CLINICAL GUIDELINE

Hypertension Guideline 2003 Update

F J Milne and V J Pinkney-Atkinson for the Southern African Hypertension Society Hypertension Guideline Working Groups 2000 and 2003

Outcomes. Extensive data from many randomised controlled trials have shown the benefit of treating hypertension. The target blood pressure (BP) for antihypertensive management should be systolic BP < 140 mmHg, diastolic < 90 mmHg, with minimal or no drug side-effects. However, a lesser reduction will elicit benefit although this is not optimal. The reduction of BP in the elderly and in those with severe hypertension should be achieved gradually over 6 months. Stricter BP control is required for patients with end organ damage, co-existing risk factors and co-morbidity, e.g. diabetes mellitus. Co-existent risk factors should also be controlled.

Benefits. Reduction in risk of stroke, cardiac failure, renal insufficiency and probably coronary artery disease. The major precautions and contraindications to each antihypertensive drug recommended are listed.

Recommendations. Correct BP measurement procedure is described. Evaluation of cardiovascular risk factors and recommendations for antihypertensive therapy are stipulated. The total cardiovascular disease risk profile should be determined for all patients and this should inform management strategies. Lifestyle modification and patient education plays an essential role in the management strategy. Drug therapy: First line – low dose thiazide-like diuretics; second line – add one of the following: reserpine, or β-blockers or ACE inhibitors or calcium channel blockers; third line – add another second line drug or hydralazine or α-blocker. The guideline includes management of specific situations, i.e. hypertensive emergency and urgency, severe hypertension with target organ damage and refractory hypertension (BP >160/95 mmHg on triple therapy), hypertension in diabetes mellitus, etc.

Validity. Developed by the Working Groups established by the Executive Committee of the Southern African Hypertension Society with broader consensus meeting endorsement. The 2001 version was endorsed by the South African Medical Association Guideline Committee. The 2003 revisions were endorsed by the Executive Committee and a wider Working Group.

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1. Introduction

The Southern African Hypertension Society (SAHS) published its first guideline in 1995 followed by a second in 2001.[1,2] Since then a number of new recommendations for the diagnosis and management of hypertension have been published internationally and reflected in the numerous guideline revisions.[3-7] This version remains modelled on evidence-based links guidelines[8,9] and emphasises the trend toward risk stratification and the tighter control of BP once management has been started.[4-6]

However, the SAHS Executive Committee gave only a limited mandate for the review of its guideline in 2002. Thus, only the following sections have been fully revised and are designated as new sections:

- The measurement of blood pressure (BP)
- Sustainable hypertension management and scarce resources
- Compelling indications for a specific drug class
- Comprehensive management of the complicated patient
- Strategy implications.

The remainder of the guideline remains unchanged except for these updates. The SAHS is in the process of revising the entire guideline which should be complete in 2005. The methodology and participants for the 2001 version and this update are given in Annexures A and B.

Hypertension is a major health challenge in South Africa. This guideline is targeted at all health care professionals in both the public and private health sectors. It reflects realistic objectives that can be applied widely and aims to diminish the impact of hypertension in this country. The control of hypertension in conjunction with other major risk factors such as cigarette smoking, dyslipidaemia and diabetes mellitus constitutes the ideal approach to the primary prevention of atherosclerotic disease and remains a major challenge for the community at large. In 2004, as this updated version goes to press, it is clear that the trend towards comprehensive cardiovascular risk factor management is now the internationally accepted model of care.[6]

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Hypertension is a costly and a major contributor to cardiovascular disease (CVD). In 1991, CVD accounted for R4 - R5 billion in direct and indirect costs.[10] This expenditure was 7.5% of the direct health care spending in South Africa.[11] This guideline adopts the approach of a formal estimation of cardiovascular risk which will allow the treatment of those South Africans at highest risk and those who can gain maximally from lifestyle and drug interventions at the lowest cost, given South Africa's limited national resources. It is for this reason that a new section has been added on sustainable hypertension management and scarce resources.

The dilemma raised by changing the definition of hypertension is highlighted by the 1998 South Africa Demographic and Health Survey.[12] In this survey 3.3 million hypertensives were identified using the criterion of either a BP of 160/95 mmHg or the taking of antihypertensive medication (persons aged ≥ 15 years.) By changing the BP criterion to the lower level of 140/90 mmHg as suggested in this guideline a further 3 million persons are added to the hypertensive population. This clearly has implications for the availability and affordability of hypertensive care and was one of the main reasons for holding the consensus meeting. The implications of not treating these patients must be considered.

2. Objective

To promote evidence-based, accessible, and comprehensive management of hypertension in adults by health care professionals.

3. Abbreviations

ABPM = ambulatory blood pressure monitoring; ACE-I = angiotensin-converting enzyme inhibitor; ARB = angiotensin II receptor blocker; BMI = body mass index; BP = blood pressure; CCB = calcium channel blocker; CCD = clinical cardiovascular disease; CVD = cardiovascular disease; CHD = coronary heart disease; DBP = diastolic blood pressure; ISH = isolated systolic hypertension; SBP = systolic blood pressure; TC = total cholesterol; TOD = target organ damage.

