SAHS & NDOH Hypertension Management Lecture Series

Back to Basics in Hypertension Management

Southern African Hypertension Society

SAHS

Know your blood pressure by

How to treat uncomplicated HT, Targets, treatment options and Best Practice

Southern African Hypertension Society

SAHS

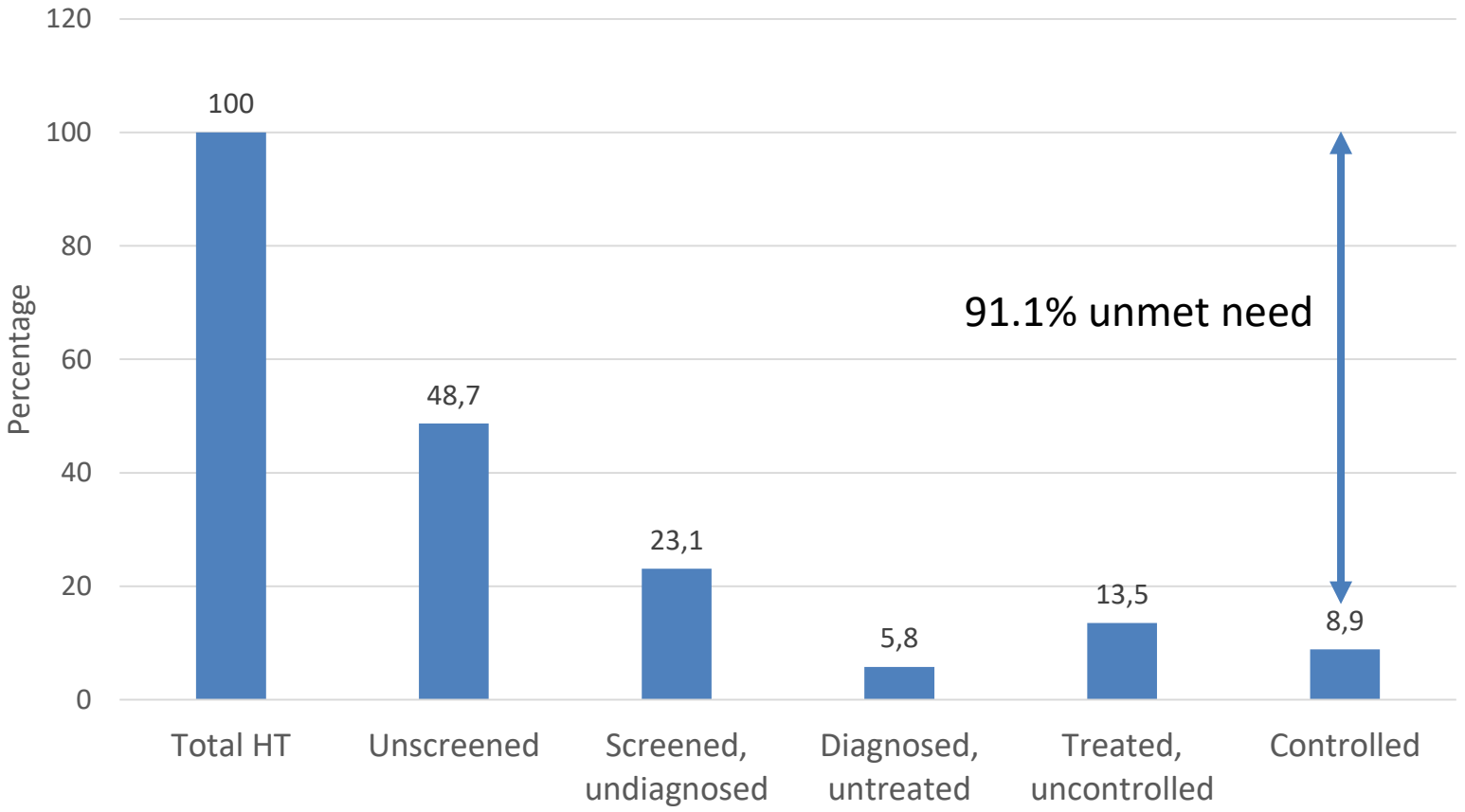
Know your blood pressure by

Prepared by Prof Brian Rayner

OVERVIEW

- Introduction and importance
- Definitions and targets
- BP measurement
- Basic tests
- Non pharmacological treatment
- Pharmacological treatment
- A few words on treatment resistant HT

UNMET NEED IN SA



Know your blood pressure by

Berry KM, Parker WA, Mchiza ZJ, Sewpaul R, Labadarios D, Rosen S, Stokes A. Quantifying unmet need for hypertension care in South Africa through a care cascade: evidence from the SANHANES, 2011-2012. BMJ Glob Health. 2017

•Editorial

The 10 ‘Best Buys’ to combat heart disease, diabetes and stroke in Africa

Bongani M Mayosi, Heart 2014

1. Hypertension

1967-2018

Why do we have guidelines?

- Identifying all patients eligible for management
- Monitoring at the practice/population level
- Increasing patient and provider awareness
- Providing an effective diagnosis and treatment guideline
- Systematic follow-up of patients for the initiation and intensification of therapy
- Clarifying roles of healthcare providers to implement a team approach
- Reducing barriers for patients to receive and adhere to medications and to implement lifestyle modifications
- Leveraging the electronic medical record systems being established throughout the United States to support each of these steps

Go et al, Effective approach to HT management, Hypertension 2014

COMMENTARY

The Treatment of Hypertension: A Remarkable Success Story

Marvin Moser, MD;[1] Edward J. Roccella, PhD, MPH[2]

One of the most successful public health programs in the past century provides an example of what can be accomplished when the government, the private sector, academia, and community organizations work together. The results of 4 decades of activities of the National High Blood Pressure Education Program (NHBPEP) can be measured in several ways. The publics' awareness, treatment, and control have increased remarkably. Hypertension is the primary reason adults visit physicians. Age-adjusted mortality for heart disease and stroke has declined by 70% and 80%, respectively, since the beginning of the program. The decline in heart and stroke deaths is seen in both sexes and blacks and whites, and is particularly evident in people who reside in the southeastern portion of the United States, which once had the highest mortality rates of stroke in the United States. This dramatic decrease in strokes and heart disease has occurred despite the substantial increase in obesity and diabetes in the United States. *J Clin Hypertens (Greenwich)*. 2013; 15:88–91 © 2012 Wiley Periodicals, Inc.

Effect of proper implementation of guidelines

COMMENTARY

The Treatment of Hypertension: A Remarkable Success Story

Marvin Moser, MD;[1] Edward J. Roccella, PhD, MPH[2]

" is particularly evident in people who reside in the Southeastern portion of the United States, which once had the highest mortality rates of stroke in the United States."
"The public awareness has increased dramatically"

"This dramatic decrease in strokes and heart disease has occurred despite the substantial increase in obesity and diabetes in the United States."

Review Article

South African hypertension practice guideline 2014

Hypertension guideline working group: YK Seedat, BL Rayner, Yosuf Veriava

Abstract

Outcomes: Extensive data from many randomised, controlled trials have shown the benefit of treating hypertension (HTN). The target blood pressure (BP) for antihypertensive management is systolic < 140 mmHg and diastolic < 90 mmHg, with minimal or no drug side effects. Lower targets are no longer recommended. The reduction of BP in the elderly should be achieved gradually over one month. Co-existent cardiovascular (CV) risk factors should also be controlled.

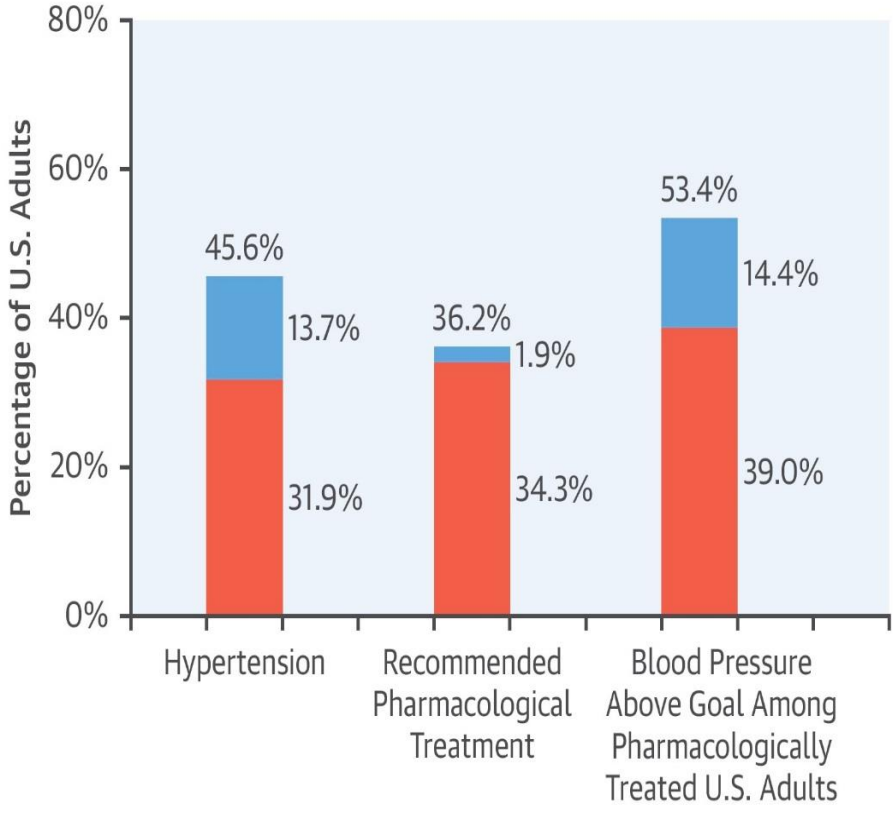
Benefits: Reduction in risk of stroke, cardiac failure, chronic kidney disease and coronary artery disease.

