



UNITED ARAB EMIRATES
MINISTRY OF HEALTH & PREVENTION

Clinical Practice Guidelines for the Management of Arterial Hypertension in Primary Healthcare

4th Edition 2019

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Foreword to the Fourth Edition 2019

This updated publication of the Clinical Practice Guidelines (CPG) for hypertension in primary health care (PHC) incorporates the new updates in the international guidelines and tailors this to our settings in the Ministry of Health and Prevention facilities. Hypertension continues to be a worldwide public health problem with increasing burden on all health sector resources. Preventing hypertension, diagnosing it early and treating it properly is a goal that all health care systems in the world are working for.

We hope that these guidelines will help our health care providers in PHC to achieve this goal.

Special thanks to Professor Krzysztof Narkiewicz, Head of Hypertension & Diabetology, Medical University of Gdansk, Poland, Dr Amrish Agrawal, Dr. Mohammed Ibrahim and Prof. Hassan Al Tamimi consultant cardiologists, UAE, for their contribution to the guidelines.

I would like to thank the group of specialists and consultants who authored the publication as well as the reviewers for their contribution.

Finally, I hope that you all find these guidelines a useful tool to improve the care of hypertensive patients in practice.

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1 INTRODUCTION

- These guidelines are adapted from *2018 ESC/ESH Guidelines for the management of arterial hypertension*. They provide recommendations for the primary care management of hypertension. [1]
- Hypertension is one of the most common conditions seen in primary health care and leads to myocardial infarction, stroke, renal failure, and death if not detected early and treated appropriately.
- Hypertension remains one of the most important preventable contributors to disease and death. As populations age, adopt more sedentary lifestyles, and increase their body weight. The prevalence of hypertension worldwide will continue to rise. Abundant evidence from randomized controlled trials (RCTs) has shown benefit of antihypertensive drug treatment in reducing premature morbidity and mortality in patients with hypertension.
- These guidelines for the management of arterial hypertension are designed for adults with hypertension aged ≥ 18 years. They do not address management of hypertension in pregnancy or the specialist management of secondary hypertension. Patients with existing coronary heart disease or diabetes should be managed in line with current national guidance for these conditions.
- The specific aims of these guidelines are to produce pragmatic recommendations to improve the detection and treatment of hypertension, and to improve the

poor rates of blood pressure (BP) control by promoting simple and effective treatment strategies.

- Although these guidelines provide evidence-based recommendations for the management of high BP and should meet the clinical needs of most patients. However, the final decisions concerning an individual patient must be made by the responsible health professional(s) in consultation with the patient and caregiver as appropriate.

2 HYPERTENSION PREVALENCE IN UNITED ARAB EMIRATES (UAE)

- According to Global status report on non-communicable diseases 2014-WHO, prevalence of raised blood pressure in UAE among persons aged 18+ years (defined as systolic blood pressure >140 mmHg and /or diastolic blood pressure >90 mmHg) is 26.3% in both sexes, 27.5% among males & 23.3% among females. [2]
- According to UAE national health survey 2018 hypertension prevalence is 28.8%, among males 37.8%, and among females 19.5%. [3]
- Ministry of Health and Prevention in UAE (MOHAP) has launched a national non-communicable disease plan 2017-2021 in alignment with the World Health Organization (WHO) action plan 2015-2025 and Sustainable Development Goals (SDGs) 2030. [4]
- One of the main targets to be achieved by year 2025 is to decrease prevalence of blood pressure by 25%, and it is included as a strategic indicator in MOHAP strategic plan. [5]
- To achieve this target multi-stakeholders collaboration is needed; guideline implementation, awareness programs and salt reduction legislation are priorities.

3 DEFINITION & CLASSIFICATION OF HYPERTENSION

3.1 DEFINITION

Hypertension is defined as office systolic BP (SBP) values ≥ 140 mmHG and/or diastolic BP (DBP) values ≥ 90 mmhg. Based on evidence from multiple RCTs, treatment of patients with these BP values is beneficial.

3.2 CLASSIFICATION

Table 1: Classification of office blood pressure and definitions of hypertension grades (The same classification is used in younger, middle-aged and older people)

Category	Systolic (mmHg)		Diastolic (mmHg)
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

4 BLOOD PRESSURE MEASUREMENT

4.1 OFFICE BLOOD PRESSURE MEASUREMENT

- Diagnosis and treatment of hypertension depend on accurate measurement of blood pressure. However, blood pressure reading is one of the most inaccurately performed measurements in clinical practice.
- Healthcare professionals taking blood pressure measurements need adequate initial training and should have their performance reviewed periodically.
- Devices for measuring blood pressure must be properly validated, maintained and regularly recalibrated according to manufacturer's instructions.
- Blood pressure should be measured in both arms, which may be useful for identifying coarctation of aorta and upper extremity arterial obstruction. If there is a consistent difference in measurement between the arms, subsequent blood pressure measurements should be taken from the arm with the higher reading.
- Accurate blood pressure measurement in the office requires standardized measurements protocol being carried out under strict conditions.

Figure 1: Blood pressure measurement tips [6]

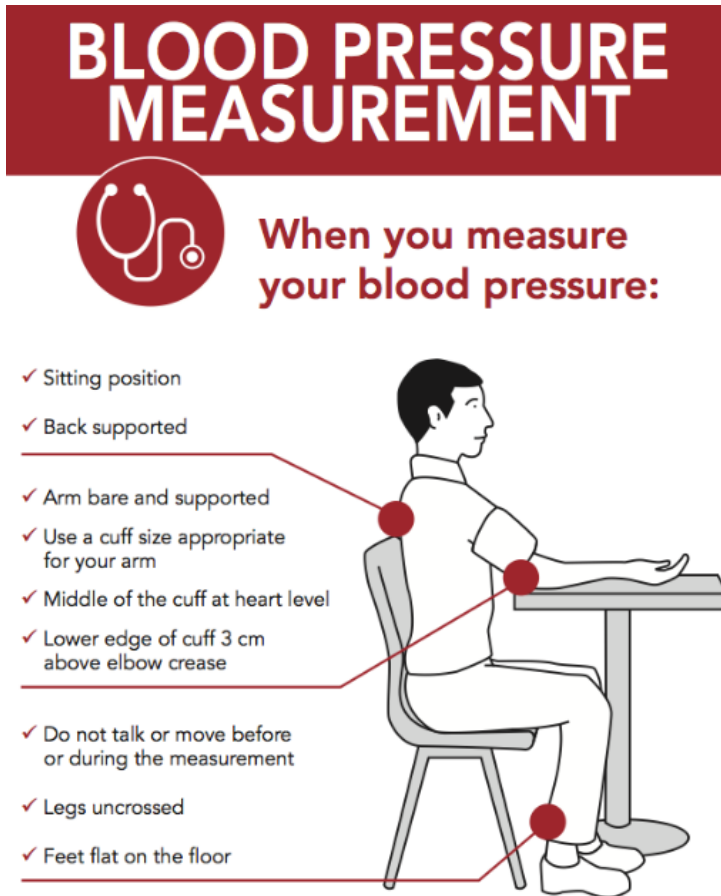


Table 2: Key steps for proper BP measurements

Step 1: Properly prepare the patient.	Patient seated comfortably with back supported, legs uncrossed, upper arm bared, empty bladder and to be seated for 5 min in a quiet environment.
Step 2: Use proper technique for BP measurements.	Use a standard bladder cuff (12–13 cm wide and 35 cm long) for most patients, but have larger and smaller cuffs available for larger (arm circumference >32 cm) and thinner arms, respectively. The cuff should be positioned at the level of the heart with the back and arm supported, to avoid muscle contraction and isometric-exercise dependent increases in BP. Measure BP in both arms at the first visit to detect possible between-arm differences. Use the arm with the higher value as the reference
Step 3: Take the proper measurements needed for diagnosis and treatment of elevated BP/hypertension.	Three BP measurements should be recorded, 1–2 min apart, and additional measurements only if the first two readings differ by >10 mmHg
Step 4: Average the readings.	BP is recorded as the average of the last two BP readings
Step 5: Exclude orthostatic hypotension	Measure BP 1 min and 3 min after standing from a seated position in all patients at the first measurement to exclude orthostatic hypotension.