4. Measurement of blood pressure (new section)

BP measurement is a vital clinical sign but it is poorly performed by all health care professional categories. The European Hypertension Society recently published detailed

recommendations on the measurement of BP which the SAHS Hypertension Working Group fully endorses.[3]

The previous recommendations regarding 24-hour ambulatory BP monitoring (ABPM) are largely unchanged. However, there have been advances in automatic devices and in self- (home) measurement of BP, which have been driven by the increasing recognition of mercury as an environmental toxin.[13]

4.1 Generic measurement principles

These recommendations are generic and apply equally to all validated devices, especially clinic and self-measurement of BP, e.g. arm position, posture of the patient, cuff size and the number of readings that should be taken.

If the BP is optimal (< 120/80 mmHg) on the first measurement then further measurement is not necessary at that time. However, if the BP measurement is elevated, then take the steps below to ensure accurate readings:

- 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 before measurement. Patients should not have smoked, ingested caffeine-containing beverages or had food in the previous 30 minutes. In persons aged over 60 years, those with diabetes mellitus and others at risk, the BP should also be recorded after standing for 1 minute to document postural hypotension.
- An appropriate size cuff should be used: a standard cuff (12 cm) for a normal arm, a larger cuff (15 cm) for an arm with a mid-upper circumference > 33 cm (the bladder within the cuff should encircle 80% of the arm). If an undersized cuff is used, the BP can be overestimated (undercuffing), and if the cuff and bladder are too large the BP can be underestimated (overcuffing).
- Both systolic blood pressure (SBP) and diastolic blood pressure (DBP) should be recorded. SBP is measured at the first appearance of sound (phase I) and DBP is measured at the disappearance of the sounds (phase V). Phase V is also recommended in pregnancy. In cardiac arrhythmias (e.g. atrial fibrillation), the highest phase I, and lowest phase V are recorded as the SBP and DBP respectively. There are circumstances when both phase IV (muffling) and phase V should be recorded, e.g. aortic regurgitation, pregnancy, and severe anaemia.
- The BP recorded should be the average of two readings taken 1 minute apart. If the first two readings differ by

> 5 mmHg, additional readings should be taken.

- Repeat measurements should be performed on three separate occasions when either the initial SBP is between 140 and 160 mmHg or the DBP is between 90 and 100 mmHg. This should occur within 2 months to determine if the patient should be diagnosed as hypertensive. All measurements should preferably be taken at the same time of the day and using the same arm.
- The elderly may present special problems with BP measurement because there may be considerable BP variability, with periods of hypotension as well as hypertension. They may demonstrate postural and post-prandial hypotension. The most common form of hypertension is isolated systolic hypertension (ISH), due to the arterial stiffening that occurs with ageing. This stiffening may cause pseudohypertension which may only be diagnosed with specialist referral.
- The BP measurement device and its attachments (tubing, cuff, valve) need to be serviced and calibrated at least every 2 years.

4.2 Mercury sphygmomanometer

There are increasing criticisms of the use of mercury sphygmomanometers. Mercury is inert and does not degrade. Although it is not toxic to patients or operators when the device is intact, mercury becomes a major environmental hazard when it is discarded.[13] There are international moves to replace mercury sphygmomanometers with battery-operated digital devices. However, in South Africa and other developing countries, there is concern about the availability of these devices and the safe disposal of lead-containing batteries, but if a mercury sphygmomanometer needs replacement a validated oscillometric device should be considered.

4.3 Twenty-four-hour ABPM

ABPM is not part of routine BP evaluation but is increasingly used worldwide.[14] It is of value in the following circumstances and for selected target groups:

- Suspected white-coat hypertension
- White-coat effect
- Masked hypertension (reverse white-coat hypertension)
- Refractory hypertension
- Elderly patients in whom treatment is being considered
- Suspected nocturnal hypertension
- Type 1 diabetes mellitus
- Pregnancy
- Systolic and diastolic hypertension
- Ambulatory hypotension.

The ABPM measuring device must be rigorously validated according to acceptable international standards before purchase and must, together with its attachments (tubing, cuff, etc.), be serviced on a regular basis. In selected situations where ABPM is not available, self-BP monitoring may be used as a substitute.[4]

An up-to-date list of validated devices is available on a recently established website (**www.dableducational.com**).[15]

4.4 Self-measurement of BP

Self-measurement of BP is recommended in selected circumstances and for selected target groups:

- Suspected white-coat hypertension
- To guide antihypertensive medication
- The elderly
- Pregnancy
- Diabetes mellitus
- Refractory hypertension
- To improve compliance with treatment
- To predict outcomes.

The recommendation for the purchase of a device should come from the patient's medical practitioner. The practitioner is responsible for educating the patient on user procedure, and the types of validated device that are available. Not all devices currently on the market have been validated according to stringent international standards. An up-to-date list of validated devices may be found on a recently established independent website, **www.dableducational.com**.[15]

Only upper arm devices are recommended, but even these are unsuitable in patients with sustained arrhythmias. They should not be used for BP measurement during exercise and they are not as specific as ABPM for the diagnosis of white-coat hypertension.

Patients must discuss any proposed change in drug medication with their health care professional.

5. Risk stratification

Cardiovascular risk factor stratification was accepted by all delegates but there was considerable debate about whether the adopted model should be qualitative or quantitative.

