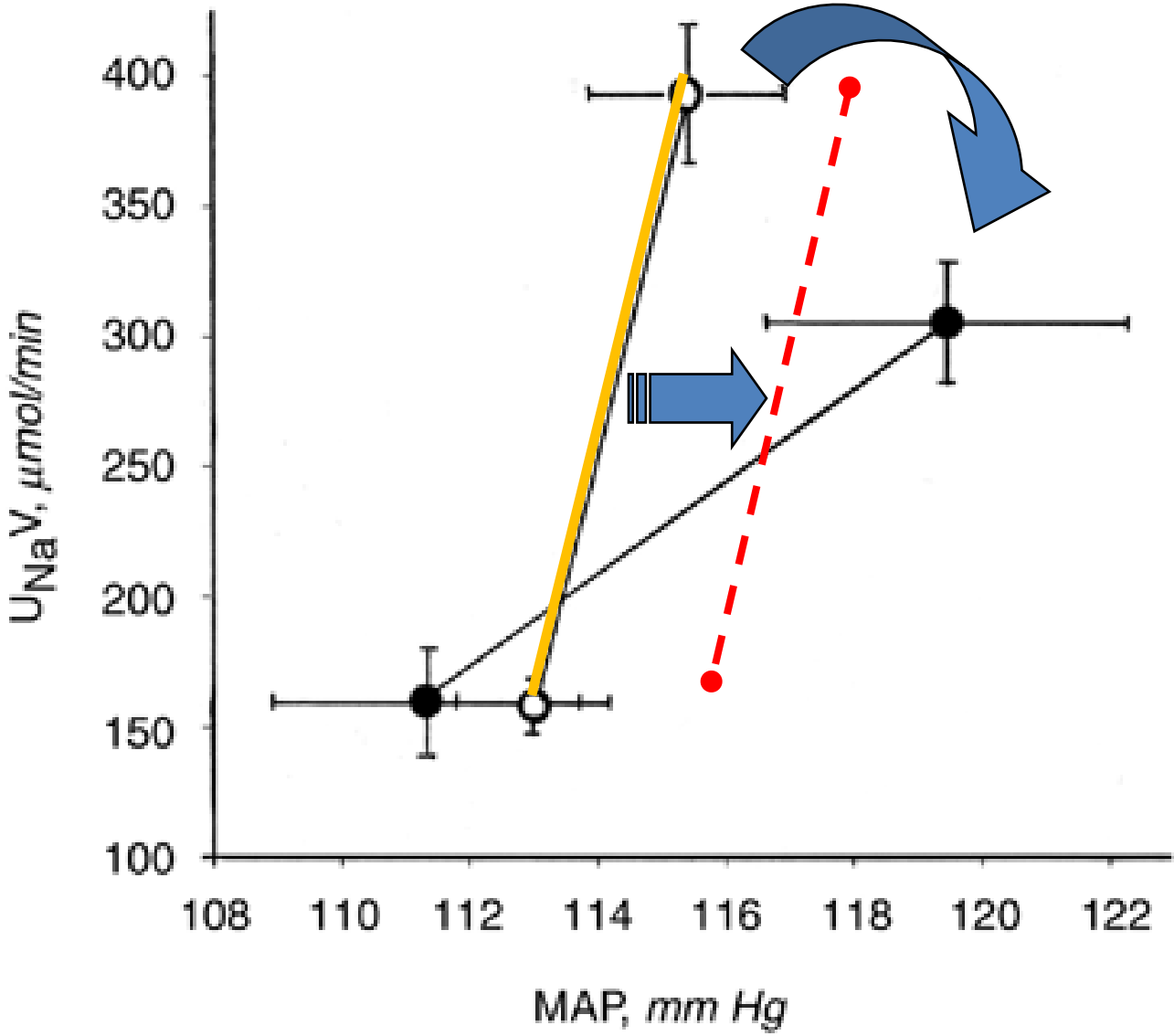


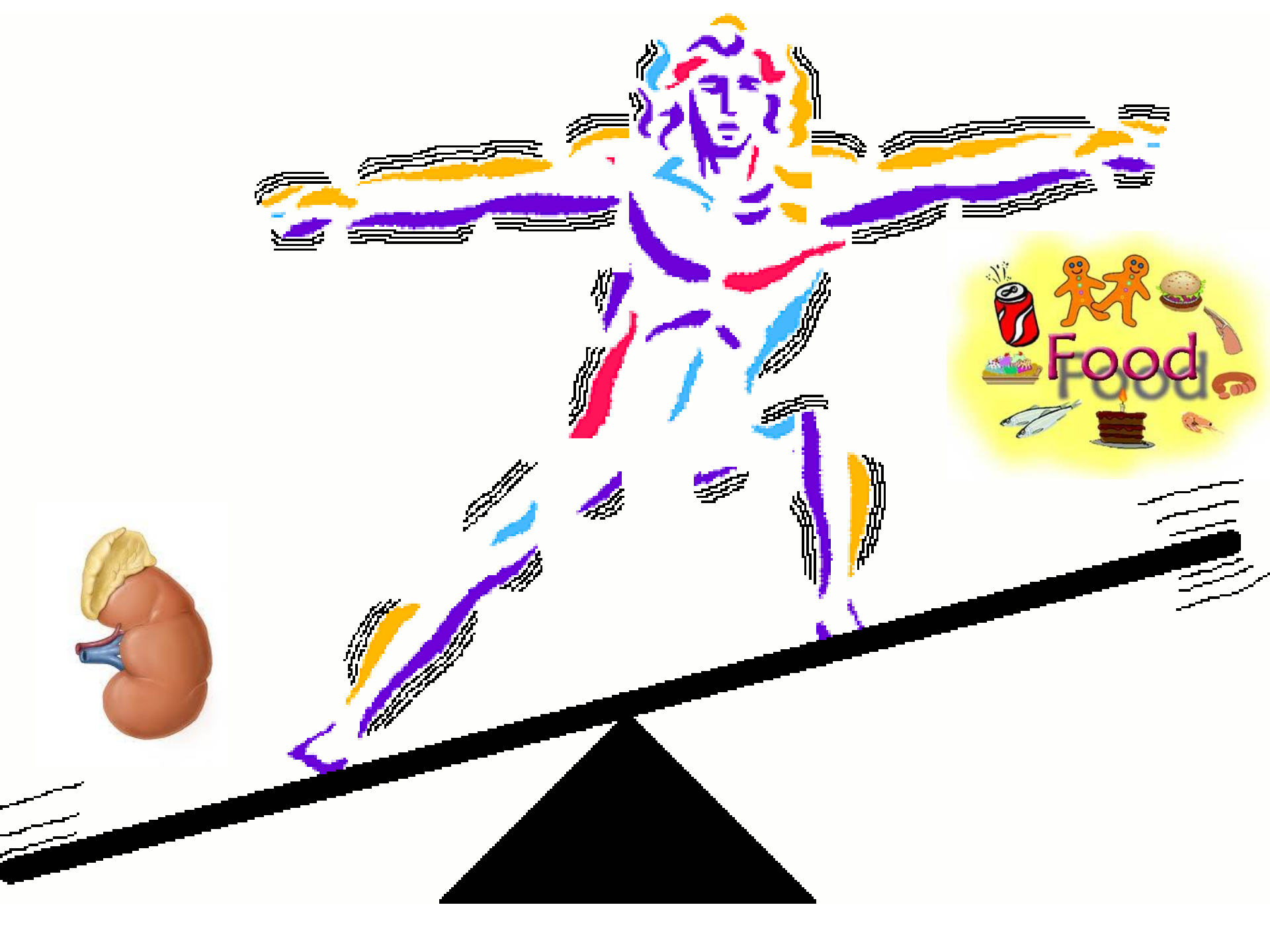
BP = CO x SVR

Kaplan NM & Opie LH. Lancet 2006; 367:168-176.

