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کنترل فشار خون در جهت کاهش خطر بیماریهای قلبی عروقی

Primary hypertension is a key contributor to premature morbidity and mortality in the United States [1] and consistently ranks among the top two risk factors worldwide for global disease burden in 2015. [2] After tobacco use and diabetes, uncontrolled primary hypertension is the most important risk factor for peripheral vascular disease (the second leading cause of loss of limbs in the United States). [3]

Uncontrolled primary hypertension is the most important modifiable risk factor for stroke, the leading contributor to all common forms of heart failure, the second most common cause of end-stage kidney disease, and also contributes to memory loss. [4]

Definitions of Hypertension

Blood pressure (BP) is the phenotypic expression of the genetically predisposed disease hypertension and is a continuous variable. As more data became available, the guideline-based definition of hypertension has evolved over the past 40 years. The traditional "threshold BP value" to secure a diagnosis of hypertension comes from large epidemiologic studies demonstrating a higher mortality at levels above 140/90 mm Hg. [4]

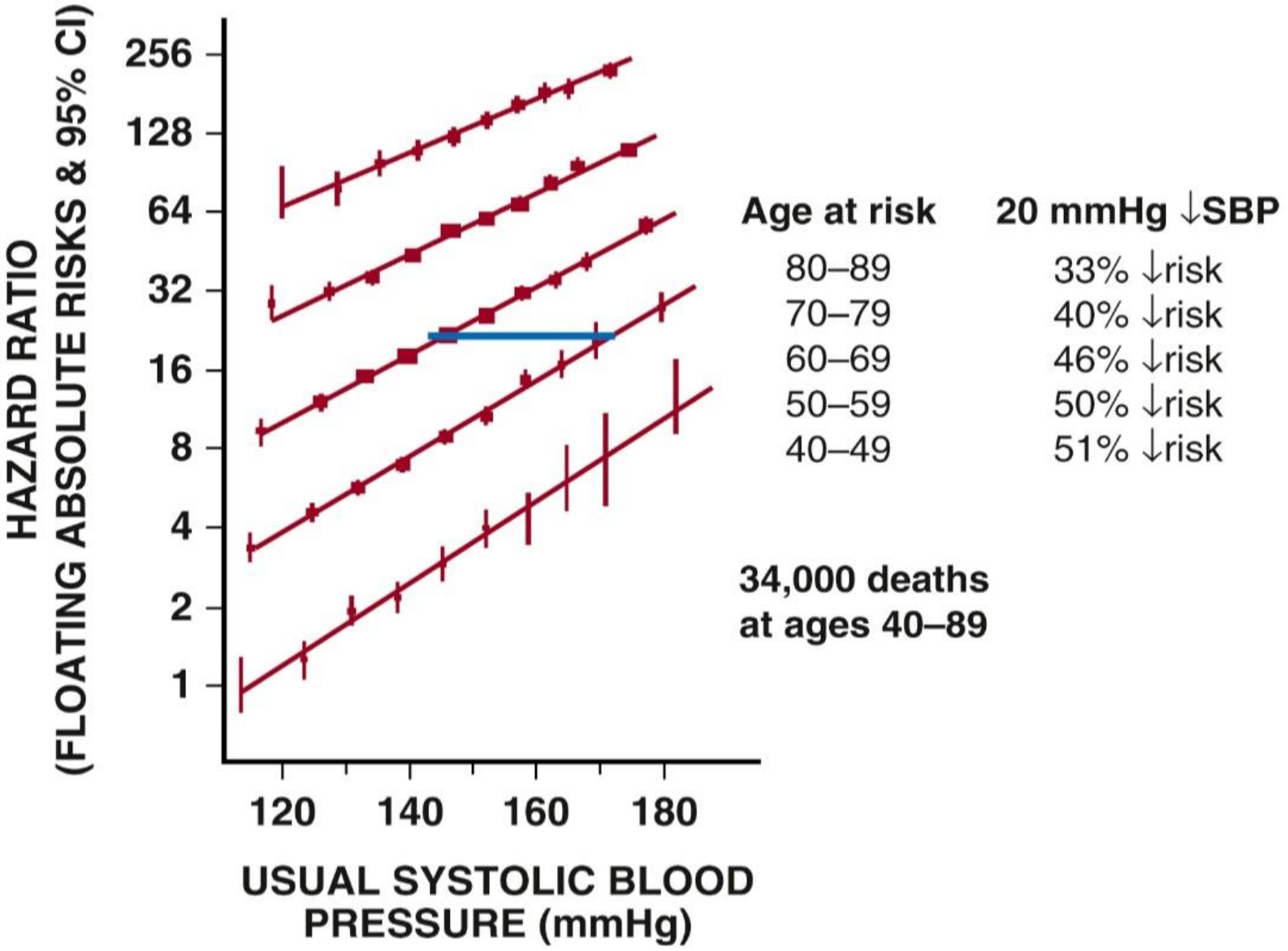
TABLE 1. Classification of office BP and definitions of hypertension grades

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	and	<80
Normal	120–129	and	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[a]	≥140	and	<90
Isolated diastolic hypertension[a]	<140	and	≥90

The BP category is defined by the highest level of BP, whether systolic or diastolic.
[a]Isolated systolic or diastolic hypertension is graded 1, 2 or 3 according to SBP and DBP values in the ranges indicated. The same classification is used for adolescents ≥16 years old (Section 15.1).