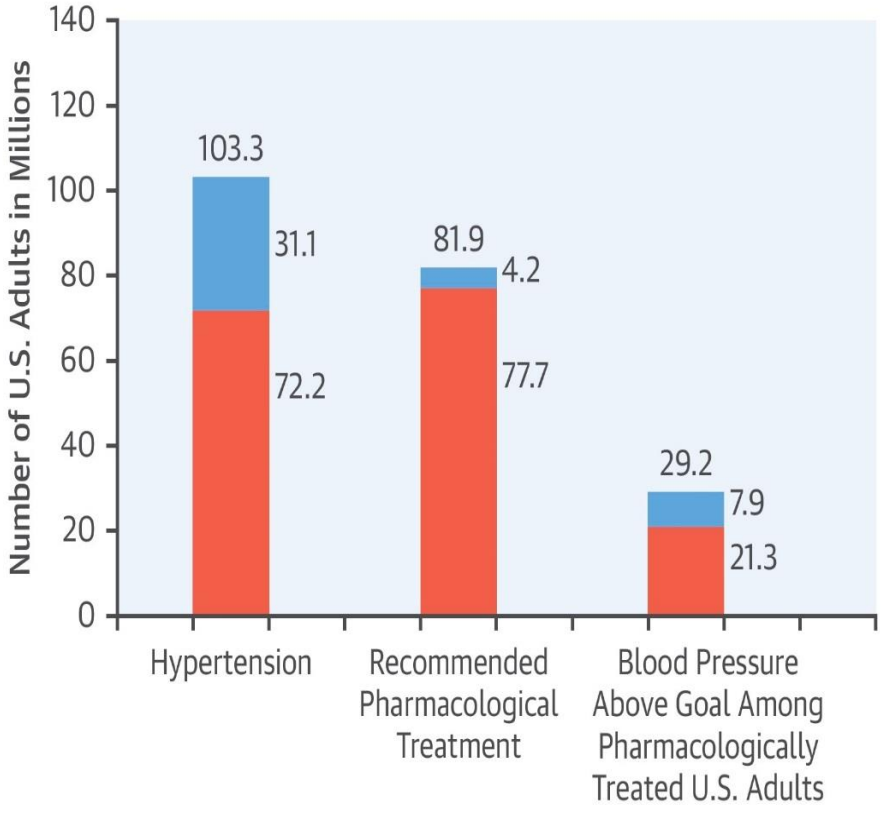
Recommendations: Correct BP measurement procedure is described. Evaluation of cardiovascular risk factors and recommendations for antihypertensive therapy are stipulated. Lifestyle modification and patient education are cornerstones of management. The major indications, precautions and contra-indications are listed for each antihypertensive drug recommended. Drug therapy for the patient with uncomplicated HTN is either mono- or combination therapy with a low-dose diuretic, calcium channel blocker (CCB) and an ACE inhibitor (ACEI) or angiotensin receptor blocker (ARB). Combination therapy should be considered *ab initio* if the BP is ≥ 160/100 mmHg. In black patients, either a diuretic and/or a CCB is recommended initially because the response rate is better compared to an ACEI. In resistant hypertension, add an alpha-blocker, spironolactone, vasodilator or β-blocker.

Validity: The guideline was developed by the Southern African Hypertension Society 2014[e].

Keywords: South Africa, hypertension, guideline

CENTRAL ILLUSTRATION: Prevalence of Hypertension, Recommendation for Pharmacological Antihypertensive Treatment, and Blood Pressure Above Goal Among U.S. Adults According to the 2017 ACC/AHA and the JNC7 Guidelines





2017 ACC/AHA Guideline But Not JNC7 | 2017 ACC/AHA Guideline and JNC7

Muntner, P. et al. J Am Coll Cardiol. 2018;71(2):109-18.

Summary of major guidelines - SBP target, class of recommendation (COR) and level of evidence (LOE)

Clinical Condition	Threshold	Goal	COR	LOE
Low to moderate CV risk < 65 years				
2016 Australia: 5 year CVE risk < 10%	≥160	<140	Strong	I
2017 US: no CVD, 10 year ASCVD < 10%	≥140	<130	IIb	B-NR
2017-2018 Canada: no TOD or CVD risk factors	≥160	< 140	A	
Diabetes	≥130	<130	C	
All others excluding high risk	≥140	<140	A	
2018 Europe: low risk Score < 1%, moderate Score 1-5%*	≥140	<140 * (120-129)	I	A
High CV risk (< 65 years)				
2016 Australian: 5 year CVE risk 10-15% (moderate)	≥140	<140	Strong	I
5 year CVE risk > 15%	?	< 120	Strong	II
2017 US: clinical CVD, 10 year ASCVD ≥10%	≥130	<130	I	B-R
2017-2018 Canada: SPRINT-like profile	AOBP ≥ 130	AOBP <120	I	A
2018 Europe: high risk Score 5-10%	≥140	<140	I	A
very high risk Score ≥ 10%	130-139	120-129		
Older Adults				
2016 Australian: > 75 years	≥140	<120	Strong	II
2017 US: ≥ 65 years, community living	≥130	<130	I	A
2017-2018 Canada: ≥ 75 years	AOBP ≥130	<120	B	
2018 Europe: 65-79 years	≥140	130-139	I	A
≥ 80 years	≥160			

- Adapted Egan, Brent M.; Kjeldsen, Sverre E.; Grassi, Guido; Esler, Murray; Mancia, Guiseppe. Journal of Hypertension37(6):1148-1153, June 2019.

SAHS Guidelines Target 2019

- < 140/90 universal target – all categories
- Not opposed to < 130/80 in high risk patients if resources permit and well tolerated

South African Hypertension Society commentary on the American College of Cardiology/American Heart Association hypertension guidelines. Brian Rayner, Erika Jones, Yusuf Veriava, YK Seedat, CVJA, 2019

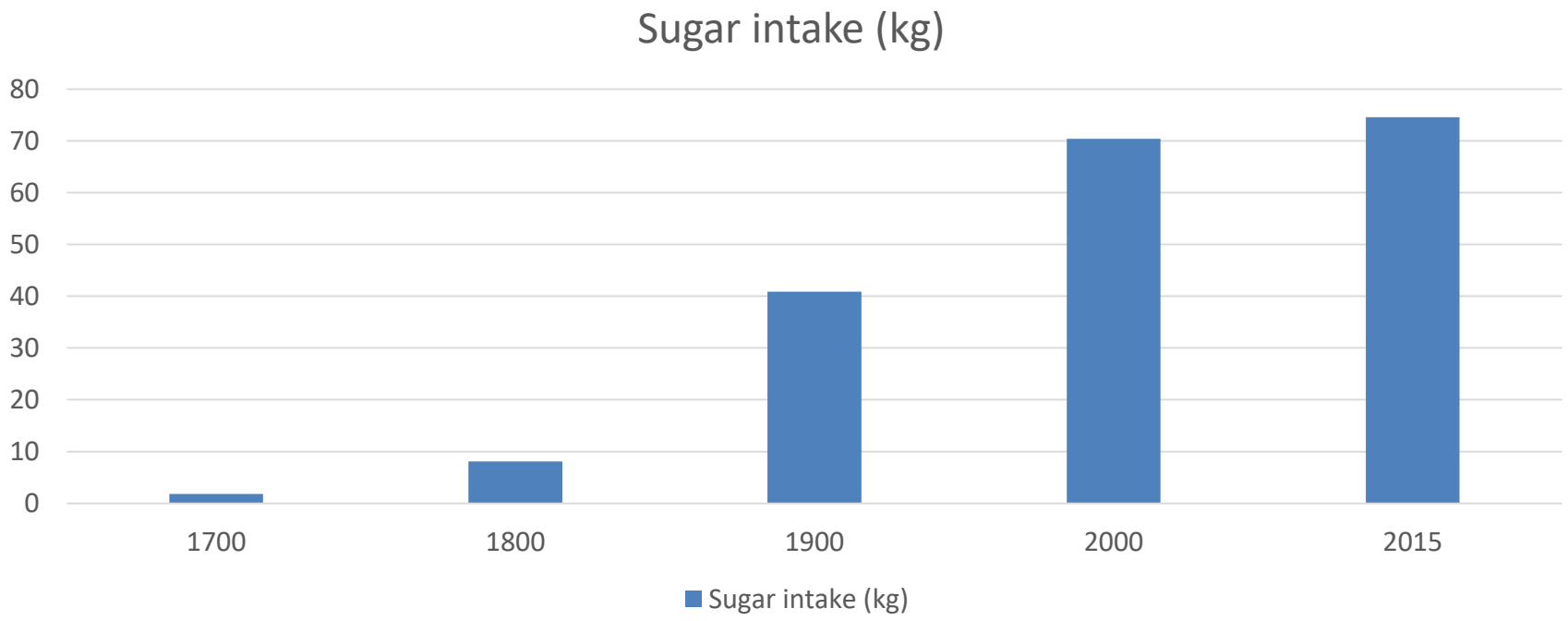
TREATMENT

- Lifestyle
- Antihypertensive therapy
- Treatment of all risk factors – LDL and diabetes as per LASSA and SEMDSA guidelines
- Statins should be considered in every patient
- Aspirin for secondary prevention and only for very high risk for primary prevention
- BP must be controlled (at least < 160 mmHg) to avoid cerebral Hx


24 HOUR
FITNESS

PATIENT REPORTED HE WALKED THE DOG REGULARLY

SUGAR



Sugar – 50% glucose/50% fructose, high fructose corn syrup 45% glucose/55% fructose
Honey = sugar from bees

