CHALLENGES OF HYPERTENSION IN THE COALFACE

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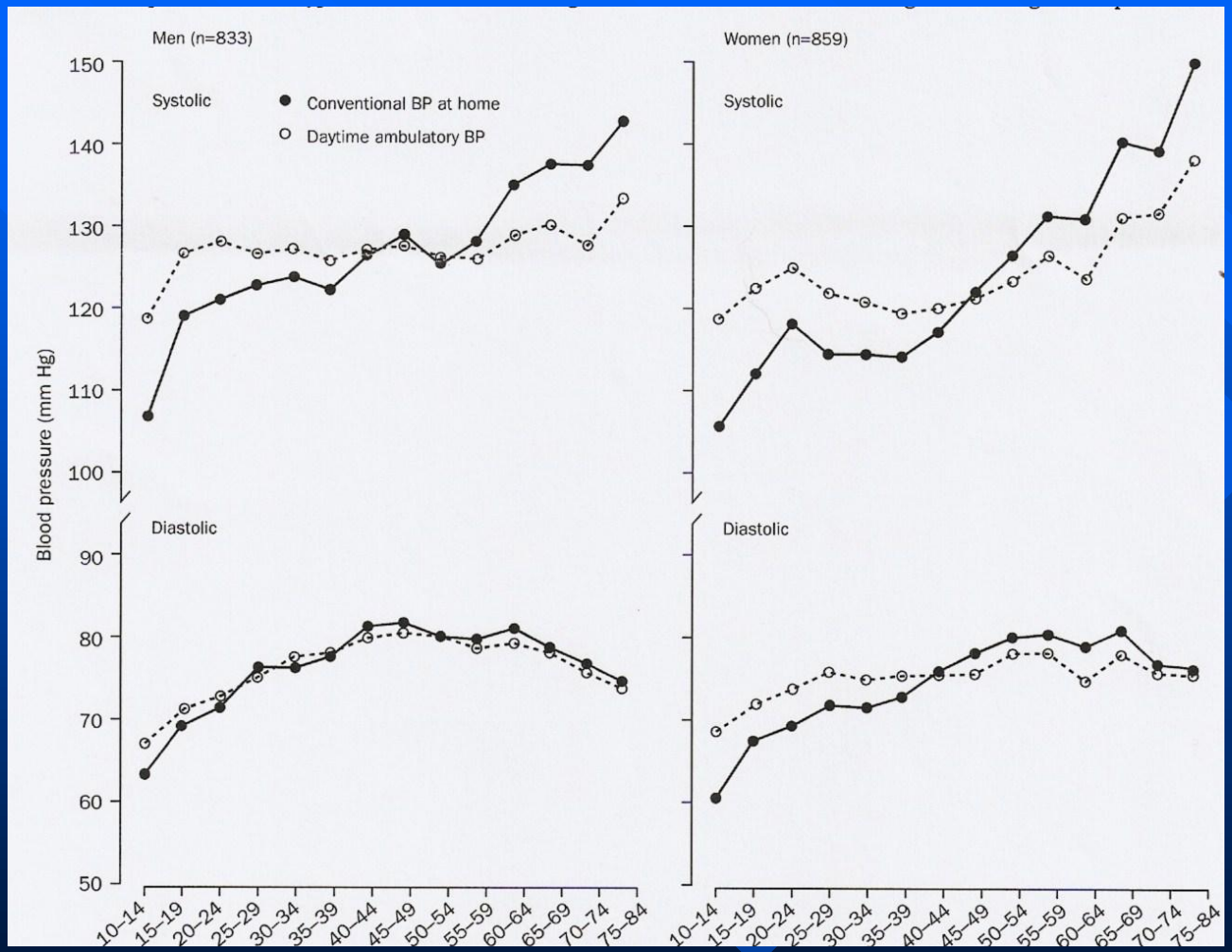
SYSTOLIC AND DIASTOLIC BLOOD PRESSURES (BP) IN 5-YEAR AGE GROUPS IN A REPRESENTATIVE SAMPLE OF THE POPULATION OF NOORD LIMBURG, BELGIUM