Guideline Differences	American College of Cardiology/American Heart Association (ACC/AHA)		European Society of Cardiology/European Society of Hypertension (ESC/ESH)	
Level of Blood Pressure (BP) Defining Hypertension	Systolic and/or Diastolic		Systolic and/or Diastolic	
	(mm Hg)	(mm Hg)	(mm Hg)	(mm Hg)
Office/clinic BP	≥130	≥80	≥140	≥90
Daytime mean	≥130	≥80	≥135	≥85
Nighttime mean	≥110	≥65	≥120	≥70
24-hr mean	≥125	≥75	≥130	≥80
Home BP mean	≥130	≥80	≥135	≥85
BP targets for treatment	<130/80		Systolic targets	<140 and close to 130
Initial combination therapy	Initial single-pill combination therapy		Initial single-pill combination in patients >20/10 mm Hg above BP goal therapy in patients ≥ 140/90 mm Hg	
Hypertensive requiring	>130/80 mm Hg		≥140/90 mm Hg intervention	

10 11 The continuous relationship between BP level and risk of events in the brain, heart, and kidney are well documented. 9 10 11 12 A natural history study involving almost 12,000 veterans, followed over 15 years, noted that BP level correlated with risk for end-stage kidney disease (Fig. 26.1). 13 Note that, in this study, the highest risk for end-stage kidney disease was found at levels above the renal autoregulatory range (i.e., a systolic BP >180 mm Hg).


HAZARD RATIO
(FLOATING ABSOLUTE RISKS & 95% CI)
256
128
64
32
16
8
4
2
1
120
140
160
180
USUAL SYSTOLIC BLOOD PRESSURE (mmHg)
Age at risk
20 mmHg ↓SBP
80–89
33% ↓risk
70–79
40% ↓risk
60–69
46% ↓risk
50–59
50% ↓risk
40–49
51% ↓risk
34,000 deaths
at ages 40–89

These data highlight the public health importance of SBP, particularly among people older than 50 years of age. In such individuals, SBP is a much better predictor of hypertensive target-organ damage and future CV and renal events than is DBP. [4, 17, 18] Overall, each 20–mm Hg increase in SBP doubled the risk for CV death.

The diagnosis of hypertension in children and adolescents is becoming more important, due to the epidemic of obesity in young Americans. [29] Current US guidelines recommend BP measurement in children at least annually, but "normative values" depend on sex, age, and height of the child. [30] As a result, interpretation of

Pathophysiology

The factors that generate BP comprise the integration of cardiac output (CO) and systemic vascular resistance (SVR): BP = CO × SVR. Note that CO = heart rate × stroke volume; SVR = 80 × (mean arterial pressure − central venous pressure)/CO.

Factors Involved in Predisposition to Hypertension

Genetics

Hypertension clusters in families; an individual with a family history of hypertension has a fourfold greater chance of developing hypertension, [100] and it is estimated that the heritability of hypertension ranges from 31% to 68%.

Obesity

Obesity-related hypertension is characterized primarily by impaired sodium excretion and endothelial dysfunction, both of which are dependent on SNS overactivity, activation of the RAAS, and increased oxidative stress.

A Diagnostic Approach to Primary Hypertension

The evaluation of patients with hypertension focuses on six key components: (1) the confirmation that the patient is indeed hypertensive through careful measurements of BP; (2) an assessment of clinical features that might suggest specific remediable causes of hypertension; (3) the identification of comorbid conditions that confer additional CV risk, or that may impact treatment decisions; (4) the discussion of patient-related lifestyle factors and preferences that will affect management; (5) the systematic evaluation of hypertensive target-organ damage; and (6) shared decision making about the treatment plan. To accomplish this, the clinician often needs multiple visits, a targeted clinical examination, and selected laboratory and imaging tests.

History and Physical Examination

The medical history and physical examination are essential to uncovering possible secondary causes of hypertension, identifying symptoms suggestive of hypertensive target-organ damage, and diagnosing comorbid conditions that may affect treatment decisions. Although the focus is traditionally on the CV, neurologic, and renal systems, a complete review of systems is recommended when the patient is first evaluated, to identify comorbid conditions that may influence the BP. Some patients will present with hypertension because of sleep apnea (snoring, witnessed apneas/gasping), hyperthyroidism or hypothyroidism (each with their litany of possible symptoms), hyperparathyroidism (symptoms of hypercalcemia), Cushing syndrome

High BP is typically asymptomatic, but some symptoms are common among patients with very high BP levels, such as headaches, epistaxis, dyspnea, chest pain, and faintness, all of which were present in more than 10% of patients presenting with DBP levels above 120 mm Hg.

Blood Pressure Measurement

Because treatment decisions are based largely on BP levels, accurate BP measurement is essential. Cuff-based brachial BP is the most used method to measure BP, typically in the office setting. lists the proper method for measuring BP. However, a rapidly growing body of evidence points to the value of out-of-office BP methods, such as 24-hour ambulatory BP monitoring (ABPM) and home BP monitoring, as superior methods to evaluate BP burden and evaluate BP-related risk in patients with hypertension. , Additionally, the most recent guidelines point to much more careful assessment of BP in the office setting.

Likewise, home BP is a better marker than office BP for LVH and proteinuria, though it is not consistently superior for other measures of target-organ damage.

In the assessment of hard CV endpoints, out-of-office BP has consistently outperformed office BP in studies that account for the values observed in the office; in other words, no matter what the office BP, it is the out-of-office BP that decisively drives outcomes.

In meta-analyses of studies that evaluated both office and ABPM on outcomes, only ABPM values retained significance and was useful in masked hypertension.

, but not all studies, nighttime BP is a better marker of CV disease than daytime or 24-hour-average BP. [130] [131] [132] The importance of nighttime BP (compared with daytime levels) appears greater among treated patients, perhaps because antihypertensive treatment, often taken in the morning, might result in better BP control during the day than during the night.