5.1 Rationale for cardiovascular risk evaluation

Consensus has been reached on the necessity of treating those with known CVD, TOD, and for those with a SBP ≥ 180 mmHg or DBP ≥ 110 mmHg.[16] For those without CVD, TOD or very high levels of BP the exact level of BP at which to treat has changed over time. This reflects the continuous risk associated with BP.[9,17] The recently published Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC7)[4] includes additional CVD risk factors, e.g. obesity, in the treatment decision. Table I reflects the earlier Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High

Table I. Risk stratification and treatment (adapted from JNCVI guideline[18])

BP stage (mmHg)	No risk factor or TOD/CCD	≥ 1 major risk factor; no TOD/CCD	TOD/CCD or diabetes mellitus with or without other risk factors
High-normal SBP 130 - 139 and/or DBP 85 - 89	Lifestyle modification Low risk	Lifestyle modification Low risk	Lifestyle modification Drug therapy for those with heart failure, diabetes mellitus or renal insufficiency High risk
Stage I (mild) SBP 140 - 159 and/or DBP 90 - 99	Lifestyle modification for 6 - 12 months Then drug therapy if needed and as resources permit Low risk	Lifestyle modification for 6-12 months Then drug therapy as resources permit Medium risk	Lifestyle modification Drug therapy High risk
Stage II (moderate) SBP > 160 - 179 and/or DBP 100 - 109	Lifestyle modification Recheck BP within 2 weeks, then drug therapy Medium risk	Lifestyle modification Recheck BP within 2 weeks, then drug therapy Medium risk	Lifestyle modification Drug therapy Very high risk
Stage III (severe)* SBP > 180 and/or DBP > 110	Asymptomatic severe hypertension Very high risk	Recheck BP after 1 hour Start drug therapy with 2 agents	
	Hypertensive urgency Very high risk	Start drug therapy with 2 agents	Very high risk
*Refer when necessary.	Hypertensive emergency Very high risk	Parenteral drug therapy	

Blood Pressure (JNCVI)[18] as no mandate was given to update the risk factors.

The Society remains committed to the format of the risk factor model as outlined in JNCVI and JNC7 until there is wide national consensus on a different CVD risk model by all stakeholders (professionals, providers, government and health care funders). A number of risk factor charts are available, but none relate specifically to the South African situation. Any consensus needs to address topics such as the weighting of BP readings and other risk factors in relation to ethnic group and the development of TOD.

5.2 Risk factors, target organ damage and clinical cardiovascular disease

Listed below are the major risk factors and TOD/CCD. Risk factors that are modifiable (e.g. smoking and dyslipidaemia) should be the target of lifestyle intervention and other treatment as appropriate. However, some TOD/CCD (e.g. retinopathy and left ventricular hypertrophy) are not simply complications of hypertension but also carry risk for morbidity and disability. Manage TOD/CCD as appropriate. Table I indicates risk stratification and the need for drug therapy when the risk is increased and is based on JNCVI.[18]

5.2.1 Major risk factors

- Smoking
- Dyslipidaemia
- Diabetes mellitus
- Age > 60 years
- Sex (men, postmenopausal women)
- Family history of early onset of CVD (women aged < 65 years, men aged < 55 years).

5.2.2 TOD/CCD

- Left ventricular hypertrophy
- Angina/prior myocardial infarction or ischaemia
- Heart failure
- Prior coronary revascularisation
- Nephropathy (proteinuria with or without haematuria and/or elevated serum creatinine)
- Stroke or transient ischaemic attack
- Retinopathy (exudates and/or haemorrhages and/or papilloedema)
- Peripheral arterial disease.

5.3 Routine investigations

- Body weight should be recorded at each visit when BP is measured.
- Urine dipstick analysis for protein, blood and sugar should be done at presentation:

- If normal, repeat every 12 months.
- If abnormal, repeat at the next visit.
- If proteinuria ≥ 2+ or haematuria > 1+, then investigate further. If proteinuria is ≤ 2+, then monitor at least once a year.
- If glycosuria and/or diabetic symptoms (polyuria/polydipsia) are present, start dietary modification and manage appropriately.

- If blood testing facilities are available, check urea, creatinine, potassium, and glucose.
- Non-fasting total cholesterol should be measured in high-risk groups.
- Perform a resting electrocardiogram when available.

6. Goals of BP-lowering treatment

The goals of BP-lowering treatment vary according to TOD and CCD as shown in Table II.[19] These goals should be combined with the recommended goals for ideal body weight, blood sugar and lipid levels in patients with the metabolic syndrome (see section 9.4.)

Table II. Goals of BP-lowering treatment

Stage	BP level (mmHg)
All stages	< 140/90
Diabetes mellitus	< 130/85
Renal insufficiency	
serum creatinine > 220 μmol/l)	< 130/85
Proteinuria > 1 g/24 h	< 125/75
Congestive heart failure*	< 120/80
Hypertensive emergency*	Reduce mean arterial
(pulmonary oedema,	pressure by 25% in the first
encephalopathy)	2 hours. Aim for
	160/100 mmHg in 2 - 6 hours

*See section 9 for eclampsia and pre-eclampsia

7. Sustainable hypertension management and scarce resources (new section)

The Society has given considerable time, thought and debate to the very real concerns about the economic sustainability of lifelong drug therapy. The issues of affordability are considered important factors in both the private and public sectors of South Africa. This becomes even more relevant given the proposals for the holistic management of hypertension, its complications and disease associations (see section 9.4.)