AGE GROUPS

CHALLENGES

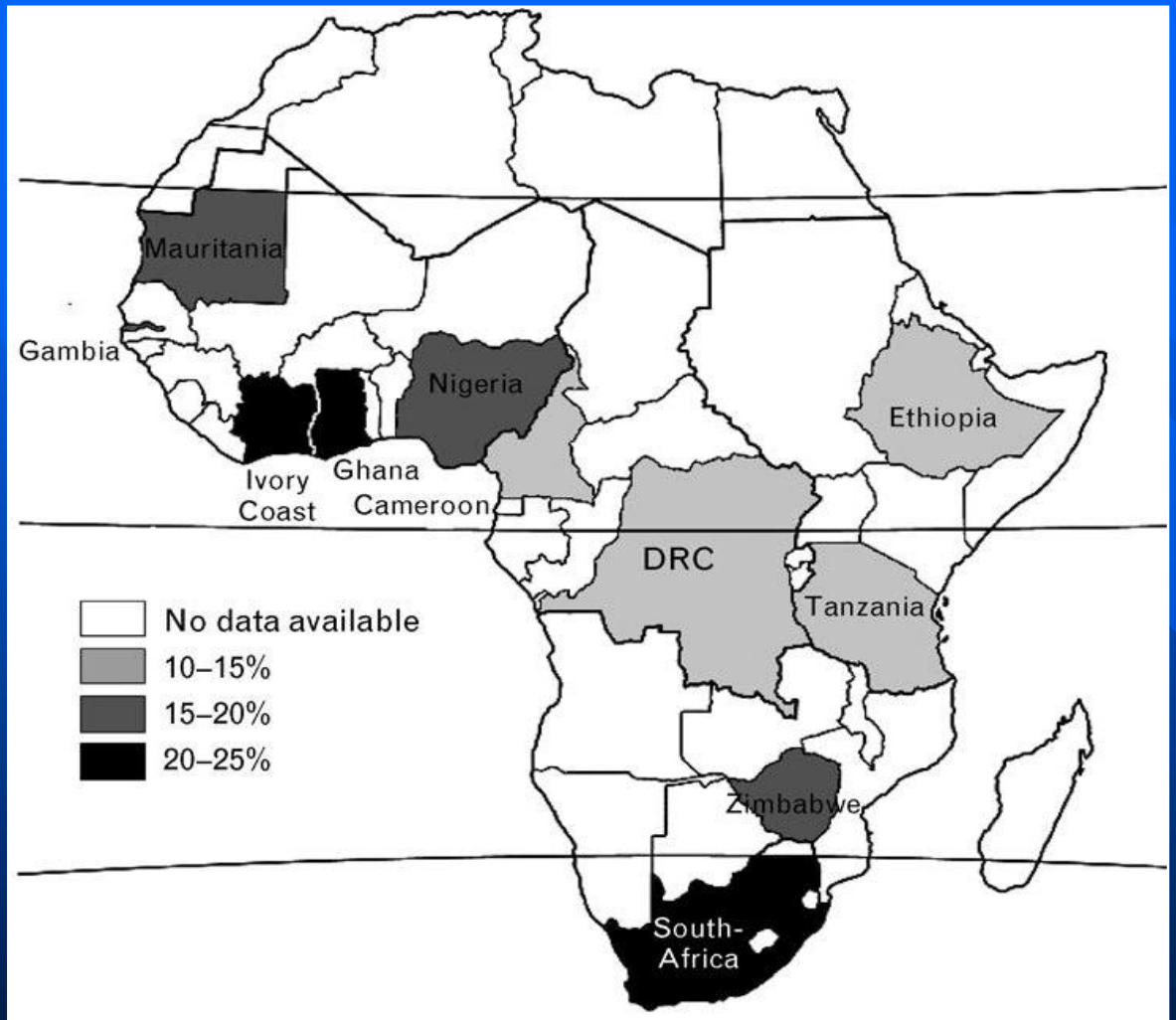
- Goals of lowering blood pressure
- Blood pressure measurement
- Risk stratification
- Modalities of blood pressure treatment
- Target blood pressure
- Stage 3 hypertension

PREVALENCE OF HYPERTENSION IN SUB-SAHARAN AFRICA

- ***OVERALL PREVALENCE***
  - *16.2% (95% CI 14.1 – 20.3)*
  - *(23.3%)*
- ***RURAL***
  - *13.7%*
- ***URBAN***
  - *20.7%*
- ***GENDER***
  - *Male 16.8%*
  - *Female 15.7%*

Twagirumukiza M et al; J of Hypertension
July 2011

HYPERTENSION PREVALENCE



on of the prevalence of hypertension in sub-Saharan African countries. DRC, Demc

Wolters Kluwer Health | Lippincott Williams & Wilkins

Twagirumukiza M et al; J of Hypertension; July 2011

The total number of hypertensives in SSA was estimated at 75 million in 2008 and at 125.5 million by 2025.

Twagirumukiza M et al; J of Hypertension July 2011

Prevalence predicted to increase to 1.5 billion world wide by 2025

He FJ et al; Eur Heart J (Suppl) 2007

GLOBAL BURDEN OF BLOOD-PRESSURE RELATED DISEASE

- *7.6 Million premature deaths (13.5% of global)*
- *92 Million disability adjusted life years (6.9% of global)*
- *54% of stroke and 47% of ischaemic heart disease*
- *80% of attributable burden in low-income and middle-income economies and over half in people aged 45 – 69 years*

Lawes C M M et al; Lancet 2008

CLASSIFICATION OF HYPERTENSION

STAGE	(MMHG)
NORMAL	SBP 120-129 and DBP 80-84
HIGH NORMAL	SBP 130-139 or DBP 85-89
GRADE 1 (MILD)	SBP 140-159 or DBP 90-99
GRADE 2 (MODERATE)	SBP 160-179 or DBP 100-109
GRADE 3 (SEVERE)	SBP > 180 or DBP > 110
ISOLATED SYSTOLIC	