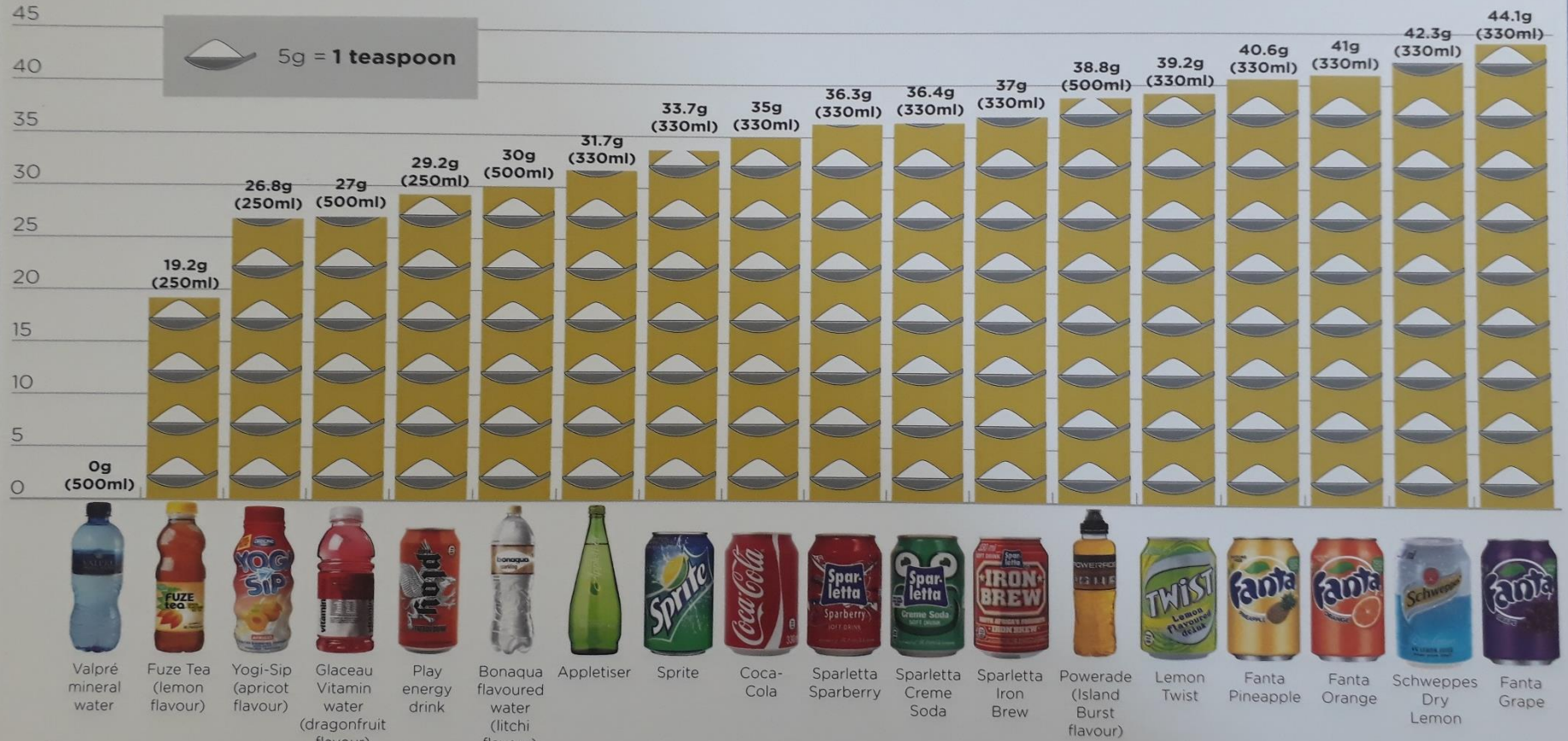
Johnson et al, Am J Nutrit, 2007

It is important to recognise sugar causes HT through mechanisms other than obesity

pharma dynamics
EFFECTIVE AFFORDABLE HEALTHCARE
A Lupin Group Company

The sugar scale

We gathered a few popular drinks from our canteen's refrigerator to check how much sugar each one contains. The results were surprising. Even 'healthier' drinks, such as flavoured mineral water and drinking yogurt, contain a large amount of sugar.



THEUNS KRUGER, Graphics24

The sugar scale

GRAMS

Although they punt themselves as a healthy, easy breakfast option, cereals are loaded with sugar. A 100g bowl of Milo cereal, for example, has about the same amount of sugar as a chocolate bar

RESEARCH: GRETHE KOEN

THEUNS KRUGER, Graphics24

View of Table Mountain from Khayelitsha

How do we realistically institute life style changes?

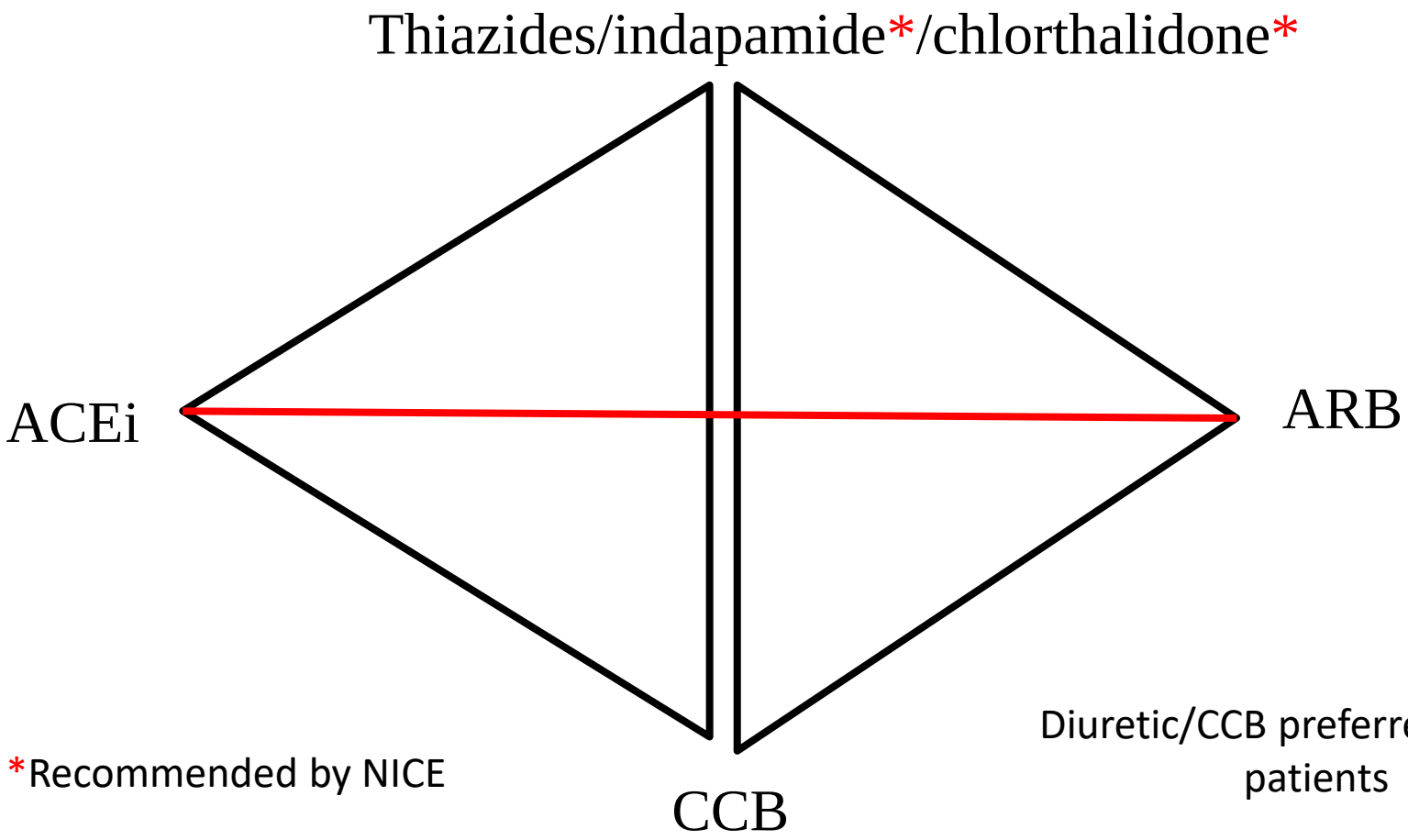
Exercise? Fresh fruit and veg? Salt for preservation of foodstuffs? Alcohol reduction? Access?

Table VI. Recommended lifestyle changes

Modification	Recommendation	Approx ↓ SBP (mmHg)
Weight reduction	BMI 18.5 – 24.9	5-20 per 10 kg
Dash diet	↓ saturated fat and total fat, ↑ fruit and vegetables	8-14
Dietary Na^+	<100 mmols or 6 gm NaCl/day	2-8
Physical activity	Brisk walking for 30 minutes per day most days	4-9
Moderation of alcohol	No more than 2 drinks per day	2-4
Tobacco	Complete cessation	-