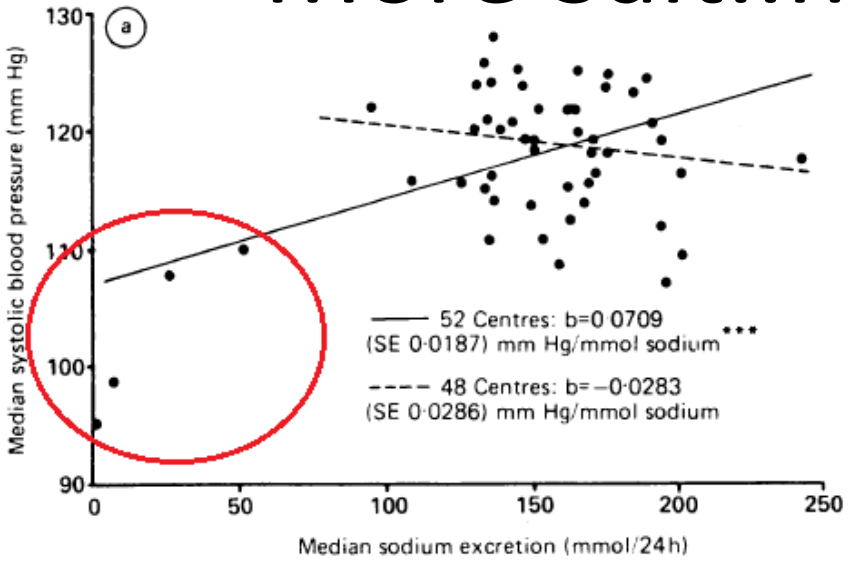


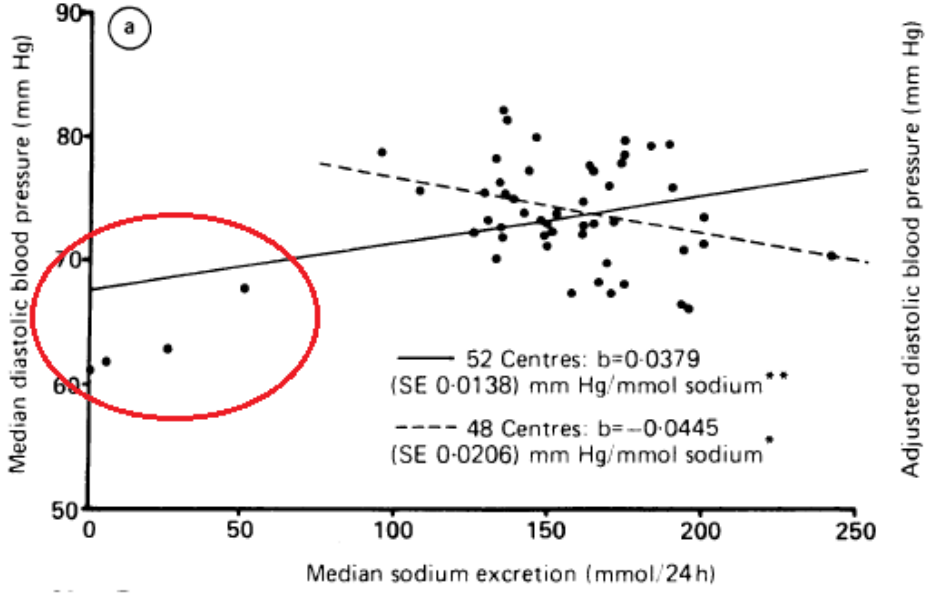
Arthur Guyton

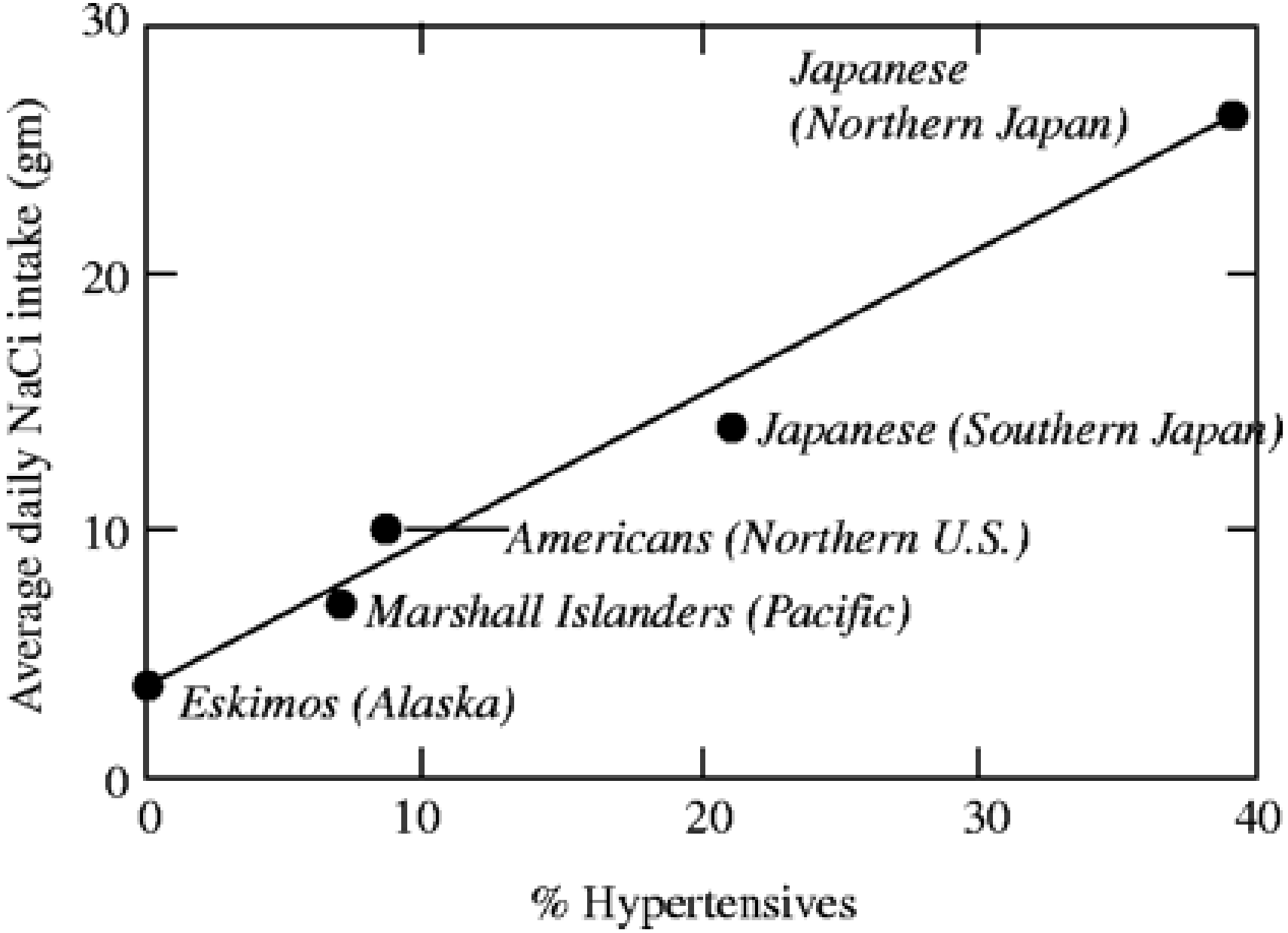


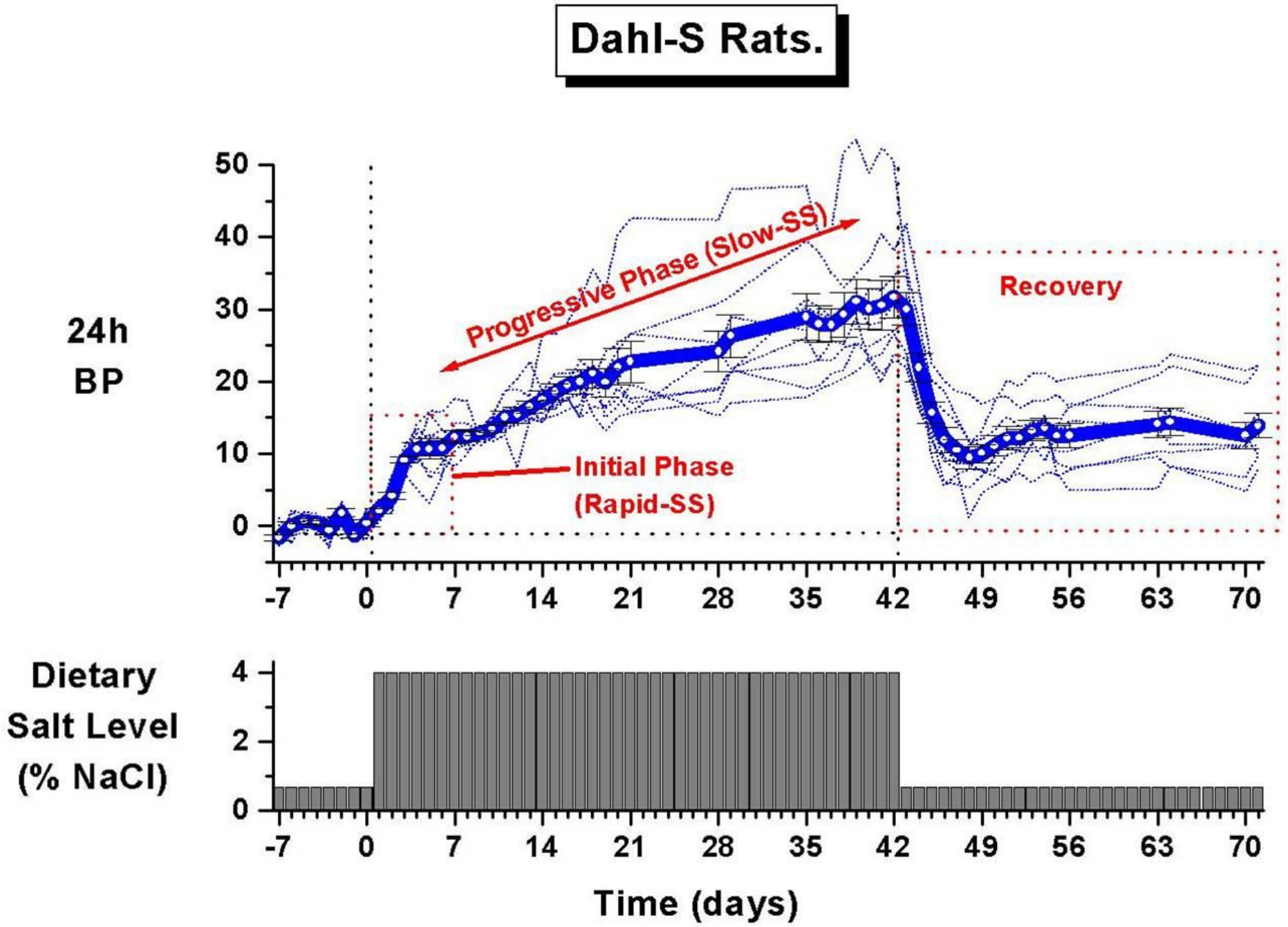

Food

More Salt..More Pressure





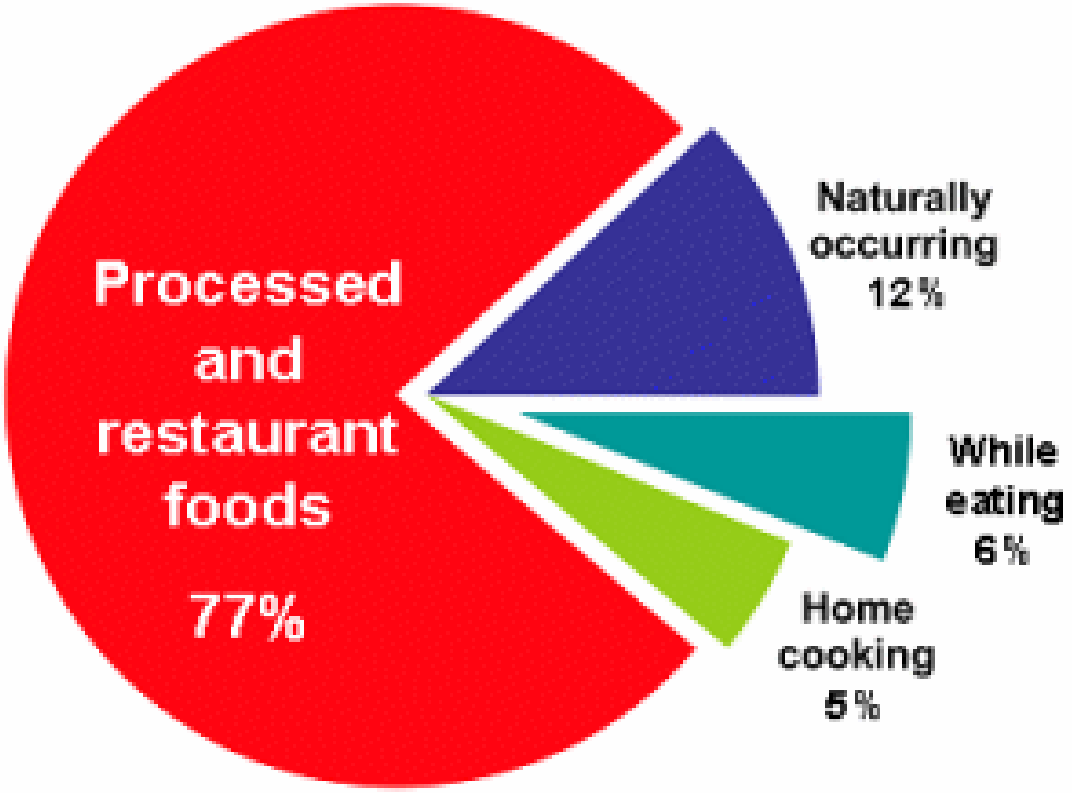

30
20
10
0
0
10
20
30
40
Average daily NaCi intake (gm)
% Hypertensives
Japanese
(Northern Japan)
Japanese (Southern Japan)
Americans (Northern U.S.)
Marshall Islanders (Pacific)
Eskimos (Alaska)


Dahl-S Rats.
24h
BP
50
40
30
20
10
0
Progressive Phase (Slow-SS)
Recovery
Initial Phase
(Rapid-SS)
-7
0
7
14
21
28
35
42
49
56
63
70
Dietary
Salt Level
(% NaCl)
4
2
0
Time (days)

Denton D et al. The effect of increased salt intake on blood pressure in chimpanzees.
Nat Med 1995;1:1009-16.

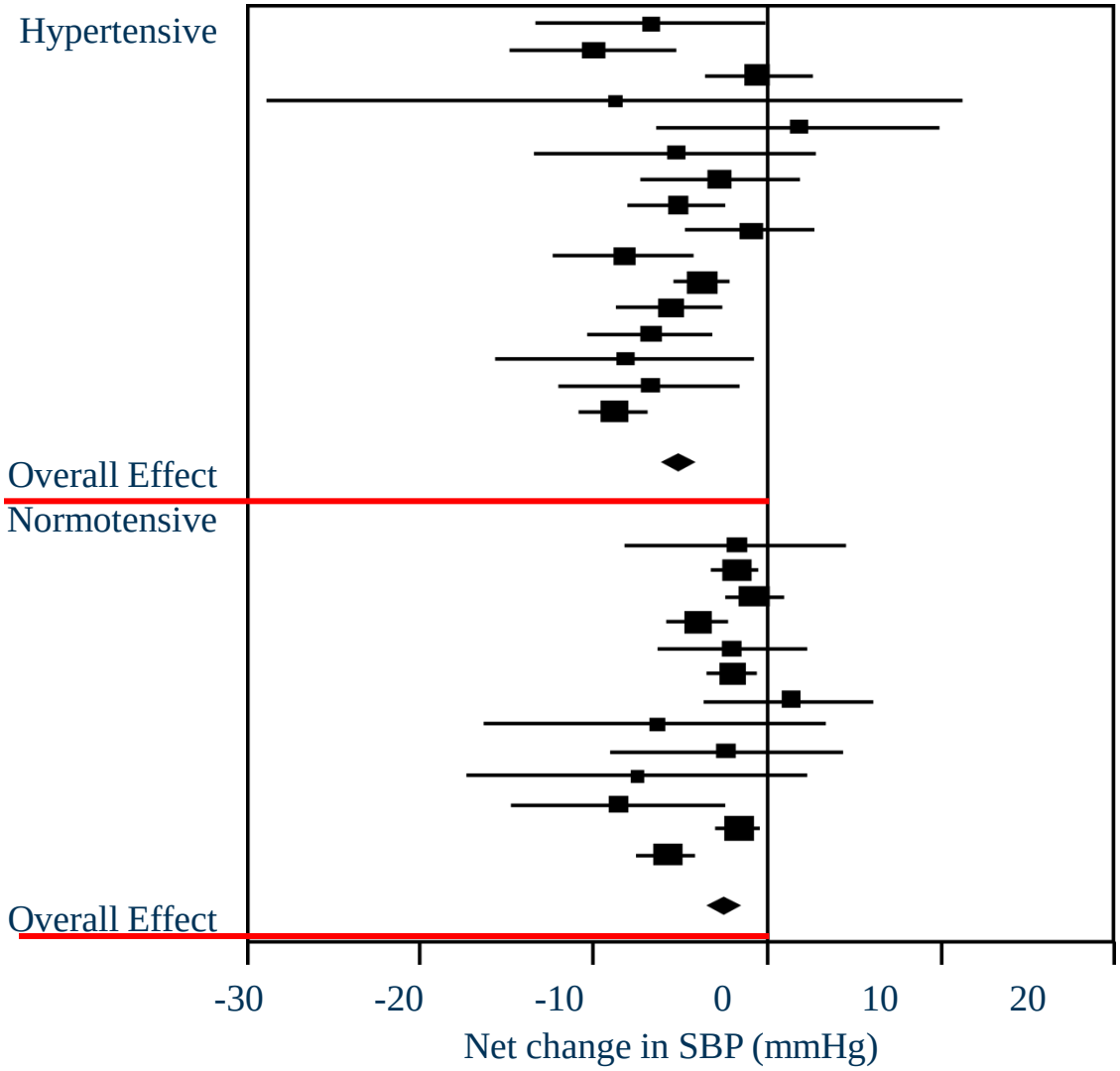
- Humans share 98.4% genetic identity with chimpanzees
- By adding up to 15 g of NaCl daily, SBP increased by 33 mm Hg and DBP by 10 mm Hg
- The increases were reversed after withdrawal of the sodium chloride supplement.

Most Sodium Comes from Processed and Restaurant Foods



Relatively salt-sensitive groups of people

- Individuals > 50-60 yo
- Blacks
- Hypertensive patients
- Obese people with metabolic syndrome and DM
- Patients with CKD



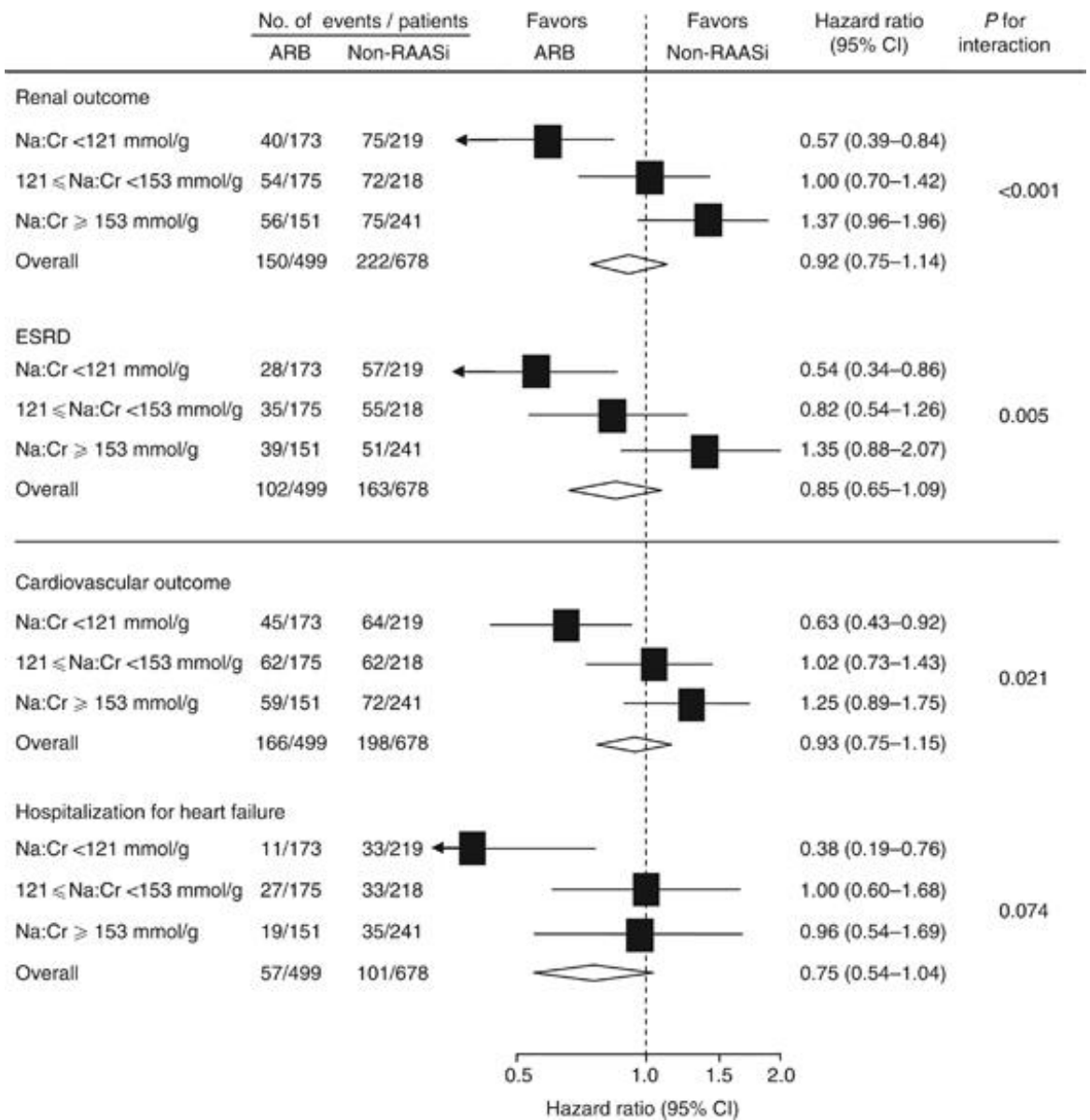
He FJ and MacGregor GA. J Hum Hypertens 2002; 16:761-770.