	Lying and standing BP measurements should also be considered in subsequent visits in older people, people with diabetes, and people with other conditions in which orthostatic hypotension may frequently occur. (refer to postural hypotension)
Step 6: Heart & pulse rate record	Record heart rate and use pulse palpation to exclude arrhythmia
Step 6: Provide BP readings to patient.	Patient should be aware about their BP readings

4.1.1 Postural hypotension

In people with symptoms of postural hypotension (fall or postural dizziness):

- Measure blood pressure with the person either supine or seated.
- Measure blood pressure again with the person standing for at least 1 minute and 3 minutes prior to measurement.
- If the systolic blood pressure falls by 20 mmHg or fall in diastolic by 10 mmHg or more when the person is standing:
 - Review medication.
 - Measure subsequent blood pressures with the person standing.
 - Consider referral to specialist care if symptoms of postural hypotension persist.

4.2 OUT-OF-OFFICE BLOOD PRESSURE MEASUREMENT

Out-of-office BP measurement refers to the use of either home blood pressure monitoring (HBPM) or ambulatory blood pressure monitoring (ABPM), the latter usually over 24 h. It provides a larger number of BP measurements than conventional office BP in conditions that are more representative of daily life.

4.2.1 Ambulatory and home BP measurements.

4.2.1.1 *Home blood pressure monitoring (HBPM)*

Home BP is the average of all BP readings performed with a semiautomatic, validated BP monitor, for at least 3 days and preferably for 6–7 consecutive days before each clinic visit, with readings in the morning and the evening, taken in a quiet room after 5 min of rest, with the patient seated with their back and arm supported. Two measurements should be taken at each measurement session, performed 1–2 min apart. (See appendix)

4.2.1.2 Ambulatory blood pressure monitoring (ABPM)

ABPM provides the average of BP readings over a defined period, usually 24 h. The device is typically programmed to record BP at 15 - 30 min intervals, and average BP values are usually provided for daytime, night-time, and 24 h. A diary of the patient's activities and sleep time can also be recorded. A minimum of 70% usable BP recordings are required for a valid ABPM measurement session. ABPM if available is recommended for new diagnosis of hypertension.

Figure 2: Ambulatory blood pressure measurement [7]

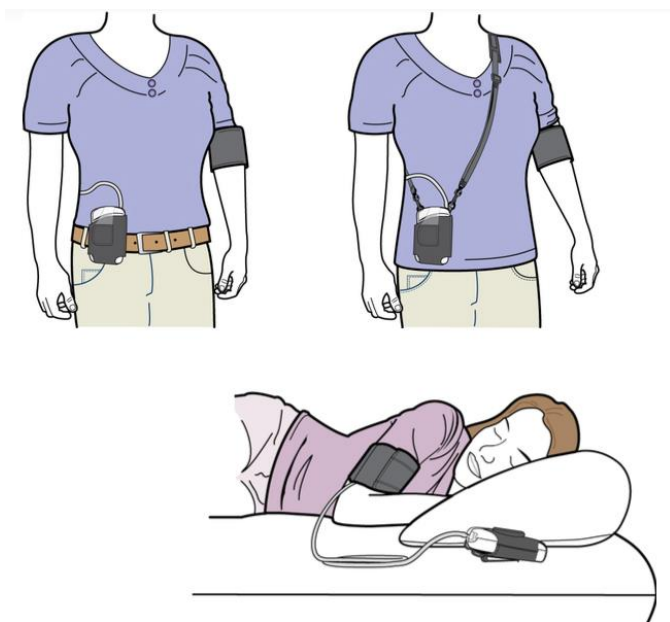


Table 3: Definitions of hypertension according to office, ambulatory, and home blood pressure levels

Category	SBP (mmHg)		DBP (mmHg)
Office BP	≥ 140	And / or	≥ 90
Ambulatory BP			
Daytime (or awake) mean	≥ 135	And / or	≥ 85
Night time (or sleep) mean	≥ 120	And / or	≥ 70
24 Hr. mean	≥ 130	And / or	≥ 80
Home BP mean	≥ 135	And / or	≥ 85

4.2.2 Clinical indications for out-of-office blood pressure measurements

- Conditions in which white-coat hypertension is more common (Grade I hypertension on office BP measurement, Marked office BP elevation without HMOD)
- Conditions in which masked hypertension is more common (High–normal office BP)
- Normal office BP in individuals with HMOD or at high total CV risk
- Postural and post-prandial hypotension in untreated and treated patients
- Evaluation of resistant hypertension
- Evaluation of BP control, especially in treated higher-risk patients
- Exaggerated BP response to exercise
- When there is considerable variability in the office BP
- Evaluating symptoms consistent with hypotension during treatment
- Specific indications for ABPM rather than HBPM:
(Assessment of nocturnal BP values and dipping status (e.g. suspicion of nocturnal hypertension, such as in sleep apnea, CKD, diabetes, endocrine hypertension, or autonomic dysfunction))

4.3 WHITE-COAT HYPERTENSION AND MASKED HYPERTENSION

4.3.1 White-coat hypertension

Refers to the untreated condition in which BP is elevated in the office, but is normal when measured by ABPM, HBPM or both.

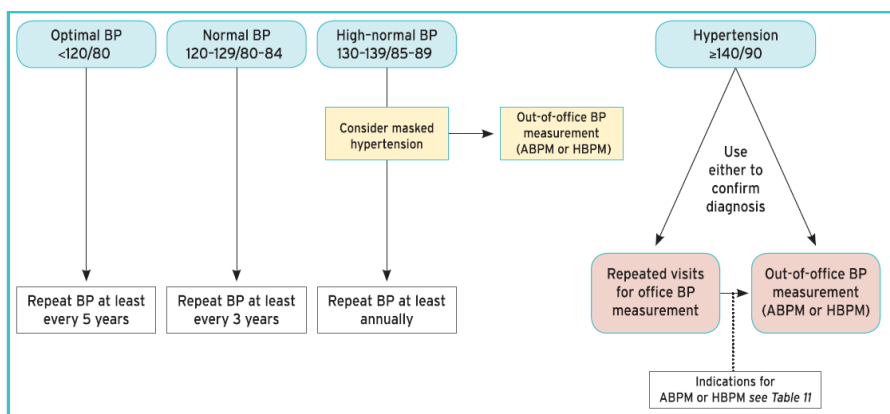
4.3.2 Masked hypertension

Refers to untreated patients in whom the BP is normal in the office but is elevated when measured by HBPM or ABPM.

4.4 SCREENING FOR THE DETECTION OF HYPERTENSION

- Hypertension is predominantly an asymptomatic condition that is best detected by structured population screening programs or opportunistic measurement of BP. When structured population screening programs have been undertaken, an alarming number of people (>50%) were unaware they had hypertension. This high rate of undetected hypertension occurred irrespective of the income status of the countries studied across the world.
- All adults should have their BP recorded in their medical record and be aware of their BP, and further screening should be undertaken at regular intervals with the frequency dependent on the BP level.
- For healthy people with an optimal office BP (<120/80 mmHg), BP should be re measured at least every 5 years and more frequently when opportunities arise. In patients with a normal BP (120–129/80–84), BP should be re measured at least every 3 years.
- Patients with high–normal BP (130–139/85–89 mmHg) should have their BP recorded annually because of the high rates of progression of high–normal BP to hypertension. This is true also for people in whom masked hypertension is detected.