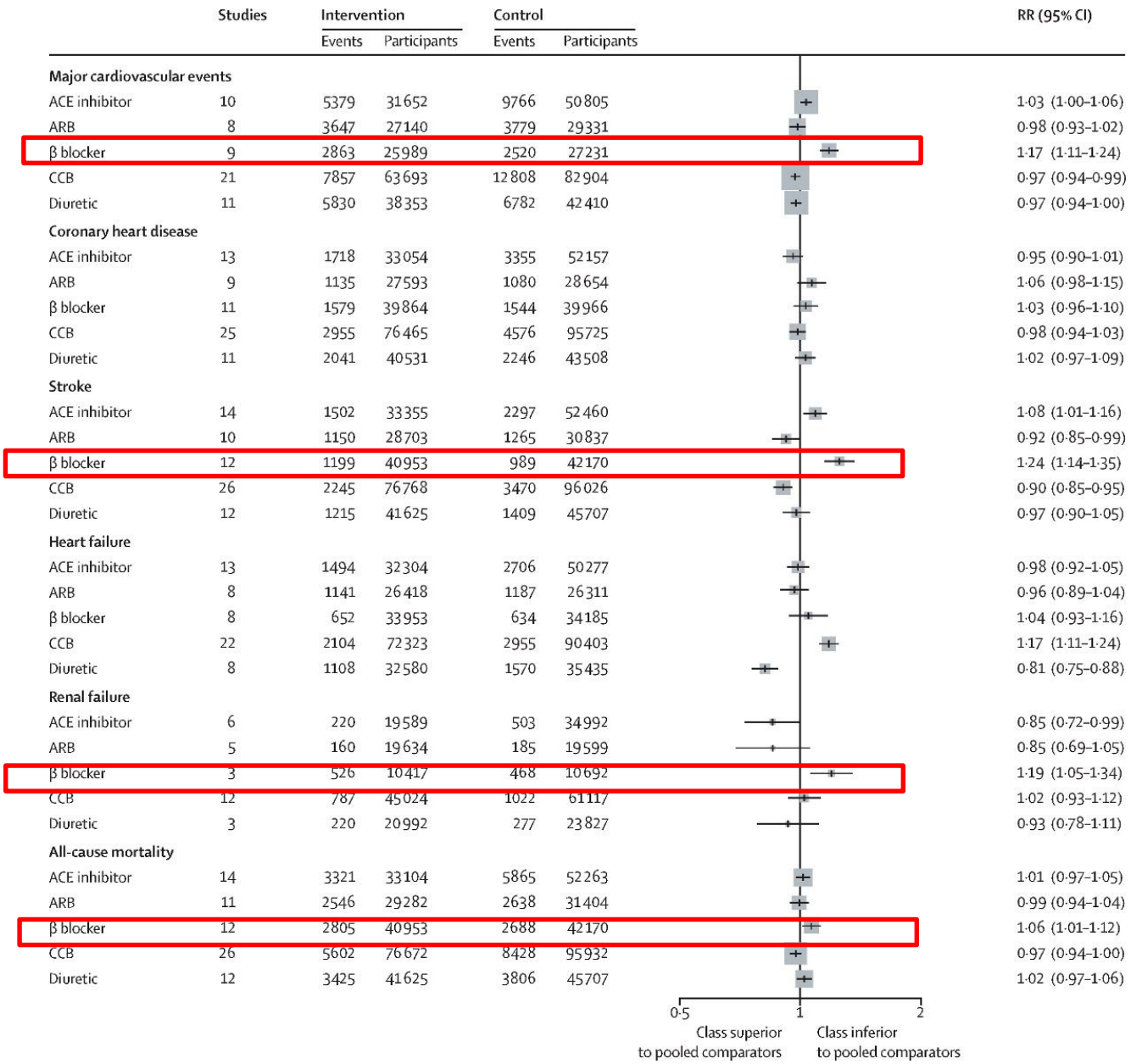
Avoid refined CHO or sugar

NICE/SA/JNC/ISHIB GUIDELINES



*Recommended by NICE

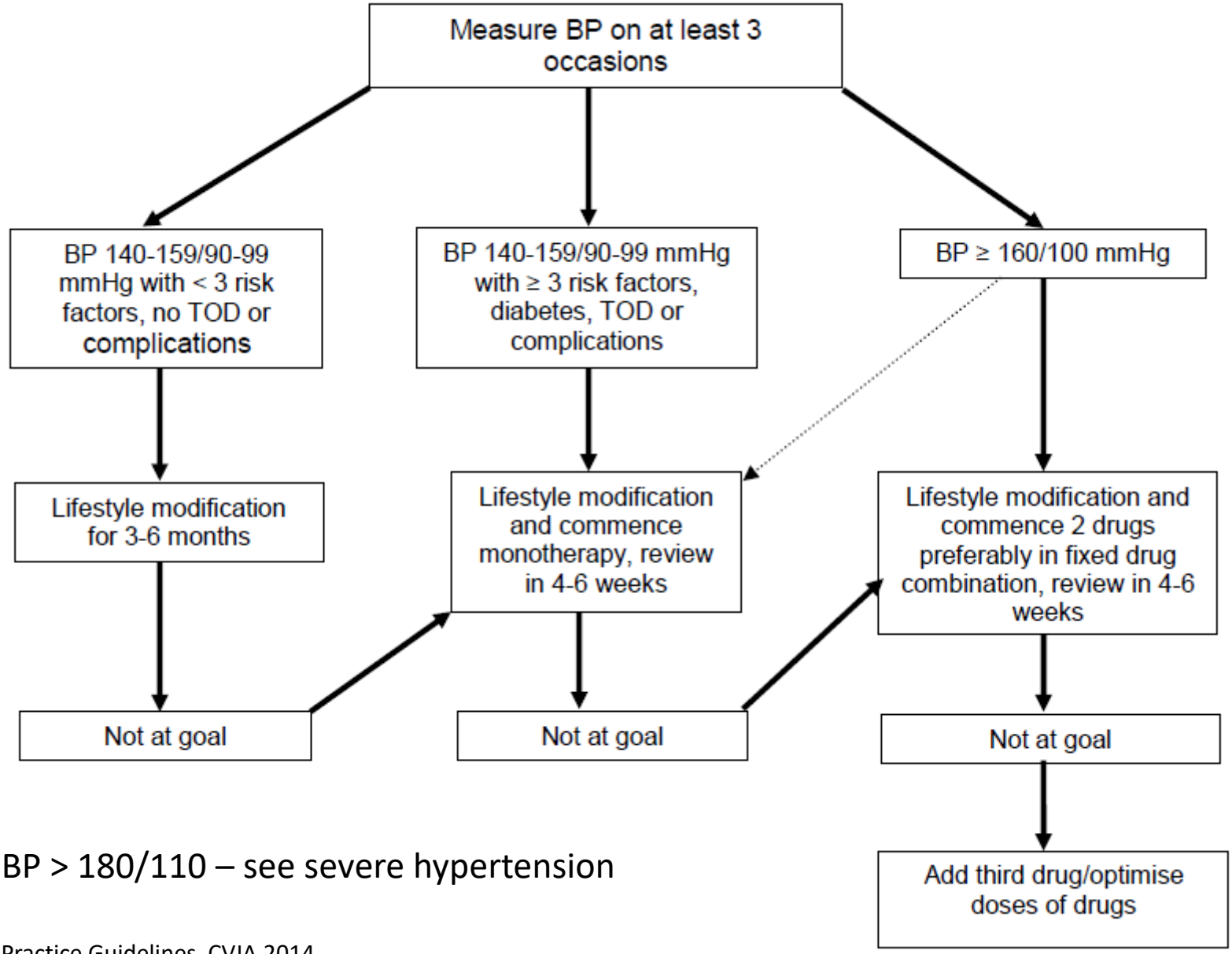
Diuretic/CCB preferred in black patients



β-blockers no longer recommended unless compelling indications

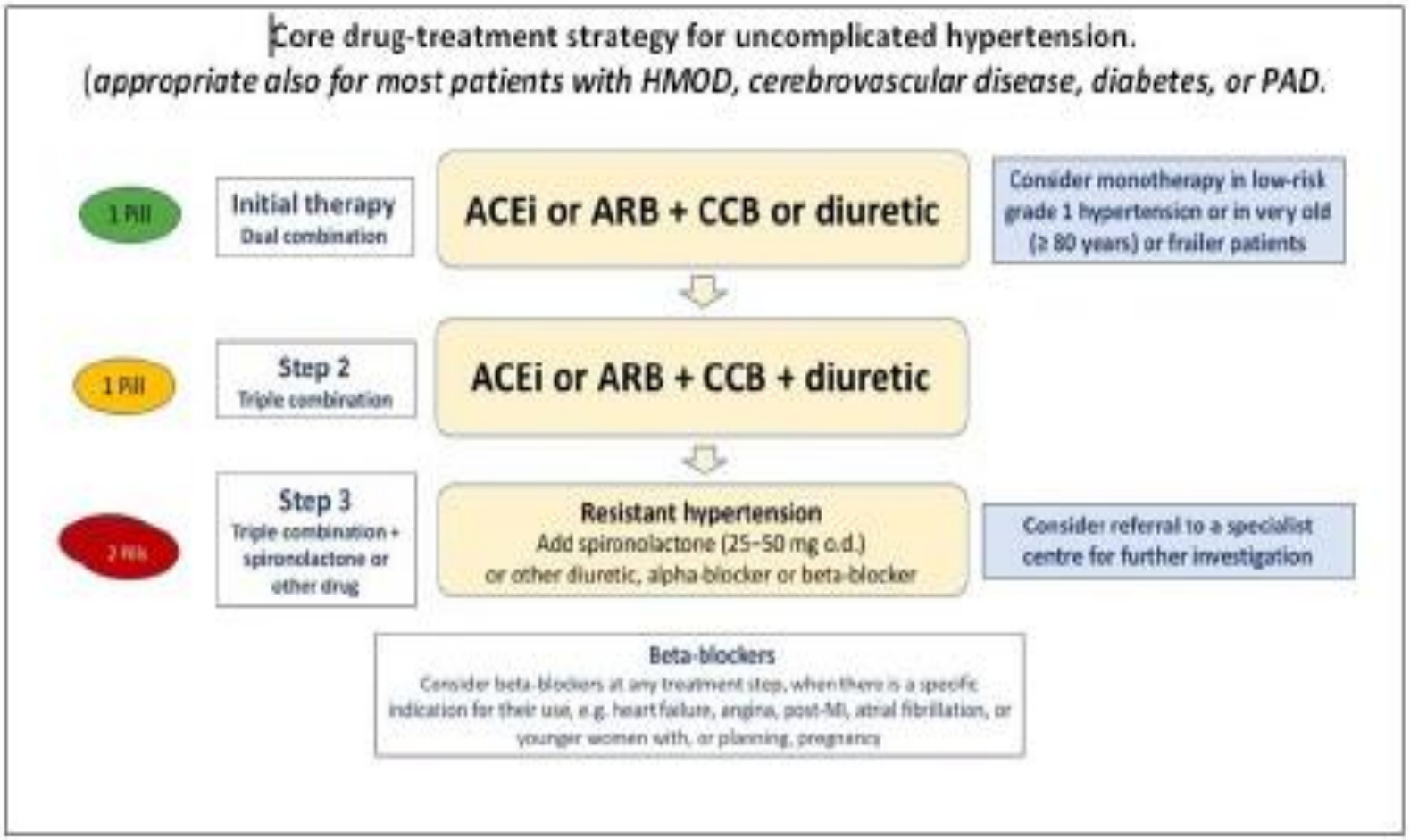
The Lancet 2016 387, 957-967DOI: (10.1016/S0140-6736(15)01225-8)

Figure 1. Overview of approach to treatment



BP > 180/110 – see severe hypertension

SAHS Practice Guidelines, CVJA,2014


Core drug-treatment strategy for uncomplicated hypertension.
(appropriate also for most patients with HMOD, cerebrovascular disease, diabetes, or PAD.
1 Pill
Initial therapy
Dual combination
ACEi or ARB + CCB or diuretic
Consider monotherapy in low-risk grade 1 hypertension or in very old (≥ 80 years) or frailer patients
1 Pill
Step 2
Triple combination
ACEi or ARB + CCB + diuretic
2 Pills
Step 3
Triple combination + spironolactone or other drug
Resistant hypertension
Add spironolactone (25–50 mg o.d.)
or other diuretic, alpha-blocker or beta-blocker
Consider referral to a specialist centre for further investigation
Beta-blockers
Consider beta-blockers at any treatment step, when there is a specific indication for their use, e.g. heart failure, angina, post-MI, atrial fibrillation, or younger women with, or planning, pregnancy

Drug Combinations

Consensus Opinion*	Discrepancies
Multiple drugs are required in most cases	SPCs recommended by ESH/ESC, Canadian, China and Taiwan guidelines for initial treatment if more than one drug is required
SPCs can be used when available	No consensus on drug class to be used for initial treatment
ACEi and ARB should not be used in combination	No consensus on most effective 2-drug combinations
CCB + thiazide-like diuretic + ACEi/ARB is the preferred 3-drug combination	

*Consensus recommendations are those that are presented in the majority of the guidelines, with no conflicting advice presented in the other guidelines (although the subject may not be discussed)

ACC/AHA, American College of Cardiology/ American Hypertension Association; ASH/ISH, American Society of Hypertension/International Society of Hypertension; ESH/ESC, European Society of Hypertension/European Society of Cardiology; JNC 8, Eighth Joint National Committee; NICE, National Institute for Clinical Excellence (UK), ACEi, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker, BP blood pressure; CCB, calcium channel blocker; SPC, single pill combination