The pattern of BP fluctuation between day and night also associates with prognosis. The normal circadian BP pattern includes a fall in BP of approximately 15% to 20% during sleep. Patients who lack this normal BP dip during sleep are called “nondippers”

Echocardiography

LVH is the most common target-organ damage in hypertension and is independently associated with worse prognosis, marked by increased risk for CV events (coronary, cerebrovascular), heart failure, and death. [146] The electrocardiogram is very specific but insensitive for the detection of LVH. The prevalence of LVH among patients with hypertension is approximately 18% based on electrocardiographic criteria, whereas this number increases to approximately 40% when more sensitive echocardiographic criteria are used. The echocardiogram

Recommendations and statements	CoR	LoE
HBPM is recommended in addition to OBPM to improve CV risk prediction due to better reproducibility and prognostic value than OBPM, although lacking data on treatment benefit from RCTs.	IIa	B
HBPM is recommended to identify white-coat hypertension or masked hypertension.	I	B
HBPM is recommended for long-term follow-up of treated hypertension because it improves BP control, especially when combined with education and counselling.	I	B
HBPM should be performed using automated upper arm-cuff BP monitors validated according to an established protocol. www.stridebp.org	I	C
Home BP should be monitored for 7 (not fewer than 3) days with duplicate morning (with 1 minute between them) and evening measurements before office visits. Average home BP should be calculated after discarding readings of the first day.	I	C

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Ambulatory BP monitoring (ABPM)

Specific recommendations and statements	CoR	LoE
ABPM is recommended in addition to OBPM to improve CV risk prediction due to better reproducibility and prognostic value than OBPM, although lacking data on treatment benefit from RCTs.	II	B
ABPM is recommended to identify white-coat hypertension, masked hypertension and nocturnal BP phenotypes. Repeated ABPM may be necessary because these phenotypes have a limited reproducibility.	I	B
ABPM should be used to diagnose true resistant hypertension.	I	B
ABPM should be measured using upper arm-cuff automated BP monitors validated according to an established protocol. www.stridebp.org	I	C
The recommended frequency of measurements is 20 minutes during day and night to minimize the risk of missing day or night periods.	I	C

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Office BP measurements

Recommendations and statements	CoR	LoE
Ofiice BP is recommended for diagnosis of hypertension, because it is the one method by which hypertension-related risk, benefits of antihypertensive treatment, and treatment-related BP thresholds and goals are based.	I	A
Office BP measurements should be performed in standardized conditions, using a standard measurement protocol. Triplicate measurements should be taken and the average of the last two should be referred to as the representative value.	I	C
It is recommended to diagnose hypertension during at least 2 separate office visits (within 4 weeks) unless office BP indicates grade 3 hypertension (≥180/110 mmHg) or patients presents with hypertension related symptoms or there is evidence of HMOD or CVD.	I	C
At the first office visit, BP should be measured in both arms. A consistent between-arm SBP difference >15-20 mmHg suggests atheromatous disease and is associated with increased CV risk. All subsequent measurements should be made on the arm with the highest BP readings.	I	C
Out-of-office BP is a source of multiple BP-related information before and during treatment. It is therefore recommended to obtain additional information on BP values by ABPM or HBPM or both if available.	I	C

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White-coat hypertension (WCH)

Recommendations and statements	CoR	
Out-of-office BP measurement by ABPM and/or HBPM should be done when WCH is suspected, particularly in people with grade 1 hypertension.	I	
In patients with WCH, assessment of CV risk factors and HMOD is recommended.	I	
Out-of-office BP measurements should be done by ABPM and/or HBPM and repeated during follow up to timely identify sustained hypertension or new HMOD.	I	
In patients with WCH, lifestyle interventions to reduce CV risk and close follow are recommended.	I	
Whether BP lowering drug treatment should be used is still unresolved, but it can be considered in patients with HMOD and high CV risk.	II	

Masked hypertension (MH)

Recommendations and statements	CoR
Out-of-office BP measurement by ABPM and/or HBPM should be done in people with high normal blood pressure to identify MH.	I
In patients with MH, lifestyle interventions and close follow up are recommended to reduce CV risk and to timely identify sustained hypertension and new HMOD.	I
Whether BP lowering drug treatment should be used in MH is still unresolved, but it can be considered in patients with HMOD and high CV risk.	II

Night-time hypertension and BP phenotypes

Recommendations and statements	CoR
It is recommended to assess night-time BP using ABPM because it is more predictive for outcomes than daytime BP, and because nocturnal hypertension, non-dipping and reverse dipping are associated with increased CV risk	I
For the identification of night-time BP phenotypes, repeating ABPM is necessary, because of poor reproducibility.	I
Elevated night-time BP may be reduced by antihypertensive treatment.	II
In the general hypertensive population morning dosing or bedtime dosing results in similar outcome.	I

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Recommendations and statements	CoR
In adults with elevated BP who are overweight or obese, weight reduction is recommended to reduce BP and improve CV outcomes.	I
Thiazide/Thiazide-like Diuretics and BBs have some unfavorable metabolic effects. However, since optimal BP control is the primary goal of antihypertensive treatment, combination therapy with these drug classes is frequently necessary and recommended.	I
Dual GIP/GLP-1 RA or GLP-1 RA should not be prescribed for BP control in patients with obesity.	III
Obese patients should not be referred to bariatric surgery for BP control.	III
Dual GIP/GLP-1 RA or GLP-1 RA or bariatric surgery lower BP indirectly in parallel with body weight reduction and contribute to BP control in obese patients.	II
In obese patients with diabetes and hypertension treatment with anti-diabetic drugs that reduce both body weight and BP could be preferred.	II