Additional advantages from decreased salt consumption

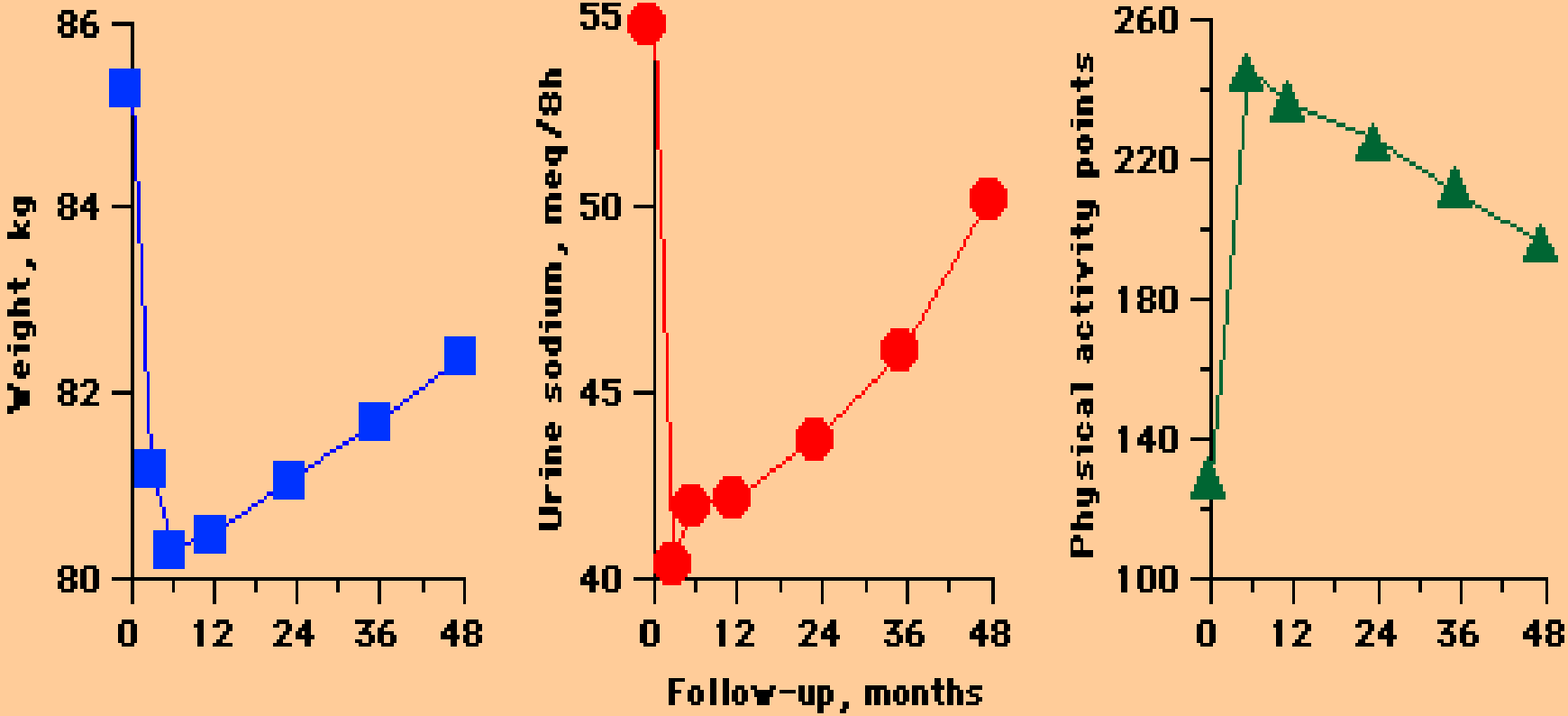
- Improved response to antihypertensive medications (except from CCB's).
- Regression of LVH.
- Decreased calcium excretion in urine (lower chance for lithiasis and renal colic).
- Augments antiproteinuric effect of RAS inhibitors and improves their renoprotective and cardioprotective capacity.

Moderation of dietary sodium potentiates the renal and cardiovascular protective effects of angiotensin receptor blockers

Hiddo J Lambers Heerspink et al KI 2012



force of HABIT



Diminished compliance with nonpharmacologic therapy over time Changes

ΥΓΙΕΙΝΟΔΙΑΙΤΗΤΙΚΗ ΑΓΩΓΗ

1. Διακοπή καπνίσματος
2. Απώλεια βάρους
3. Μείωση της κατανάλωσης οινοπνεύματος
4. Αύξηση της φυσικής δραστηριότητας
5. Ελάττωση της κατανάλωσης αλατιού
6. Δίαιτα

Αίτια υπερτάσεως στον γενικό πληθυσμό ενηλίκων

- 85-90% ιδιοπαθής υπέρταση
- 3-5% βλάβη νεφρών
- 1-3% νεφραγγειακή υπέρταση
- 0.5-1% υπεραλδοστερονισμός
- 0.1-0.5% φαιοχρωμοκύτωμα
- Cushing, Υπερπαραθυρεοειδισμός, άπνοια ύπνου, υποθυρεοειδισμός, στένωση ισθμού αορτής, αλκοολισμός
- φάρμακα (αντισυλληπτικά, ερυθροποιητίνη, κυκλοσπορίνη κλπ

Initiation of lifestyle changes and antihypertensive drug treatment

Other risk factors, asymptomatic organ damage or disease	Blood pressure (mmHg)			
	High normal SBP 130–139 or DBP 85–89	Grade 1 HT SBP 140–159 or DBP 90–99	Grade 2 HT SBP 160–179 or DBP 100–109	Grade 3 HT SBP ≥180 or DBP ≥110
No other RF	• No BP intervention	• Lifestyle changes for several months • Then add BP drugs targeting <140/90	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
1–2 RF	• Lifestyle changes • No BP intervention	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
≥3 RF	• Lifestyle changes • No BP intervention	• Lifestyle changes for several weeks • Then add BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
OD, CKD stage 3 or diabetes	• Lifestyle changes • No BP intervention	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90
Symptomatic CVD, CKD stage ≥4 or diabetes with OD/RFs	• Lifestyle changes • No BP intervention	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • BP drugs targeting <140/90	• Lifestyle changes • Immediate BP drugs targeting <140/90

BP, blood pressure; CKD, chronic kidney disease; CV, cardiovascular; CVD, cardiovascular disease; DBP, diastolic blood pressure; HT, hypertension; OD, organ damage; RF, risk factor; SBP, systolic blood pressure.

Initiation Of Drug Treatment In Hypertension

Grade 2-3	**Recommended (Promptly)**
Grade 1 / High CV risk	**Recommended**
Grade 1 / Low CV risk	**Should be considered**
Elderly	**Recommended if SBP ≥ 160 mmHg (also > 80 ys of age)**
	May be considered if SBP 140-159 mmHg
High normal BP	**No drug treatment recommended**

Blood pressure goals in hypertensive patients

Recommendations	
SBP goal for "most" •Patients at low–moderate CV risk •Patients with diabetes •Consider with previous stroke or TIA •Consider with CHD •Consider with diabetic or non-diabetic CKD	**<140 mmHg**
SBP goal for elderly •Ages <80 years •Initial SBP ≥160 mmHg	**140-150 mmHg**
SBP goal for fit elderly Aged <80 years	**<140 mmHg**
SBP goal for elderly >80 years with SBP •≥160 mmHg	**140-150 mmHg**
DBP goal for "most"	**<90 mmHg**
DB goal for patients with diabetes	**<85 mmHg**

SBP, systolic blood pressure; CV, cardiovascular; TIA, transient ischaemic attack; CHD, coronary heart disease; CKD, chronic kidney disease; DBP, diastolic blood pressure.

Treatment of hypertension in the elderly

Hypertensives > 80 years

Start antihypertesive treatment with SBP above 160 mmHg

Target SBP< 150 mmHg

(gradual and carefully monitored)

Journal of Hypertension 2009; 27: 2121-2158.

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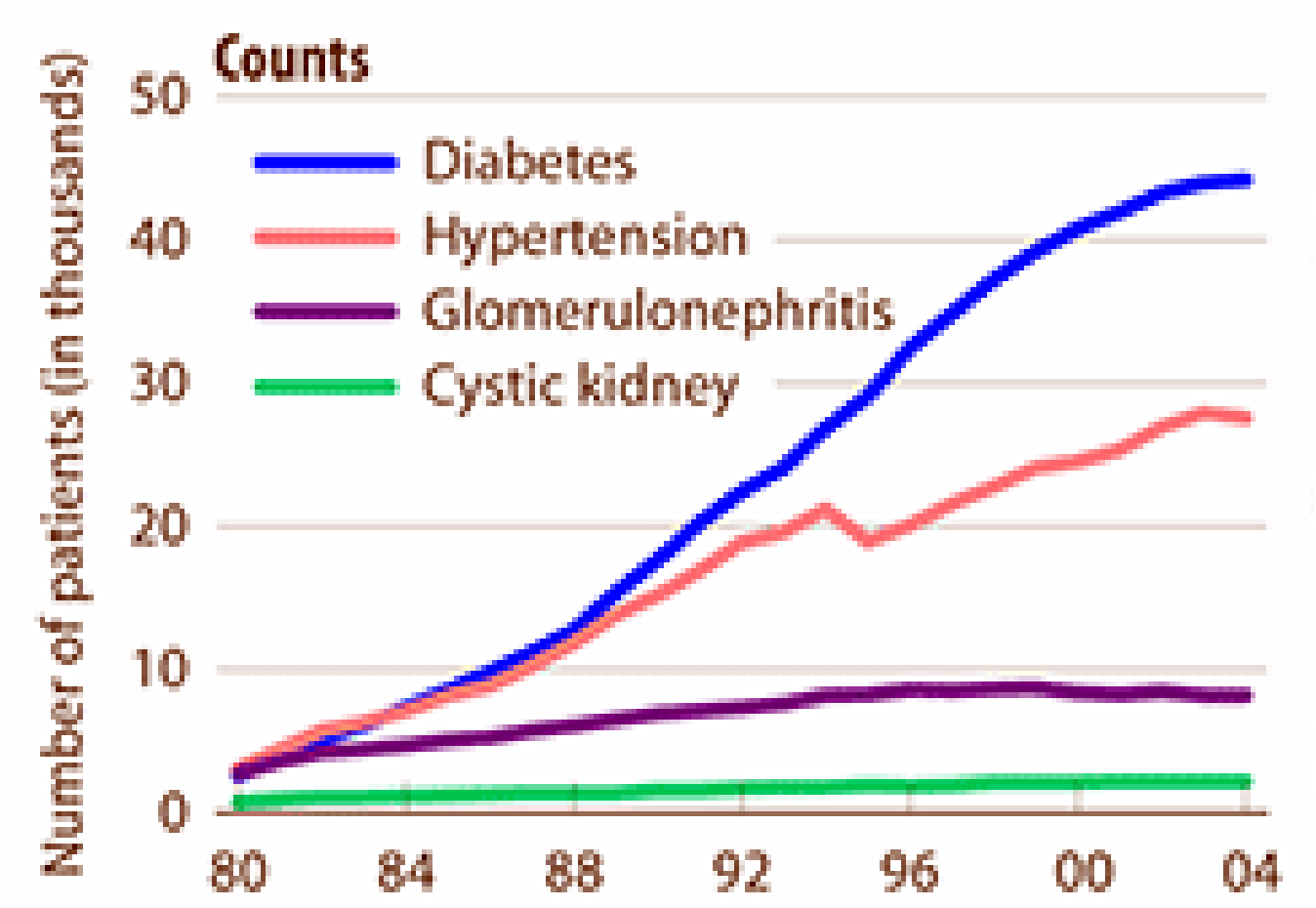
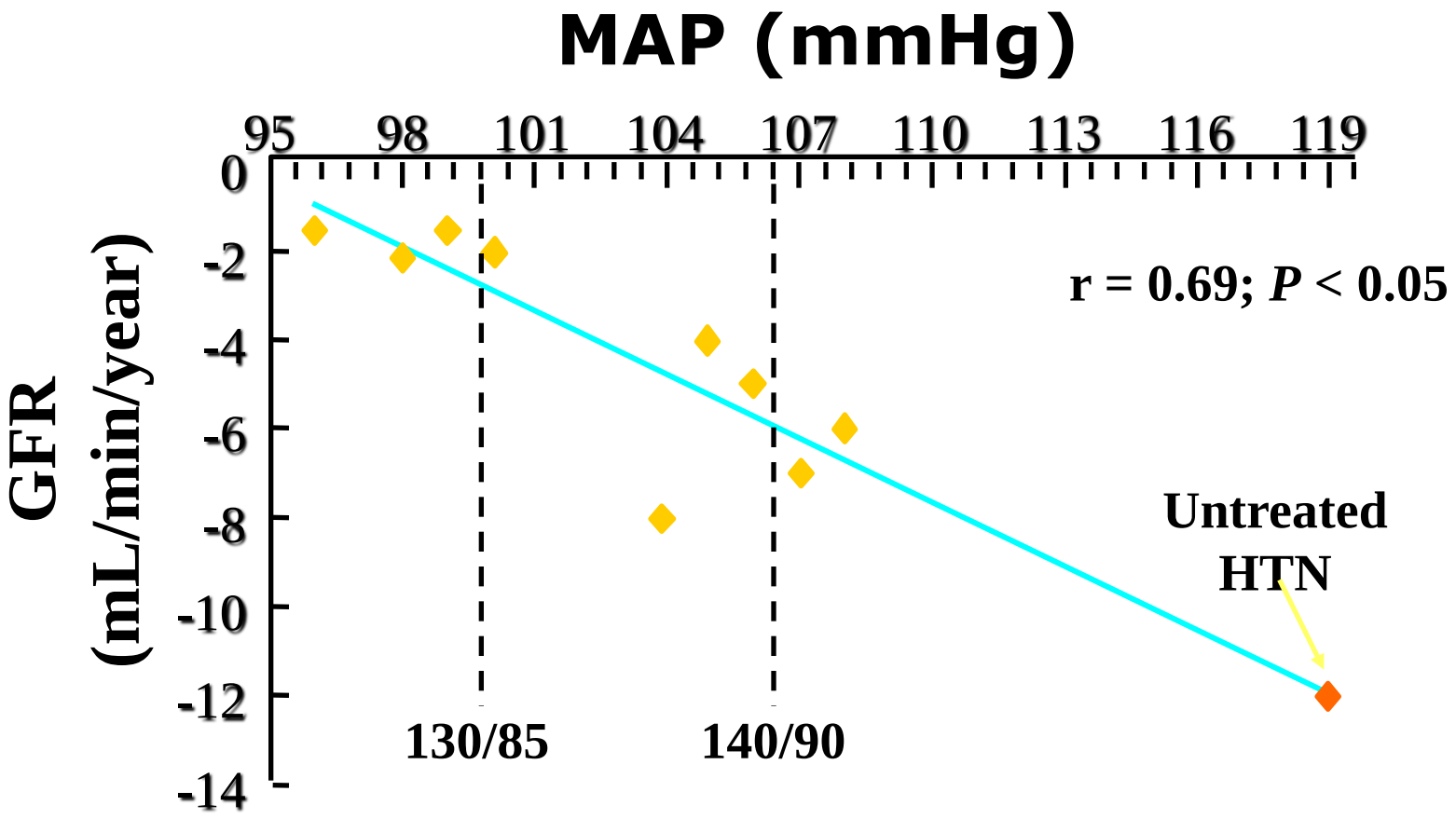
- φάρμακα (αντισυλληπτικά, ερυθροποιητίνη, κυκλοσπορίνη κλπ