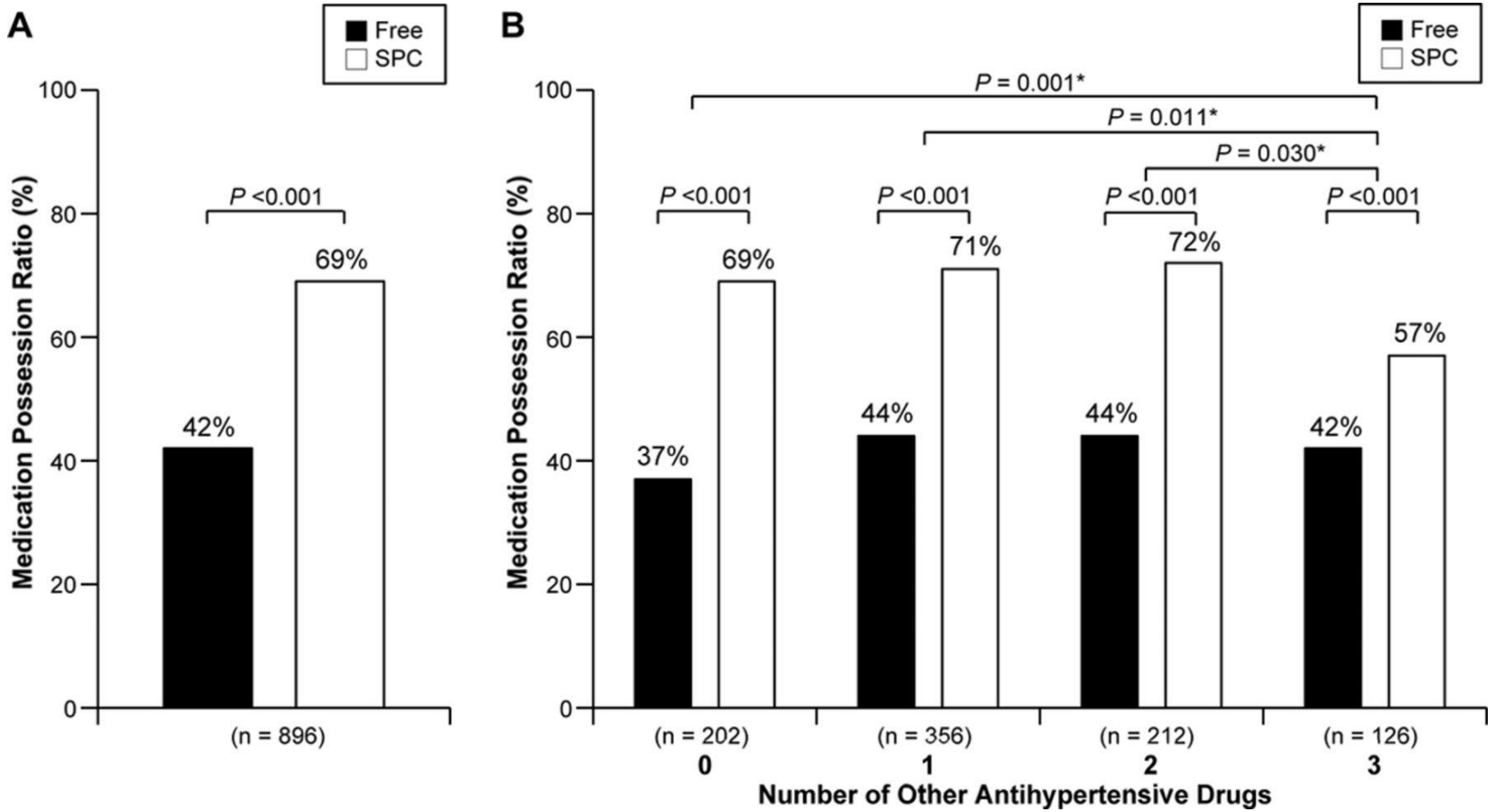
Adapted from Kjeldsen S et al. *Drugs* 2014; 74:2033-2051

Recommended 2-drug combinations of antihypertensive drugs

NICE	ESH ESC	SAHS	ASH-ISH	'JNC8'
A† + C§	A + C	A + C	**Black**	**Black**
	A + D*	A + D	A + C	C + D
	C + D	C + D	A + D	
			C + D	
			Non-black	**Non-black**
			A + C	A + C
			A + D	A + D
				C + D

†: A = ACE-inhibitor or angiotensin receptor blocker
§: C = Calcium channel blocker
*: D = Diuretic (including thiazides or thiazide-like/type)

Effects of switching from free combinations to the corresponding single-pill combinations (SPCs) on medication adherence in the whole study population (A) and patients categorized according to the number of concurrent antihypertensive drugs (B). *P values are for between-group medication possession ratio differences by using the 1-way ANOVA, followed by post hoc



Wang T et al. *Hypertension*. 2014;63:958-967

Recommendations	Class	Level
It is recommended that a two-drug combination, usually as an SPC, is used as initial therapy for most black patients.	I	C
In black patients, initial antihypertensive treatment should include a diuretic or a CCB, either in combination or with a RAS blocker.	I	B
In other ethnic groups, BP-lowering treatment may be based on the core treatment algorithm.	IIb	C

Williams, Mancia et al., J Hypertens 2018;36:1953-2041 and Eur Heart J 2018;39:3021-3104

Study Design

Comparison of dual therapies for lowering blood pressure in black Africans

- Perindopril 4 mg – HCTZ 12.5 mg
- Amlodipine 5 mg – Perindopril 4 mg
- Amlodipine 5 mg – HCTZ 12.5 mg
- Doses were then doubled for each regimen after 2 months for an additional 4 months

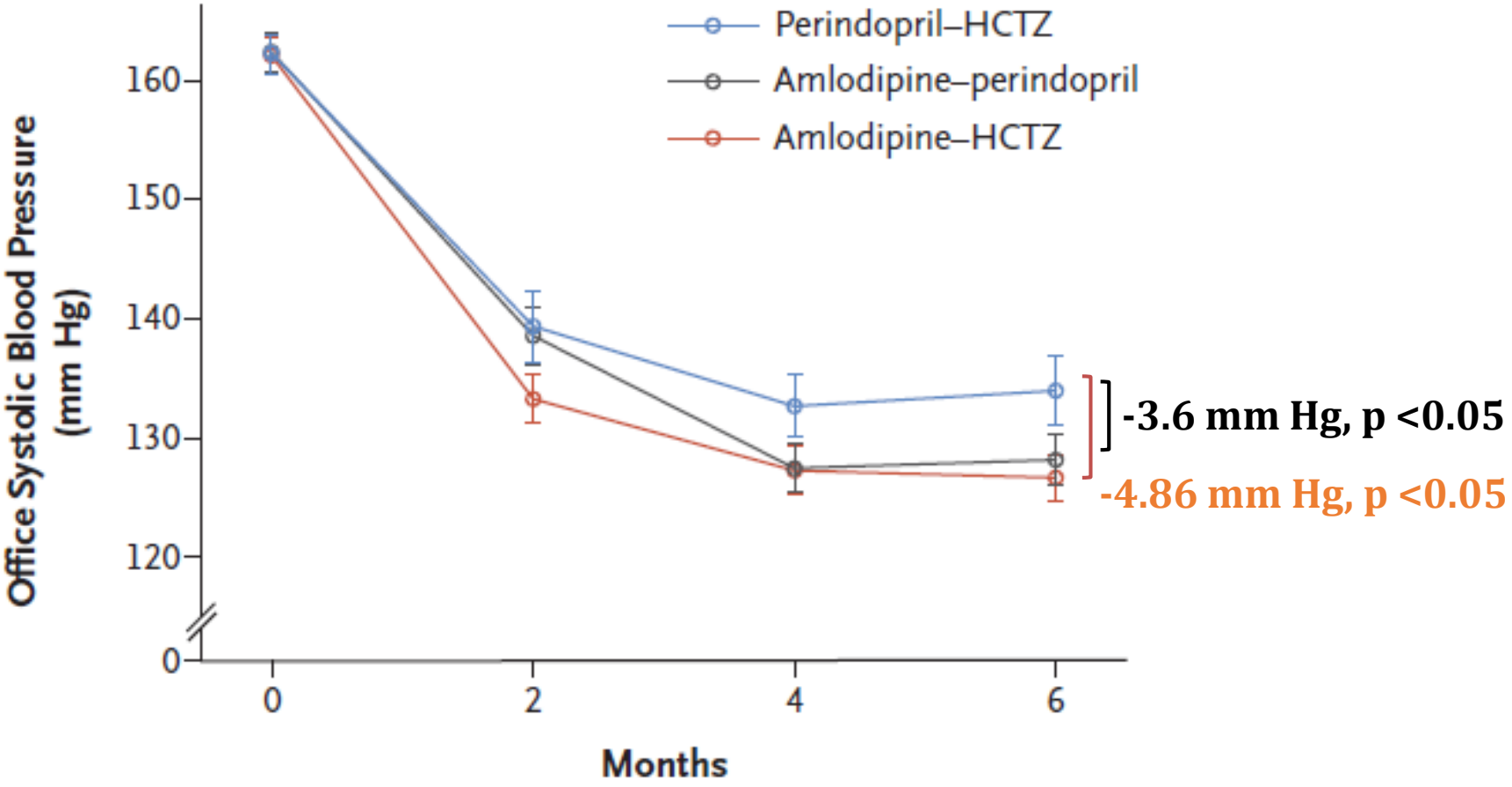
Demographics

N = 621 black patients from sub-Saharan Africa

Mean age 51 years (30-79 years); 63% female

HCTZ, hydrochlorothiazide

Ojji DB, et al. *N Engl J Med* 2019;Mar 18. [Epub ahead of print]



Doses: Perindopril 4 mg – HCTZ 12.5 mg; Amlodipine 5 mg – Perindopril 4 mg; Amlodipine 5 mg – HCTZ 12.5 mg
Doses were then doubled for each regimen after 2 months for an additional 4 months

HCTZ, hydrochlorothiazide
Adapted from Ojji DB, et al. *N Engl J Med* 2019;Mar 18. [Epub ahead of print]

Ambulatory Blood Pressure	Amlodipine-HCTZ vs Perindopril-HCTZ		Amlodipine-HCTZ vs Amlodipine-Perindopril		Amlodipine-Perindopril vs Perindopril-HCTZ	
	Mean Difference (95% CI) mmHg	*p*	Mean Difference (95% CI) mmHg	*p*	Mean Difference (95% CI) mmHg	*p*
Model 1† 24-hour						
Systolic	-3.14 (-5.90 to -0.38)	0.03	-0.14 (-2.90 to 2.61)	0.92	-3.00 (-5.81 to -0.20)	0.04
Diastolic	-1.05 (-2.67 to 0.55)		-0.41 (-2.01 to 1.18)		-0.64 (-2.27 to 0.98)	
Model 2‡ 24-hour						
Systolic	-3.57 (-6.31 to -0.83)	0.01	-0.37 (-3.09 to 2.35)	0.79	-3.20 (-5.95 to -0.46)	0.02
Diastolic	-1.37 (-2.97 to 0.23)		-0.63 (-2.22 to 0.96)		-0.74 (-2.34 to 0.86)	