The Society reiterates in the strongest possible terms the importance of lifestyle modification at all stages of hypertension. If there are limited resources then drug treatment may be delayed in mild (stage 1) hypertension until there are one or more major risk factors or clinical complications. This is in line with World Health Organisation and 2003 sub-Saharan Africa recommendations.[21,22] Recent studies emphasise the cost effectiveness of both lifestyle and drug management in reducing CVD risk in both developed and lesser developed regions of the world[23] and the importance of tight BP control in African Americans.[24]

In the current environment the price of antihypertensive and other drugs fluctuates considerably irrespective of the market sector. Where possible, generic equivalents or generic drug combinations are encouraged and the cheapest generic in a class should be considered provided they are true equivalents. The patient should not be changed from one generic to another in the same class at frequent intervals solely on the basis of lower price. It is this Society's concern that an overemphasis on limited resources (when to introduce drug therapy, use of generics, and inadequate level of BP control) may lead to poorly managed hypertension with the undesirable consequences of heart failure, stroke and chronic renal failure. Best practice recommendations should be clearly stated and compromises, based on limited resources, made deliberately and transparently.

8. Management

The criterion for management is that BP has been measured and recorded as elevated over a 2-month period for high-normal and stage 1 hypertension. Refer to Table I for details.

8.1 Lifestyle modification

All persons with hypertension should be encouraged to make the following lifestyle changes as appropriate:

- Maintain ideal weight (BMI < 25): weight reduction in the overweight patient (BMI > 25)
- Salt restriction (e.g. remove the salt cellar from the table, avoid processed foods, gradually reduce added salt in food preparation), with increased potassium intake from fresh fruits and vegetables
- Reduce alcohol intake to no more than two standard drinks per day
- Follow a prudent eating plan, i.e. low fat, fibre and unrefined carbohydrates, with adequate fresh fruit and vegetables
- Regular moderate aerobic exercise (e.g. 30 minutes brisk walking 3 - 5 times/week)
- Stop smoking.

8.2 Drug therapy (new sections)

Table III lists the clinical considerations when selecting antihypertensive drug therapy and Fig. 1 outlines the steps in

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Table III. Clinical considerations when selecting antihypertensive drug therapy (adapted from the WHO/ISH guidelines[3])

Drug class	Conditions/indications	Contraindications	Caution/limited value
Diuretics*	Heart failure Elderly persons ISH Black patients	Gout	Diabetes mellitus Dyslipidaemia Pregnancy Erectile dysfunction
Reserpine*	Uncomplicated hypertension		Depression DO NOT USE with alcohol
β-blocker	Angina and myocardial infarction Tachyarrhythmias Pregnancy Diabetes mellitus type 2	Asthma & chronic obstructive pulmonary disease Peripheral vascular disease Heart block	Dyslipidaemia Diabetes mellitus type 1 Unstable heart failure Athletes & physically active patients As monotherapy in black patients
ACE-I	Heart failure Left ventricular dysfunction after myocardial infarction Diabetes mellitus with or without microalbuminuria/proteinuria	Pregnancy Hyperkalaemia Bilateral renal artery stenosis Angioedema	As monotherapy in black patients
CCB (only long-acting CCBs should be used)	Angina Peripheral vascular disease Elderly persons ISH Black patients	Heart block (verapamil or diltiazem)	Congestive heart failure
ARB	ACE-I cough (intolerance) Left ventricular hypertrophy Diabetes mellitus type 2 with microalbuminuria OR proteinuria	Pregnancy Hyperkalaemia Bilateral renal artery stenosis	As monotherapy in black patients

the management of a patient with hypertension. It is crucial to ensure that the patient understands the importance of adherence to the treatment regimen and brings back drug containers and unused drugs. This should be reinforced frequently. Patient empowerment and single daily dose regimens improve compliance. Where appropriate use fixed-dose combinations. Continued monitoring and management of drug side-effects is essential.

The Society's consistent recommendation has been that the treatment of uncomplicated hypertension is with a low-dose thiazide diuretic provided that the contraindications and cautions in Table III are considered. However, this recommendation is now modified in the light of a recent trial[28] and other evidence-based reviews.[26] Step one drug therapy in uncomplicated hypertension is a low-dose thiazide diuretic. This Society's recommendations for step two and step three allow for considerations based on the cost of the various drug classes and other patient-related factors such as the presence of cardiovascular risk factors or CCD/TOD.

8.3 Compelling indications for a specific drug class (new section)

Table IV outlines the compelling indications (high-risk conditions) that require certain classes of antihypertensive drugs based on randomised controlled trials. In 2003 this section was extensively revised in accordance with recent evidence as indicated in the Table. Previously the only indication for the ARB class was in the case of ACE-I cough,[2] but the indications are now wider.[42] The compelling indications for specific classes of drugs apply equally to patients from any ethnic group.[24]

9. Management based on severity of hypertension

9.1 Stage 1 DBP 90 - 99 mmHg and/or SBP 140 - 159 mmHg

- Start lifestyle modification and patient education.
- Repeat BP measurement over 6 months at 2 - 3-month intervals. If the BP falls to < 140/90 mmHg and there are no risk factors, continue lifestyle changes. Review annually, ensuring the patient is not lost to follow-up.
- If the BP remains elevated at 6 - 12 months, start drug treatment while continuing lifestyle modification provided that the presence of other risk factors indicates that the patient is at medium or higher CVD risk (Table I).
- In the presence of more than one major risk factor the decision to treat patients at medium risk with drugs will depend on the availability of resources. In the presence of

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- Double digit BP reduction[1,2]
- Well tolerated & enhanced compliance[3,4,5]
- Proven protective benefits & positive outcomes[6,7,8, 9,10,11]

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Table IV. Recommendations on compelling indications for a specific drug class

Any drug that lowers BP unless absolutely contraindicated (refer to Table III), will confer protection against TOD. However, the following classes of drugs have additional protective properties in the case of the listed CCD/TOD