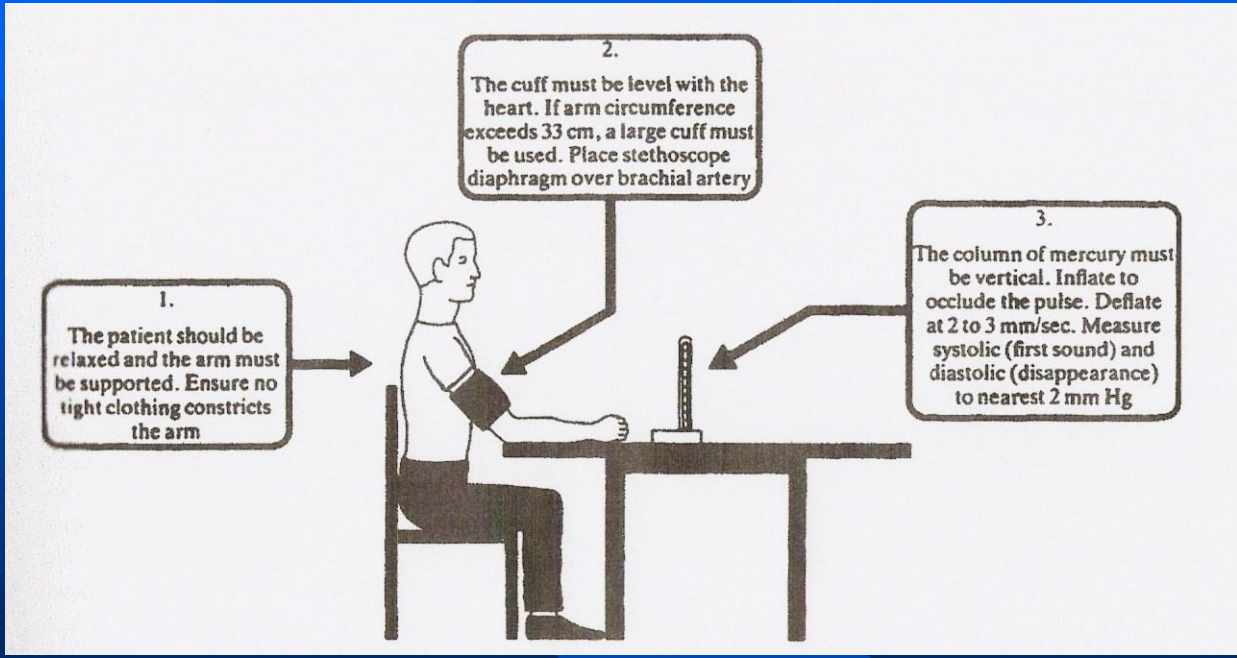
BLOOD PRESSURE MEASUREMENT

- **OFFICE OR CLINIC** - *mercury sphygmomanometer*
- **SELF MEASUREMENT:**
  - *electronic sphygmomanometer*
- **AMBULATORY BLOOD PRESSURE MONITORING**

MEASUREMENT OF BLOOD PRESSURE

BP is recorded using an approved device with the patient in a sitting position (with the back supported, arm bared and resting on a surface at heart level) for at least 5 minutes. ***An appropriate size cuff should be used: a standard cuff (12 cm) for a normal arm and a larger cuff (15 cm) for an arm with a mid-upper circumference >33cm (the bladder within the cuff should encircle 80% of the arm).*** *At the initial consultation BP should be measured in both arms, and if there is any discrepancy is should be taken thereafter in the arm with the higher BP. The systolic BP should be first estimated by palpation to avoid missing the auscultatory gap.*

TECHNIQUE OF BP MEASUREMENT



Kaplan N. Clin Hypt. 10th ed

DIAGNOSIS OF HYPERTENSION.

- *The diagnosis of hypertension may be* ***made if repeat measurements performed on three separate occasions when either the initial SBP is between ≥ 140 mm Hg and/or the DBP ≥ 90 mm Hg taken over a period of 2 months.*** *Where circumstances permit ABPM should be considered particularly in the absence of TOD.*

MEASUREMENT OF BLOOD PRESSURE

Self-measurement of BP (SBPM) and ambulatory monitoring (ABPM) is recommended for selected target groups and circumstances:

- *suspected white-coat (higher readings in the office compared to outside) or masked hypertension (normal readings in office but higher outside);*
- *to guide antihypertensive medication especially in high risk groups e.g. elderly, diabetics;*
- *refractory hypertension;*
- *to improve compliance to treatment; (SBPM only)*

RELATIVE EFFECTIVENESS OF CLINIC AND HOME BP MONITORING COMPARED WITH ABPM IN DIAGNOSIS OF HYPERTENSION

- ***CLINIC (140/90) VERSUS ABPM (135/85)***
  - *Sensitivity 74.6%;*
  - *Specficity 74.6%*

- ***HOME (135/85) VERSUS ABPM (135/85)***
  - *Sensitivity 85.7%*
  - *Specificity 62.4%*

Hodgkinson J et al; BMJ. 2011

One or more, high quality single visit nurse – recorded auscultatory blood pressure measurements may be equally as effective as ambulatory blood pressure in predicting target organ damage in a population sample of African ancestry

Woodiwiss AJ et al; J Hypertens. 2009

BLOOD PRESSURE MEASUREMENT FOR COMMENCEMENT OF ANTIHYPERTENSIVE THERAPY

- ***NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE (NICE)***
  - *ABPM if no target organ damage*
  - *HBPM if unable to tolerate ABPM*
- ***AMERICAN HYPERTENSION SOCIETY***
  - *HBPM*
- ***SOUTHERN AFRICAN HYPERTENSION SOCIETY***
  - *Conventional OBPM*

AUTOMMATED OFFICE BP MEASUREMENT

Six readings are taken at 2 minute intervals in a quite room, the initial reading discarded and the remaining 5 are averaged.