† Model 1 was adjusted for stratification variables (age [<55 years or ≥55 years] and trial site) and the ambulatory systolic blood pressure at baseline.
‡ Model 2 was a sensitivity analysis adjusted for the stratification variables (age and trial site), baseline ambulatory systolic blood pressure, sex, presence of diabetes mellitus or dyslipidemia, body-mass index, heart rate, and duration of hypertension.
HCTZ, hydrochlorothiazide.
Ojji DB, et al. *N Engl J Med* 2019;Mar 18. [Epub ahead of print]

Table 3. Adjusted Mean Between-Group Differences in Changes from Baseline in Office Blood Pressure.*

Office Blood Pressure	Amlodipine–HCTZ vs. Perindopril–HCTZ	Amlodipine–HCTZ vs. Amlodipine–Perindopril	Amlodipine–Perindopril vs. Perindopril–HCTZ
		Mean Difference (95% CI)	
		mm Hg	
Systolic			
2 Mo	–5.72 (–9.14 to –2.30)	–5.14 (–8.30 to –1.74)	–0.58 (–3.84 to 2.65)
4 Mo	–4.76 (–7.88 to –1.63)	–0.04 (–3.14 to 3.07)	–4.72 (–7.88 to –1.56)
6 Mo	–7.15 (–10.25 to –4.06)	–1.61 (–4.69 to 1.47)	–5.55 (–8.69 to –2.41)
Diastolic			
2 Mo	–3.49 (–5.49 to –1.49)	–2.81 (–4.79 to –0.82)	–0.68 (–2.71 to –1.34)
4 Mo	–2.39 (–4.24 to –0.53)	–0.14 (–1.70 to 1.98)	–2.53 (–4.23 to –0.53)
6 Mo	–4.86 (–6.84 to –2.89)	–1.27 (–3.23 to 0.70)	–3.60 (–5.60 to –1.60)

* The change in office blood pressure at 2, 4, and 6 months was one of the main secondary end points of the trial. The data were adjusted for randomization stratification variables (age [<55 years or ≥55 years] and site) and baseline ambulatory systolic blood pressure.

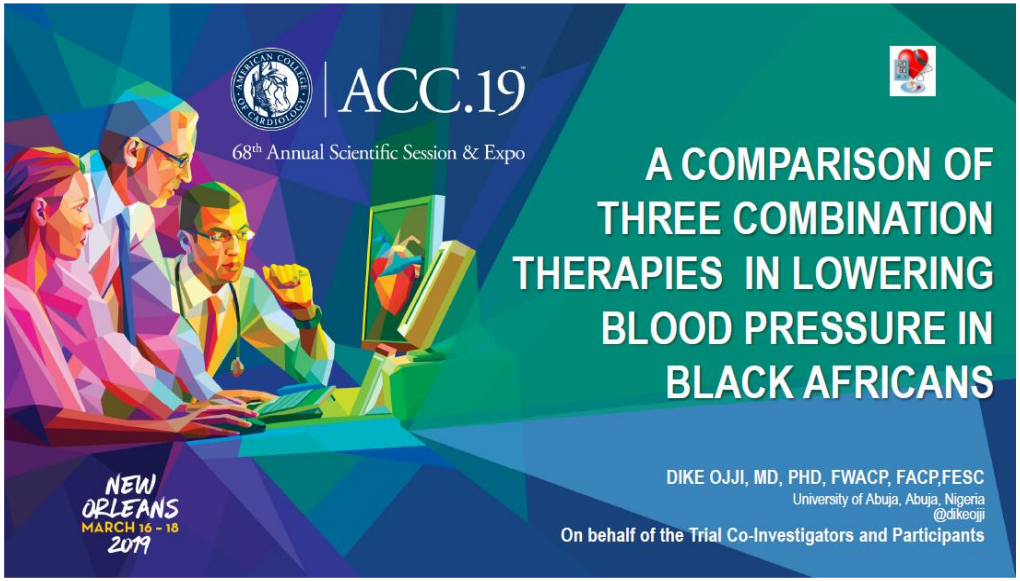
Table 5. Adverse Events (Safety Population).*

Adverse Event	Amlodipine–HCTZ (N = 244)	Amlodipine–Perindopril (N = 243)	Perindopril–HCTZ (N = 241)	All Patients (N = 728)
	number of patients (percent)			
Any adverse event	39 (16.0)	39 (16.0)	28 (11.6)	106 (14.6)
Dry cough	0	14 (5.8)	12 (5.0)	26 (3.6)
Pedal edema	10 (4.1)	9 (3.7)	1 (0.4)	20 (2.7)
Palpitations	5 (2.0)	7 (2.9)	1 (0.4)	13 (1.8)
Headache	5 (2.0)	4 (1.6)	2 (0.8)	11 (1.5)
Angioedema	0	2 (0.8)	3 (1.2)	5 (0.7)
Dizziness	4 (1.6)	1 (0.4)	4 (1.7)	9 (1.2)
Hypokalemia†	13 (5.3)	1 (0.4)	4 (1.7)	18 (2.5)
Death	0	0	0	0
Other‡	2 (0.8)	1 (0.4)	1 (0.4)	4 (0.5)

* The safety population included all 728 patients who had undergone randomization. Rates of adherence to the trial regimens (as measured by pill counts) were 80.6% in the group that received amlodipine plus HCTZ, 79.8% in the group that received amlodipine plus perindopril, and 79.5% in the group that received perindopril plus HCTZ.
† Hypokalemia was defined as a serum potassium level of less than 3.2 mmol per liter.
‡ Other adverse events included erectile dysfunction, fainting, and frequent urination.

Conclusions

The CREOLE trial showed that amlodipine plus either HCTZ or perindopril is superior to perindopril plus HCTZ in reducing BP among black patients from sub-Saharan Africa with hypertension



BP, blood pressure; HCTZ, hydrochlorothiazide.

Ojji DB, et al. *N Engl J Med* 2019;Mar 18. [Epub ahead of print]

Retrospective cohort study of the frequency, timing, and risk factors for ACEi angioedema within 5 years of prescription (N = 134,945 patients)

0.7% (n = 888) of patients developed angioedema within 5 years

0.23% incidence during the first year; 0.10% to 0.12% over subsequent 4 years

Patient characteristic	Developed ACEi-associated angioedema (n = 888)	No ACEi-associated angioedema (n = 134,057)	*p*
Age, median (IQR)*	61.5 years (52.2 – 71.2)	62.7 years (52.6 – 74.0)	0.007
Black, n (%)	174 (19.6%)	7,945 (5.9%)	< 0.001
Hispanic	60 (6.8%)	6,888 (5.1%)	0.03
NSAID allergy**	63 (7.1%	4.2%	< 0.001
Concomitant NSAID use†	299 (33.7%)	66,092 (49.3%)	< 0.001

*Use age at time of first prescription. **Prior to entry of angioedema as allergy, or within 5 years if no angioedema reported.
†Medication list specifies use of an NSAID prior to entry of angioedema as allergy, or within 5 years if no angioedema reported.
EHR, electronic health record; IQR, interquartile range.
Banerji A, et al. *J Allergy Clin Immunol Pract* 2017;5(3):744-9.

Initiate black patients on single-pill combination therapy

- **Rationale: most black patients will need > 1 antihypertensive agent to achieve BP goal < 140/90 mm Hg**

Use of an ARB rather than ACEi in the single-pill combination formulation may be preferable

- **Rationale: Higher incidence of angioedema in black people taking an ACEi**

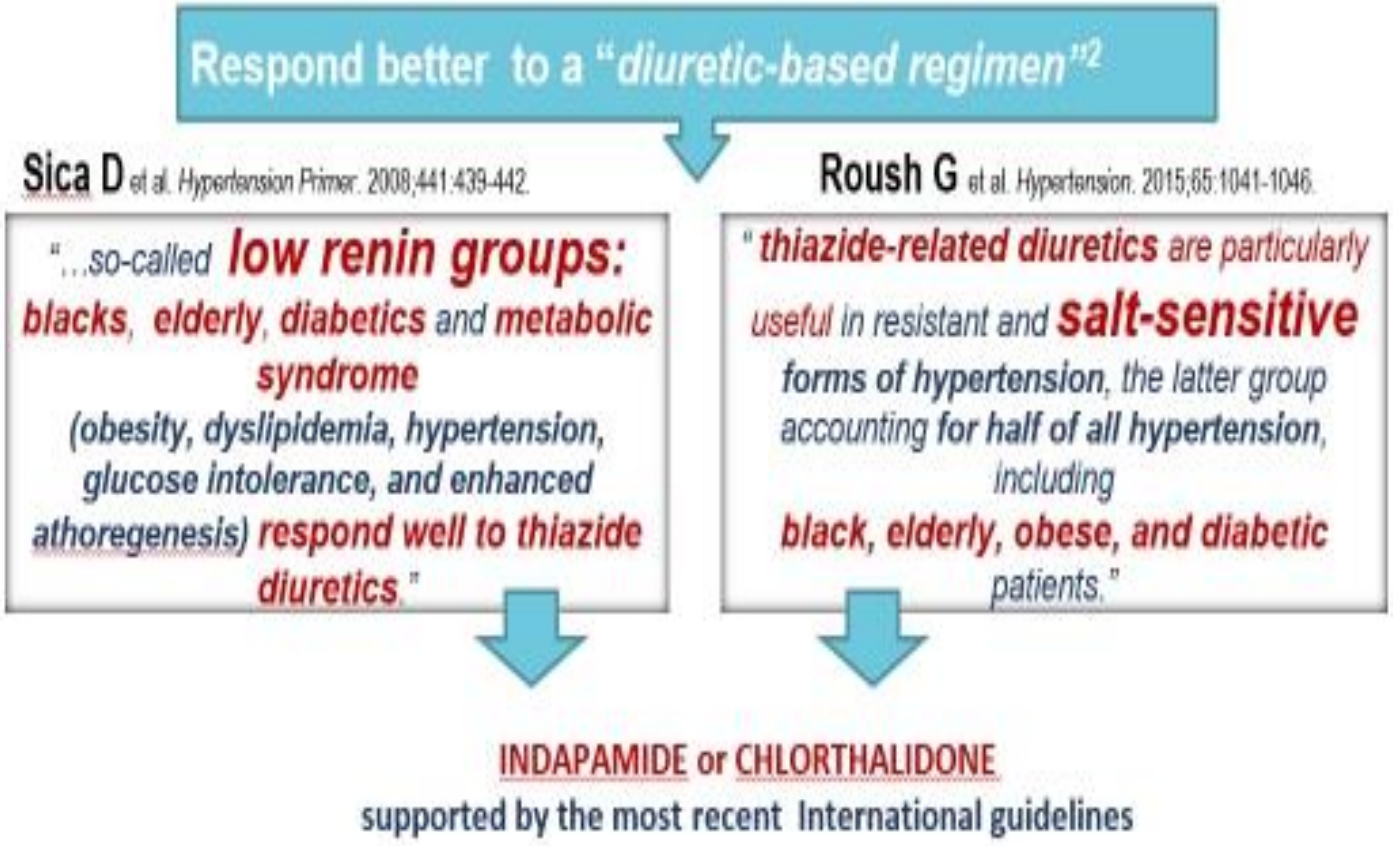
Use of a CCB in the single-pill combination formulation may be preferable

- **Rationale: higher prevalence of DM in black people and there is the potential for diuretics to worsen the glycemic profile**
- **Caveat: Black people are at higher risk for HF, and diuretics are superior to CCBs in that respect**

BP, blood pressure; CCB, calcium channel blocker; DM, diabetes mellitus; HF, heart failure.