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Treatment of hypertension in coronary artery disease (CAD)

Recommendations and statements	CoR
In adult patients with CAD, drug treatment should be initiated in the high-normal BP range (SBP ≥130 or DBP ≥80 mmHg).	I
The same treatment targets as in the general hypertensive population apply also to patients with CAD.	I
In patients with hypertension and CAD it is recommended to use drugs with documented favorable effects in CAD such as ACEis (ARBs if not tolerated) or BBs.	I
In patients with hypertension and CAD with angina pectoris, BBs and both DHP and non-DHP CCBs are particularly useful.	I
To lower heart rate to a range between 60 to 80 beats per minute is an additional treatment goal in hypertensive patients with CAD for which BB or non-DHP CCBs can be used.	I
BBs should usually not be combined with non-DHP CCBs (e.g. diltiazem or verapamil).	III
In patients with very low heart rate (< 50 beats per min) BB or non-DHP should be not initiated.	III
Hypertension and LVH is frequently associated with myocardial ischaemia and no obstructive coronary artery disease (INOCA) including patients with myocardial infarction with no obstructive coronary artery disease (MINOCA). Treatment with RAS-inhibitors, BBs, and CCBs can be used in this condidtion.	II

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Recommendations and statements	CoR
BP should be monitored at all stages of CKD, because hypertension is the second most important risk factor for end-stage kidney disease (ESKD).	I
Non-dipping or elevated night-time BP are frequent in CKD patients and should be monitored by ABPM or HBPM.	I
In both diabetic and non-diabetic CKD with hypertension, BP-lowering treatment slows the decline of kidney function and reduces the risk of ESKD and CV outcomes.	I
Immediate lifestyle interventions and antihypertensive drug treatment are recommended in most patients with CKD independently of the CKD stage if SBP≥ 140mmHg or DBP ≥90mmHg.	I
In all patients with CKD the primary goal is to lower office BP to <140 mmHg systolic and <90 mmHg diastolic.	I
In most CKD patients (young patients, patients with an albumin/creatinine ratio ≥ 300 mg/g, high CV risk patients) office BP should be lowered to <130/80 mmHg if tolerated.	II
In kidney transplant patients with hypertension, office BP should be lowered to <130 mmHg systolic and <80 mmHg diastolic.	II
In patients with CKD regardless of the presence of albuminuria, BP should not be lowered below 120/70 mmHg.	III
An ACEi or an ARB, titrated to the maximum tolerated doses is recommended for patients with CKD and moderate (UACR 30 to 300 mg/g) or severe (UACR > 300 mg/g) albuminuria.	I

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Dual combination of an ACEi with an ARB is not recommended.	III
BP control is difficult in CKD and resistant hypertension is very frequent. Therefore combination treatment is almost always recommended.	I
SGLT-2 inhibitors are recommended for patients with diabetic and non-diabetic nephropathies CKD if eGFR is at least 20 or 25 ml/min/1.73².[a]	I
The non-steroidal MRA finerenone is recomended in patients with CKD and albuminuria associated with type 2 diabetes mellitus if eGFR is at least 25 ml/min/1.73² and serrum potassium <5.0 mmo/L.	I
In CKD patients with hyperkalemia a potassium binder can be used to maintain normal or near normal serum potassium levels (<5.5 mmol/L) in order to allow optimal treatment with a RAS-blocker or a MRA to continue.	II

Additional eGFR and albuminuria criteria apply for initiation of treatment with di
according to their respective approval.

Recommendations and statements	CoR
BP should be monitored to detect hypertension in all patients with diabetes, because it is a frequent comorbidity associated with an increase CV risk and risk for kidney events.	I
Non-dipping or elevated night-time BP are frequent in type 2 diabetes and should be monitored by ABPM or HBPM.	I
Antihypertensive treatment in type 2 diabetes is recommended to protect against macrovascular and microvascular complications.	I
Immediate lifestyle interventions and antihypertensive drug treatment are recommended for people with type 2 diabetes when office SBP is ≥ 140 mmHg and DBP is ≥ 90 mmHg.	I
Drug treatment strategies in patients with type 2 diabetes should be the same as for patients without diabetes but the primary aim is to lower BP below <130/80 mmHg	I
BP control is difficult in diabetes and combination treatment is almost always necessary.	I
SGLT2is are recommended to reduce cardiac and kidney events in type 2 diabetes. These agents have a BP lowering effect.	I
The non-steroidal MRA finerenone can be used, because of its nephroprotective and cardioprotective properties in patients with diabetic CKD and moderate to severe albuminuria. Finerenone has a BP lowering effect.	I
There are only limited data on the potential benefits of combining SGLT2is and finerenone.	II

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TABLE 8. Selected standard laboratory tests for work-up of hypertensive patients[a]

- Hemoglobin and/or hematocrit
- Fasting blood glucose and HbA1c
- Blood lipids: total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides
- Blood potassium and sodium
- Blood uric acid
- Blood creatinine (and/or cystatin C) for estimating GFR with eGFR[a] formulas
- Blood calcium
- Urine analysis (first voided urine in the morning), multicomponent dipstick test in all patients, urinary albumin/ patients

GFR, estimated glomerular filtration rate; HDL, high-density lipoprotein; LDL, low-density lipoprotein.
an be adapted according to the clinical circumstance.