Compelling indications	Drug class
Angina	β-blocker OR CCB (rate lowering preferred) *
Prior myocardial infarct or coronary artery disease	β-blocker AND ACE-I (ARB if ACE-I intolerant).* Verapamil if β-blocker contraindicated
Post myocardial infarction	β-blocker AND ACE-I (ARB if ACE-I intolerant) AND aldosterone antagonist*
Heart failure	ACE-I (ARB if ACE-I intolerant) AND certain β-blockers* OR a(β-blocker AND spironolactone.* Loop diuretics for volume overload. Caution when using an ACE-I AND ARB AND β-blocker together*
Left ventricular hypertrophy (confirmed by ECG)	ARB (preferred) OR ACE-I*
Stroke	Low-dose thiazide-like diuretic AND ACE-I**
Diabetes type 1 or 2 with or without evidence of microalbuminuria or proteinuria	ACE-I OR ARB* * — usually in combination with a diuretic*
Chronic kidney disease	ACE-I OR ARB — usually in combination with a diuretic*
Isolated systolic hypertension	Low-dose thiazide-like diuretic AND/OR long-acting CCB*
Pregnancy	Methyldopa, prazosin, CCB (see section 10 on hypertension in pregnancy)
Proteinuria	α-blocker (not used as monotherapy for hypertension)

*The BP lowering effects of ACE-I and ARBs are greatly increased by the addition of a diuretic (thiazide-like or loop).

diabetes mellitus or TOD/CCD treatment should begin immediately after diagnosing hypertension, i.e. after 2 months (the time taken to establish that the BP is elevated) or sooner if the patient is symptomatic.

- Commence drug treatment with a low-dose thiazide-like diuretic in the uncomplicated patient.

9.2 Stage 2 DBP 100 - 109 mmHg and/or SBP 160 - 179 mmHg

- Start lifestyle modification and repeat BP measurements in 2 weeks
- If DBP is still 100 - 109 mmHg and/or SBP 160 - 179 mmHg, start drug treatment while continuing lifestyle modification.

9.3 Stage 3 DBP ≥ 110 mmHg and/or SBP ≥ 180 mmHg

Persons with severe hypertension fall into three categories which determine the urgency of treatment. Patients should be managed or referred to the appropriate level of care and caregiver in accordance with local protocols. Manage with drug treatment and lifestyle modification.

9.3.1 Asymptomatic severe hypertension

These patients are asymptomatic and have severe hypertension

9.3.2 Hypertensive urgency

This level of hypertension is symptomatic with evidence of TOD or grade III/IV retinopathy (malignant/accelerated hypertension). There are no immediate life-threatening neurological or cardiac complications such as are seen in the hypertensive emergencies (9.3.3). Thrombotic (ischaemic) stroke and intracerebral haemorrhage should be managed according to the South African Stroke Therapy Clinical Guideline (see box below).[43] Ideally, all patients with hypertensive urgency should be treated in hospital.

- Do not lower BP in acute stroke or use antihypertensive medication unless the BP is SBP > 220 mmHg or the DBP > 120 mmHg, as a rapid fall may aggravate cerebral ischaemia and worsen the stroke.
- If the BP is above these levels then treatment should aim not to lower the BP by more than 15 - 20% in the first 24 hours.
- Treatment may be given orally but if the patient is unable to swallow then the use of parenteral drugs may be warranted.
- The use of parenteral drugs may also be warranted in the setting of hypertensive emergencies (e.g. arterial dissection, pulmonary oedema, hypertensive encephalopathy) provided this takes place in a high care

Commence treatment with two oral agents and aim to lower the DBP to 100 mmHg slowly over 48 - 72 hours. This BP lowering can be achieved by:

- Long-acting CCB.
- ACE-I used in very low doses initially. Avoid if there is severe hyponatraemia (serum Na < 130 mmol/l indicates hyper-reninaemia and hence BP may fall dramatically with ACE-I).
- β-blockers.
- Diuretics may potentiate the effects of the other classes of drugs when added. Furosemide should be used if there is renal insufficiency or signs of pulmonary congestion; its effects may be potentiated by the concomitant use of hydrochlorothiazide, particularly if the serum creatinine is > 500 µmol/l.

9.3.3 Hypertensive emergency

This is a rare life-threatening situation requiring immediate lowering of BP usually with parenteral therapy. The true emergency situation should preferably be treated by an appropriate specialist. Admit the patient to a high-care setting for parenteral drug therapy (Table V) and close monitoring. Do not lower the BP by > 25% within 30 - 120 minutes. In the next 2 - 6 hours, aim toward 160/100 mmHg. This may be achieved by the use of intravenous or oral drugs.

The life-threatening complications include:

- Hypertensive encephalopathy (severe headache, visual disturbances, confusion, seizures, coma that may result in cerebral haemorrhage)
- Unstable angina/myocardial infarction
- Acute left ventricular failure with severe pulmonary oedema (extreme breathlessness at rest)
- Excessive circulating catecholamines:
  - phaeochromocytoma – rare cause of emergency
  - food or drug interaction with monoamine oxidase inhibitors
- Eclampsia and severe pre-eclampsia
- Acute nephritis with encephalopathy
- Acute aortic dissection.

9.4 Holistic management of the complicated patient (new section)

A recently published European CVD prevention guideline[6] is more holistic in approach. South Africa requires the development of a similar document that takes into consideration the special needs of its population.