Figure 3: Screening and diagnosis of hypertension



ABPM = ambulatory blood pressure monitoring; BP = blood pressure; HBPM = home blood pressure monitoring.

5 CLINICAL EVALUATION & ASSESSMENT OF HYPERTENSION

Evaluation of the patient has four goals:

1. To establish the diagnosis and grade of hypertension,
2. To screen for secondary hypertension in search of a curable cause.
3. To identify other cardiovascular risk factors to assess the total cardiovascular risk.
4. To evaluate the presence or absence of target organ damage.

5.1 MEDICAL HISTORY

A thorough medical history should address in particular:

5.1.1 Risk factors

- Family and personal history of hypertension, CVD, stroke, or renal disease)
- Family and personal history of associated risk factors (e.g. familial hypercholesterolemia)
- Smoking history
- Dietary history and salt intake
- Alcohol consumption
- Lack of physical exercise/sedentary lifestyle
- History of erectile dysfunction
- Sleep history, snoring, sleep apnea (information also from partner)

- Previous hypertension in pregnancy/pre-eclampsia

5.1.2 History and symptoms of HMOD, CVD, stroke, and renal Disease

- Brain and eyes: headache, vertigo, syncope, impaired vision, TIA, sensory or motor deficit, stroke, carotid revascularization, cognitive impairment, dementia (in the elderly)
- Heart: chest pain, shortness of breath, edema, myocardial infarction, coronary revascularization, syncope, history of palpitations, arrhythmias (especially AF), heart failure
- Kidney: thirst, polyuria, nocturia, hematuria, urinary tract infections
- Peripheral arteries: cold extremities, intermittent claudication, pain free walking distance, pain at rest, peripheral revascularization
- Patient or family history of CKD (e.g. polycystic kidney disease)

5.1.3 History of possible secondary hypertension

- Young onset of grade 2 or 3 hypertension (<40 years), or sudden development of hypertension or rapidly worsening BP in older patients
- History of renal/urinary tract disease
- Recreational drug/substance abuse/concurrent therapies: corticosteroids, nasal vasoconstrictor, chemotherapy, yohimbine, liquorice.

- Repetitive episodes of sweating, headache, anxiety, or palpitations, suggestive of Pheochromocytoma
- History of spontaneous or diuretic-provoked hypokalemia, episodes of muscle weakness, and tetany (hyperaldosteronism)
- Symptoms suggestive of thyroid disease or hyperparathyroidism
- History of or current pregnancy and oral contraceptive use

5.1.4 Antihypertensive drug treatment

Current/past antihypertensive medication including effectiveness and intolerance to previous medications

5.2 PHYSICAL EXAMINATION

Physical examination provides important indications of potential causes of secondary hypertension, signs of comorbidities, and hypertension end organ damage.

5.2.1 Key steps in physical examination

- Body habitus
- Weight and height measured on calibrated scale, with calculation of BMI.
- Waist circumference
- Signs of end organ damage
- Neurological examination and cognitive status
- Fundoscopy examination
- Palpation and auscultation of heart and carotid arteries

- Palpation of peripheral arteries
- Comparison of BP in both arms (at least once)
- Secondary hypertension
- Skin inspection: café-au-lait patches of neurofibromatosis (phaeochromocytoma)
- Kidney palpitation for signs of renal enlargement in polycystic kidney disease
- Auscultation of heart and renal arteries for murmurs or bruits indicative of aortic coarctation or renovascular hypertension
- Comparison of radial with femoral pulse: to detect radio-femoral delay in aortic coarctation
- Signs of Cushing's disease or acromegaly
- Signs of thyroid disease

5.3 CLINICAL INVESTIGATIONS

Basic routine laboratory test should be done to complete the assessment. Other appropriated tests could be done if secondary hypertension is suspected.

5.3.1 Routine laboratory tests and workup for evaluation of hypertensive patients

- Hemoglobin and/or hematocrit
- Fasting blood glucose
- Blood lipids: total cholesterol, LDL cholesterol, HDL cholesterol
- Blood triglycerides
- Blood potassium and sodium

- Blood uric acid
- Blood creatinine and eGFR (CKD-EPI equation)
- Blood liver function test
- Urinary analysis: microscopic examination: urinary protein by dipstick test or ideally albumin: creatinine ratio
- 12-lead ECG
- Fundoscopy

5.3.2 Basic screening tests for HMOD

- Echocardiography
 - Indications:
 - Suspected LV dysfunction
 - Evaluation of LVH and LV remodeling where this will alter management
 - Evaluation of clinically suspected aortic coarctation.
- Carotid ultrasound
- Abdominal ultrasound

6 HYPERTENSION AND CHRONIC KIDNEY DISEASE (CKD)

Hypertension is the second most important cause of CKD after diabetes. Hypertension may also be the presenting feature of asymptomatic primary renal disease. An alteration of renal function is most commonly detected by an increase in serum creatinine. The diagnosis of hypertension-induced renal damage is based on the finding of reduced renal function and/or the detection of albuminuria. CKD is classified according to eGFR (Table 4). The albumin:creatinine ratio (ACR) is measured from a spot urine sample (preferably early morning urine), and is the preferred method to quantify urinary albumin excretion. A progressive reduction in eGFR and increased albuminuria indicate progressive loss of renal function, and are both independent and additive predictors of increased CV risk and progression of renal disease.

Table 4: The KDOQI stages of kidney disease [8]

CKD is classified based on:				Albuminuria categories		
				Description and range		
				A1	A2	A3
				Normal to mildly increased <30 mg/g <3 mg/mmol	Moderately increased 30-299 mg/g 3-29 mg/mmol	Severely increased ≥300 mg/g ≥30 mg/mmol
GFR categories (ml/min/1.73m ²) Description and range	G1	Normal or high	≥90	1 if CKD	Treat 1	Refer* 2
	G2	Mildly decreased	60-89	1 if CKD	Treat 1	Refer* 2
	G3a	Mildly to moderately decreased	45-59	Treat 1	Treat 2	Refer 3
	G3b	Moderately to severely decreased	30-44	Treat 2	Treat 3	Refer 3
	G4	Severely decreased	15-29	Refer* 3	Refer* 3	Refer 4+
	G5	Kidney failure	<15	Refer 4+	Refer 4+	Refer 4+

	Low risk
	Moderate risk
	High risk
	Very high risk

7 HYPERTENSION AND CARDIOVASCULAR RISK FACTORS

Hypertension rarely occurs in isolation, and often clusters with other CV risk factors (Table 5). Quantification of total CV risk is an important part of the risk stratification process for patients with hypertension. SBP appears to be a better predictor of events than DBP after the age of 50 years. High DBP is associated with increased CV risk and is more commonly elevated in younger (<50 years) vs. older patients, increased pulse pressure has additional adverse prognostic significance.

Elevated BP was the leading global contributor to premature death in 2015, accounting for almost 10 million deaths and over 200 million disability-adjusted life years. Importantly, despite advances in diagnosis and treatment over the past 30 years, the disability-adjusted life years attributable to hypertension have increased by 40% since 1990.