5.2 Physical examination

TABLE 7. Comprehensive physical examination for hypertension[a]

Body habitus
• Weight and height measured on a calibrated scale, with calculation of BMI
• Waist circumference
Signs of hypertension-mediated organ damage
• Neurological examination and cognitive status
• Fundoscopic examination for hypertensive retinopathy in emergencies
• Auscultation of heart and carotid arteries
• Palpation of carotid and peripheral arteries
• Ankle–brachial index
Signs of secondary hypertension (Section 6)
• Skin inspection: cafe-au-lait patches of neurofibromatosis (pheochromocytoma)
• Kidney palpation 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
• Signs of Cushing's disease or acromegaly
• Signs of thyroid disease

[a]Can be adapted according to the clinical circumstance.

Lifestyle interventions

Recommendations and statements	CoR	LoE
In adults with elevated BP who are overweight or obese, weight reduction is recommended to reduce BP and improve CV outcomes.	I	A
Preferred dietary products include vegetables, fruits, beans, nuts, seeds, vegetable oils, and fish and poultry among meat products. Fatty meats, full-fat dairy, sugar, sweetened beverages, and sweets should be limited. Overall, a healthy dietary patterns including more plant-based and less animal-based food is recommended.	I	B
In adults with hypertension consuming a high sodium diet (most Europeans), salt substitutes replacing part of the NaCl with KCl is recommended to reduce BP and the risk for CVD.	I	A
Dietary salt (NaCl) restriction is recommended for adults with elevated BP to reduce BP. Salt (NaCl) restriction to < 5 g (~2g sodium) per day is recommended.	I	B
Increased potassium consumption, preferably via dietary modification, is recommended for adults with elevated BP, except for patients with advanced CKD.	I	B
Daily physical activity and structured exercise is recommended for adults with elevated BP to reduce BP and improve cardiovascular risk profile. It is recommended to strive for at least 150-300 minutes of aerobic exercise a week of moderate intensity, or 75-150 minutes a week of aerobic exercise of vigorous intensity or an equivalent combination. Sedentary time should also be reduced and supplemented with dynamic resistance exercise (2-3 times per week).	I	B
Adult men and women with elevated BP or hypertension who currently consume alcohol (≥3 drinks[a]/day) should be advised that reduction of alcohol intake close to abstinence will lower their BP.	I	B
Alcohol should not be recommended for CVD prevention, as previous studies linking moderate consumption to lower CV risk are likely confounded.	III	B
It is recommended to avoid excessive (binge) drinking to reduce BP, and the risks particularly for haemorrhagic stroke and premature death.	III	B
Smoking cessation, supportive care and referral to smoking cessation programs are recommended for all smokers to avoid ambulatory BP increases, reduce the risk of masked hypertension, and improve CV health outcome.	I	B
Reduced stress via controlled breathing exercises, mindfulness-based exercise and meditation may be considered.	II	C

[a]There are varying definitions for drinks used in the literature; a drink may relate to about 350 ml of regular beer containing 5% alcohol by volume or 150 ml of wine containing 12% alcohol by volume.

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Recommendations for LDL-cholesterol-lowering therapy in hypertension

Recommendations and statements	CoR	LoE
The decision to initiate LDL-cholestrol lowering treatment, as well as treatment goals, should be based on an estimation of total CV risk, with priority given to high-risk patients.	I	A
Statin treatment is recommended in patients with hypertension and elevated CV risk.	I	A
Statin treatment at maximum tolerated dose is recommended as the first-line drug class to achieve LDL-cholesterol targets in patients with hypertension and high CV risk.	I	A
Ezetimibe may be added to maximum tolerated statin dose to attain LDL-cholesterol targets.	I	A
PCSK9-inhibitors and siRNA targeting PCSK9 may be considered in selected high-risk patients not attaining target LDL-cholesterol levels with statin/ezetimibe combination therapy.	II	A
Use of a polypill containing two BP lowering drugs and a statin for LDL-cholestrol lowering can be considered in hypertensive patients for primary prevention.	II	A

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Blood Pressure–Lowering Medications

The American Society of Hypertension published a compendium summarizing more than 120 antihypertensive medications in eight drug classes.[202] There has been no newly approved antihypertensive medications since 2007. The following will briefly comment on these classes and make some specific observations regarding treatment.

Although both US and European guidelines focus on assessing CV risk before pursuing management, both agree that either a RAAS blocker, CCB, or thiazide-type diuretic be the initial treatment started in patients. Moreover, the European guidelines mandate initial therapy be a combination of a RAAS blocker with either a diuretic or calcium blocker, while US guidelines recommend single-pill combinations for those who are 20/10 mm Hg above the goal BP or higher. Only the US guidelines define hypertension as $\geq$130/80 mm Hg. The next closest group with this goal is the Canadian guidelines, but they reserve 130/80 mm Hg for those with higher CV risk only. All other international guidelines define hypertension as $\geq$140/90 mm Hg with a goal to get to 130/80 mm Hg.[7]

Therapeutic Options and Approaches for Subgroups Of Hypertension

Pharmacologic Intervention in the Older People (>65 years)

The primary agents used in the treatment of hypertension in older people with the greatest efficacy are thiazide-type diuretics and CCBs. ACEI and ARBs are effective adjuncts but because of the lower renin status in older people they are not as successful in lowering BP. This is also true for younger African Americans patients. [203] Although other drug classes are available, confirmation that these agents decrease clinical outcomes to a similar extent as the primary agents is either lacking or safety and tolerability may relegate their role to use as secondary agents. [25] Specifically, there is inadequate evidence to support the initial use of beta blockers for hypertension in the absence of specific CV comorbidities. In considering the initial drug treatment of high BP, several different strategies may be contemplated. Many patients can be started on a single agent, but consideration should be given to starting with a single-pill two-drug combination for those greater than 20/10 mm Hg above the goal of 130/80 mm Hg. [204] Many patients started on a single agent will subsequently require two or more drugs from different pharmacologic classes to reach their BP goals (Fig. 26.5).