Hypertension can:

- independently cause CKD
- contribute to its development in the setting of other potential causes and accelerate the rate of deterioration
- be the result of CKD, as is the case in patients with polycystic kidney disease.

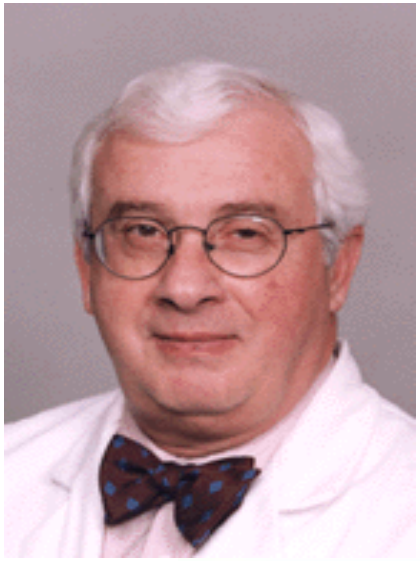

Counts
Number of patients (in thousands)
50
40
30
20
10
0
Diabetes
Hypertension
Glomerulonephritis
Cystic kidney
80
84
88
92
96
00
04

Meta Analysis: Lower Mean BP Results in Slower Rates of Decline in GFR in Diabetics and Non-Diabetics



Bakris GL, et al. Am J Kidney Dis. 2000;36(3):646-661.

The role of angiotensin II in maintaining adequate intraglomerular pressure



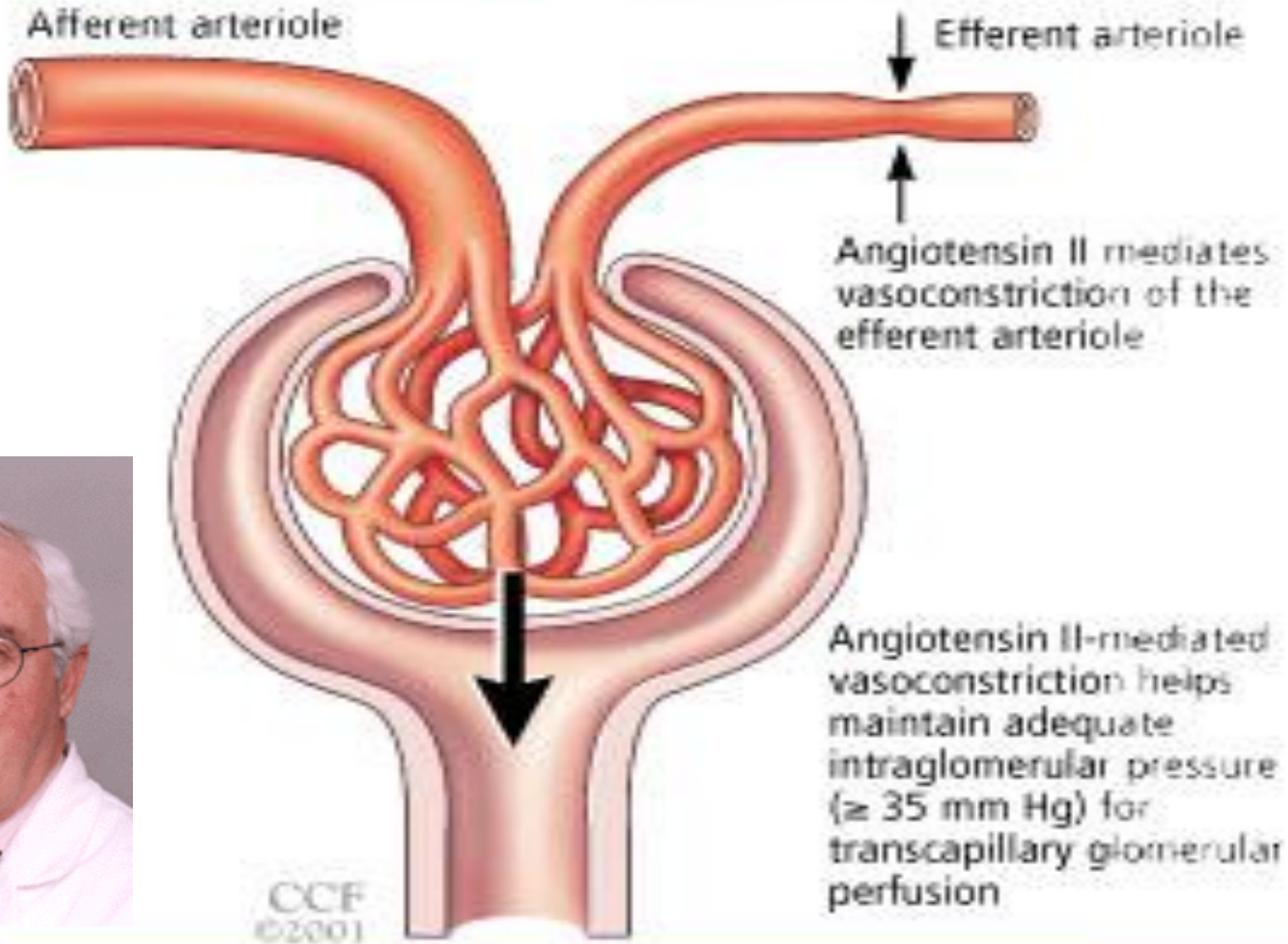
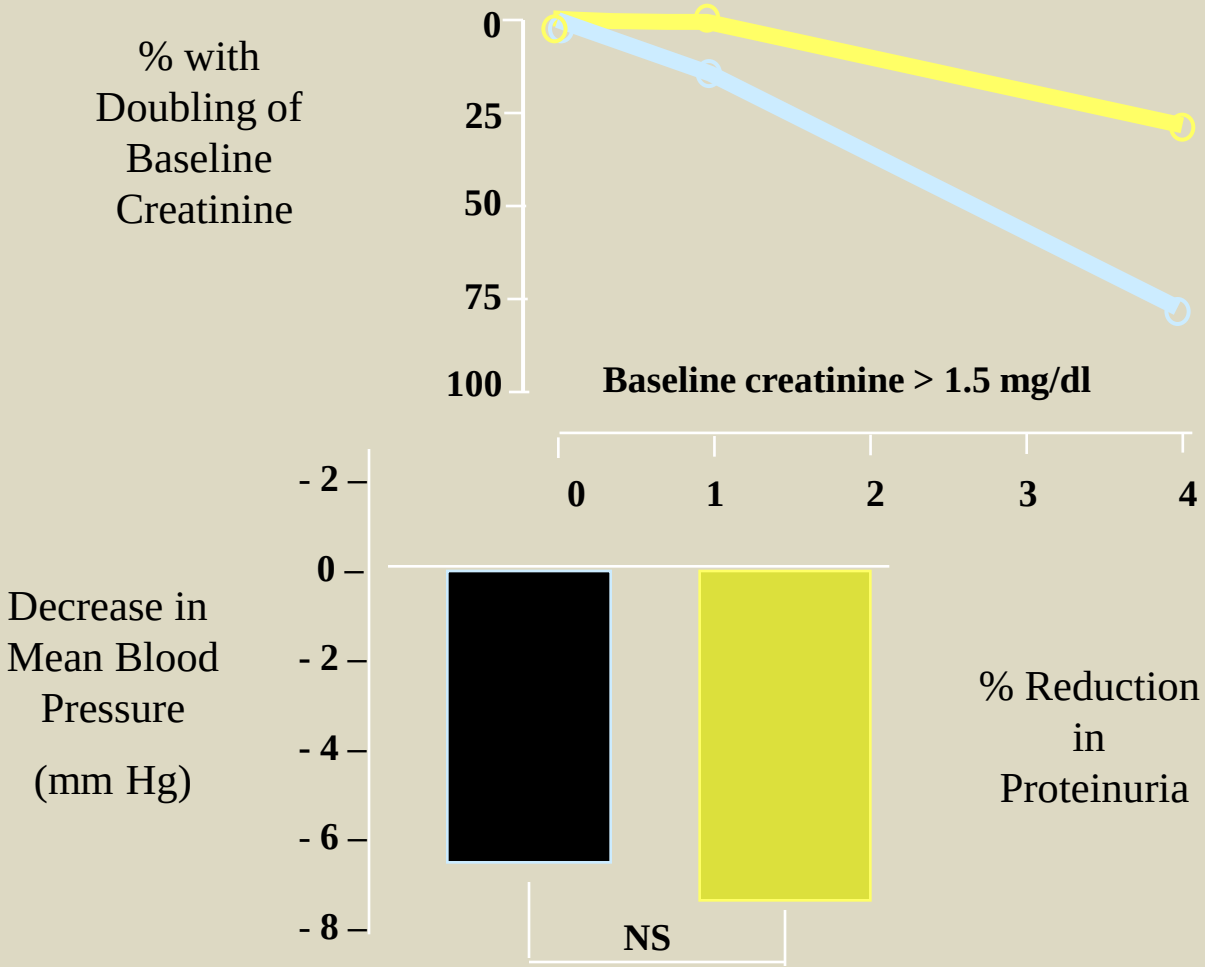


FIGURE 1

ACE-I is More Renoprotective than Conventional Therapy in Type 1 Diabetes (Total N = 409)



Lewis et al. *N Engl J Med*. 1993;329:1456-1462.

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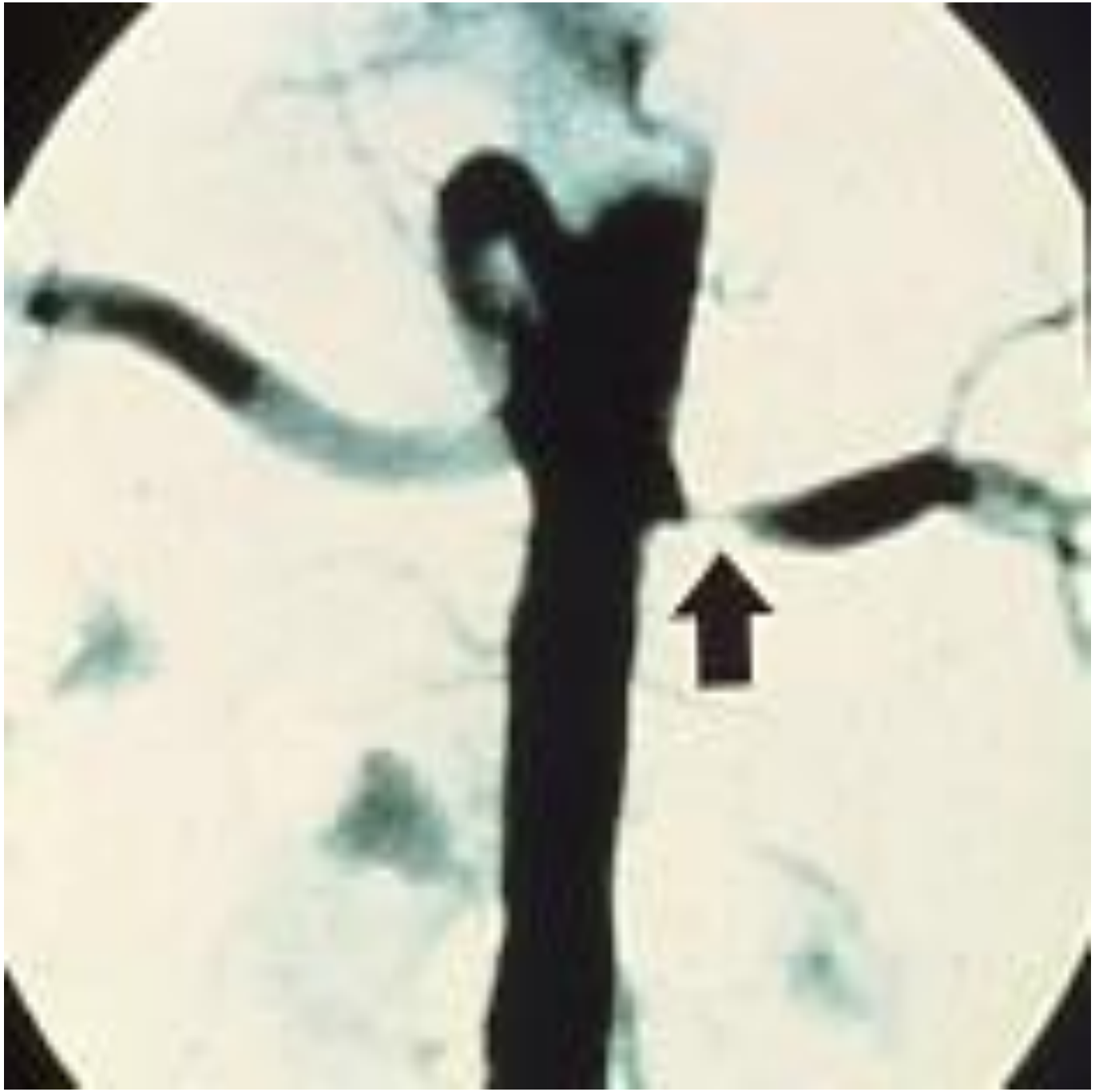
- 0.1-0.5% φαιοχρωμοκύτωμα
- Cushing, Υπερπαραθυρεοειδισμός, άπνοια ύπνου, υποθυρεοειδισμός, στένωση ισθμού αορτής, αλκοολισμός
- φάρμακα (αντισυλληπτικά, ερυθροποιητίνη, κυκλοσπορίνη κλπ