Table 5: Factors influencing cardiovascular risk in patients with hypertension

Demographic characteristics and laboratory parameters
Sex (men >women)
Age
Smoking (current or past history)
Total cholesterol and HDL-C
Uric acid
Diabetes
Overweight or obesity
Family history of premature CVD (men aged <55 years and women aged <65 years)

Family or parental history of early-onset hypertension
Early-onset menopause
Sedentary lifestyle
Psychosocial and socioeconomic factors
Heart rate (resting values >80 beats/min)
Asymptomatic HMOD
ECG LVH
Echocardiographic LVH
Microalbuminuria 24hr urine collection (30–300mg/24hr), spot urine albumin (30–300mg/L) or elevated albumin–creatinine ratio (30–300 ; 3.4–34mg/mmol) (preferentially on morning spot urine)
Moderate CKD with eGFR >30–59 mL/min/1.73 m ² (BSA) or severe CKD eGFR <30 mL/min/1.73 m ² (CKD-EPI equation)
Ankle-brachial index <0.9
Advanced retinopathy: haemorrhages or exudates, papilloedema
Established CV or renal disease
Cerebrovascular disease: ischaemic stroke, cerebral haemorrhage, TIA
CAD: myocardial infarction, angina, myocardial revascularization
Presence of atheromatous plaque on imaging
Heart failure, including HFpEF
Peripheral artery disease
Atrial fibrillation
BSA = body surface area; CAD = coronary artery disease; CKD = chronic kidney disease; CV = cardiovascular; CVD = cardiovascular disease; ECG = electrocardiogram; eGFR= estimated glomerular filtration rate; HDL-C = HDL cholesterol; HFpEF = heart failure with preserved ejection fraction; HMOD = hypertension-mediated organ damage; LV= left ventricular; LVH = left ventricular hypertrophy; Evaluation; TIA = transient ischaemic attack.

7.1 CHALLENGES IN CARDIOVASCULAR RISK (CV) ASSESSMENT

- CV risk is strongly influenced by age (i.e. older people are invariably at high absolute CV risk). In contrast, the absolute risk of younger people, particularly younger women, is invariably low, even in those with a markedly abnormal risk factor profile. In the latter, relative risk is elevated even if absolute risk is low.
- A second consideration is that the presence of concomitant disease is often recorded in a binary way in CV risk assessment systems (e.g. diabetes, yes/no). This does not reflect the impact of the severity or duration of concomitant diseases on total CV risk. For example, long-standing diabetes is clearly associated with high risk, whereas the risk is less certain for recent-onset diabetes
- A third conundrum specific to hypertension is what BP value to use in CV risk assessment in a patient who is receiving treatment for hypertension. If treatment was commenced recently, it seems appropriate to use the pre-treatment BP value. If treatment has been long-standing, using the current treated BP value will invariably underestimate risk because it does not reflect prior longer-term exposure to higher BP levels, and antihypertensive treatment does not completely reverse the risk even when BP is well controlled.

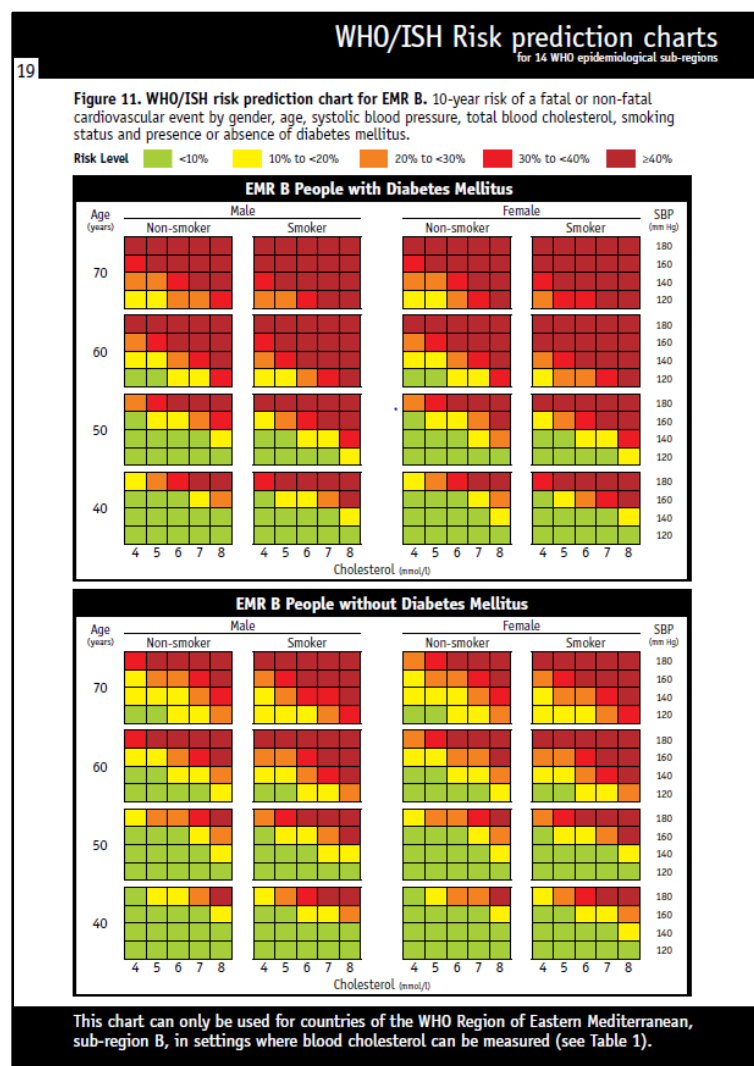
Table 6: Classification of hypertension stages according to blood pressure levels, presence of cardiovascular risk factors, hypertension-mediated organ damage, or comorbidities

Hypertension disease staging	Other risk factors, HMOD, or disease	BP (mmHg) grading			
		High normal SBP 130-139 DBP 85-89	Grade 1 SBP 140-159 DBP 90-99	Grade 2 SBP 160-179 DBP 100-109	Grade 3 SBP $\geq$ 180 or DBP $\geq$ 110
Stage 1 (uncomplicated)	No other risk factors	Low risk	Low risk	Moderate risk	High risk
	1 or 2 risk factors	Low risk	Moderate risk	Moderate to high risk	High risk
	$\geq$ 3 risk factors	Low to Moderate risk	Moderate to high risk	High Risk	High risk
Stage 2 (asymptomatic disease)	HMOD, CKD grade 3, or diabetes mellitus without organ damage	Moderate to high risk	High risk	High risk	High to very high risk
Stage 3 (established disease)	Established CVD, CKD grade $\geq$ 4, or diabetes mellitus with organ damage	Very high risk	Very high risk	Very high risk	Very high risk

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MOHAP has adapted WHO/ International Society of Hypertension (ISH) prediction chart for WHO regions to be used for CVD risk assessment in individuals aged 40 years and above with no manifested CVD. Individuals with established coronary heart disease, cerebrovascular disease, peripheral vascular disease, diabetes or chronic kidney disease are considered to be at high risk for events and require intensive lifestyle interventions and appropriate drug therapy.