Prevention of coronary artery disease (CAD) in hypertension

Recommendations and statements	CoR
Antihypertensive treatment of hypertension is recommended to effectively prevent CAD	I
Antihypertensive treatment with all major antihypertensive drug classes including ACEis, ARBs, BBs, CCBs and Thiazide/Thiazide-like diuretics can be used for the prevention of CAD.	I

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Office BP thresholds for drug treatment initiation

Recommendations and statements	CoR	LoE
In patients 18 to 79 years, the recommended office threshold for initiation of drug treatment is 140 mmHg for SBP and/or 90 mmHg for DBP.	I	A
In patients ≥80 years, the recommended office SBP threshold for initiation of drug treatment is 160 mmHg.	I	B
However, in patients ≥80 years a lower SBP threshold in the range 140 – 160 mmHg may be considered.	II	C
The office SBP and DBP thresholds for initiation of drug treatment in frail patients should be individualized.	I	C
In adult patients with a history of CVD, predominantely CAD, drug treatment should be initiated in the high-normal BP range (SBP ≥130 or DBP ≥80 mmHg).	I	A

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26 trials identified, the three most effective antihypertensive drug classes for reducing heart failure were thiazide diuretics, ACEIs, and ARBs. In direct and indirect comparisons, thiazide diuretics were marginally superior to ACEIs and ARBs; CCBs, beta blockers, and alpha blockers were the least effective agents for heart failure prevention.

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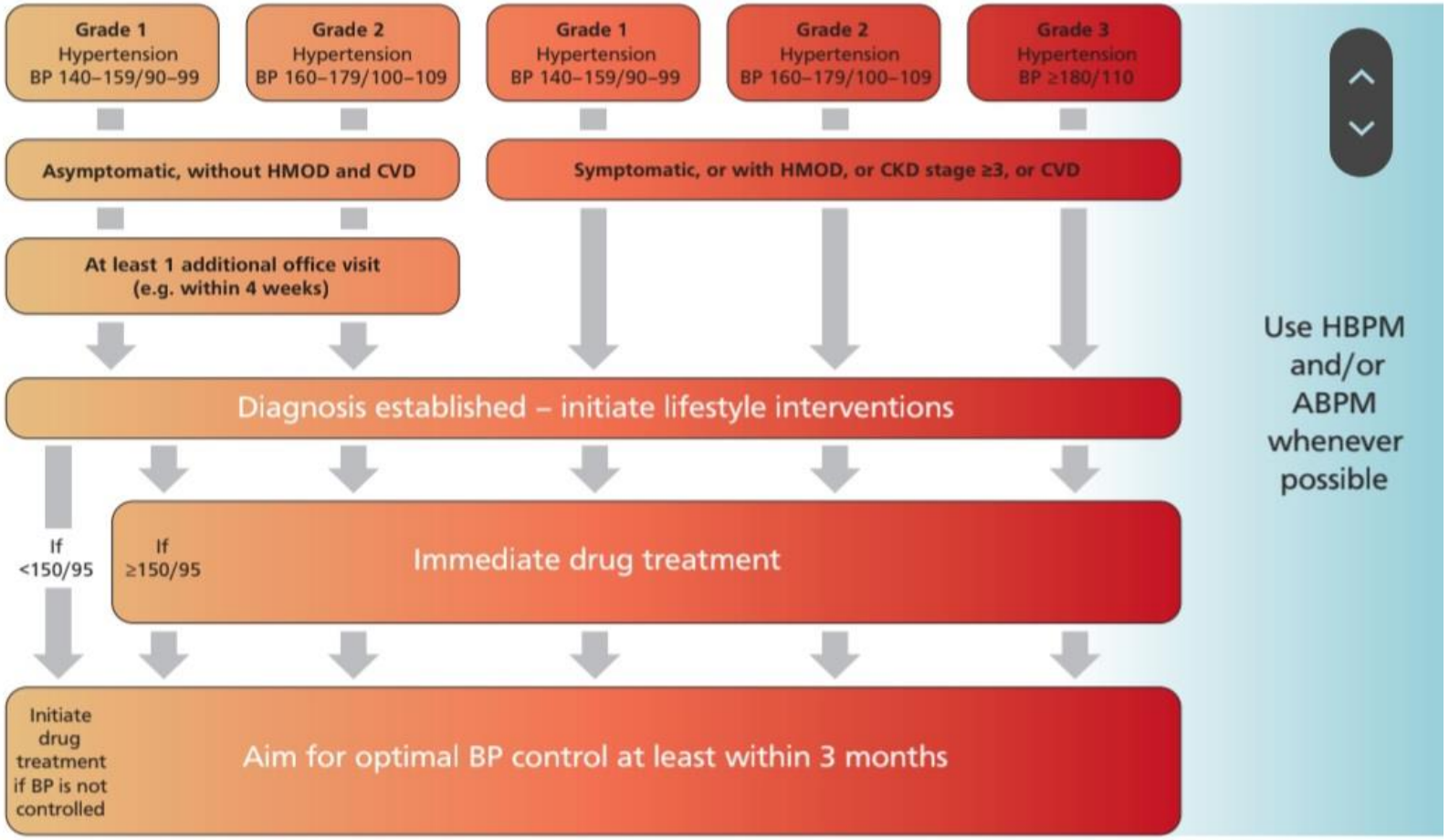

management of hypertension.