THE RISK FOR CARDIOVASCULAR DISEASE IN PATIENTS WITH HYPERTENISON IS DETERMINED BY THE PRESENCE OF

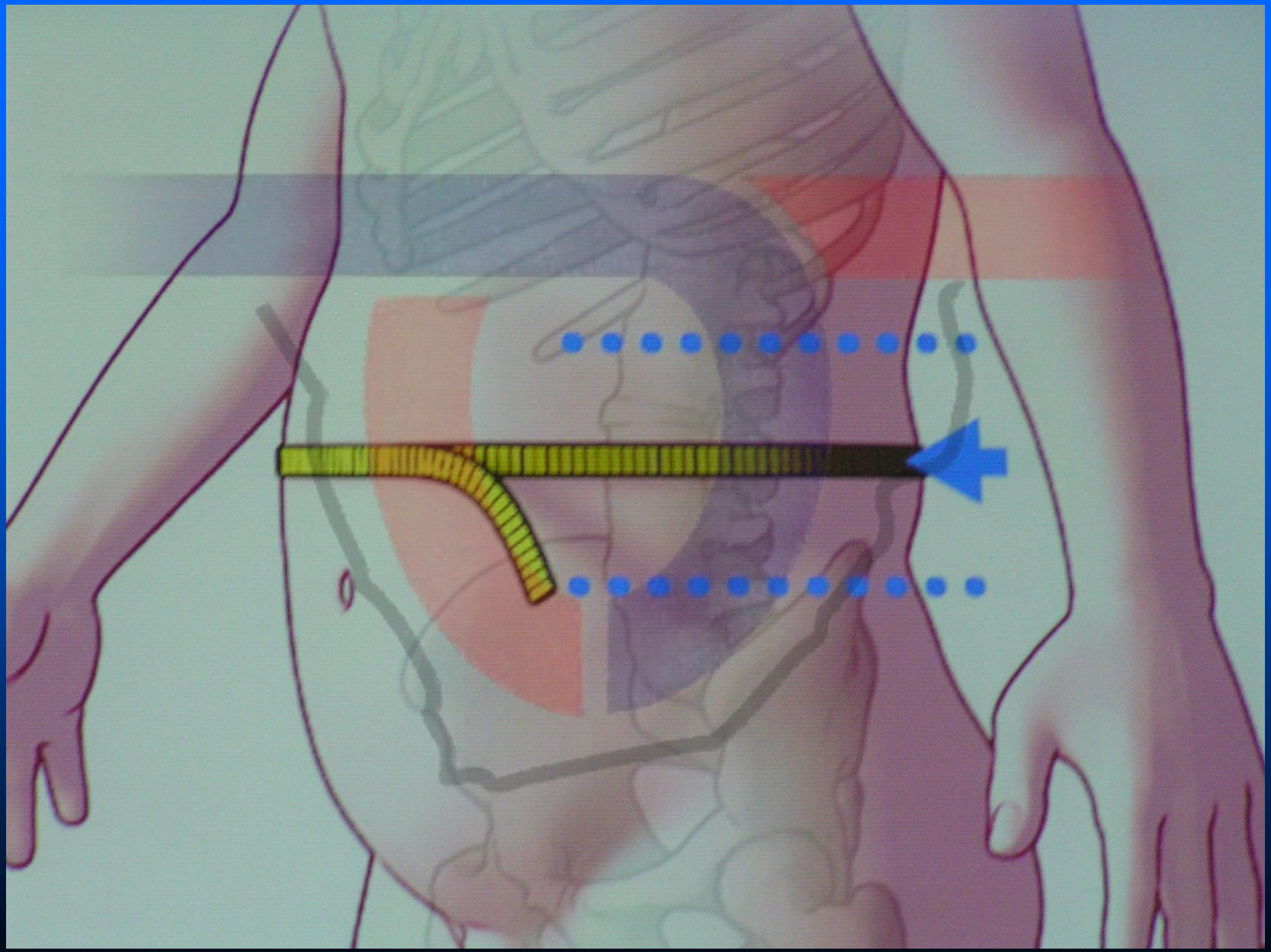
CARDIOVASCULAR RISK FACTORS

TARGET ORGAN DAMAGE AND ASSOCIATED CLINICAL CONDITIONS

MAJOR RISK FACTORS, TARGET ORGAN DAMAGE (TOD) AND ASSOCIATED CLINICAL CONDITIONS (ACC)*

MAJOR RISK FACTORS	TOD	COMPLICATIONS
Levels of SBP and DBP *Smoking* *Dyslipidaemia* *Total cholesterol >5.1 mmol/l, OR* *LDL >3 mmol/l, OR* *HDL <1 (men) and <1.2 mmol/l (women)* *Diabetes mellitus* *Men >55 years* *Women >65 years* *Family history of early-onset CVD:* *Men aged <55 years* *Women aged <65 years* *Waist circumference* *Men ≥94 cm* *Women ≥80 cm* *Exceptions are South Asians and Chinese: Men >90 cm and women >80 cm.*	*LVH: based on ECG* *Sokolow-Lyon >35mm* *Cornell >2440 mm.ms* *Microalbuminuria* *albumin creatinine ratio 3 - 30 mg/mmol* *Slightly elevated creatinine:* *115 - 133 µmol/l (men)* *107 - 124 µmol/l (women)*	*CHD* *HF* *CKD* *Albuminuria >30 mg/mmol, OR* *creatinine >133 µmol/l (men)* *creatinine >124 µmol/l (women)* *Stroke or TIA* *Peripheral arterial disease* *Advanced retinopathy:* *Haemorrhages, OR* *Exudates* *Papilloedema*

*



ROUTINE INVESTIGATIONS

INVESTIGATION	FREQUENCY	COMMENTS
Blood tests		
Creatinine	Yearly if normal	From serum creatinine calculate GFR (modified MDRD equation = GFR in ml/min/1.73 m^2)
Potassium	Yearly if normal	
Glucose (fasting preferred)	Yearly if normal	Consider GTT in patients with fasting glucose >6.1 mmol/l
Random total cholesterol	Yearly if normal	Measure fasting lipogram if cholesterol >5.1 mmol/l or in high-risk groups
ECG (resting)	Yearly if normal	Refer to SAHS policy brief on LVH
Secondary cause suspected	Referral as necessary	If suspected at first visit or if refractory hypertension exists, additional investigations should be performed If invasive renal, vascular or endocrine investigations are required, refer the patient to the appropriate specialist or subspecialist.