Figure 4: WHO/ISH Risk prediction charts for 14 WHO epidemiological sub-regions [9]



Practice points:

Please note that CVD risk may be higher than indicated by the charts in the presence of the following:

- Already on antihypertensive therapy
- Premature menopause
- Approaching the next age category or systolic blood pressure category
- Obesity (including central obesity)
- Sedentary lifestyle
- Family history of premature coronary heart disease (CHD) or stroke in first degree relative (male <55 years, female <65 years)
- Raised triglyceride level (>2.0 mmol/L or 180 mg/dl, Low HDL (high density lipoprotein) cholesterol level (< 1 mmol/l or 40 mg/dl in males, <1.3 mmol/L or 50 mg/dl in females), Raised levels of C-reactive protein, fibrinogen, homocysteine, apolipoprotein B or Lp (a), or fasting glycaemia, or impaired glucose tolerance
- Microalbuminuria (increases the 5year risk of diabetics by about 5%)
- Raised pulse rate
- Socioeconomic deprivation

8 TREATMENT OF HYPERTENSION

The primary goal of treatment is to achieve maximum reduction in the long-term total risk of cardiovascular diseases. There are two well-established strategies to lower BP:

8.1 NON-PHARMACOLOGICAL (LIFESTYLE INTERVENTIONS) [5]

8.1.1 Physical exercise

For non-hypertensive individuals (to reduce the possibility of becoming hypertensive) or for hypertensive patients (to reduce their BP), prescribe the accumulation of 30-60 minutes of moderate intensity dynamic exercise (eg, walking, jogging, cycling, or swimming) 4-7 days per week in addition to the routine activities of daily living. Higher intensities of exercise are not more effective. For non-hypertensive or stage 1 hypertensive individuals, the use of resistance or weight training exercise (such as free weightlifting, fixed weightlifting, or handgrip exercise) does not adversely influence BP.

8.1.2 Weight reduction

Maintenance of a healthy body weight (body mass index 18.5-24.9, and waist circumference < 102 cm for men and < 88 cm for women) is recommended for non-hypertensive individuals to prevent hypertension and for hypertensive patients to reduce BP. All overweight hypertensive individuals should be advised to lose weight.

Weight loss strategies should use a multidisciplinary approach that includes dietary education, increased physical activity, and behavioral intervention.

8.1.3 Alcohol consumption

Alcohol is harmful in any form, abstinence is the best. If the person is consuming alcohol, he /she should limit alcohol consumption to ≤ 2 drinks per day, and consumption should not exceed 14 standard drinks per week for men and 9 standard drinks per week for women, to prevent hypertension and reduce BP in hypertensive adults.

8.1.4 DASH Diet

It is recommended that hypertensive patients and normotensive individuals at increased risk of developing hypertension consume a diet that emphasizes fruits, vegetables, low-fat dairy products, whole grain foods rich in dietary fiber, and protein from plant sources that is reduced in saturated fat and cholesterol.

8.1.5 Sodium intake

To prevent hypertension and reduce BP in hypertensive adults, consider reducing sodium intake to less than 5 g of salt or 87 mmol of sodium per day.

8.1.6 Calcium and magnesium intake

Supplementation of calcium and magnesium is not recommended for the prevention or treatment of hypertension.

8.1.7 Potassium intake

For patients not at risk of hyperkalemia increase dietary potassium intake to reduce BP.

Before advising an increase in potassium intake, the following types of patients, who are at high risk of developing hyperkalemia, should be assessed for suitability, and monitored closely:

- Patients receiving renin-angiotensin-aldosterone inhibitors
- Patients receiving other drugs that can cause hyperkalemia (e.g. trimethoprim and sulfamethoxazole, amiloride, triamterene)
- Chronic kidney disease (glomerular filtration rate < 60 mL/min/1.73m²)
- Baseline serum potassium > 4.5 Mmol/L

8.1.8 Stress management

In hypertensive patients in whom stress might be contributing to high BP, stress management should be considered as intervention. Individualized cognitive-behavioral interventions are more likely to be effective when relaxation techniques are used.

8.1.9 Smoking cessation

- Smoking is a major risk factor for CVD and cancer. Smoking cessation is probably the single most effective lifestyle measure for the prevention of CVD; include stroke, myocardial infarction, and PAD. Therefore, the history of tobacco use should be established at each patient visit and hypertensive smokers should be counseled regarding smoking cessation.
- Brief advice from a physician has a small but significant effect of 1 - 3% over and above the unassisted 12 month quit rate. This can be improved by the use of

pharmacological measures combining behavioral support with pharmacotherapy increases the chance of success by 70 - 100% compared with brief advice alone.

8.2 PHARMACOLOGICAL THERAPY

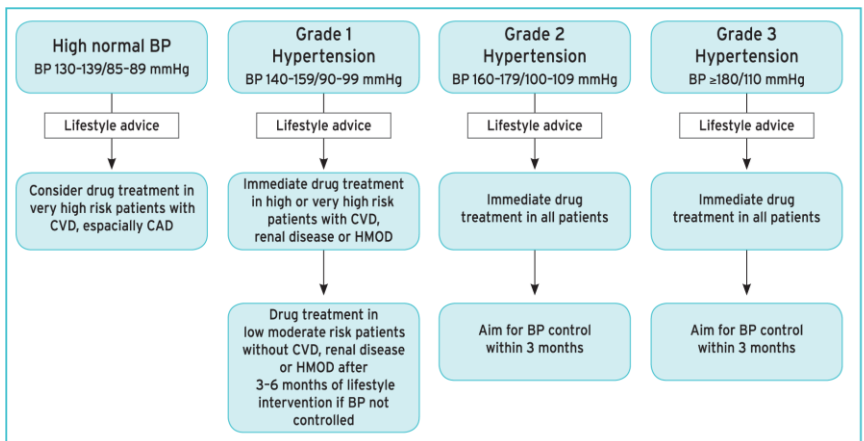
8.2.1 Initiation of blood pressure-lowering drug treatment

See Figure 5 below.

- Prompt initiation of BP-lowering drug treatment is recommended in patients with grade 2 or 3 hypertension at any level of CV risk, simultaneous with the initiation of lifestyle changes.
- In patients with grade 1 hypertension:
 - Lifestyle interventions are recommended to determine if this will normalize BP.
 - In patients with grade 1 hypertension at low–moderate-risk and without evidence of HMOD, BP-lowering drug treatment is recommended if the patient remains hypertensive after 3-6 months of lifestyle intervention.
 - In patients with grade 1 hypertension and at high risk or with evidence of HMOD, prompt initiation of drug treatment is recommended simultaneously with lifestyle interventions
- In fit older patients with hypertension (even if aged >80 years), BP-lowering drug treatment and lifestyle intervention are recommended when SBP is >_160 mmHg.

- BP-lowering drug treatment and lifestyle intervention are recommended for fit older patients (>65 years but not >80 years) when SBP is in the grade 1 range (140–159 mmHg), provided that treatment is well tolerated.
- Antihypertensive treatment may also be considered in frail older patients if tolerated.
- Withdrawal of BP-lowering drug treatment on the basis of age, even when patients attain an age of >_80 years, is not recommended, provided that treatment is well tolerated.
- In patients with high–normal BP (130–139/85–89 mmHg): lifestyle changes are recommended. Drug treatment may be considered when their CV is very high due to established CVD, especially CAD.

Figure 5: Initiation of blood pressure-lowering treatment (lifestyle changes and medication) at different initial office blood pressure levels



8.2.2 The drug treatment algorithm for hypertension

These guidelines recommend five major drug classes for the treatment of hypertension: Angiotensin-converting enzyme (ACE) inhibitors, angiotensin-receptor blockers (ARBs), beta-blockers, calcium channel blockers (CCBs), and diuretics (thiazides and thiazide-like diuretics such as chlortalidone and indapamide).

In previous guidelines, the emphasis was on initial use of different monotherapies, increasing their dose, or substituting for another monotherapy. However, increasing the dose of monotherapy produces little additional BP lowering and may increase the risk of adverse effects, whilst switching from one monotherapy to another is frustrating, time consuming, and often ineffective.

Initial combination therapy is invariably more effective at BP lowering than monotherapy, indeed even low-dose combination therapy is usually more effective than maximal dose monotherapy. It is associated with a better long-term adherence to the prescribed treatment regimen results in reduced treatment discontinuation and a lower risk of CV events than initial monotherapy.

