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ESC/ESH GUIDELINES

2018 ESC/ESH Guidelines for the management of arterial hypertension

The Task Force for the management of arterial hypertension of the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH)

http://www.eshonline.org/esh-2018-guidelines-webcast/

Qualitat de l'evidència

Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of opinion of the experts and/ or small studies, retrospective studies, registries.

Força de la recomanació

Classes of recommendations	Definition	Suggested wording to use
Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	Is recommended/is indicated
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class IIa	*Weight of evidence/opinion is in favour of usefulness/efficacy.*	Should be considered
Class IIb	*Usefulness/efficacy is less well established by evidence/opinion.*	May be considered
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.	Is not recommended

Screening and diagnosis of hypertension

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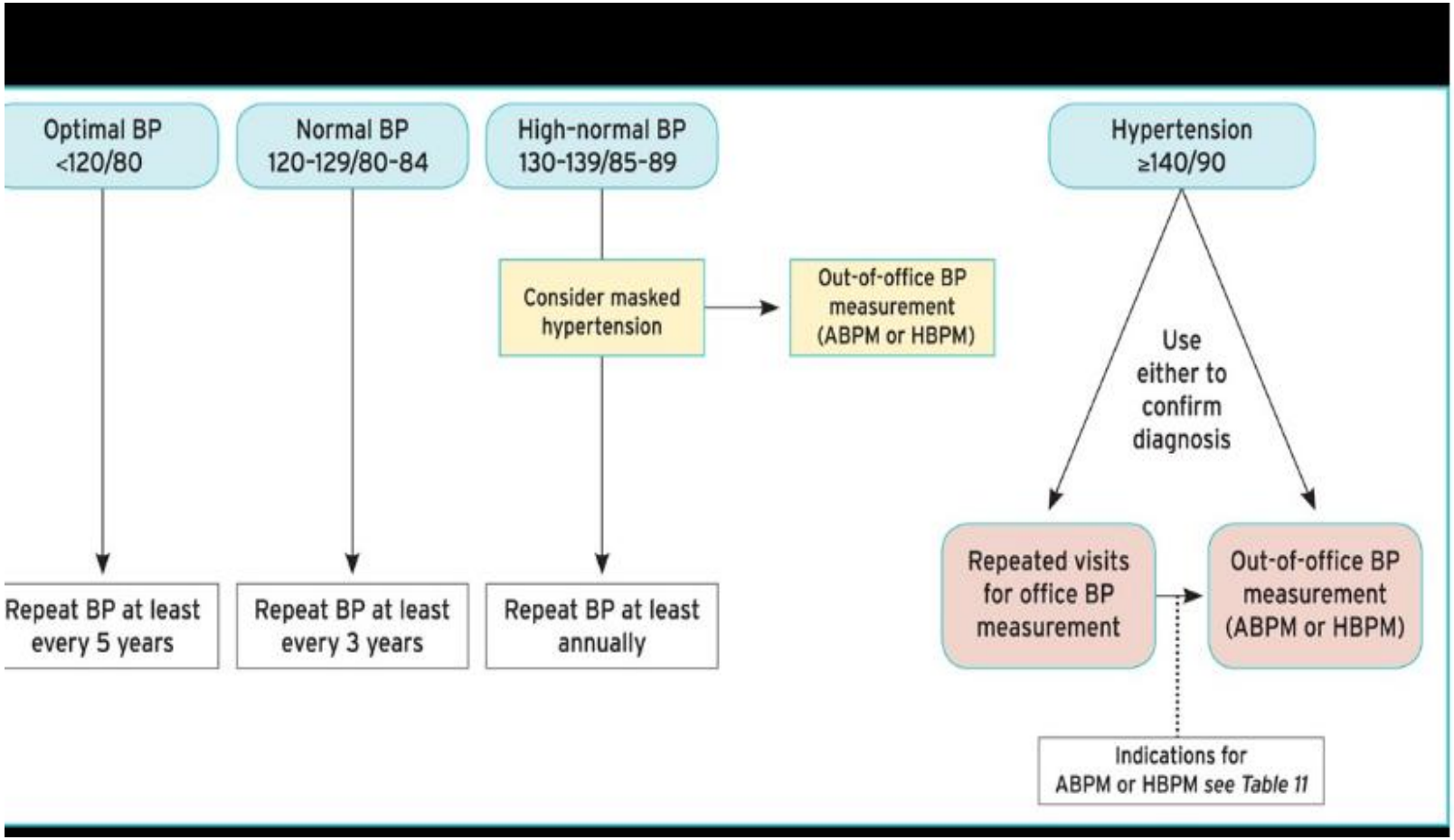