Hypertension can seldom be managed in isolation from other related chronic illnesses. Obesity, dyslipidaemia and

Table V. Intravenous and oral drugs for hypertensive 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 30 - 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 ICU • 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 • Acts only for 6 hours • Potentiates all of the above drugs	
Furosemide	40 - 80 mg		
Oral (use only if IV drugs are not available)			
Captopril	6.25 mg as a test dose Increase to 25 mg if BP lowering is not obtained in 15 - 30 minutes	• Other equally acting ACE I 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 • Preferred in black persons • Potentially dangerous: risk of sudden fall in BP which may precipitate CV events • DO NOT USE in patients with known CHD or CVD • BP must be continually monitored	BP lowering in 15 - 30 minutes
Nifedipine	5 mg capsule Dose can be repeated after 1 hour		Risk of sudden BP fall which can occur within 15 - 30 minutes

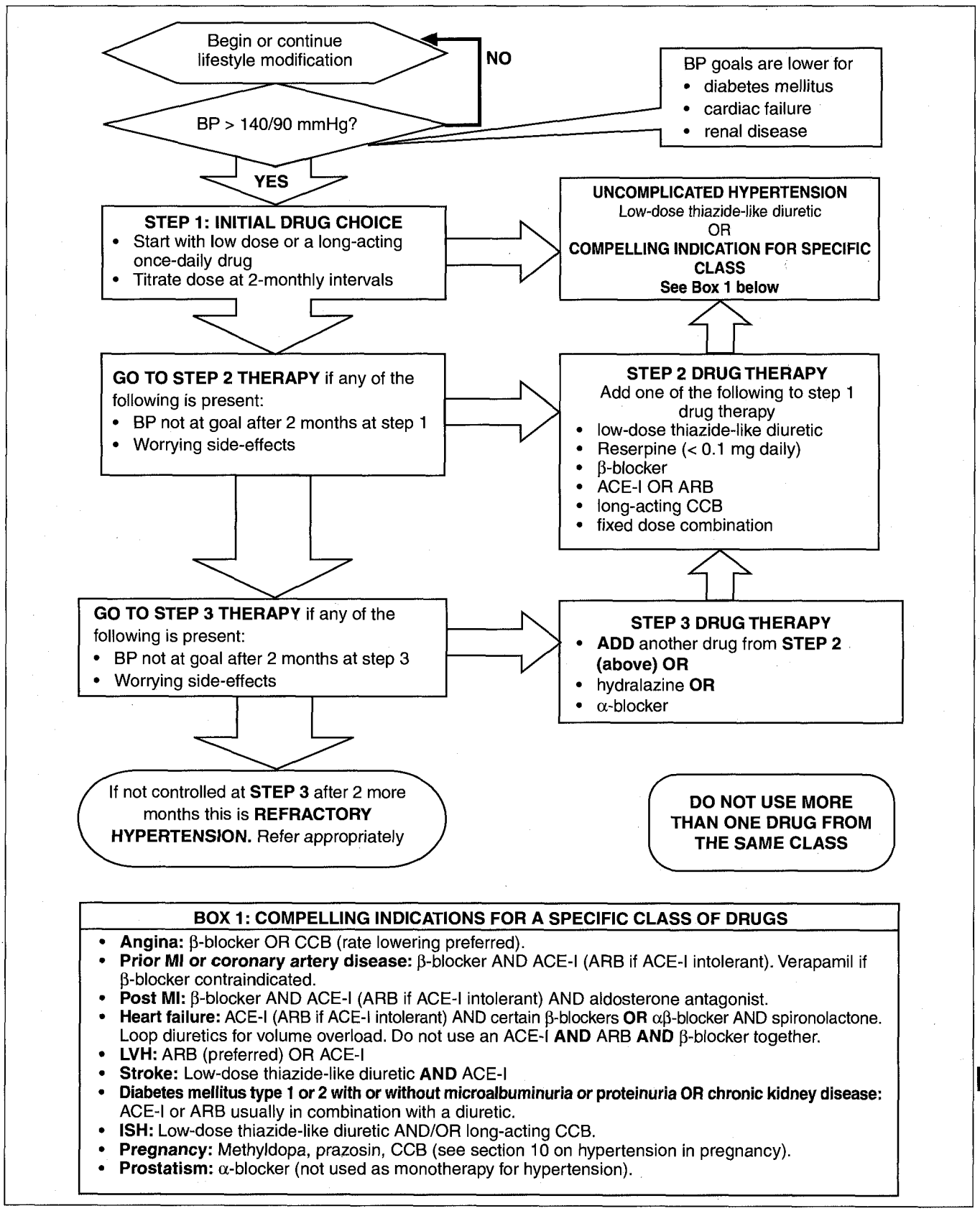

Fig. 1. Hypertension treatment algorithm.

type 2 diabetes mellitus are increasingly prevalent and commonly occur together with hypertension as the metabolic syndrome. Lifestyle modifications, drug therapy and the targets of management should be broadened to include weight, blood sugar and lipids as well as BP control (see section 6). The Dietary Approaches to Stop Hypertension (DASH) low-sodium diet will not only lower BP, but will also have a favourable effect on weight, lipids and glycaemic control.[44] There is mounting evidence that so-called normal lipid levels may be inappropriately high in hypertensive patients and certainly are so in patients with hypertensive complications, e.g. stroke.[23,45] Lipid-lowering therapy will increasingly become part of standard drug therapy in both young and old.[5] Intensive diet and exercise therapy and in some cases the use of the biguanide, metformin, may be required to prevent the progression to frank type 2 diabetes mellitus in hypertensive patients with central obesity.