The most effective evidence-based treatment strategy to improve BP control is:

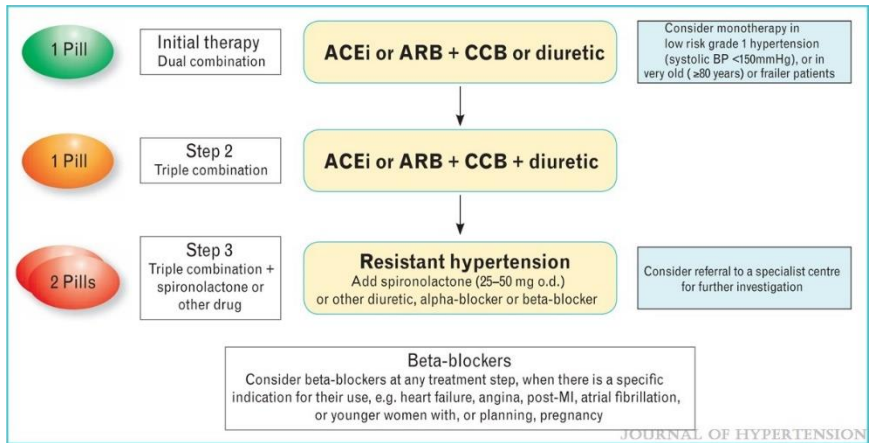
1. The initiation of treatment in most patients with an single pill combination (SPC) comprising two drugs, to

improve the speed, efficiency, and predictability of BP control.

2. Preferred two-drug combinations are a RAS blocker (ACE inhibitors or ARBs) with a CCB or a diuretic. ACE inhibitors and ARBs, whose concomitant use may lead to no additional benefit but increased adverse effects and is thus discouraged. A beta-blocker in combination with a diuretic or any drug from the other major classes is an alternative when there is a specific indication for a beta-blocker, e.g. angina, post-myocardial infarction, heart failure, or heart rate control.
3. Use monotherapy for low-risk patients with stage 1 hypertension whose SBP is <150 mmHg, very high-risk patients with high-normal BP, or frail older patients.
4. The use of a three-drug SPC comprising a RAS blocker, a CCB, and a diuretic if BP is not controlled by a two-drug SPC.
5. The addition of spironolactone for the treatment of resistant hypertension, unless contraindicated.
6. The use of other classes of antihypertensive drugs in the rare circumstances in which BP is not controlled by the above treatments.
7. Information on availability and recommended doses of individual drugs, as well as SPCs and free combinations, can be found in national formularies.

(See Figure 6)

Figure 6: These guidelines recommend 3 drugs treatment strategy for the treatment of hypertension



Core drug treatment strategy for uncomplicated hypertension. ACEi = angiotensin-converting enzyme inhibitor; ARB = angiotensin receptor blocker; CCB = calcium channel blocker; HMOD = hypertension-mediated organ damage; MI = myocardial infarction; o.d. = omni die (every day); PAD = peripheral artery disease

8.2.2.1 Blockers of the renin angiotensin system (angiotensin-converting enzyme inhibitors and angiotensin receptor blockers)

Both ACE inhibitors and ARBs are among the most widely used classes of antihypertensive drugs. They have similar effectiveness, as each other and other major drug classes on major CV events and mortality outcomes. ACE inhibitors and ARBs also appear effective in preventing or regressing HMOD, such as LVH and small artery remodelling, for an equivalent reduction in BP. Both ACE inhibitors and ARBs reduce albuminuria more than other BP-lowering drugs and are

effective at delaying the progression of diabetic and non-diabetic CKD.

8.2.2.2 Calcium channel blockers

CCBs are widely used for the treatment of hypertension and have similar effectiveness as other major drug classes on BP, major CV events, and mortality outcomes. CCBs are a heterogeneous class of agents, dihydropyridines (especially amlodipine) and non-dihydropyridines (verapamil and diltiazem).

8.2.2.3 Thiazide/thiazide-like diuretics (e.g. indapamide)

Diuretics have remained the cornerstone of antihypertensive treatment. Diuretics also appear to be more effective than other drug classes in preventing heart failure. Both thiazides and thiazide-like agents are less effective antihypertensive agents in patients with a reduced GFR (eGFR <45 mL/min) and become ineffective when the eGFR is <30 mL/min. In such circumstances, loop diuretics such as furosemide should replace thiazides and thiazide-like diuretics to achieve an antihypertensive effect.

8.2.2.4 Beta-Blockers

Beta-blockers significantly reduce the risk of stroke, heart failure, and major CV events in hypertensive patients when compared with other BP-lowering drugs, beta-blockers are usually equivalent in preventing major CV events, except for less effective prevention of stroke.

8.2.2.5 Other antihypertensive drugs

Antihypertensive drugs, other than the major classes already discussed above, are no longer recommended for the routine

treatment of hypertension, and are primarily reserved for add-on therapy in rare cases of drug-resistant hypertension where all other treatment options have failed (e.g. sprinolactone, α -blocker).

Table 7: Office blood pressure treatment target range

Age group	Hypertension	Diabetes	CAD	Stroke/TIA	CKD
18 - 65 years	Target to 130/70-79 or lower if tolerated not <120				Target to <140 to 130/70-79 if tolerated
65 - 79 years	Target to 130-139/70-79 if tolerated				
>_80 years	Target to 130-139/70-79 if tolerated				

There are compelling or possible contraindications for each class of drug and preferential use of some drugs for some conditions.

(See Table 8)

Table 8: Compelling and possible contraindications to the use of specific antihypertensive drugs

Drug	Compelling	Possible
Diuretics (thiazides/thiazide-like, e.g. indapamide)	Gout	Metabolic syndrome Glucose intolerance Pregnancy hypercalcaemia Hypokalaemia
Beta-blockers	Asthma (cardioselectives Beta –blockers can be used) Any high-grade sinoatrial or atrioventricular block Bradycardia (heart rate <60 beats per min)	Metabolic syndrome Glucose intolerance Athletes and physically active patients
Calcium antagonists (dihydropyridines)		Tachyarrhythmia Heart failure (HFrEF, class III or IV) Pre-existing severe leg oedema
Calcium antagonists (verapamil, diltiazem)	Any high-grade sinoatrial or atrioventricular block Severe LV	Constipation

Drug	Compelling	Possible
	dysfunction (LV ejection fraction <40%) Bradycardia (heart rate <60 beats per min)	
ACE inhibitors	Pregnancy Previous angioneurotic oedema Hyperkalaemia (potassium >5.5 mmol/L) Bilateral renal artery stenosis	Women of child-bearing potential without reliable contraception
ARBs	Pregnancy Hyperkalaemia (potassium >5.5 mmol/L) Bilateral renal artery stenosis	Women of child-bearing potential without reliable contraception
ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blocker; HFrEF = heart failure with reduced ejection fraction; LV = left ventricular.		

9 STATIN USE IN HYPERTENSION

The benefit of adding a statin to antihypertensive treatment was well established in many RCT's.

Statins are recommended for all people with high blood pressure complicated by CVD, irrespective of baseline concentration total cholesterol or low density lipoprotein cholesterol (LDL-C). Statins are also recommended for primary prevention in people with high blood pressure who have a 10-year risk of CVD of >20%.