THE IDENTIFICATION OF CARDIOVASCULAR RISK FACTORS TARGET ORGAN DAMAGE, AND ASSOCIATED CLINICAL CONDITIONS, STRATIFIES RISK, QUANTIFIES PROGNOSIS, AND ESTABLISHES THE THRESHOLD FOR INTERVENTION

STRATIFICATION OF RISK TO QUANTIFY PROGNOSIS(ESH/ECC) GUIDELINES)

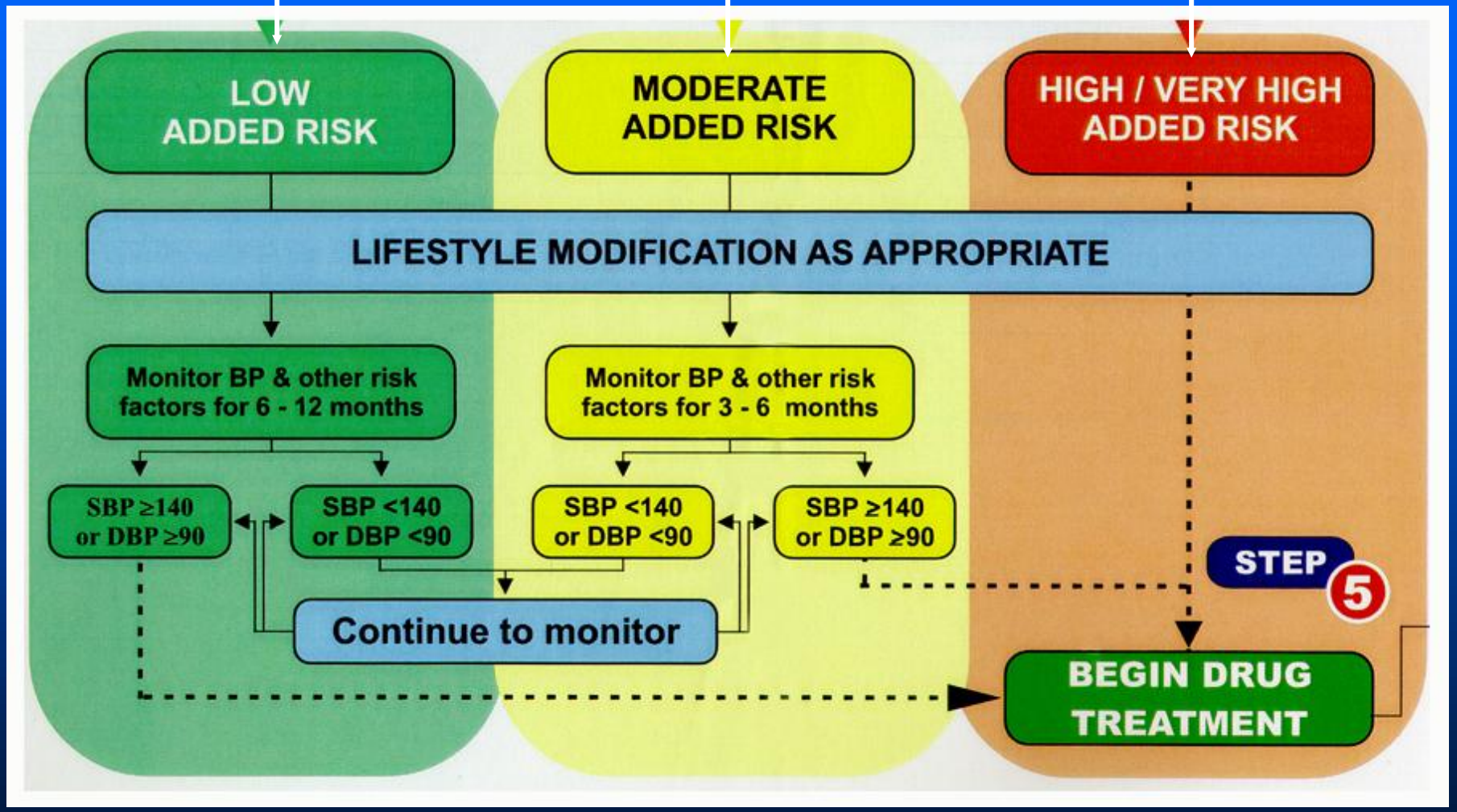
	Blood pressure (mm Hg)					
Other risk factors and disease history	Normal SBP 120 – 129 Or DBP 80 - 84	High normal SBP 130-139 or DBP 85-89	Grade 1 (mild hypertension) SBP 140-159 or DBP 90-99	Grade 2 (moderate hypertension) SBP 160-179 or DBP 100-109	Grade 3 (severe hypertension) SBP > 180 or DBP> 110	
No other risk factors	Average risk	Average risk	Low added risk	Moderate added risk	High added risk	
1-2 risk factors	Low added risk	Low added risk	Moderate added risk	Moderate added risk	Very high added risk	
3 or more risk factors or TOD or diabetes	Moderate added risk	High added risk	High added risk	High added risk	Very high added risk	
ACC	Very high added risk	Very high added risk	Very high added risk	Very high added risk	Very high added risk	