The indications for and cautions against the use of aspirin, hormone replacement therapy and antioxidants are frequently asked questions. Low-dose aspirin should be used for secondary prevention of transient ischaemic attacks, stroke and myocardial infarction only once the BP is well controlled. Hormone replacement therapy should only be prescribed for those women with menopausal symptoms or those who are at risk of osteoporosis.[46] Antioxidants are of no benefit in hypertensive patients.[28]

10. Hypertension in pregnancy

Hypertensive conditions of pregnancy, particularly pre-eclampsia, are multi-organ diseases requiring the monitoring of renal, liver, placental and central nervous functions.

- BP > 140/90 mmHg on two occasions, at least 6 hours apart, is abnormal.
- BP > 140/90 mmHg — treat with oral drugs
- BP > 180/110 mmHg should be treated as an hypertensive emergency.

The presence of significant proteinuria (2+ on dipstick or 300 mg/24 h) in the first half of pregnancy usually indicates underlying chronic renal disease; when it appears for the first time in the second half of pregnancy, usually in association with hypertension, pre-eclampsia is the most likely cause. Patients with pre-eclampsia should be admitted to hospital.

10.1 Oral medication

- First drug: methyldopa, start with 500 mg 8-hourly, increasing to 750 mg 8-hourly.
- Second drug: nifedipine, start with 10 mg 8-hourly, increasing to 20 mg 8-hourly. Note the contraindications and cautions that should be taken when using nifedipine (Table V).
- Third drug: prazosin, start with 1 mg 8-hourly, increase to 7 mg 8-hourly.

For patients with chronic hypertension with no proteinuria, low-dose thiazide works well as a second or third additional drug.

10.2 Hypertensive emergency

Preload with 300 - 500 ml balanced crystalloid solution over 30 minutes. Administer dihydralazine 6.25 mg slowly intravenously over 2 minutes every 20 - 30 minutes or 6.25 mg intramuscularly (by midwife). Alternatively, 25 mg dihydralazine may be diluted with 18 ml sterile water in a 20 ml syringe. Boluses of 2.5 - 5 mg (1-2 ml) are given intravenously every 20 - 30 minutes. Alternatively administer a 10 mg nifedipine capsule immediately and, if necessary, 20 - 30 minutes later. This should be taken continuously in patients receiving magnesium sulphate.

The goal should be to lower the BP to between140/90 and 150/100 mmHg. Avoid ACE-I, reserpine, and diuretics in patients with pre-eclampsia. Only use β-blockers for very specific indications.

11. Patient education

The purpose of patient education is to empower the patient to participate in good-quality hypertensive care.

- Patients need to understand hypertension and its consequences if not treated adequately. Involve them and their families in treatment.
- Inform patients of the BP reading and their overall cardiovascular risk at every visit and whether the BP is controlled.
- Patients need to inform relevant medical authorities about their hypertension and the medications they are taking for it.
- Encourage patients to request BP measurement at every visit to a health care professional.
- Inform patients about the name and dose of medications prescribed, the frequency of dosing, and the necessity for regular lifelong use.
- Encourage a positive attitude to achieving therapeutic goals and explain the need to add effective drugs stepwise in sufficient doses to achieve the goal of therapy.
- Anticipate adverse effects and adjust therapy to prevent, minimise or ameliorate adverse events.
- Encourage lifestyle modifications.
- Ask patients to return drug containers and unused drugs as a measure of compliance/adherence to therapy.
- Emphasise adherence to management.

12. Refractory hypertension

Hypertension may be termed refractory when a therapeutic plan that has included lifestyle measures and combination drug treatment in adequate doses (triple-drug regimen including a diuretic) has failed to lower BP to < 160/95 mmHg.

The causes of refractory hypertension are:[25]

- Unsuspected secondary cause (NB: coarctation, renal or endocrine causes).
- Poor adherence to therapeutic plan.
- Continued intake of drugs that raise BP (e.g. inappropriate use of non-steroidal anti-inflammatory drugs).
- Failure to modify lifestyle including:
  - weight gain
  - heavy alcohol intake (especially binge drinking).
- Volume overload due to:
  - inadequate diuretic therapy
  - progressive renal insufficiency
  - high sodium intake.

The causes of spurious refractory hypertension are isolated office (white-coat) hypertension and failure to use a large cuff on a large arm.[3]

13. Ongoing management

13.1 Dose titration or stepwise increase should be carried out after 2 months.

13.2 Once a stable target BP has been achieved, follow-up BP measurement should be performed every 3 - 6 months.

13.3 Drug dose should be reduced if the patient presents with symptoms of postural hypotension, i.e. dizziness or > 20 mmHg fall SBP on standing.

13.4 Refer the patient from the primary care level to higher levels in the following circumstances:

- Young patients (18 - 30 years)
- Pregnancy
- Uncontrolled BP despite step 3 care (refractory hypertension)
- Any patient with severe TOD and/or severe CCD
- Hypertensive urgency or emergency

14. Strategy implications (new section)

The Society acknowledges that the development and publication of a clinical guideline is insufficient to ensure its implementation and to change practice.[47] The Society remains committed to the development of an active multifaceted implementation strategy with partners from all market sectors and provider groups, including patient groups.

15. Disclaimer

This national clinical guideline is for reference and education only and is not intended to be a substitute for the advice of the appropriate health care professional or for independent research and judgement. The SAHS accepts no responsibility or liability arising from any information contained in or any error or omission from the protocol or from the use of any information contained in it.