ΑΙΤΙΑ ΣΤΕΝΩΣΗΣ ΝΕΦΡΙΚΩΝ ΑΡΤΗΡΙΩΝ

- **Αθηρωμάτωση (75%-90%)** συνήθως αμφοτερόπλευρη, προϊούσα επιδείνωση, μέρος γενικευμένης αρτηριοσκληρώσεως, συχνά έμβολα χοληστερόλης, 5% του γενικού πληθυσμού

- **Ινομυική δυσπλασία (10-15%)** (70% του μέσου χιτώνα, κομβολογιοειδής εμφάνιση), συχνότερα σε νεαρές γυναίκες, <1% του γενικού πληθυσμού

- **Σπάνια αίτια:** Διαχωρισμός αορτής ή νεφρικής αρτηρίας , Μη ειδική αορτοαρτηριίτιδα (αρτηριίτιδα Takayasu), Εμβολή θρόμβου ή χοληστερόλης, Νόσημα κολλαγόνου, Νευροινωμάτωση, Τραυματισμός, Στένωση μετά μεταμόσχευση, Στένωση μετά ακτινοβολία

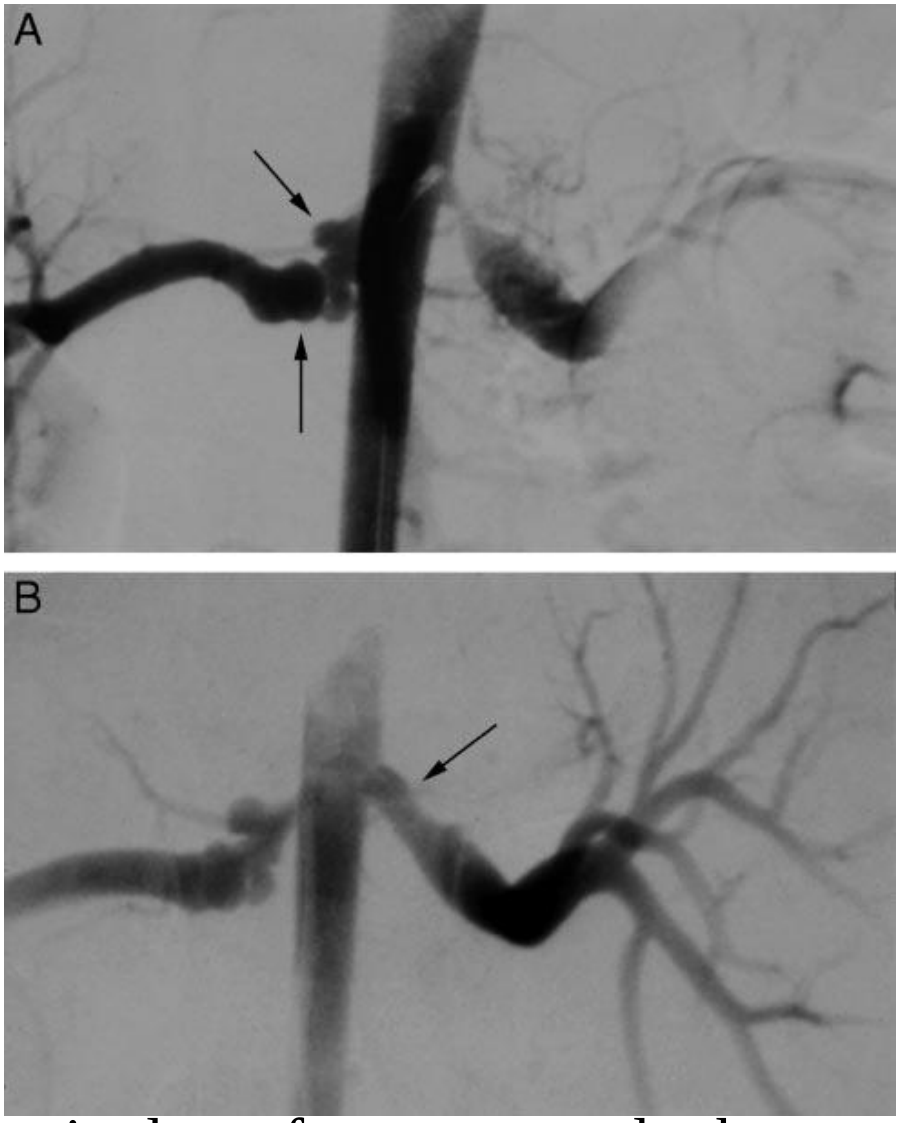
Αθηρωματική στένωση της νεφρικής αρτηρίας σε αγγειακούς ασθενείς

Ασθενείς	>50% στένωση νεφρικής αρτηρίας	
• Ανεύρυσμα αορτής	109	38%
• Περιφ. αγγειοπάθεια	189	39%
• Στεφανιαία νόσος	76	29%
• Υψηλή υποψία	76	70%

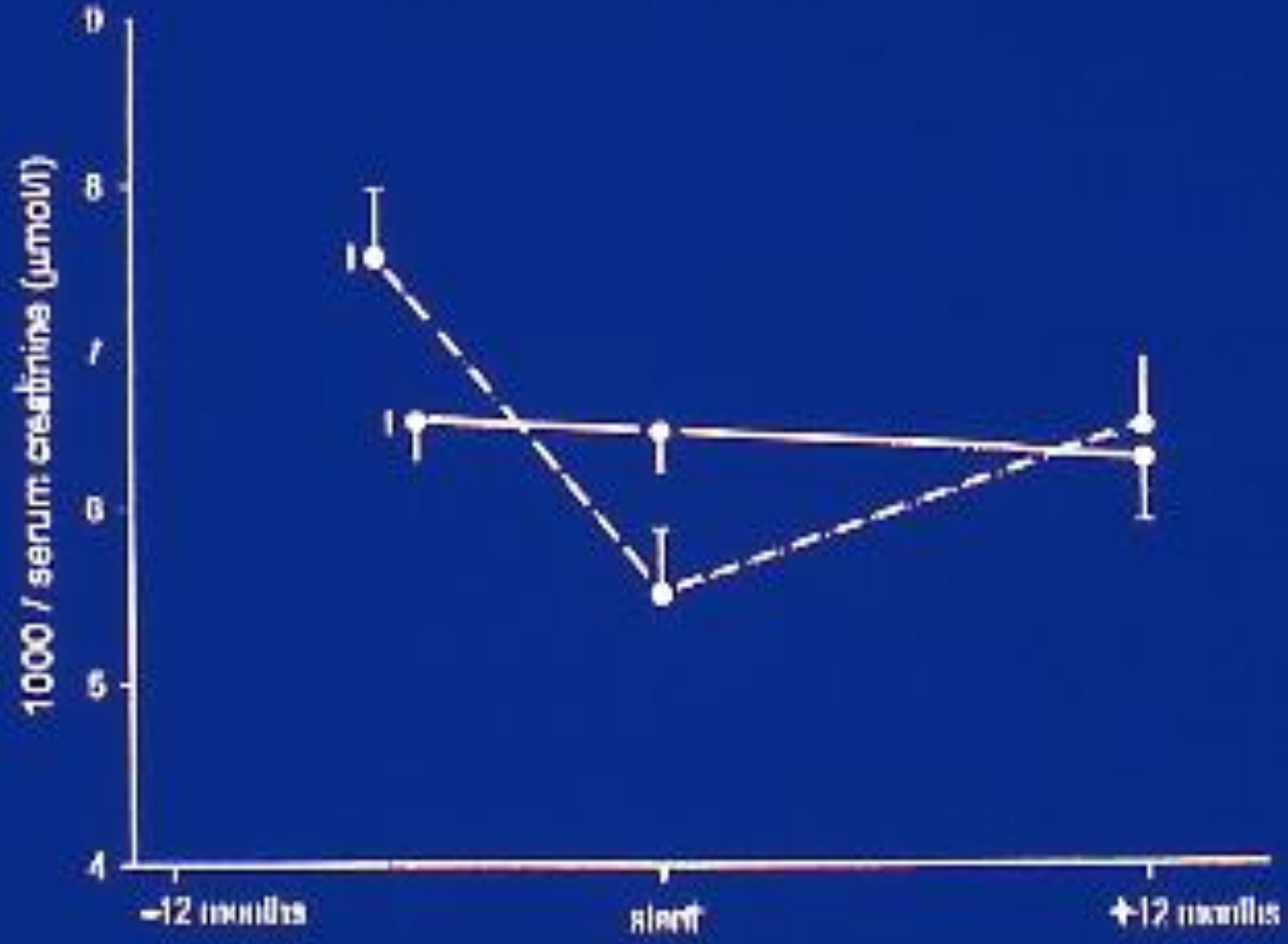
Διάγνωση Νεφραγγειακής Νόσου

- **ACEi - augmented renography**
- **Duplex ultrasonography**
- **Magnetic resonance angiography**
- **Spiral Computerized Tomography**
- **Intraarterial Angiography**

Left RAS before & after Angioplasty



Schroff et al. Angioplasty for renovascular hypertension in children: 20 year experience. *Pediatrics* 2006;118:268-275

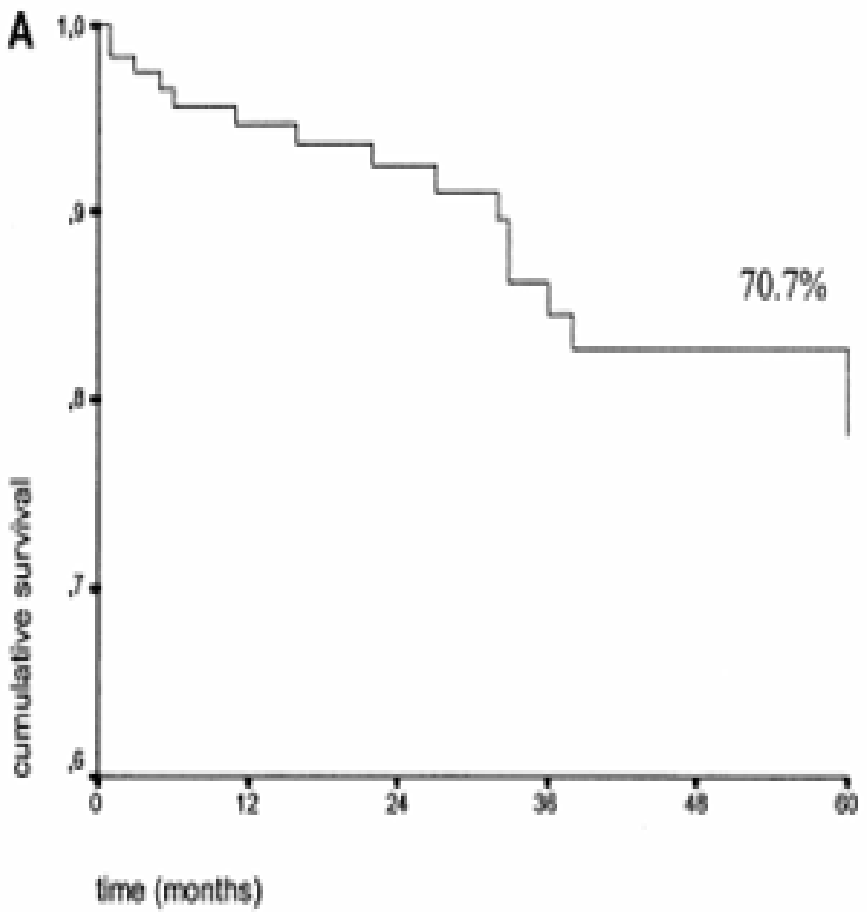


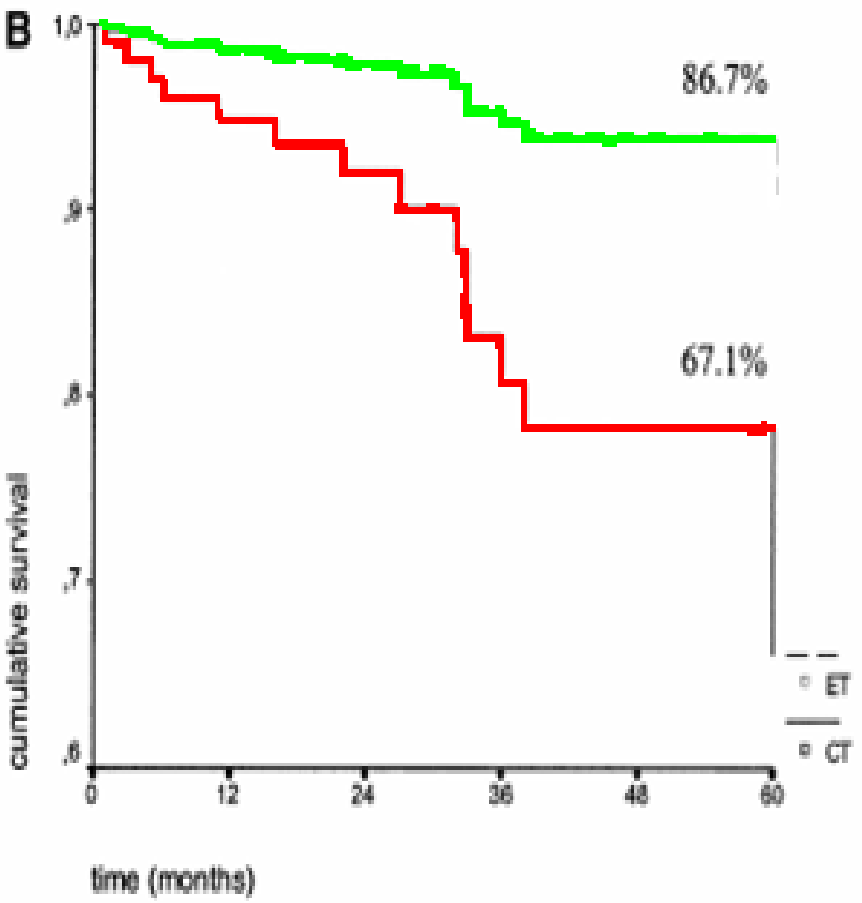
Beutler et al. JASN 2001;12:1475-81

Success Rate (<50% stenosis) after PTRA or PTRA-S in ostial atherosclerotic RVD

Van de Ven et al. Lancet 1999;353(9149):282-6

ΕΠΙΒΙΩΣΗ ΑΣΘΕΝΩΝ ΜΕ RVH





- **PTA-stent**
- **Medical treatment**

PIZZOLO J Vasc Surg 2004

Αίτια υπερτάσεως στον γενικό πληθυσμό ενηλίκων

- 85-90% ιδιοπαθής υπέρταση
- 3-5% βλάβη νεφρών
- 1-3% νεφραγγειακή υπέρταση
- 0.5-1% υπεραλδοστερονισμός
- 0.1-0.5% φαιοχρωμοκύτωμα
- Cushing, Υπερπαραθυρεοειδισμός, άπνοια ύπνου, υποθυρεοειδισμός, στένωση ισθμού αορτής, αλκοολισμός
- φάρμακα (αντισυλληπτικά, ερυθροποιητίνη, κυκλοσπορίνη κλπ