Office blood pressure measurement

Patients should be seated comfortably in a quiet environment for 5 min before beginning BP measurements.
Three BP measurements should be recorded, 1–2 min apart, and additional measurements only if the first two readings differ by >10 mmHg. BP is recorded as the average of the last two BP readings.
Additional measurements may have to be performed in patients with unstable BP values due to arrhythmias, such as in patents with AF, in whom manual auscultatory methods should be used as most automated devices have not been validated for BP measurement in patients with AF.[a]
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-dependant increases in BP.
When using auscultatory methods, use phase I and V (sudden reduction/disappearance) Korotkoff sounds to identify SBP and DBP, respectively.
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.
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.
Record heart rate and use pulse palpation to exclude arrhythmia.

AF, atrial fibrillation; BP, blood pressure.
[a]Most automatic devices are not validated for BP measurement in patients with AF and will record the highest individual systolic pressure wave form rather than an average of several cardiac cycles. This will lead to overestimation of BP.

Table 3 Classification of office blood pressure[a] and definitions of hypertension grade[b]

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[b]	≥140	and	<90

BP = blood pressure; SBP = systolic blood pressure.

[a]BP category is defined according to seated clinic BP and by the highest level of BP, whether systolic or diastolic.

[b]Isolated systolic hypertension is graded 1, 2, or 3 according to SBP values in the ranges indicated.

The same classification is used for all ages from 16 years.

Definitions of hypertension according to office, ambulatory, and home BP levels

Category	Systolic (mmHg)		Diastolic (mmHg)
Office BP	≥ 140	and/or	≥ 90
Ambulatory BP			
Daytime (or awake) mean	≥ 135	and/or	≥ 85
Night-time (or asleep) mean	≥ 120	and/or	≥ 70
24-h mean	≥ 130	and/or	≥ 80
Home BP mean	≥ 135	and/or	≥ 85

Recommendations	Class	Level
Classification of BP		
It is recommended that BP be classified as optimal, normal, high-normal, or grades 1–3 hypertension, according to office BP.	I	C
Screening for hypertension		
Screening programmes for hypertension are recommended. All adults (≥ 18 years) should have their office BP measured and recorded in their medical file and be aware	I	B

Diagnòstic HTA

Recommendations	Class	Level
It is recommended to base the **diagnosis of hypertension** on:		
• **Repeated office BP measurements** on more than one visit, except when hypertension is severe (e.g. grade 3 and especially in high-risk patients). At each visit, three BP measurements should be recorded, 1–2 min apart, and additional measurements should be performed if the first two readings differ by > 10 mmHg. The patient's BP is the average of the last two BP readings.	I	C
Or •**Out-of-office BP measurement with ABPM and/or HBPM**, provided that these measurements are logistically and economically feasible.	I	C
Out-of-office BP (i.e. ABPM or HBPM) is specifically recommended for a number of clinical indications, such as identifying white-coat and masked hypertension, quantifying the effects of treatment, and identifying possible causes of side-effects (e.g. symptomatic hypotension).	I	A

Table 10 Comparison of ambulatory blood pressure monitoring and home blood pressure monitoring

ABPM	HBPM
Advantages • Can identify white-coat and masked hypertension • Stronger prognostic evidence • Night-time readings • Measurement in real-life settings • Additional prognostic BP phenotypes • Abundant information from a single measurement session, including short-term BP variability	**Advantages** • Can identify white-coat and masked hypertension • Cheap and widely available • Measurement in a home setting, which may be more relaxed than the doctor's office • Patient engagement in BP measurement • Easily repeated and used over longer periods to assess day-to-day BP variability
Disadvantages • Expensive and sometimes limited availability • Can be uncomfortable	**Disadvantages** • Only static BP is available • Potential for measurement error • No nocturnal readings[a]

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

[a]Techniques are being developed to enable nocturnal BP measurement with home BP devices.

Table 11 Clinical indications for home blood pressure monitoring or ambulatory blood pressure monitoring

Conditions in which white-coat hypertension is more common, e.g.: • Grade I hypertension on office BP measurement • Marked office BP elevation without HMOD
Conditions in which masked hypertension is more common, e.g.: • 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 apnoea, CKD, diabetes, endocrine hypertension, or autonomic dysfunction)

ABPM = ambulatory blood pressure monitoring; BP = blood pressure; CKD = chronic kidney disease; CV = cardiovascular; HBPM = home blood pressure monitoring; HMOD = hypertension-mediated organ damage.