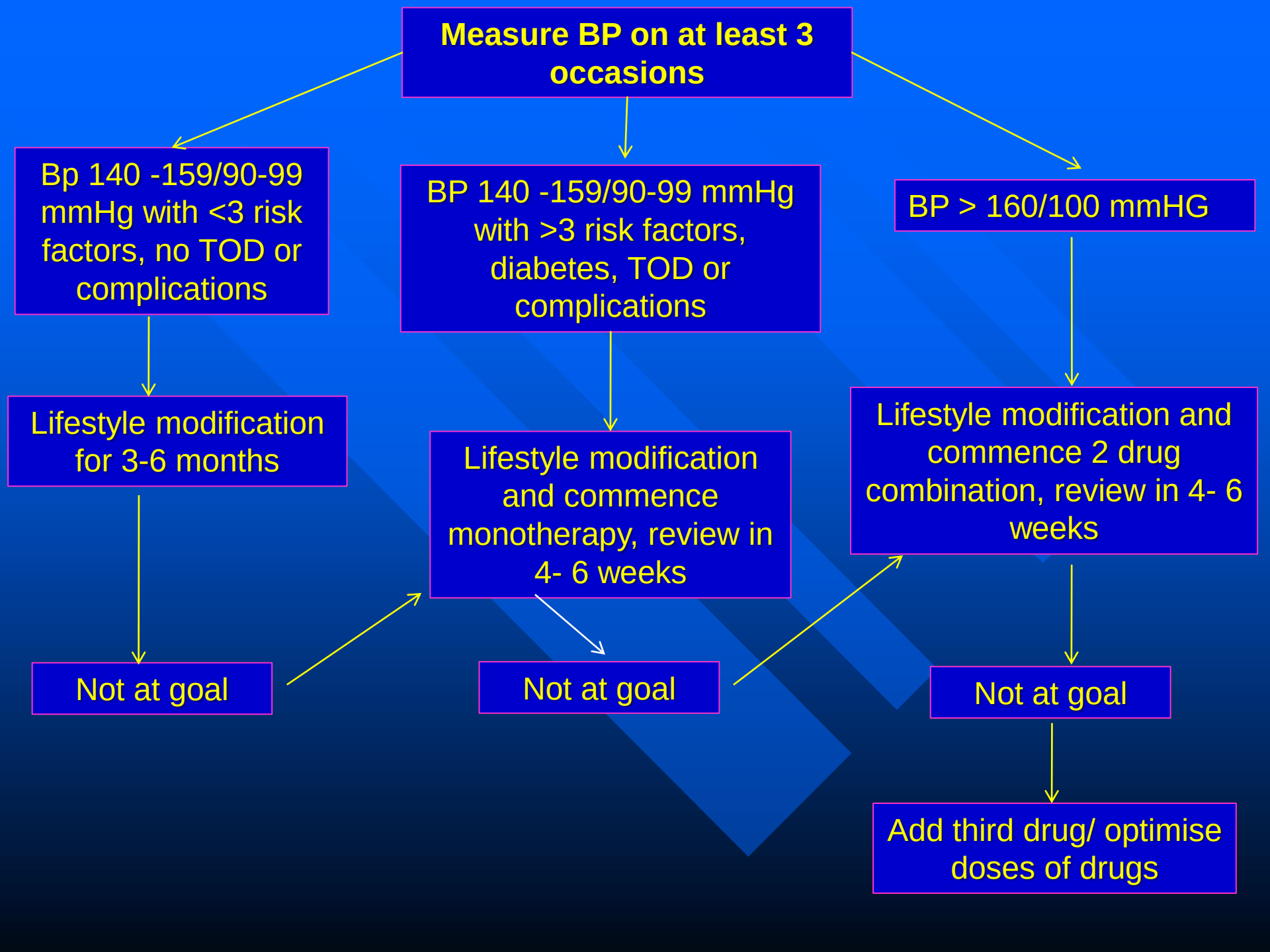
J Hypertension 2003; 21: 1011-1053.

CARDIOVASCULAR RISK

	Absolute 10 year risk of cardiovascular disease (%)	Absolute risk of fatal cardiovascular disease (%)
Low added	<15	<4
Moderate added	15-20	4-5
High added	20-30	5-8
Very high added	>30	>8

STRATIFY ACCORDING TO ADDED RISK




Measure BP on at least 3 occasions
Bp 140 -159/90-99 mmHg with <3 risk factors, no TOD or complications
BP 140 -159/90-99 mmHg with >3 risk factors, diabetes, TOD or complications
BP > 160/100 mmHG
Lifestyle modification for 3-6 months
Lifestyle modification and commence monotherapy, review in 4- 6 weeks
Lifestyle modification and commence 2 drug combination, review in 4- 6 weeks
Not at goal
Not at goal
Not at goal
Add third drug/ optimise doses of drugs

MANAGEMENT OF HYPERTENSION

- LIFE STYLE MODIFICATION
- DRUG THERAPY

Recommended Life style Changes

Modification	**Recommendation**	**Approx↓ BP (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*	< 100mmols or 6 gm NaCl /day	2-8
Physical activity	Brisk walking for 30mins per day most days	4-9
Moderation of alcohol	No more than 2 Drinks per day	2-4
Tobacco	Complete cessation	-

RECOMMENDATIONS

First-line drug therapy for uncomplicated hypertension includes low-dose thiazide-like diuretics, calcium channel blockers (CCBs) or angiotensin-converting enzyme inhibitors (ACE-Is) or -angiotensin receptor blockers (ARBs). In black patients either thiazide-like diuretics or CCBs can be used initially, because response rates are better than with ACE-Is.