(See Table 9)

Table 9: The use of statins in hypertension based on CVD risk factors assessment

Risk categories	Recommendations	Goal to achieve
Low - Moderate CVD risk People with: Grade 2 Hypertension	Statins should be considered	LDL-C value of <3.0 mmol/L (115 mg/dL)
High CVD risk People with any of the following: - Grade 3 hypertension (BP >_180/110) - Familial hypercholesterolemia (Cholesterol >8 mmol/L (>310 mg/dL))	Statins are recommended	LDL-C <2.6 mmol/L (100 mg/dL)

Risk categories	Recommendations	Goal to achieve
• Diabetes Mellitus • Hypertensive LVH • Moderate CKD (eGFR 30-59 mL/min/1.73 m²)		
Very high risk People with any of the following: • Coronary heart disease (CHD) • Cerebrovascular disease (CeVD) • Peripheral vascular disease • DM with target organ damage • Severe CKD (eGFR <30 mL/min/1.73 m²)	Statins are recommended	LDL-C <1.8 mmol/L (70 mg/dL)

9.1.1 The use of antiplatelet (Aspirin) in hypertension

- Aspirin is not recommended for primary prevention in hypertensive patients without CVD.
- Antiplatelet therapy, in particular low-dose aspirin, is recommended for secondary prevention (previous CVD) in hypertensive patients.

9.2 PATIENT FOLLOW-UP AND OBEDIENCE

9.2.1 Strategies to improve patient obedience (adherence, compliance)

- Assist your patient to adhere
 - Tailoring pill-taking to fit patient's daily habits.
 - Simplifying medication regimens to once-daily dosing.
 - Replacing 2 antihypertensive agents with a fixed dose combination (where available and appropriate), provided it is the same combination the patient is already taking.
 - Utilizing unit-of-use packaging if several medications to be taken together (pills dispenser).
- Assist your patient in getting more involved in their treatment
 - Encouraging greater patient responsibility/autonomy in monitoring their blood pressure and adjusting their prescriptions.
 - Educating patient and patients' family about their disease/treatment regimens.
 - Assessing adherence to pharmacological and non-pharmacological therapy at every visit.
 - Utilizing electronic medication compliance aids.

9.2.2 Follow up and monitoring

- Once treatment is initiated, most patients return for follow up and adjustment of prescription at monthly intervals until BP goal is achieved.
- More frequent visits may be required for patients with complicating comorbid conditions.
- Serum potassium and creatinine should be monitored at least once a year.
- Micro-albuminuria should be measured yearly if the patient has no renal impairment and more frequently if the kidneys are affected or in diabetic patients.
- Screening for new diagnosis of diabetes and dyslipidemia should be done annually. In patients already diagnosed with any of these conditions, glucose and lipids should be repeated according to the corresponding guidelines.
- After achieving the blood pressure goal, the follow up visits can be at 3 to 6 month intervals.
- Co-morbidities such as heart failure, associated diseases such as diabetes, and the need for lab tests influence the frequency of visits.
- Other cardiovascular risk factors should be treated according to their respective guidelines.
- Patients only on pharmacological treatment should understand the need for regular follow up with periodic reconsideration for drug treatment.
- If the therapeutic goals, including the control of blood pressure, have not been reached within 6 months, the

physician should consider referral to a hypertension specialist.

- Antihypertensive therapy is generally for life. Cessation of therapy by patients correctly diagnosed as hypertensive is usually followed by the return of blood pressure to pre-treatment levels and severe target organ damage may develop.
- Once patient started on ACE /ARB, renal function and potassium level to be checked within 2 weeks after starting treatments.

10 RESISTANT HYPERTENSION & RECOMMENDATIONS

10.1 DEFINITION OF RESISTANT HYPERTENSION

Hypertension is defined as resistant to treatment when the recommended treatment strategy fails to lower office SBP and DBP values to <140 mmHg and/or <90 mmHg, respectively, and the inadequate control of BP is confirmed by ABPM or HBPM in patients whose adherence to therapy has been confirmed.

The recommended treatment strategy should include appropriate lifestyle measures and treatment with optimal or best-tolerated doses of three or more drugs, which should include a diuretic, typically an ACE inhibitor or an ARB, and a CCB. Pseudo-resistant hypertension (see below) and secondary causes of hypertension should also have been excluded.

10.2 PSEUDO-RESISTANT HYPERTENSION

Several possible causes of pseudo-resistant hypertension should be evaluated and ruled out before concluding that the patient has resistant hypertension:

1. Poor adherence to prescribed medicines occurs in $\leq 50\%$ of patients assessed by therapeutic drug monitoring, and is directly related to the number of tablets prescribed.

2. White-coat phenomenon.
3. Poor office BP measurement technique, including the use of cuffs that are too small relative to the arm circumference, can result in a spurious elevation of BP.
4. Marked brachial artery calcification, especially in older patients with heavily calcified arteries.
5. Clinician inertia, resulting in inadequate doses or irrational combinations of BP-lowering drug therapies.

10.3 DIAGNOSTIC APPROACH TO RESISTANT HYPERTENSION

Diagnosis of resistant hypertension requires detailed information about:

- The patient's history, including lifestyle characteristics, alcohol and dietary sodium intake, interfering drugs or substances, and sleep history.
- The nature and dosing of the antihypertensive treatment.
- A physical examination, with a particular focus on determining the presence of end organ damage and signs of secondary hypertension.
- Confirmation of treatment resistance by out-of-office BP measurements (i.e. ABPM or HBPM).
- Laboratory tests to detect electrolyte abnormalities (hypokalemia), associated risk factors (diabetes), organ damage (advanced renal dysfunction), and secondary hypertension.
- Confirmation of adherence to BP-lowering therapy.

Table 10: Resistant hypertension characteristics, secondary causes, and contributing factors.

Characteristics of patients with resistant hypertension	Causes of secondary resistant hypertension	Drugs and substance that may cause raised BP
• Demographics • Older age (especially >75 years) • Obesity • More common in black people • Excess dietary sodium intake • High baseline BP and chronicity of uncontrolled hypertension	More common causes Primary hyperaldosteronism Atherosclerotic renovascular disease Sleep apnoea CKD	• Prescribed drugs • Oral contraceptives • Sympathomimetic agents (e.g. decongestant in proprietary cold remedies) • Non-steroidal anti-inflammatory drugs • Cyclosporin • Erythropoietin • Steroids (e.g. prednisolone and hydrocortisone) • Some cancer therapies
Concomitant disease • HMOD: LVH and/or CKD • Diabetes • Atherosclerotic vascular disease • Aortic stiffening and	Uncommon causes Phaeochromocytoma Fibromuscular dysplasia Aortic coarctation Cushing's disease Hyperparathyroidism	• Non-prescription drugs • Recreational drugs (e.g. cocaine, amphetamines, and anabolic steroids) • Excessive liquorice ingestion • Herbal remedies (e.g. ephedra and

isolated systolic hypertension		mahuang)
BP = blood pressure; CKD = chronic kidney disease; HMOD = hypertension-mediated organ damage; LVH = left ventricular hypertrophy.		

10.4 RECOMMENDED TREATMENT OF RESISTANT HYPERTENSION

- Reinforcement of lifestyle measures, especially sodium restriction.
- Addition of low-dose spironolactone to existing treatment.
- Or the addition of further diuretic therapy if intolerant to spironolactone, with either eplerenone*, amiloride*, a higher-dose thiazide/thiazide-like diuretic, or a loop diuretic**.
- Or the addition of bisoprolol or doxazosin.

*The use of these drugs should be restricted to patients with an estimated glomerular filtration rate ≥ 45 ml/min and a potassium plasma concentration of ≤ 4.5 mmol/l, because of the risk of hyperkalemia.

**A loop diuretic should replace thiazide/thiazide-like diuretic if the estimated glomerular filtration rate ≤ 30 ml/min.

11 SECONDARY ARTERIAL HYPERTENSION

Secondary hypertension is hypertension due to an identifiable cause, which may be treatable with an intervention specific to the cause. A high index of suspicion and early detection of secondary causes of hypertension are important because interventions may be curative, especially in younger patients.