Antecedents familiars I personals

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

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, oedema, myocardial infarction, coronary revascularization, syncope, history of palpitations, arrhythmias (especially AF), heart failure
Kidney: thirst, polyuria, nocturia, haematuria, 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)

Antihypertensive Drug Treatment
Current/past antihypertensive medication including effectiveness and intolerance to previous medications
Adherence to therapy

Antecedents familiars i personals (2)

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 Phaeochromocytoma
History of spontaneous or diuretic-provoked hypokalaemia, episodes of muscle weakness, and tetany (hyperaldosteronism)
Symptoms suggestive of thyroid disease or hyperparathyroidism
History of or current pregnancy and oral contraceptive use
History of sleep apnoea

Secondary hypertension

Cause	Prevalence in hypertensive patients	Suggestive symptoms and signs	Screening Investigations
Obstructive sleep apnoea	5–10%	Snoring; obesity (can be present in non obese); morning headache; daytime somnolence	Epworth score and ambulatory polygraphy
Renal parenchymal disease	2–10%	Mostly asymptomatic; diabetes; haematuria, proteinuria, nocturia; anaemia, renal mass in adult polycystic CKD	Plasma creatinine and electrolytes, eGFR; urine dipstick for blood and protein, urinary albumin:creatinine ratio; renal ultrasound
Renovascular disease			
Atherosclerotic renovascular disease	1–10%	Older; widespread atherosclerosis (especially PAD); diabetes; smoking; recurrent flash pulmonary oedema; abdominal bruit	Duplex renal artery Doppler or CT angiography or MR angiography
Fibromuscular dysplasia		Younger; more common in women; abdominal bruit	
Endocrine causes			
Primary Aldosteronism	5–15%	Mostly asymptomatic; muscle weakness (rare)	Plasma aldosterone and renin, and aldosterone: renin ratio; hypokalaemia (in a minority): note hypokalaemia can depress aldosterone levels
Phaeochromocytoma	<1%	Episodic symptoms (the 5 'Ps'): paroxysmal hypertension, pounding headache, perspiration, palpitations, and pallor; labile BP; BP surges precipitated by drugs (e.g. beta-blockers, metoclopramide, sympathomimetics, opioids, and tricyclic antidepressants)	Plasma or 24 h urinary fractionated metanephrines
Cushing's syndrome	<1%	Moon face, central obesity, skin atrophy, striae and bruising; diabetes; chronic steroid use	24 h urinary-free cortisol
Thyroid disease (hyperthyroidism or hypothyroidism)	1–2%	Signs and symptoms of hyperthyroidism or hypothyroidism	Thyroid function tests
Hyperparathyroidism	<1%	Hypercalcaemia, hypophosphataemia	Parathyroid hormone, Ca^{2+}
Other causes			
Coarctation of the aorta	<1%	Usually detected in children or adolescence; different BP (≥20/10 mmHg) between upper–lower extremities and/or between right–left arm and delayed radial-femoral femoral pulsation; low ABI interscapular ejection murmur; rib notching on chest X-ray	Echocardiogram

ABI, ankle-brachial index; BP, blood pressure; CKD, chronic kidney disease; CT, computed tomography; eGFR, estimated glomerular filtration rate; MR, magnetic resonance; PAD, peripheral artery disease.

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Key steps in physical examination

Body habitus
- Weight and height measured on a calibrated scale, with calculation of BMI
- Waist circumference

Signs of HMOD
- Neurological examination and cognitive status
- Fundoscopic examination for hypertensive retinopathy
- 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: cafe-au-lait patches of neurofibromatosis (phaeochromocytoma)
- 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
- 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

BMI, body mass index; BP, blood pressure; HMOD, hypertension-mediated organ damage.

Routine workup for evaluation of hypertensive patients

Routine laboratory tests
Haemoglobin and/or haematocrit
Fasting blood glucose and glycated HbA_{1c}
Blood lipids: total cholesterol, LDL cholesterol, HDL cholesterol
Blood triglycerides
Blood potassium and sodium
Blood uric acid
Blood creatinine and eGFR
Blood liver function tests
Urine analysis: microscopic examination; urinary protein by dipstick test or, ideally, albumin:creatinine ratio
12-lead ECG

eGFR, estimated glomerular filtration rate; HbA_{1c}, haemoglobin A1c.