Office BP targets for drug treatment

Recommendations and statements	CoR	LoE
Patients 18 to 64 years old		
The goal is to lower office BP to <130/80mmHg	I	A
Patients 65 to 79 years old		
The primary goal of treatment is to lower BP to <140/80mmHg	I	A
However, lowering BP to below 130/80mmHg can be considered if treatment is well tolerated.	I	B
Patients 65 to 79 years old with ISH		
The primary goal of treatment is to lower SBP in the 140 to 150 mmHg range.	I	A
However, a reduction of office SBP in the 130 to 139 mmHg range may be considered if well tolerated, albeit cautiously if DBP is already below 70 mmHg.	II	B
Patients ≥80 years old		
Office BP should be lowered to a SBP in the 140 to 150 mmHg range and to a DBP <80mmHg.	I	A
However, reduction of office SBP between 130 to 139 mmHg may be considered if well tolerated, albeit cautiously if DBP is already below 70 mmHg.	II	B
Additional safety recommendations		
In frail patients, the treatment target for office SBP and DBP should be individualised.	I	C
Do not aim to target office SBP below 120 mmHg or DBP below 70 mmHg during drug treatment.	III	C
However, in patients with low office DBP, i.e. below 70 mmHg, SBP should be still lowered, albeit cautiously, if on-treatment SBP is still well above target values	II	C
Reduction of treatment of can be consider in patient aged 80 years or older with a low SBP (< 120 mmHg) or in the presence of severe orthostatic hypotension or a high frailty level	III	C

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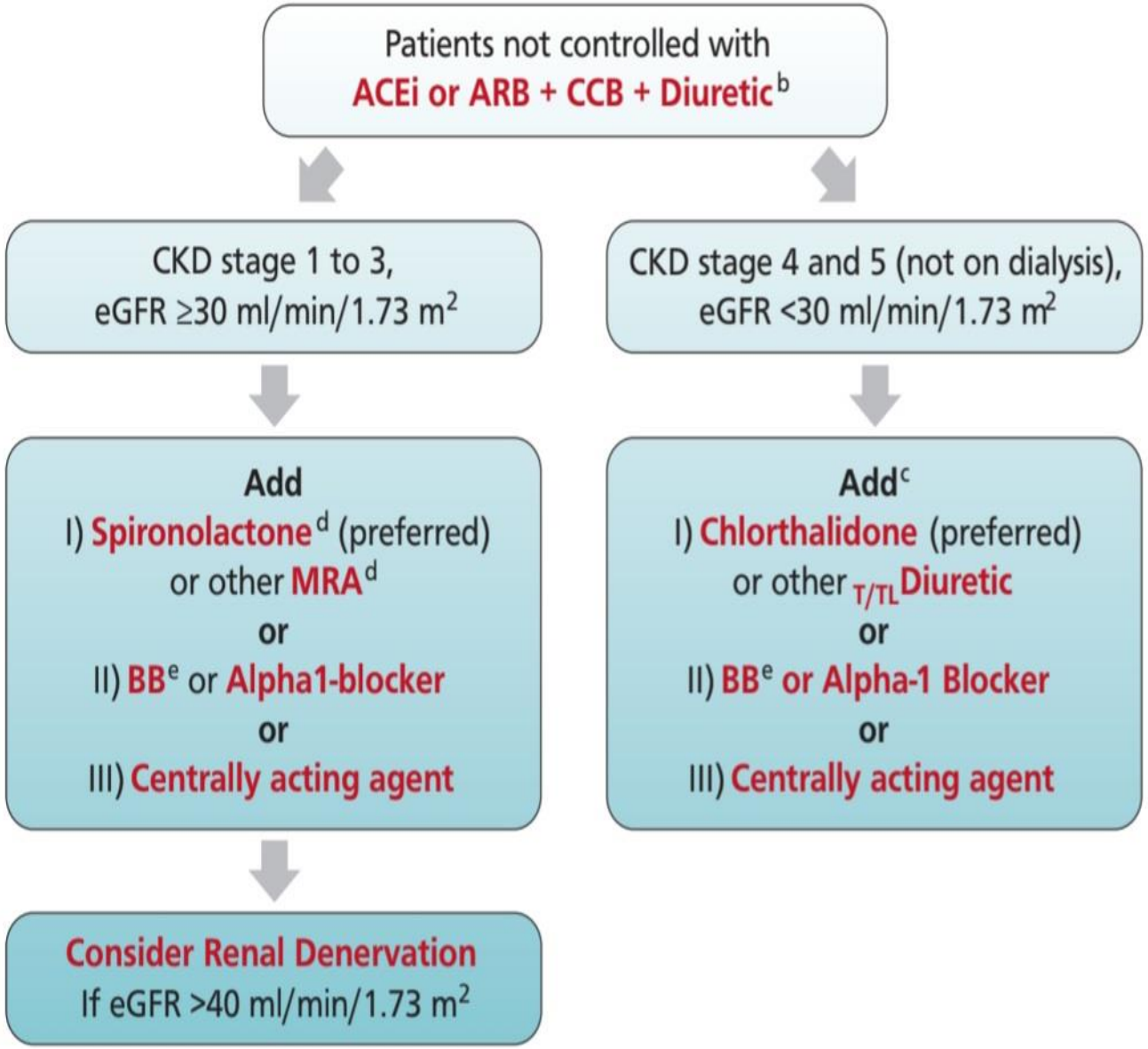
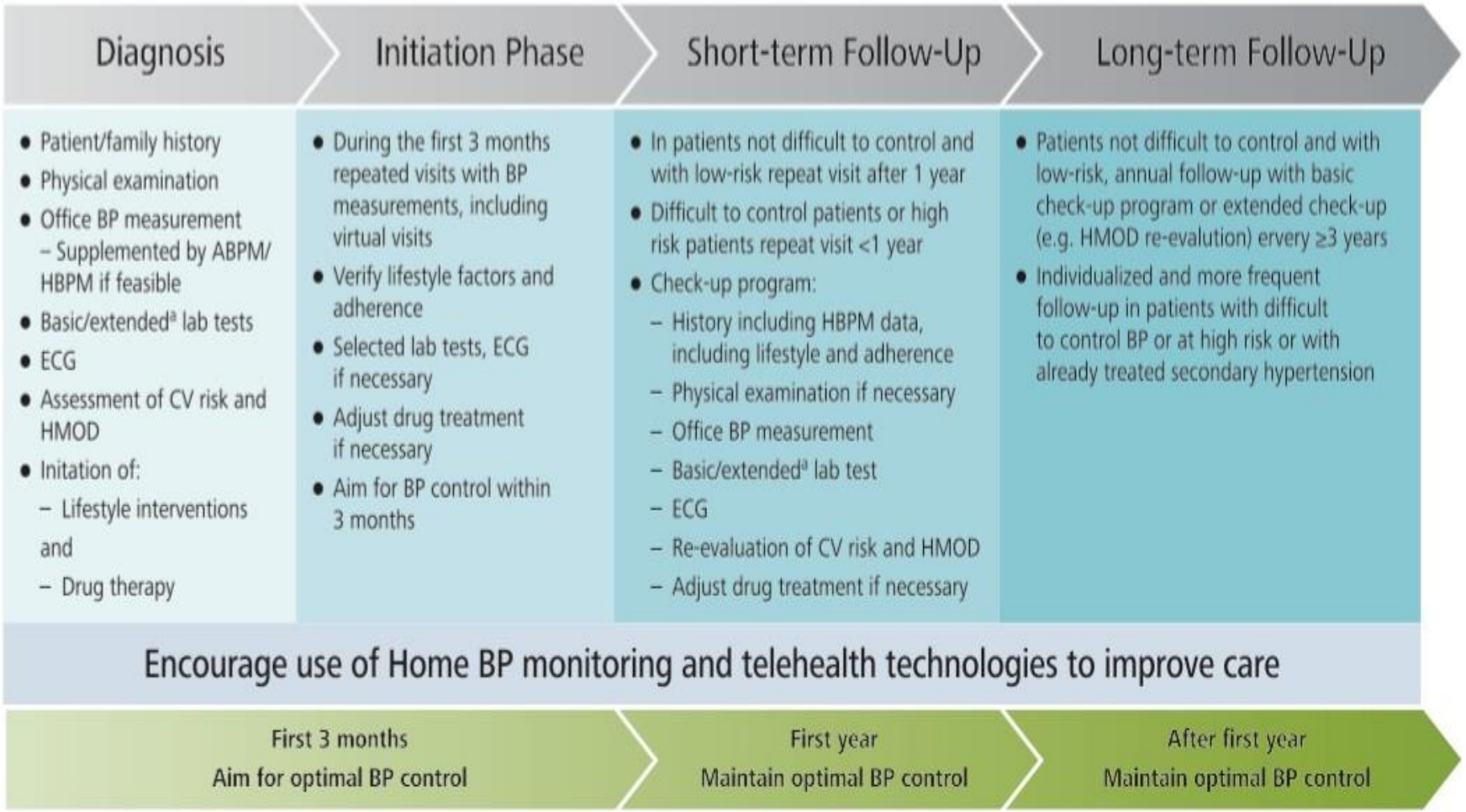