Primary hyperaldosteronism

2/3 bilateral hyperplasia,

1/3 adenoma (Conn' syndrome)

M:F => 1:2, 30-50 yo

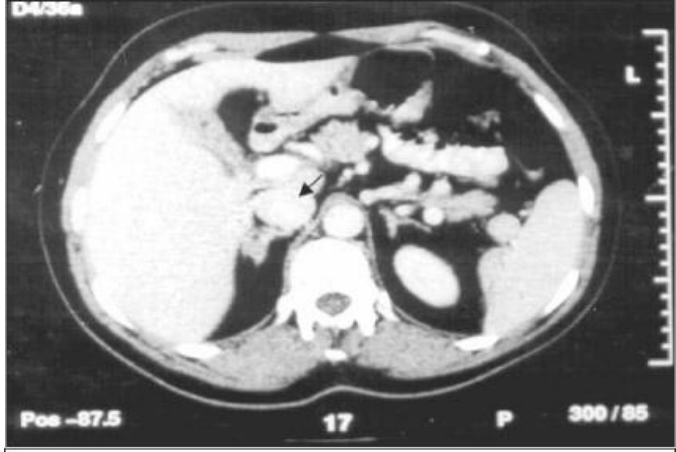
-Hypertension

-Hypokalemia (95%)

ή K+ 3.4-3.7 meq/L

-Metabolic Alkalosis

-Low Renin - High Aldo



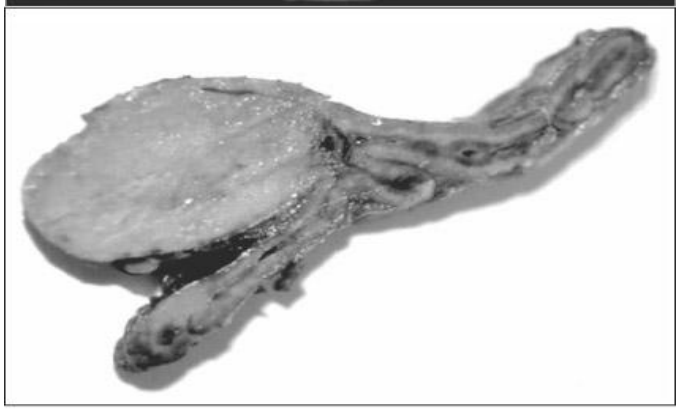


Fig. 4 - Aspecto macroscópico da glândula supra-renal-renal e vesícula biliar. A supra-renal mediu 4,7 x 4,5 x 1,5 cm e apresentou nódulo único medindo 1,5 cm de diâmetro. A vesícula biliar não apresentou alterações.

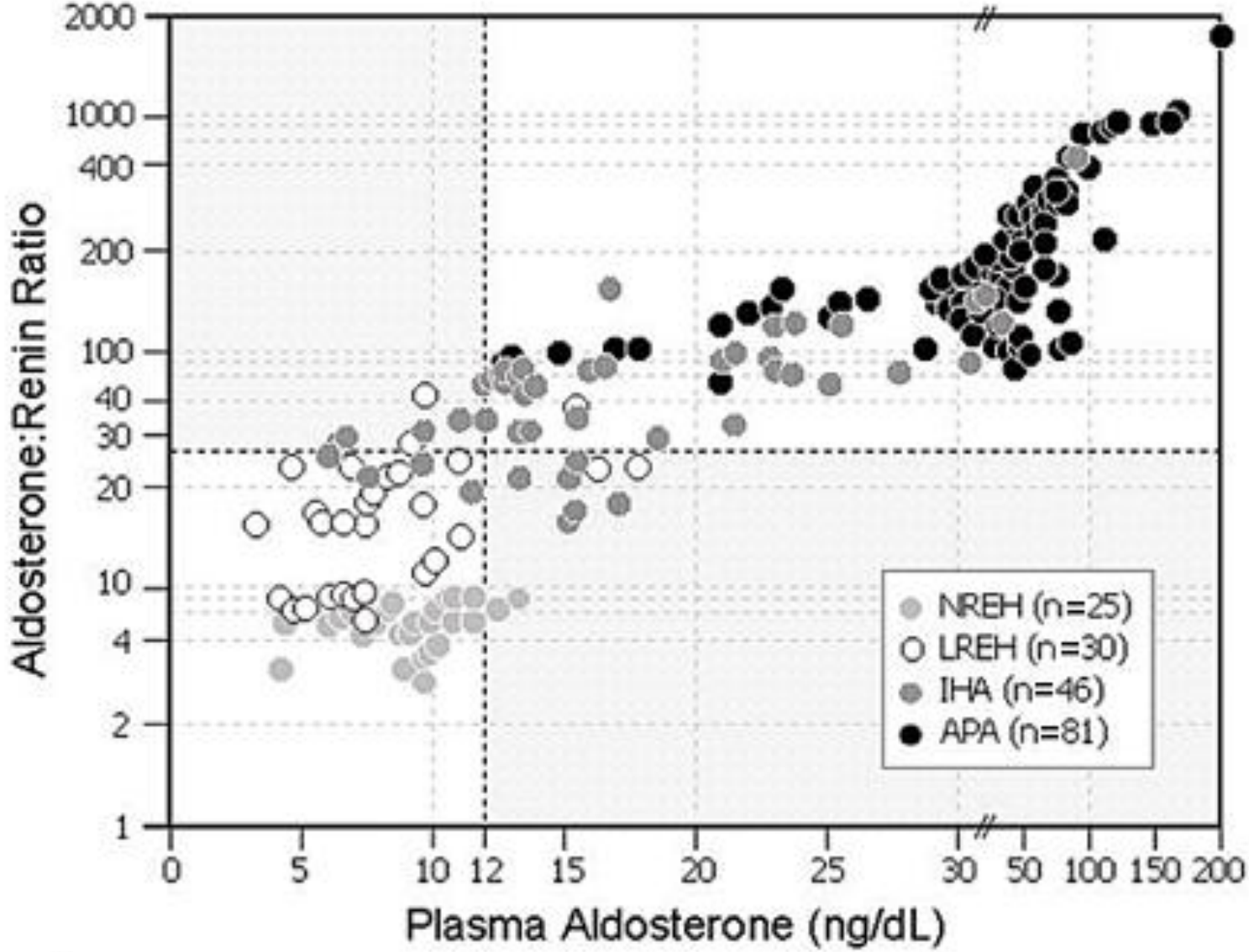


Figure 3. Scattered plot (on a semi-logarithmic scale) correlating plasma aldosterone: plasma renin activity ratio (ARR) with the corresponding plasma aldosterone concentration in patients with "primary aldosteronism" (APA and IHA) and with "essential hypertension" (LREH and NREH).

The spectrum of hypertension and hypokalemia

- primary aldosteronism

- monogenic forms of hypertension

1. 11-betahydroxylase deficiency,
2. 17-alphahydroxylase deficiency,
3. glucocorticoid-suppressible hyperaldosteronism (GRA),
4. apparent mineralocorticoid excess (AME),
5. glucocorticoid resistance,
6. Liddle's syndrome, and
7. hypertension due to activating mutations of mineralocorticoid receptor.

Αίτια υπερτάσεως στον γενικό πληθυσμό ενηλίκων

- 85-90% ιδιοπαθής υπέρταση
- 3-5% βλάβη νεφρών
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- φάρμακα (αντισυλληπτικά, ερυθροποιητίνη, κυκλοσπορίνη κλπ

Pheochromocytoma

- 0.01-0.1% of HTN population
  - Found in 0.5% of those screened
- M = F
- 3rd to 5th decades of life
- Rare, investigate only if clinically suspicion:
  - Signs or Symptoms
  - Severe HTN, HTN crisis
  - Refractory HTN (> 3 drugs)
  - HTN present @ age < 20 or > 50 ?
  - Adrenal lesion found on imaging (ex. Incidentaloma)

Pheo: Signs & Symptoms

- The five P's:
  - Pressure (HTN) 90%
  - Pain (Headache) 80%
  - Perspiration 71%
  - Palpitation 64%
  - Pallor 42%
    - » Paroxysms (the sixth P!)
- The Classical Triad:
  - Pain (Headache), Perspiration, Palpitations
  - Lack of all 3 virtually excluded diagnosis of pheo in a series of > 21,0000 patients

Pheo: ‘Rule of 10’

- 10% extra-adrenal (closer to 15%)
- 10% occur in children
- 10% familial (closer to 20%)
- 10% bilateral or multiple (more if familial)
- 10% recur (more if extra-adrenal)
- 10% malignant
- 10% discovered incidentally

Biochemical Tests: Summary

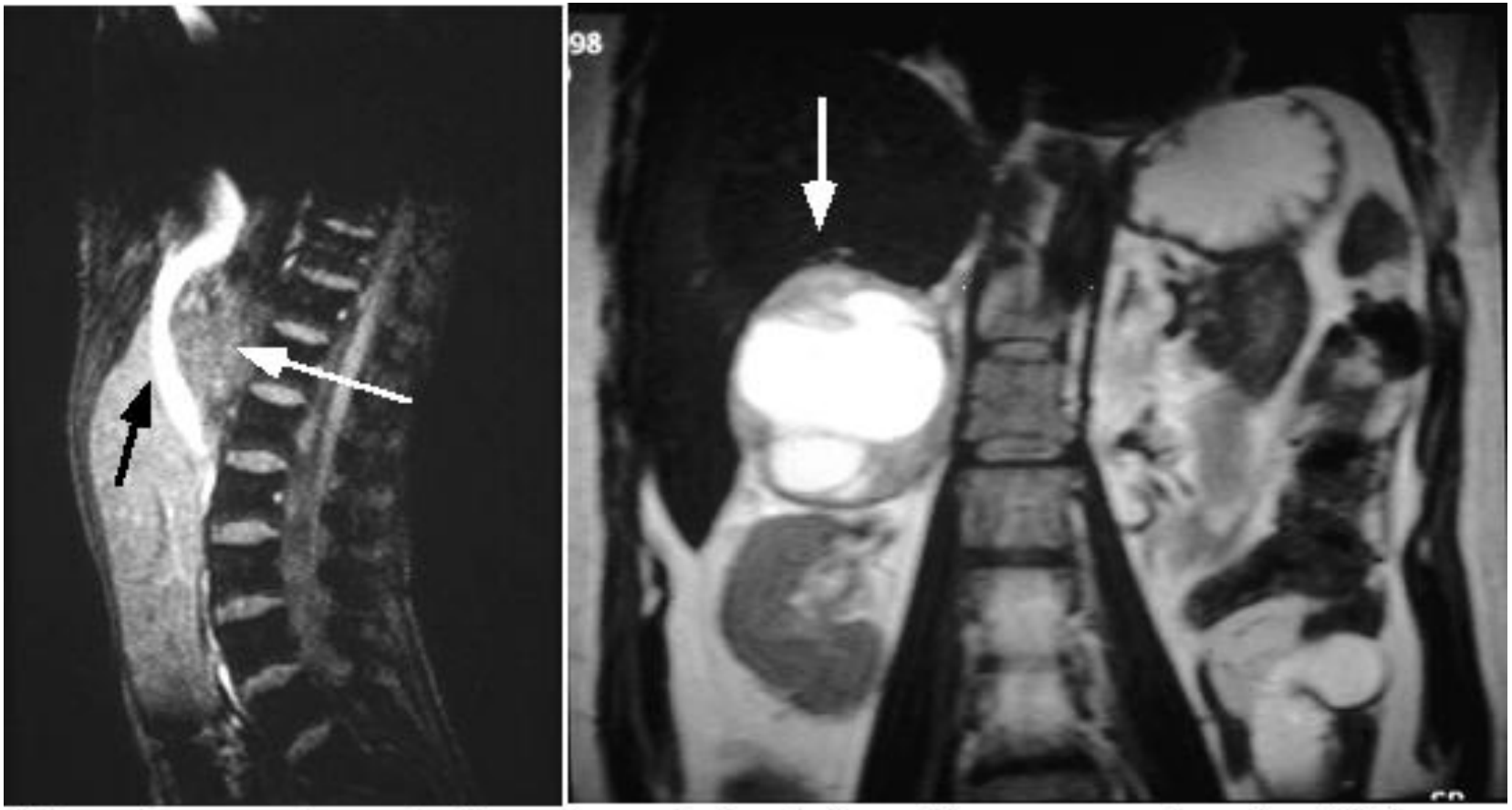
	SEN	SPEC
$U_{catechols}$	83%	88%
$U_{total\ metanephrines}$	76%	94%
$U_{catechols+metaneph}$	90%	98%
U_{VMA}	63%	94%
Plasma catecholamines	85%	80%
Plasma metanephrines	99%	89%

Localization: Imaging

- CT abdomen
  - Adrenal pheo SEN 93-100%
  - Extra-adrenal pheo SEN 90%
- MRI
  - > SEN than CT for extra-adrenal pheo

MIBG Scan

- ^{123}I or ^{131}I labelled metaiodobenzylguanidine
- MIBG catecholamine precurosr taken up by the tumor
- Inject MIBG, scan @ 24h, 48h, 72h
- Lugol's 1 gtt tid x 9d (from 2d prior until 7d after MIBG injection to protect thyroid)
- False negative scan:
    - Drugs: Labetalol, reserpine, TCAs, phenothiazines
    - Must hold these medications for 4-6 wk prior to scan



Pheochromocytoma in the adrenal gland Magnetic resonance imaging (MRI) findings in adrenal pheochromocytomas. Left panel: Sagittal MRI demonstrates a mass (white arrow) displacing the inferior vena cava anteriorly (black arrow). This caval displacement is typically seen with tumors arising in the adrenal gland. Right panel: Coronal MRI of the abdomen demonstrates a large mass in the right adrenal bed (arrow), lying immediately superior to the kidney. The low signal intensity in the center is caused by hemorrhage into the tumor. Courtesy of Jonathan Kruskal, MD.