Williams SK, et al. *Prog Cardiovasc Dis* 2016;59(3):282-8.

Low Renin + High Salt Sensitivity Patients



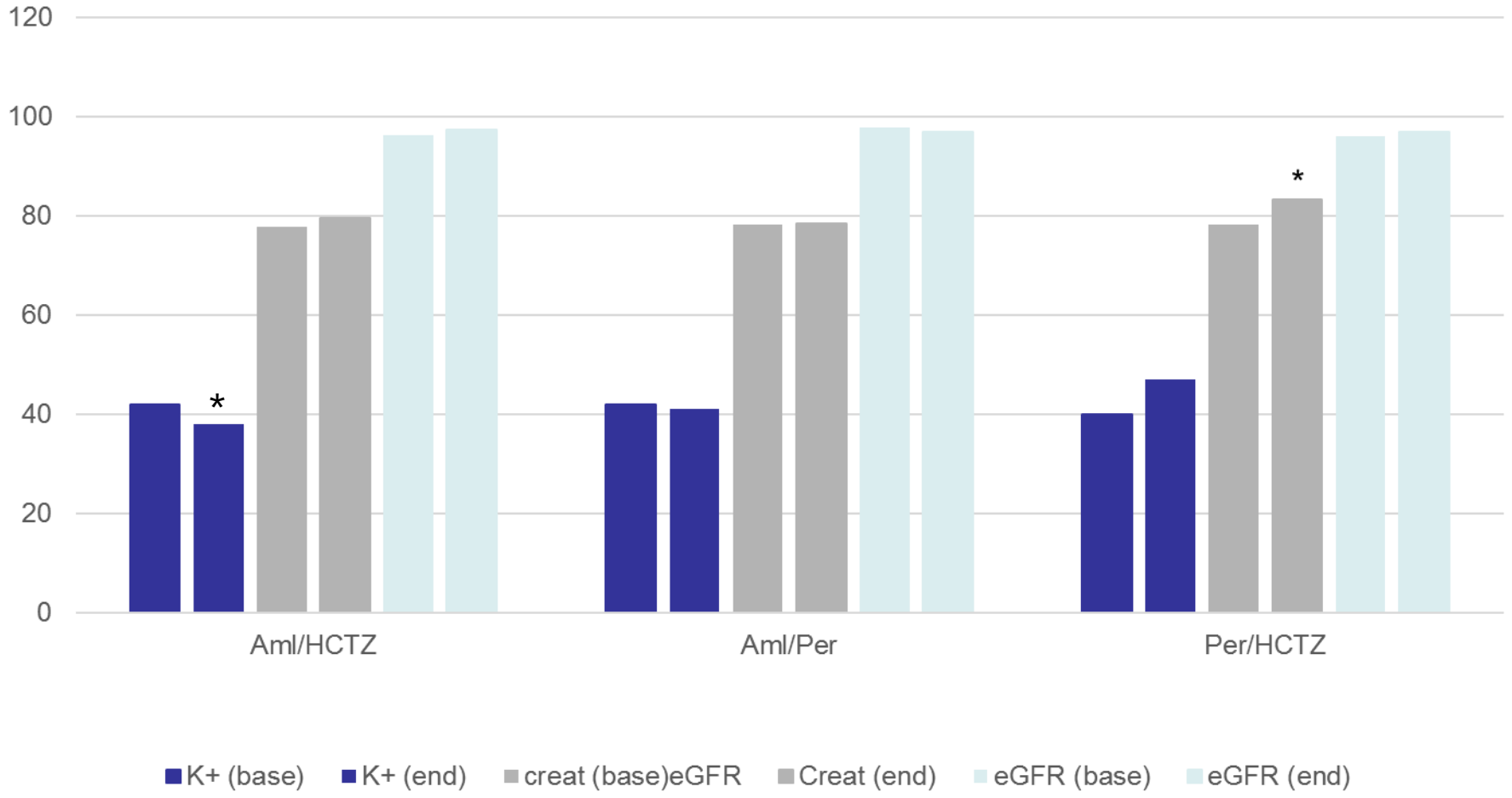
Lower BP control

Higher CV risk

Poor adherence

Reduced life expectancy

Safety Bloods

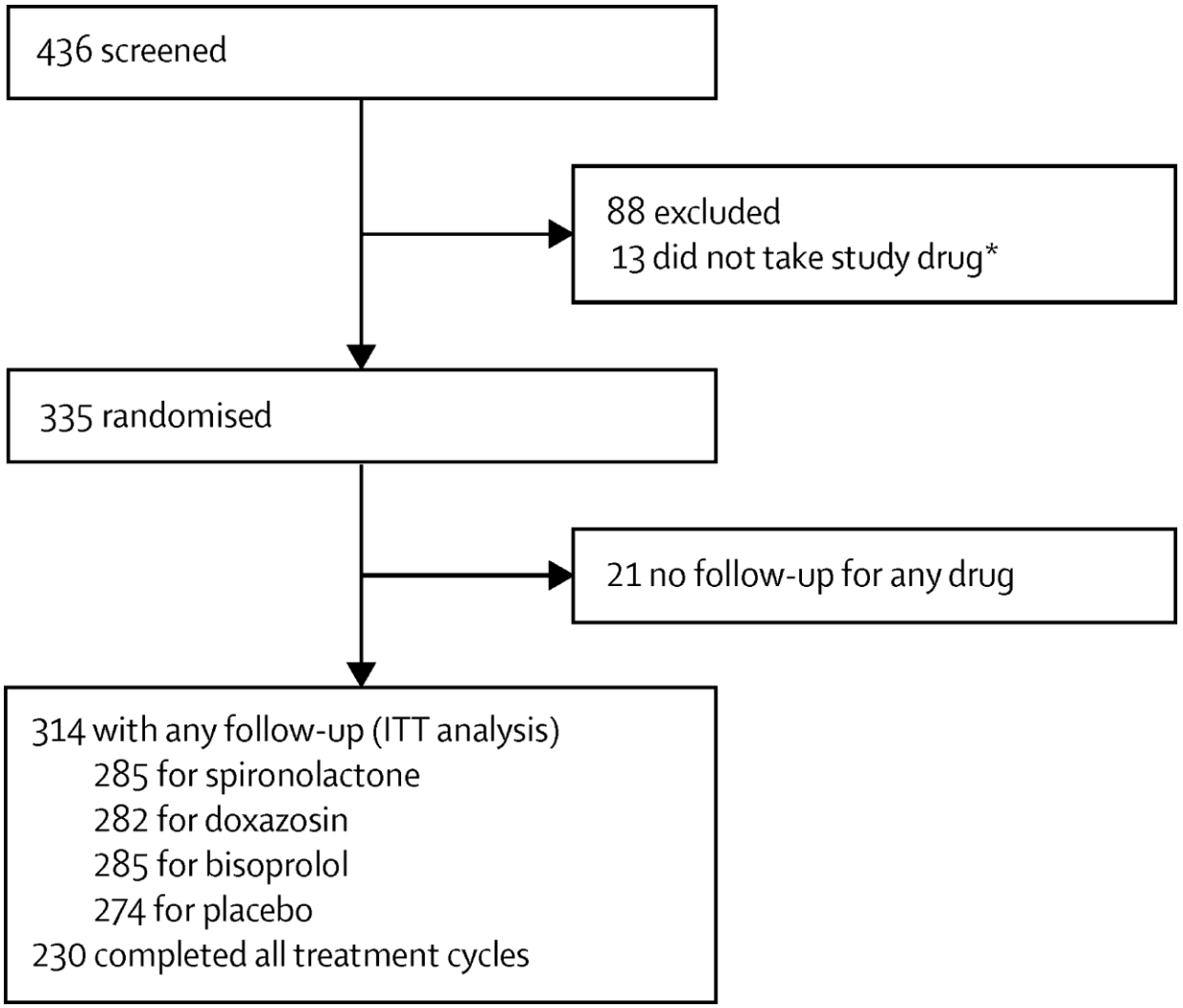


K^+ - x 10^{-1}

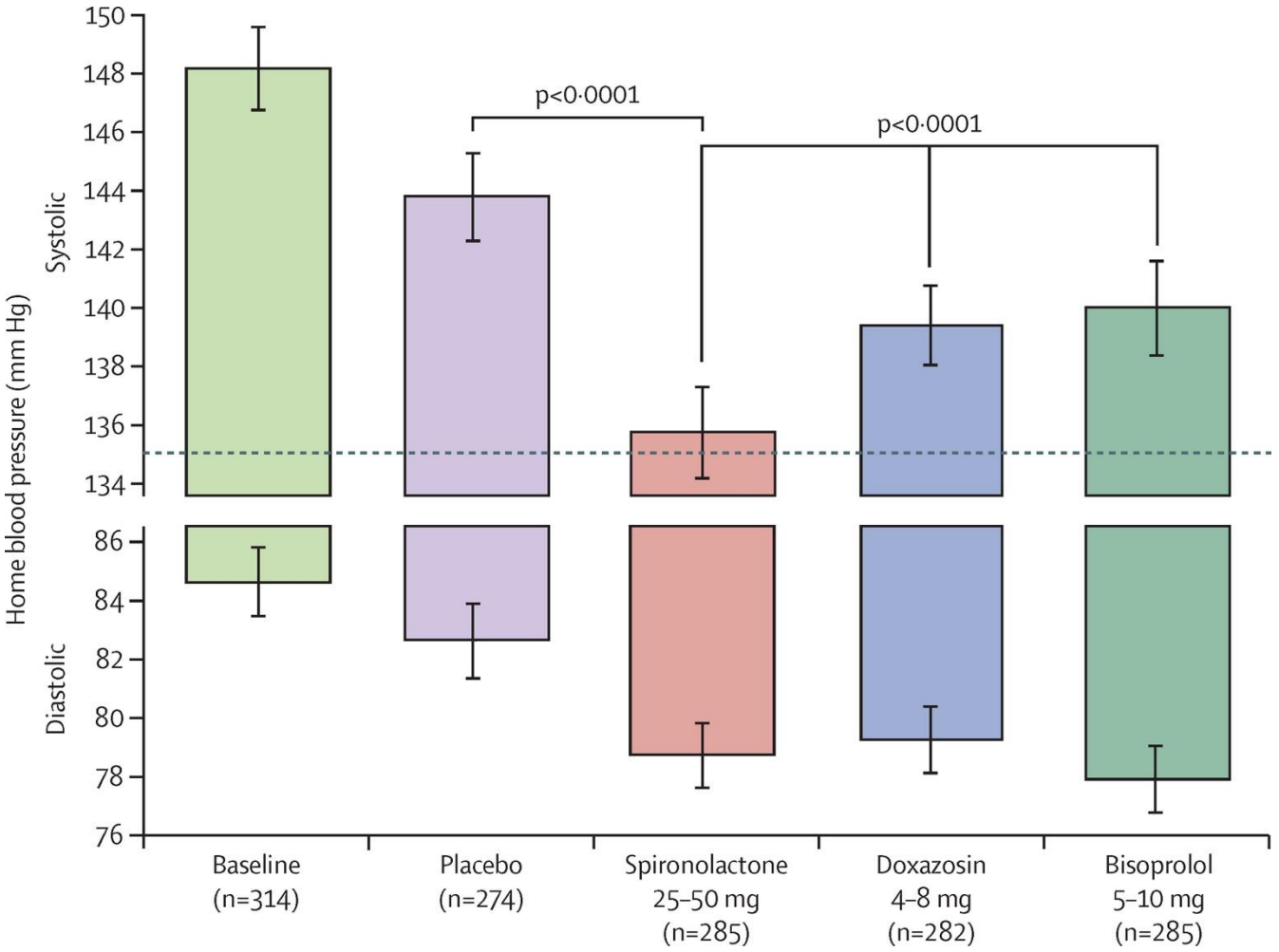
Spironolactone versus placebo, bisoprolol, and doxazosin to determine the optimal treatment for drug-resistant hypertension (PATHWAY-2): a randomised, double-blind, crossover trial

Prof Bryan Williams, FRCP, Prof Thomas M MacDonald, FRCP, Steve Morant, PhD, Prof David J Webb, FMedSci, Prof Peter Sever, FRCP, Prof Gordon McInnes, FRCP, Prof Ian Ford, PhD, Prof J Kennedy Cruickshank, FRCP, Prof Mark J Caulfield, FMedSci, Prof Jackie Salsbury, RGN, Isla Mackenzie, FRCP, Sandosh Padmanabhan, FRCP, Prof Morris J Brown, FMedSci

The Lancet
Volume 386, Issue 10008, Pages 2059-2068 (November 2015)
DOI: 10.1016/S0140-6736(15)00257-3



The Lancet 2015 386, 2059-2068DOI: (10.1016/S0140-6736(15)00257-3)



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HYPERTENSION MANAGEMENT ALGORITHM

Step 1 — **Assess**

Major risk factors

- Levels of systolic and diastolic BP
- Smoking
- Dyslipidaemia:
  - total cholesterol > 5.1 mmol/L
- Diabetes mellitus
- Men > 55 years
- Women > 65 years
- Family history of early onset of CVD:
  - Men aged <55 years
  - Women aged <65 years
- Waist circumference- abdominal obesity:
  - Men ≥ 102 cm
  - Women ≥ 94 cm

Target Organ Damage

- LVH: based on ECG
  - Sokolow-Lyons > 35 mv (S in V1 + R in V5 or V6)
  - Cornell product > 2440 mm.ms (S in V3 + R in aVL + 6 in females) x QRS duration)
  - R in aVL > 11 mv
- +ve dipsticks for protein

Complications

- Coronary heart disease
- Heart failure
- Chronic kidney disease:
  - +ve dipsticks for protein OR eGFR < 60ml/min
- Stroke or TIA
- Peripheral arterial disease
- Advanced retinopathy:
  - haemorrhages OR
  - exudates
  - papilloedema

Step 2 — **Measure Blood Pressure** according to the ESC/ESH guidelines*

Step 3 — **Lifestyle changes**

- Weight reduction
- Restrict salt, dietary sugars, and saturated fat
- Limit alcohol consumption
- Increase fruit and vegetables
- Increase physical activity
- Stop all tobacco products

Step 4

- BP 140-159/90-99 mmHg with < 3 risk factors, no TOD or complications → Lifestyle modification for 12 months → Not at goal → Commence monotherapy, review in 4-6 weeks
- BP 140-159/90-99 mmHg with ≥ 3 risk factor, diabetes, TOD or complications → Commence monotherapy, review in 4-6 weeks
- BP ≥ 160/100 mmHg* → Commence 2 first line drugs, review in 4-6 weeks → Not at goal → Add third drug/optimise doses of drugs