Patients not controlled with
ACEi or ARB + CCB + Diuretic[b]
CKD stage 1 to 3,
eGFR ≥30 ml/min/1.73 m²
CKD stage 4 and 5 (not on dialysis),
eGFR <30 ml/min/1.73 m²
Add
I) Spironolactone[d] (preferred)
or other MRA[d]
or
II) BB[e] or Alpha1-blocker
or
III) Centrally acting agent
Add[c]
I) Chlorthalidone (preferred)
or other T/TL Diuretic
or
II) BB[e] or Alpha-1 Blocker
or
III) Centrally acting agent
Consider Renal Denervation
If eGFR >40 ml/min/1.73 m²

Resistant Hypertension

Resistant hypertension is defined as the failure to achieve a goal BP of less than 140/90 mm Hg in patients who are adherent with maximal tolerated doses of three antihypertensive drugs, one of which must be a diuretic appropriate for kidney function.[152] The increasing prevalence of obesity and hypertension in the general population has resulted in a higher incidence of resistant hypertension. Large-scale population-based studies such as the NHANES have specifically examined the prevalence and incidence of resistant hypertension and associated risk factors. The findings suggest the prevalence of resistant hypertension is approximately 8% to 12% of adult patients with hypertension (6 to 9 million people).[270] The increasing prevalence of resistant hypertension contrasts with the improvement in BP control rates during the same period. Studies also show that patients with resistant hypertension who are older than 55 years, of Black ethnicity, with high body mass index, diabetes, or CKD have an increased risk for

Common causes of resistant hypertension include nonadherence with medication and volume overload secondary to poor kidney function and nonadherence with a low-sodium diet. Once a diagnosis of resistant hypertension is made, a fourth drug is needed after use of a calcium antagonist, diuretic, and RAAS blocker. A mineralocorticoid inhibitor such as spironolactone has demonstrated significant benefit in controlling BP in these patients. [272] [273] [274]



; with hypertension.

Thank you…