Pheo Management

- Prior to 1951, reported mortality for excision of pheochromoyctoma 24 - 50 %
  - **HTN crisis, arrhythmia, MI, stroke**
  - **Hypotensive shock**
- **Currently, mortality:** 0 - 2.7 %
  - Preoperative preperation, α-blockade?
  - New anesthetic techniques?
    - » Anesthetic agents
    - » Intraoperative monitoring: arterial line, EKG monitor, CVP line, Swan-Ganz
- **Experienced & Coordinated team:**
  - Endocrinologist, Anesthesiologist and Surgeon

Στρατηγικές θεραπείας

Κανόνες φαρμακοθεραπείας:

1. Φάρμακα μακράς δράσης
2. Καθημερινή λήψη
3. Μία δόση (πρωϊνή)

Επιλογή 1ου αντιϋπερτασικού φαρμάκου

1. Η επίτευξη άριστης ρύθμισης έχει μεγαλύτερη σημασία στη μείωση του κινδύνου
2. Στις περισσότερες περιπτώσεις χρειάζονται 2-3 φάρμακα

Φάρμακα 1ης γραμμής

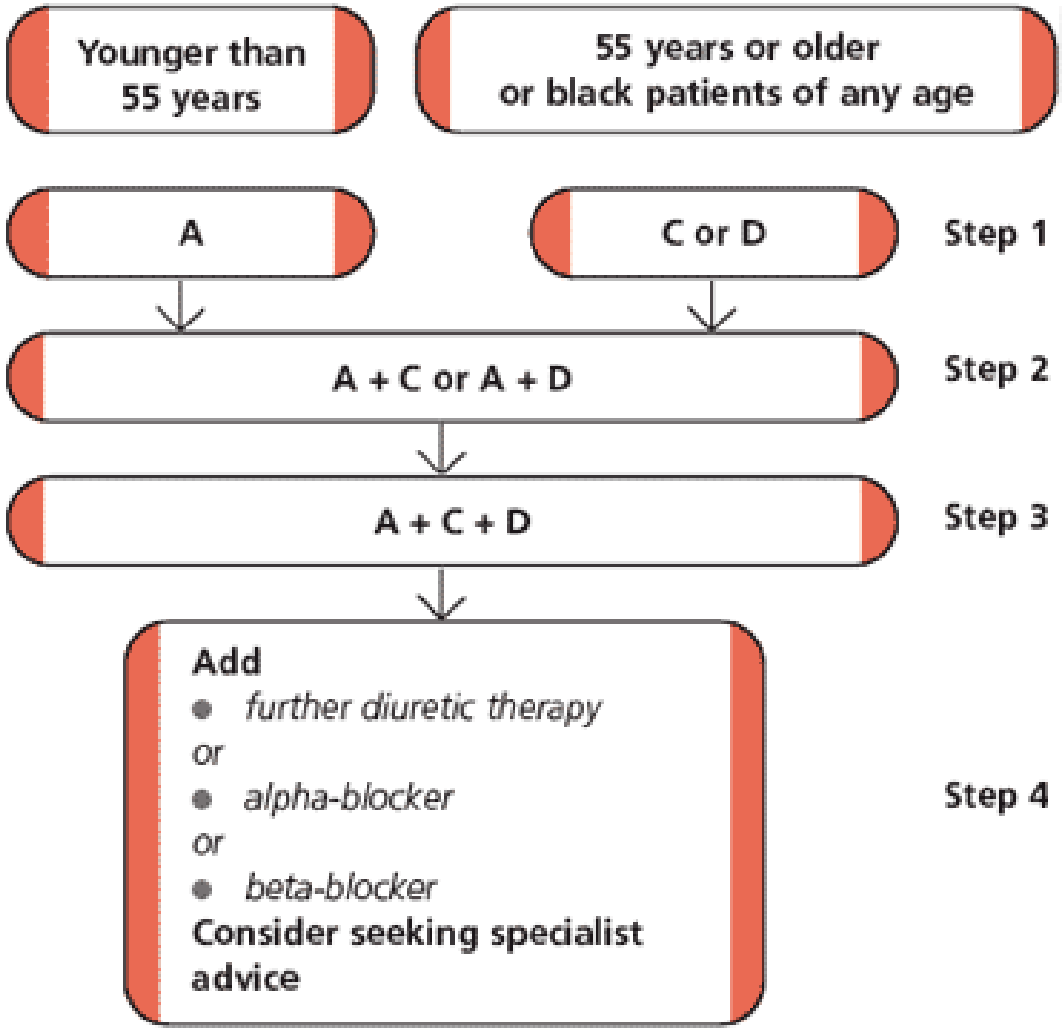
- Θειαζιδικά διουρητικά
- Αναστολείς ΜΕΑ
- Ανταγωνιστές Ca
- Ανταγωνιστές αγγειοτασίνης
- β-Αποκλειστές ***

*** : *σε ειδικές ενδείξεις*

: *σε ↑ κίνδυνο εμφάνισης διαβήτη, ηλικιωμένους*

Abbreviations:
A = ACE inhibitor
(consider angiotensin-II receptor antagonist if ACE intolerant)
C = calcium-channel blocker
D = thiazide-type diuretic

Black patients are those of African or Caribbean descent, and not mixed-race, Asian or Chinese patients



Box 11 Position statement: Antihypertensive treatment: Preferred drugs

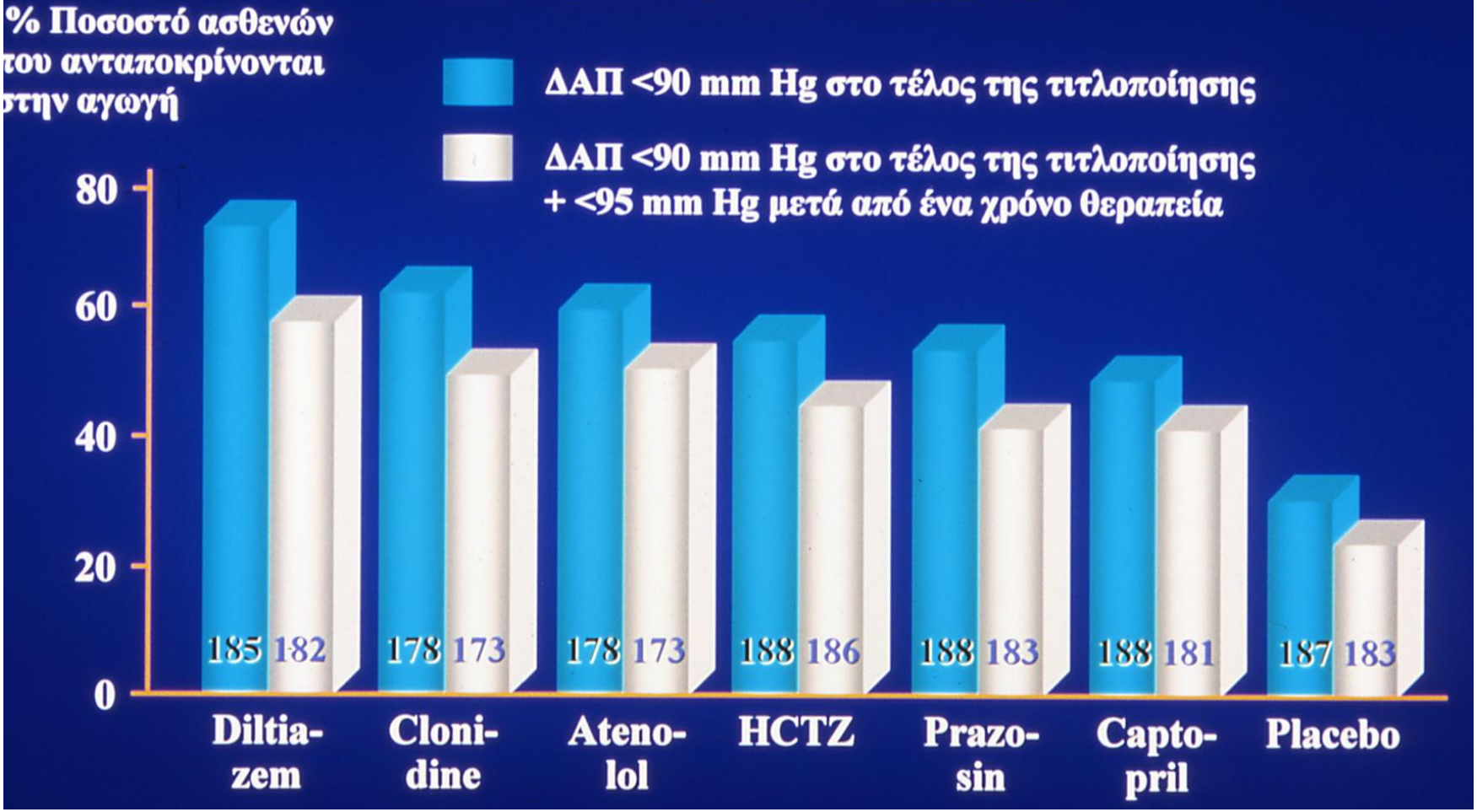
Subclinical organ damage	
LVH	ACEI, CA, ARB
Asympt. atherosclerosis	CA, ACEI
Microalbuminuria	ACEI, ARB
Renal dysfunction	ACEI, ARB
Clinical event	
Previous stroke	any BP lowering agent
Previous MI	BB, ACEI, ARB
Angina pectoris	BB, CA
Heart failure	diuretics, BB, ACEI, ARB, antialdosterone agents
Atrial fibrillation	
Recurrent	ARB, ACEI
Permanent	BB, non-dihydropiridine CA
ESRD/proteinuria	ACEI, ARB, loop diuretics
Peripheral artery disease	CA
Condition	
ISH (elderly)	diuretics, CA
Metabolic syndrome	ACEI, ARB, CA
Diabetes mellitus	ACEI, ARB
Pregnancy	CA, methyldopa, BB
Blacks	diuretics, CA

Abbreviations: LVH: left ventricular hypertrophy; ISH: isolated systolic hypertension; ESRD: renal failure; ACEI: ACE inhibitors; ARB: angiotensin receptor antagonists; CA: calcium antagonists; BB: β-blockers

Thiazide diuretics	Gout	Metabolic syndrome Glucose intolerance Pregnancy
Beta-blockers	Asthma A-V block (grade 2 or 3)	Peripheral artery disease Metabolic syndrome Glucose intolerance Athletes and physically active patients Chronic obstructive pulmonary disease
Calcium antagonists (dihydropiridines)		Tachyarrhythmias Heart failure
Calcium antagonists (verapamil, diltiazem)	A-V block (grade 2 or 3) Heart failure	
ACE inhibitors	Pregnancy Angioneurotic oedema Hyperkalaemia Bilateral renal artery stenosis	
Angiotensin receptor antagonists	Pregnancy Hyperkalaemia Bilateral renal artery stenosis	
Diuretics (antialdosterone)	Renal failure Hyperkalaemia	