ANTIHYPERTENSIVE DRUGS IN BLACK PATIENTS

DIURETICS	*Effective*
B BLOCKERS	*Less effective*
CALCIUM CHANNEL BLOCKERS	*Effective*
ACE –I/ARB	*Less effective*
ACE-I/ARB + DIURETICS	*Effective*

RECOMMENDATIONS ON COMPELLING INDICATIONS FOR

COMPELLING INDICATIONS	DRUG CLASS
Angina	Beta-blocker OR CCB (rate lowering preferred)
Prior myocardial infarct	Beta-blocker AND ACE-1 (ARB if ACE-1 intolerant). Verapamil if Beta-blockers contraindicated. If heart failure, see below
Heart failure	ACE-1 (ARB-1 intolerant) AND certain beta-blockers AND aldosterone antagonist For combination ARB and ACE-1 Loop diuretics for volume overload
Left ventricular hypertrophy (confirmed by ECG) Stroke: secondary prevention	ARB (preferred) OR ACE-1 Low-dose thiazide-like diuretic and ACE-1 or ARB
Diabetes type 1 or 2 with or without evidence of microalbuminuria or proteinuria	ACE-1 or ARB – usually in combination with a diuretic
Chronic kidney disease	ACE-1 OR ARB – usually in combination with a diuretic
Isolated systolic hypertension	Low-dose thiazide or thiazide-like diuretic OR long-acting CCB

WHAT IS THE TARGET BLOOD PRESSURE?

Targets for BP-lowering treatment

STAGE	BP LEVEL (mmHg)
All stages	< 140/90 In isolated systolic hypertension do not lower the DBP to < 65
High-risk patients: Diabetes mellitus Renal disease (macroalbuminuria and/or elevated creatinine) Congestive heart failure	< 130/80 **Targets should be reached in 3 months**

TARGET BP

CONVENTIONAL	
Age <80: 140/90	
Age >80: 150/90	
ABPM /HBPM	
Age <80:135/85	
Age>80:145/85	