Not at goal → Commence monotherapy, review in 4-6 weeks → Not at goal → Commence 2 first line drugs, review in 4-6 weeks → Not at goal → Add third drug/optimise doses of drugs

Step 5

Is there a hypertensive urgency or emergency? BP > 180/110 mmHg with symptoms and/or accelerated TOD

- Yes → **Refer for hospital admission**
- No → **Step 6**

Step 6 — **Are there compelling indications/contraindications? (see below)**

- No → **Routine Management**

Routine Management

Step 1: Choose any of the following:*

- Hydrochlorothiazide 12.5 -25 mg daily or indapamide 1.25 – 2.5 mg daily
- CCB
- ACE-I or ARB
- If 20/10mmHg above goal proceed directly to step 2

Step 2

1. Combine any 2 of the above
2. Combine all 3 of above
3. Maximize doses of individual agents

Step 3

- Spironolactone 25mg daily (monitor K+ and avoid if eGFR < 45 mls/min)
- β blocker, α blocker, minoxidil, centrally acting drug, or hydralazine
- Consider furosemide 40mg b.d. in place of thiazide if eGFR < 45mls/min
- Check adherence, secondary causes, home or 24 hour BP monitoring for white coat or pseudoresistance

* CCBs/diuretics preferred in Blacks/Elderly

* 24 hour acting drugs and single pill combinations preferred

Step 7

Step 8

BP TARGETS

- <140/90 mmHg
- <150/90 mmHg if > 80 years

Abbreviations

- LVH = left ventricular hypertrophy
- eGFR = estimated glomerular filtration rate
- TOD = target organ damage
- TIA = transient ischaemic attack
- ACE-I = angiotensin converting enzyme inhibitor
- ARB = angiotensin receptor blocker
- CCB = calcium channel blocker
- HF = heart failure
- ISH = isolated systolic hypertension

GUIDELINE CONSENSUS

- Broad consensus for BP thresholds for intervention (140/90) except ACC/AHA guideline
- ACC/AHA has recommended a new target of < 130/80 mmHg in most at risk patients, but S Africa is not ready for this and this recommendation is also controversial in low risk patients
- Importance of accurate BP measurement within and out of office
- Much closer agreement on optimal drug treatment (ACE or ARB, CCB, diuretic or all 3)
- Recognition for the wider use of single pill drug combinations for optimal BP control, and earlier initial use of combinations in high risk e.g. > 160/100
- Results of Creole study inform us of combination treatment in Blacks
- Spironolactone low dose for resistant hypertension, caution if eGFR < 45, monitor K+
- All risk factors must be addressed especially more routine use of statins

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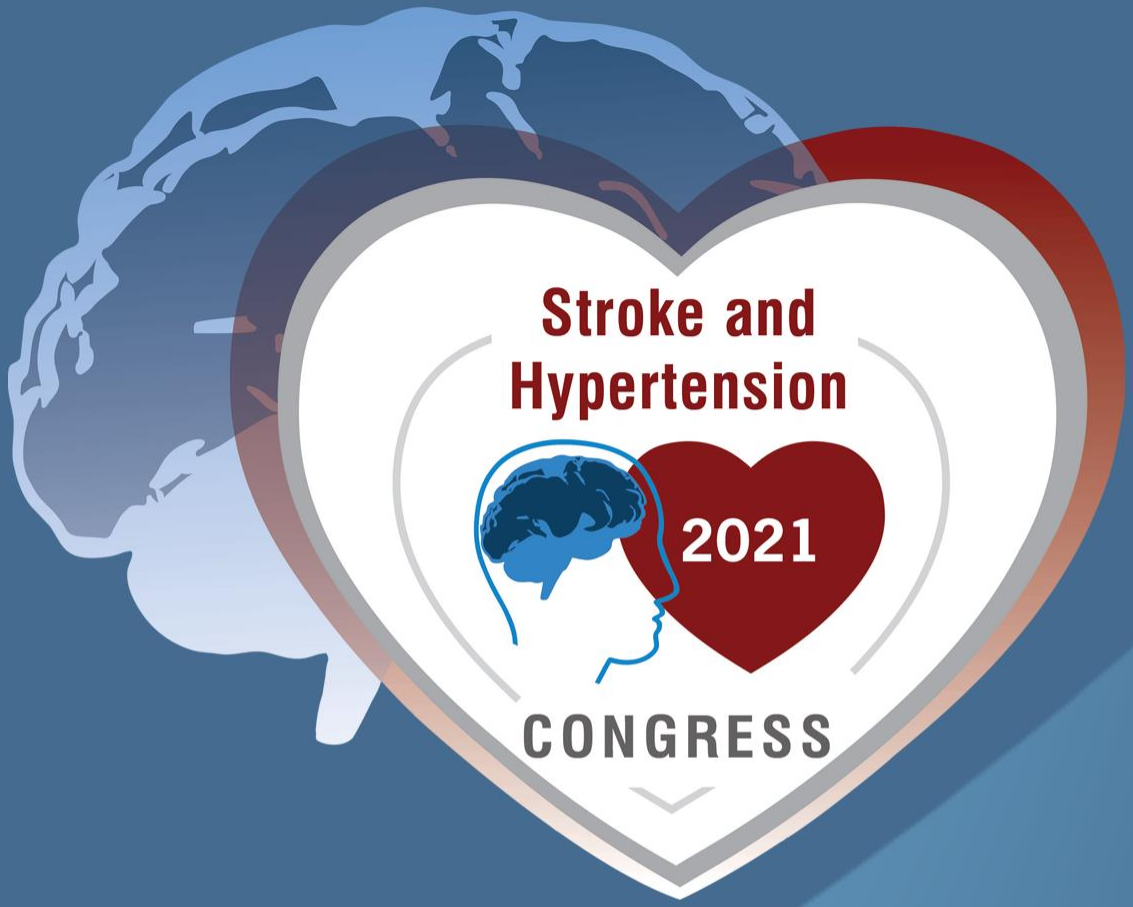

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