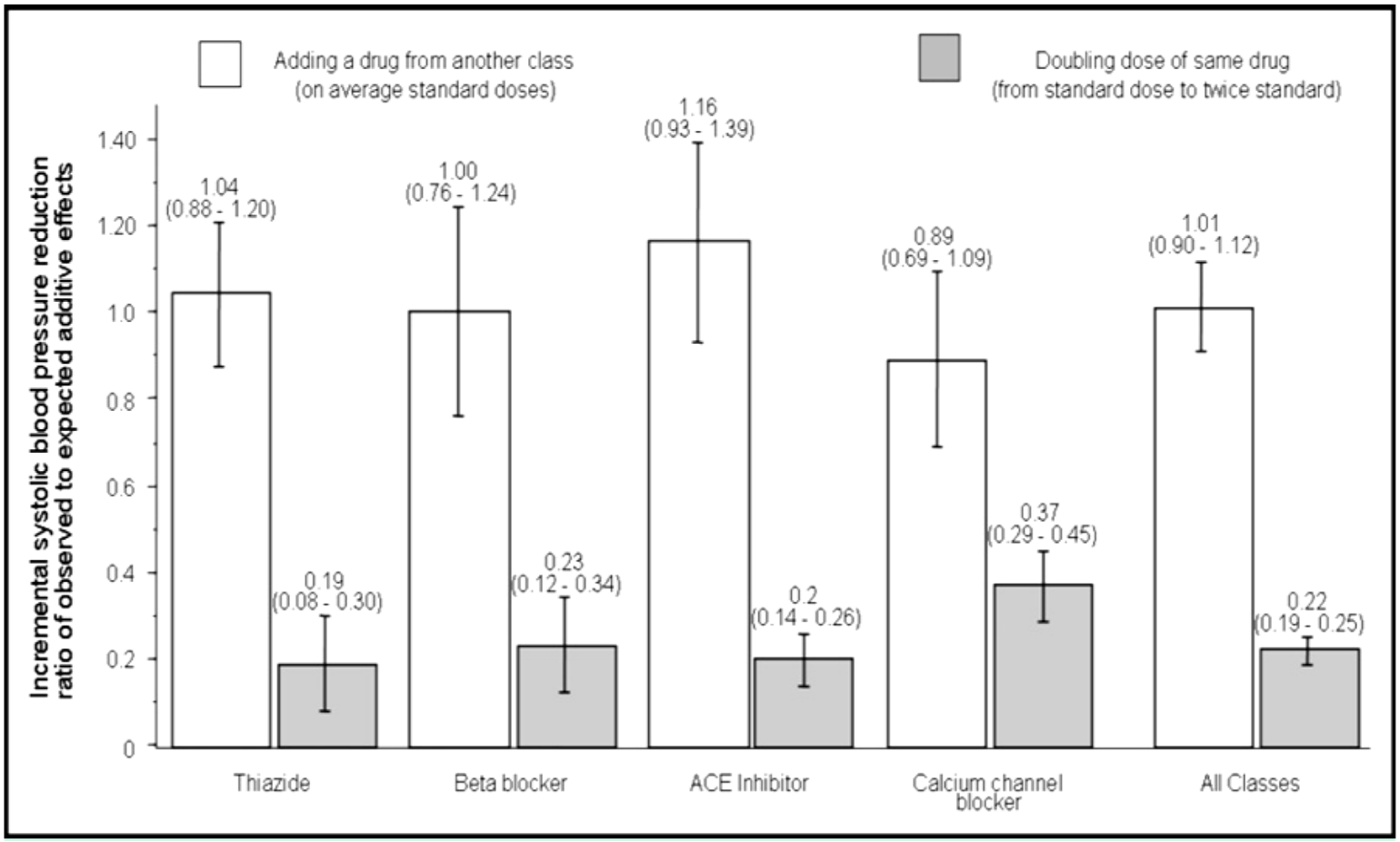
Συνδυασμένη αντιϋπερτασική θεραπεία

ΑΝΤΑΠΟΚΡΙΣΗ ΣΤΗ ΜΑΚΡΟΧΡΟΝΙΑ ΑΓΩΓΗ ΜΕ ΜΟΝΟΘΕΡΑΠΕΙΑ



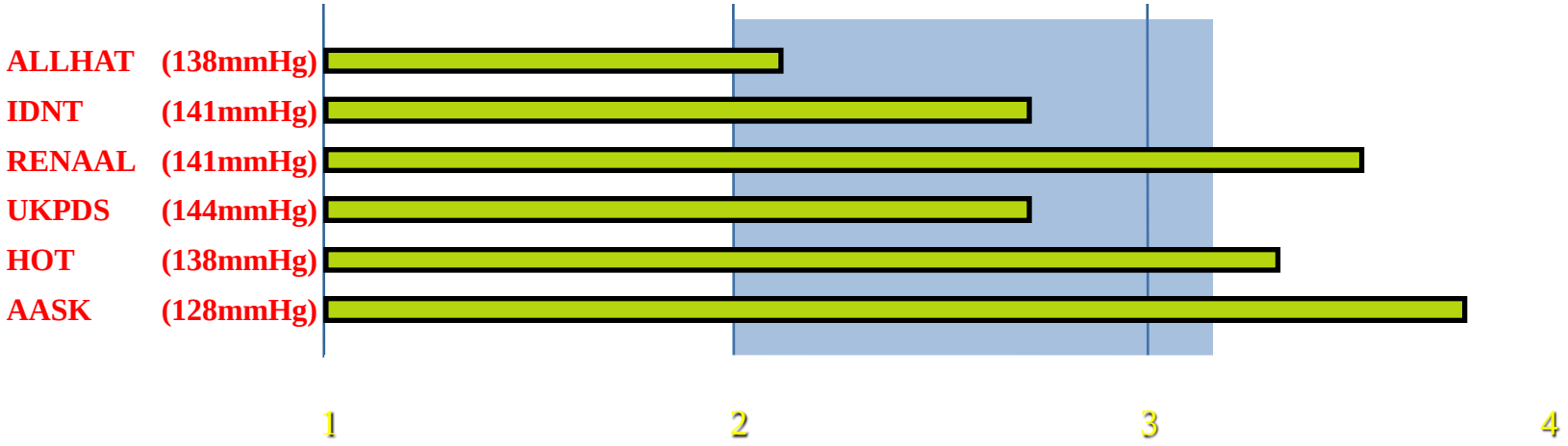
Ο συνδυασμός 2 αγωγών είναι 5 φορές πιο αποτελεσματικός στη μείωση της ΣΑΠ από το διπλασιασμό της δόσης 1 φαρμάκου

Μετα-ανάλυση 42 μελετών σε 10.969 υπερτασικούς



Number of antihypertensive agents used in various trials

Trial/average SBP achieved

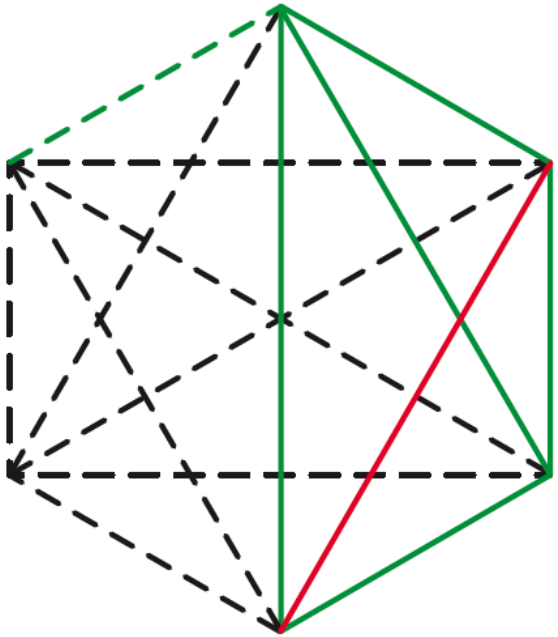


Average number of antihypertensive agents/patient

Adapted from Bakris GL, et al. Am J Kidney Dis 2000; 36: 646-61.

Thiazide diuretics

β-blockers



Angiotensin-receptor blockers

Other antihypertensives

Calcium antagonists

ACE inhibitors

Fixed-dose (Single Tablet) Combinations

Evidence	
Class	Level
IIb	B

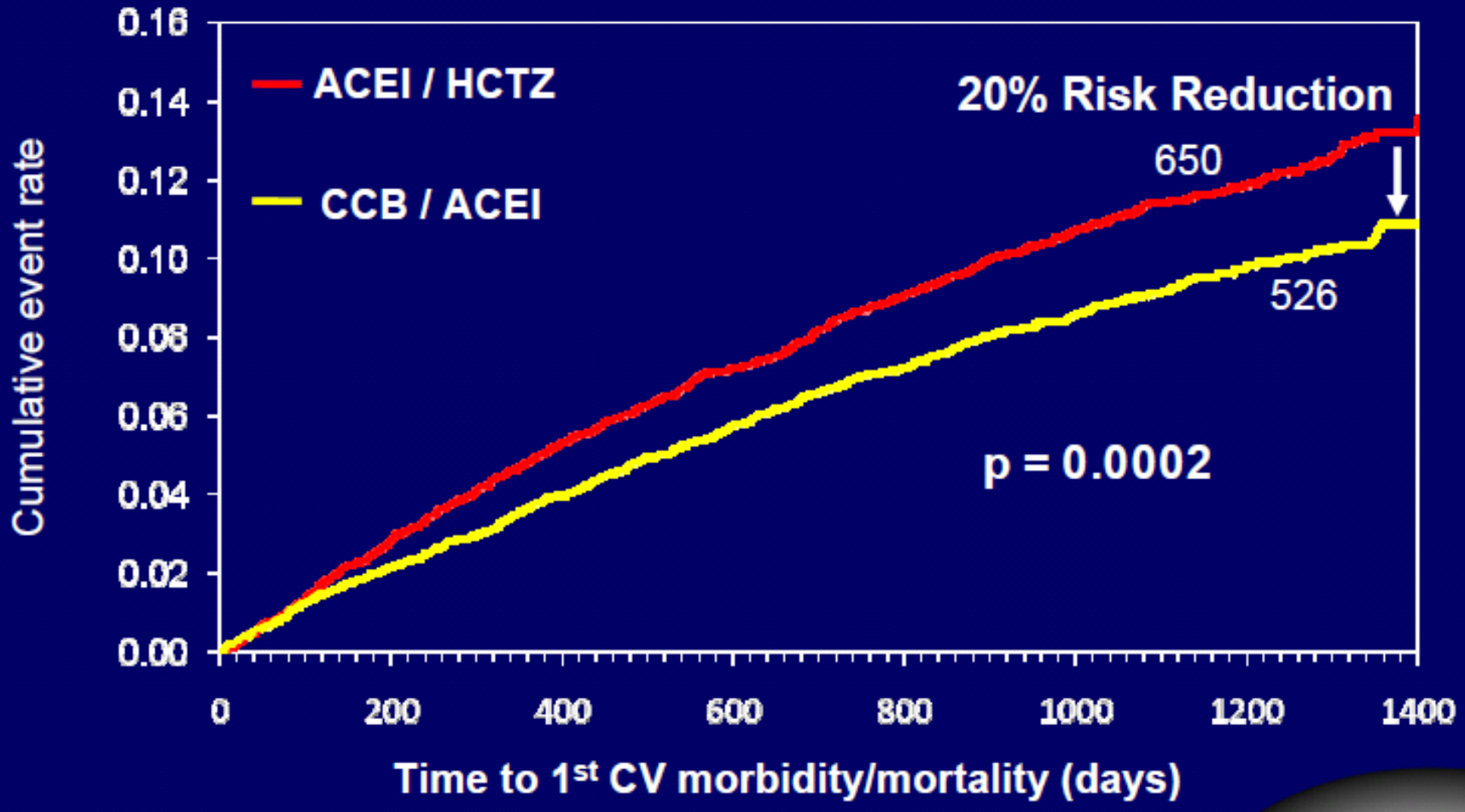
Combinations of two antihypertensive drugs at fixed doses in a single tablet may be recommended and favoured, because reducing the number of daily pills improves adherence which is low in patients with hypertension

Avoiding Cardiovascular Events through COMbination Therapy in Patients LIving with Systolic Hypertension

Kenneth Jamerson[1], George L. Bakris[2], Bjorn Dahlof[3], Bertram Pitt[1], Eric J. Velazquez[4], and Michael A. Weber[5] for the ACCOMPLISH Investigators

University of Michigan Health System, Ann Arbor, MI[1]; University of Chicago-Pritzker School of Medicine, Chicago, IL[2]; Sahlgrenska University Hospital, Gothenburg, Sweden[3]; Duke University School of Medicine, Durham, NC[4]; SUNY Downstate Medical College, Brooklyn, NY[5]

Kaplan Meier for Primary Endpoint



HR (95% CI): 0.80 (0.72, 0.90)

INTERIM RESULTS Mar 08

ACCOMPLISH

Πώς συνεχίζουμε σε προσθήκη τρίτου ή τέταρτου φαρμάκου ?

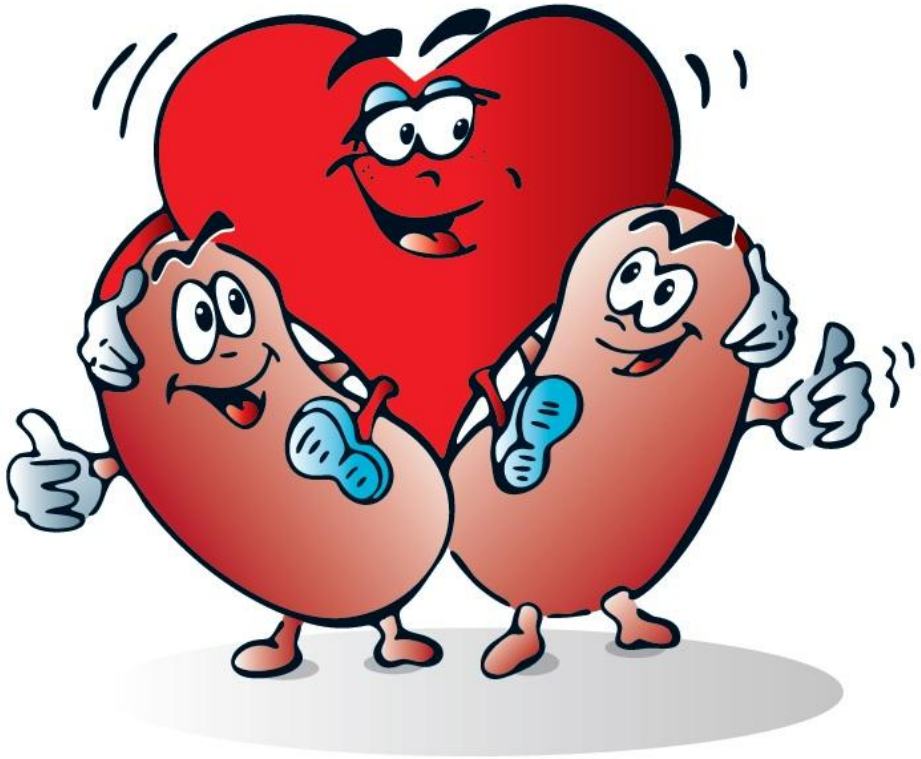
Το τρίτο φάρμακο είναι διουρητικό

Resistant hypertension

- • **Definition:** when lifestyle measures and combination of at least three drugs (one should be diuretic) in adequate doses have failed to lower systolic and diastolic BP sufficiently
- • **Causes:**
- – unsuspected secondary cause
- – poor adherence to therapeutic plan
- – intake of drugs raising BP (steroids, anti-inflammatory
- drugs, oral contraceptives, cocaine, etc.)
- – failure to modify lifestyle (weight gain, alcohol, etc.)
- – volume overload (insufficient diuretic dose, renal insufficiency, high salt intake)
- – sleep apnea
- – spurious hypertension (e.g. small cuff on large arms, isolated office hypertension)

WKD 2011 Logo

Protect your kidneys, Save your heart



Ευχαριστώ για την προσοχή σας!

Προτεινόμενα θέματα

1. Ορισμός, επιδημιολογία, διάγνωση και φαρμακευτική αγωγή της ιδιοπαθούς υπέρτασης
2. Νεφραγγειακή υπέρταση: ορισμός, αίτια, κλινική και εργαστηριακή προσέγγιση, θεραπεία
3. Πρωτοπαθής υπεραλδοστερονισμός - Φαιοχρωμοκύττωμα
4. Πλεονεκτήματα, δόκιμοι και αδόκιμοι συνδυασμοί αντιϋπερτασικών φαρμάκων
5. Νεφρός και υπέρταση – Υπερτασική νεφροσκλήρυνση – στόχοι και φάρμακα αντιϋπερττασικής αγωγής