Table 11: Signs and symptoms that suggest specific causes of secondary hypertension

Signs/symptoms	Possible secondary hypertension cause	Diagnostic test options
Arm to leg systolic blood pressure difference > 20 mmHg Delayed or absent femoral pulse Murmur	Coarctation of the aorta	Magnetic resonance imaging (adults) Transthoracic echocardiography (children)
Increase in serum creatinine concentration (0.5 to 1 mg per dL [44.20 to 88.40 μ mol per L]) after starting angiotensin-converting enzyme inhibitor or angiotensin receptor blocker Renal bruit	Renal artery stenosis	Computed tomography angiography Doppler ultrasonography of renal arteries Magnetic resonance imaging with gadolinium contrast media

Signs/symptoms	Possible secondary hypertension cause	Diagnostic test options
Bradycardia/tachycardia Cold/heat intolerance Constipation/diarrhea Irregular, heavy, or absent menstrual cycle	Thyroid disorders	Thyroid-stimulating hormone
Hypokalemia	Aldosteronism	Renin and aldosterone levels to calculate aldosterone/renin ratio
Apneic events during sleep Daytime sleepiness Snoring	Obstructive sleep apnea	Polysomnography (sleep study) Sleep Apnea Clinical Score with nighttime pulse oximetry
Flushing Headaches Labile blood pressures Orthostatic hypotension Palpitations Sweating Syncope	Pheochromocytoma	24-hour urinary fractionated metanephrines Plasma free metanephrines
Buffalo hump Central obesity Moon facies Striae	Cushing syndrome	24-hour urinary cortisol Late- night salivary cortisol Low-dose dexamethasone suppression

12 MANAGEMENT OF SEVERE HYPERTENSION

Severe elevation of blood pressure can be presented at any age, and may be the initial presentation for a previously undiagnosed hypertensive patient. Most patients who present with severely elevated blood pressure are those with chronic essential hypertension who have been noncompliant or inadequately treated.

12.1 EVALUATION

- The role of a primary care doctor in the evaluation of severely elevated blood pressure in an outpatient setting is to distinguish as quickly as possible those patients who require aggressive blood pressure reduction from those who can be managed in the office.
- In all patients with severe hypertension, repeat the blood pressure after rest in quiet room; this can lead to a fall in BP of 10 to 20 mmHg or more.
- A thorough review of systems with an emphasis on neurologic, cardiac, and renal symptoms should be performed to detect new vision changes, mild confusion, dyspnea on exertion, and oliguria.
- A complete medication history should be obtained to review adherence to current antihypertensives, as well as the use of new drugs or nonprescription supplements (e.g., nonsteroidal anti-inflammatory drugs, Oral contraceptives, Monoamine oxidase inhibitors, Tricyclic antidepressants, Steroids, Nasal decongestants, Cold

remedies, Appetite suppressants and herbal or dietary supplements).

- All patients should receive focused cardiopulmonary, neurologic, and fundoscopic examinations.

12.2 HYPERTENSION EMERGENCY AND HYPERTENSION URGENCY

12.2.1 Hypertension emergencies

Hypertension emergencies are situations in which severe hypertension (grade 3) BP > 180/120 mmHg with impending or progressive hypertension mediated end organ damage (HMOD), which often is life threatening and requires immediate medical attention, including admission to the intensive care unit.

Continuous cardiac monitoring, frequent measurement of urine output, and neurologic assessment are all necessary. Treatment with IV antihypertensive agents with a short half-life is ideal to allow careful titration of the BP response to treatment in a higher dependency clinical area with facilities for continuous hemodynamic monitoring.

12.2.2 Hypertension urgency

Has been used to describe severe hypertension in patients presenting to the PHC or emergency department with BP >180/120 mmHg without clinical evidence of acute HMOD. Whilst these patients require BP reduction, they do not usually require admission to hospital, and BP reduction is best achieved with:

- Optimizing or restarting their current regimens
- Consider short acting oral medication according to the drug treatment presented in Table 12.
- Do not treat aggressively with I.V. or oral loading
- Ensure patient has a follow up within few days.

Table 12: Agents for management of hypertensive urgency [10]

Agent	Class	Onset of action	Duration of action	Dosing	Adverse effects
Captopril	ACE-I	5-15 min	2-6 h	Recommended : 25 mg PO or SL Dosing range: 6.25-50 mg PO Max dose: 50 mg PO	Hyperkalemia, angioedema, rash, decreased renal function in renal artery stenosis
Clonidine	Centrally acting α_2 -agonist	15-30 min	2-8 h	Recommended : 0.1-0.2 mg PO, followed by 0.05-0.1 mg every hour until desired effect Max dose: 0.8 mg	Dry mouth, sedation, orthostatic hypotension, rebound HTN
Labetalol	α_1 -selective, β -nonselective antagonist	2 h	4 h	Recommended : 200 mg PO, followed by 200 mg every hour until desired effect Max dose: 1,200 mg	Hypotension, dizziness, headache, nausea, vomiting
Amlodipine	CCB	30- 50 min	12-18 h	5-10 mg	Headache, flushing

Table 13: Characteristics of hypertensive emergency versus hypertensive urgency

Characteristics of hypertensive emergency versus hypertensive urgency		
	Hypertensive emergency	Hypertensive urgency
Significant elevation in BP	Yes	Yes
BP> 180/120	Yes	Yes
Target organ damage	Yes	No
IV medication required	Yes	No
Associated conditions	Heart attack, aortic bleeding, optic swelling, hypertensive encephalopathy, excess circulatory fluid	Nose bleeds, severe hypertension, scleroderma

13 WHEN TO REFER PATIENT WITH HYPERTENSION FOR SPECIALIZED CARE

Hypertension is a very common condition and most patients with hypertension will be managed in the primary care setting. However, there are circumstances in which a referral for routine hospital-based evaluation and treatment may be required:

- Patients in whom secondary hypertension is suspected.
- Younger patients (<40 years) with grade 2 or more severe hypertension in whom secondary hypertension should be excluded.
- Patients with treatment-resistant hypertension.
- Patients in whom more detailed assessment of HMOD would influence treatment decisions
- Patients with sudden onset of hypertension when BP has previously been normal
- Other clinical circumstances in which the referring doctor feels more specialist evaluation is required.
- Symptoms of postural hypotension or a fall in standing SBP > 20 mmHg.
- Rapidly progressive end organ damage (progressive microalbuminuria, increasing creatinine, decreasing glomerular filtration rate, angina, heart failure).

There are also rarer circumstances in which a patient with hypertension should be referred to hospital for emergency care, which will often require inpatient care.

14 APPENDIX

Instructions for using the blood pressure machine & home BP monitoring:

- Take your device to the health center to make sure the readings match between your device and the health center
- You should be seated properly where the back is straight for 5 min, the arm is on a level surface and place the blood pressure machine on a table beside you.
- Measure your blood pressure before taking blood pressure medication, before eating, or 2 hours after eating.
- Sit quietly for 5 minutes before each pair of readings.
- Leave at least one minute between each measurement.
- Place the cuff around your bare arm, above your elbow.
- The rubber tube should be in the middle of your arm and leading down from the cuff.
- The two numbers that appear together represent your blood pressure.
- The number after the P is your pulse reading.
- Bring the record and blood pressure medication every visit to your doctor.

Please record your blood pressure morning/evening for 7 days

Name:						CMRN:			
DAY	DATE	Reading One		Reading Two		Reading One		Reading Two	
		BP	Pulse	BP	Pulse	BP	Pulse	BP	Pulse
Example	1/9/19	130/85	70	125/80	72	140/90	60	145/90	70
1									
2									
3									
4									
5									
6									
7									

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