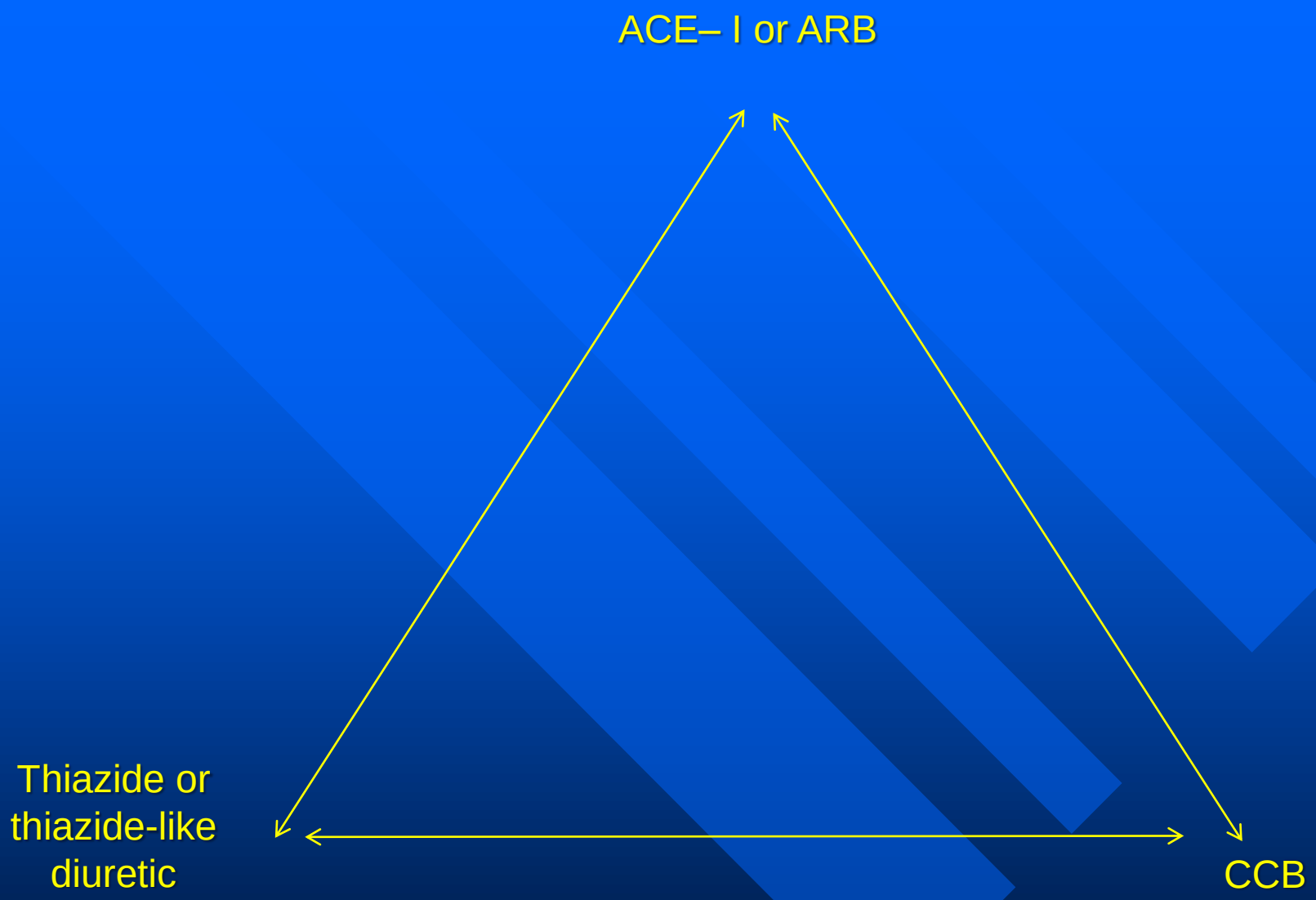
MONOTHERAPY

WITH MONOTHERAPY, A TARGET BLOOD PRESSURE
OF LESS THAN 140 / 90 mmHg IS
RARELY ACHIEVED IN MORE
THAN 50% OF HYPERTENSIVE
PATIENTS

If the target BP is not achieved with the initial agent or monotherapy, what are the options available ?

OPTIONS AVAILABLE WITH FAILURE OF INITIAL MONOTHERAPY

- Increase Dose
- Sequential Monotherapy
- Combination Therapy


ACE– I or ARB
Thiazide or thiazide-like diuretic
CCB

BENEFITS OF COMBINATION THERAPY

Enhanced antihypertension effect.

Improved response rates.

Fewer adverse effects.

Lessened metabolic effects.

Improved outcomes.

RATIONALE FOR THE DIURETIC ACE-I or ARB COMBINATION

DIURETIC	ACE-I or ARB
Activation of SNS	Attenuates SNS Activation
Activates RAS	Block RAS
Decrease Serum K†	Increases Serum K †

ACE-I/ARB + DIURETIC

- Also - ACE-I's prevent or attenuate the metabolic side effects of diuretics
  - hypokalaemia
  - hyperglycaemia
  - hypercholesterolaemia
  - hyperuricaemia

Waeber B et al AmJ Hypertens 1997; 10: 131S-137S

RATIONALE FOR ACE I/ARB CALCIUM ANTAGONIST COMBINATION

CA	ACE I /ARB
Activation of SNS	Attenuates Sympathetic activity
Activation of RAS	Blocks RAS

STAGE 3 HYPERTENSION

- Asymptomatic severe hypertension
- Hypertensive emergency
- Hypertensive urgency

HYPERTENSIVE EMERGENCY

- Elevation of BP associated with acute and ongoing organ damage to kidneys,brain, heart, eyes or vascular system.
- Require rapid (within minutes to a few hours) lowering of BP to safe levels.
- Treatment: Hospitalisation in an intensive care unit. Intravenous antihypertensive therapy.

HYPERTENSIVE EMERGENCY

- Hypertensive encephalopathy
- Unstable angina/myocardial infarction
- Acute left ventricular failure with severe pulmonary redema
- Excessive circulating catecholamines
  - Pheochromocytoma
  - Food or drug administration with monoamine oxidase inhibitors
- Eclampsia and severe pre-eclampsia
- Acute nephritis with encephalopathy
- Acute aortic dissection

INTRAVENOUS AND ORAL DRUGS FOR HYPERTENSION EMERGENCY

Drug	Dose	Indications and precautions	Effect on BP
Intravenous Nitroglycerin (glyceryl trinitrate)	5-10 µg/min	Especially useful for myocardial ischaemia	BP lowering occurs in 2 – 5 minutes
Dihydralazine	10 mg every 10-15 minutes until either BP is controlled or a maximum of 50 mg given	Avoid in patients with myocardial ischaemia	BP lowering occurs In 10 minutes
Sodium nitroprusside	0.25 – 10 µg/kg/min diluted in 5% dextrose and adjust dose as necessary	Admission to intensive care unit An intra-arterial BP line is desirable	BP control is immediate
Labetalol	2 mg/min to a total dose of 1-2 mg/kg	Use where emergency caused by phaeochromocytoma Caution in acute pulmonary oedema	
Furosemide	40 – 80 mg	Acts only for 6 hours Potentiates all of the above drugs	

INTRAVENOUS AND ORAL DRUGS FOR HYPERTENSION EMERGENCY (CONTINUTED)

Drug	Dose	Indications and precautions	Effect on BP
ORAL (USE ONLY IF IV DRUGS ARE NOT AVAILABLE)			
Nifedipine Long-acting only	Long-acting CCBs must be used to prevent rapid and dangerous BP reduction Check dosage according to CCB brand used	Preferred in black persons	
Captopril	6.25 mg as a test dose Increase to 25 mg if BP Lowering is not obtained in 15 – 30 minutes	Other rapidly acting ACE-1 may be used starting with a low test dose DO NOT USE if bilateral renal artery stenosis is suspected DO NOT USE if pregnancy is suspected	BP lowering in 15 – 30 Minutes

THANK YOU