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Annexure A: Hypertension Guideline Working Groups

The 2000 Guideline Working Group Members

Some Working Group members represented more than one grouping. Chairperson: R W Charlton. SAHS: H Kakaza, F J Milne (Principal author), K P Mokhobo, M Mpe, D P Naidoo, G Norton, L Opie, V J Pinkney-Atkinson (guideline facilitator), P Sareli, Y K Seedat, H C Seftel, K Steyn, D R Taylor, Y Veriava, D J V Weich. National Department of Health, Directorate Chronic Diseases, Disabilities and Geriatrics: C C Kotzenberg, A Croasdale. SA Heart Association: A J Dalby. Society of General Practice: S Mazaza. SA Academy of Family Practice: L Geffen. Neurological Association of SA and Stroke Foundation of SA: A Bryer. Heart Foundation of SA: G Pappas. Lipid and Atherosclerosis Society of SA: K Steyn. Medical Advisors Group: H C Seftel, F J Milne. National Pathology Group: P Cole. SA Renal Society: A Meyers. Society for Endocrinology, Metabolism and Diabetes of SA: A Motala. SAMA: P Mavengere (Guideline Committee). SA Society of Obstetricians and Gynaecologists: H J Odendaal. SA Society of Occupational Medicine: A Combrinck. Invited participant: T A Gaziano. Private sector health funders: Medscheme: B Taylor; Qualsa Healthcare: A van den Heever; Discovery Health: R Klein, N Butkow. **Observer Delegates:** Aventis: R Potgieter; Bayer Healthcare: L Anderson; Boehringer Ingelheim: T Kruger; Bristol-Myers-Squibb: D Webb; Merck Generics: A Becker; Novartis: M Frey; Pfizer: T McCoy; Roche Products: M Newton; Sanofi-Synthelabo: M Palane; Servier Laboratories: M Parkin.

The 2003 Guideline Update Working Group

SAHS Executive Committee participated in the revision process: A Maseko, S Middlemost, F J Milne (Working Group Chairperson, Editor), K P Mokhobo, P S Mntla, M Mpe, D P Naidoo, G Norton, L H Opie, V J Pinkney-Atkinson (Editor), B Rayner (President), Pinhas E Sareli, Y K Seedat, H C Seftel, K Steyn, B van Rensburg, Y Veriava, A J Woodiwiss.

International speakers at the 13th Scientific meeting: A Mimran (France), K Narkiewicz (Poland), E O'Brien (Republic of Ireland), N Poulter (United Kingdom), K S Reddy (India), B Waeber (Switzerland).

South African Special Interest Groups: M Connor (SA Stroke Foundation); F J Raal (Society for Metabolism, Endocrinology of South Africa and Lipid and Atherosclerosis Society of South Africa), A J Dalby (SA Heart Association).

African Hypertension Special Interest Groups: O Oosthuizen (Namibia); B Onwubere (Nigeria); A Damasceno (Mozambique).

Invited Local National Department of Health Delegates: C C Kotzenberg, A Croasdale.

Annexure B: Methodology

In 1999 the Executive Committee of the SAHS revised the 1995 guideline and it was submitted to the South African Medical Association's (SAMA) Guideline Committee for endorsement. Provisional endorsement as a national guideline was given provided that certain recommendations were made. This led to a facilitated guideline development process in 2000 in conjunction with the Southern African Hypertension Society.

On 14 May 2000, a nationally representative hypertension consensus meeting was held in Gauteng. Participants were invited as representatives of professional, government and consumer groups with an interest in the hypertension field. All participants received a revised copy of the draft guideline developed previously together with the relevant references

before the meeting. The meeting was chaired by a neutral chairperson. The purpose of the meeting was to consider the content of the draft guideline and either endorse or amend the document. The proceedings were audio recorded and transcribed for future reference.

The endorsement document was revised according to the proceedings of the national consensus meeting and also incorporates a further series of comments circulated after the meeting. The endorsement draft document was circulated to all participants and many other interested persons approximately 8 weeks after the meeting.

Amendments will be made to the guideline where there is sufficient need. All major debates and areas where it was not possible to come to agreement will be highlighted. The 2000 guideline was endorsed by the SAMA Guideline Committee (in 2003 this body became defunct.)

Equal financial sponsorship was received from: Aventis, Bayer Healthcare, Boehringer Ingelheim, Bristol-Myers-Squibb, Merck Generics, Novartis, Pfizer, Roche Products, Sanofi-Synthelabo and Servier Laboratories. The grants were unconditional precluding the unethical influence of the content of the guideline by sponsors. All funds were paid directly into the SAHS accounts and all disbursements made from that fund.

In 2002 the SAHS Executive commenced the review of selected guideline sections: BP measurement, compelling indications. New sections on holistic and sustainable hypertension management, and strategy implications were also added. At the 13th Biennial Congress of the Society (March 2003), a Working Group was assembled to consider interim modifications to the guidelines based on evidence and presentations (participants listed in Annexure A). The pharmaceutical industry was not represented at the meeting, nor was any sponsorship raised for the meeting. Boehringer Ingelheim made available the services of its Medical Librarian, Ms Sylvia Bezuidenhout, who performed the required literature searches and obtained copies of publications.

The amendments were posted on the SAHS website (**www.hypertension.org.za**) for comment and were sent out to the Executive Committee. Further comment was sought from local experts in certain sections.