Assessment of hypertension-mediated organ damage

Basic screening tests for HMOD	Indication and interpretation
12-lead ECG	Screen for LVH and other possible cardiac abnormalities, and to document heart rate and cardiac rhythm
Urine albumin:creatinine ratio	To detect elevations in albumin excretion indicative of possible renal disease
Blood creatinine and eGFR	To detect possible renal disease
Fundoscopy	To detect hypertensive retinopathy, especially in patients with grade 2 or 3 hypertension
More detailed screening for HMOD	
Echocardiography	To evaluate cardiac structure and function, when this information will influence treatment decisions
Carotid ultrasound	To determine the presence of carotid plaque or stenosis, particularly in patients with cerebrovascular disease or vascular disease elsewhere
Abdominal ultrasound and Doppler studies	• To evaluate renal size and structure (e.g. scarring) and exclude renal tract obstruction as possible underlying causes of CKD and hypertension • Evaluate abdominal aorta for evidence of aneurysmal dilatation and vascular disease • Examine adrenal glands for evidence of adenoma or phaeochromocytoma (CT or MRI preferred for detailed examination); see section 8.2 regarding screening for secondary hypertension • Renal artery Doppler studies to screen for the presence of renovascular disease, especially in the presence of asymmetric renal size
PWV	An index of aortic stiffness and underlying arteriosclerosis
ABI	Screen for evidence of LEAD
Cognitive function testing	To evaluate cognition in patients with symptoms suggestive of cognitive impairment
Brain imaging	To evaluate the presence of ischaemic or haemorrhagic brain injury, especially in patients with a history of cerebrovascular disease or cognitive decline

ABI = ankle-brachial index; CKD = chronic kidney disease; CT = computed tomography; ECG = electrocardiogram; eGFR = estimated glomerular filtration rate; HMOD = hypertension-mediated organ damage; LEAD = lower extremity artery disease; LVH = left ventricular hypertrophy; MRI = magnetic resonance imaging; PWV = pulse wave velocity.

electrocardiogram left ventricular hypertrophy

ECG voltage criteria	Criteria for LVH
$S_{V1}+R_{V5}$ (Sokolow–Lyon criterion)	>35 mm
R wave in aVL	≥11 mm
$S_{V3}+R_{aVL}$ (Cornell voltage)[a]	>28 mm (men)
Cornell duration product[b]	>20 mm (women)
	>2440 mm.ms

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ECG = electrocardiogram; LVH = left ventricular hypertrophy.
[a]Sum of limb and precordial lead voltage.
[b]Product of Cornell voltage x QRS duration (mm.ms).

Classificació Nivell de risc

SCORE 5%=REGICOR 10%

Tabla 2 Categorías de riesgo

Riesgo muy alto	Individuos con alguna de la siguientes: • Enfermedad cardiovascular documentada, ya sea clínicamente o a través de imágenes, incluyendo infarto de miocardio, síndrome coronario agudo, revascularización coronaria o de otras arterias, ictus y accidente vascular transitorio, y enfermedad vascular periférica, así como la presencia de placas en la arteriografía coronaria o en la ecografía carotídea. No incluiría aumento del grosor de la íntima media carotídea • Diabetes con afectación de órgano diana como proteinuria o con la presencia de un factor de riesgo mayor, como tabaquismo, hipercolesterolemia o hipertensión • ERC grave (GFR < 30 ml/min/1,73 m²) • Un SCORE ≥ 10%
Riesgo alto	Individuos con: • Un factor de riesgo elevado, como colesterol > 8 mmol/l (310 mg/dl), PA ≥ 180/110 mmHg • El resto de diabéticos (con la excepción de jóvenes con diabetes tipo 1 y sin factores de riesgo, que podrían ser de riesgo moderado o bajo) • ERC moderada (GFR, 30-59 ml/min/1,73 m²) • Un SCORE ≥ 5% y < 10%
Riesgo moderado	• SCORE ≥ 1% y < 5% a los 10 años
Riesgo bajo	• SCORE < 1%

ERC: enfermedad renal crónica; GFR: tasa de filtrado glomerular; PA: presión arterial.

Table 6 Risk modifiers increasing cardiovascular risk estimated by the Systemic COronary Risk Evaluation (SCORE) system[35]

Social deprivation, the origin of many causes of CVD
Obesity (measured by BMI) and central obesity (measured by waist circumference)
Physical inactivity
Psychosocial stress, including vital exhaustion
Family history of premature CVD (occurring at age <55 years in men and <60 years in women)
Autoimmune and other inflammatory disorders
Major psychiatric disorders
Treatment for infection with human immunodeficiency virus
Atrial fibrillation
LV hypertrophy
CKD
Obstructive sleep apnoea syndrome

BMI = body mass index; CKD = chronic kidney disease; CVD = cardiovascular disease; LV = left ventricular.

Factors influencing cardiovascular risk in patients with hypertension (1)

Demographic characteristics and laboratory parameters
Sex[a] (men >women)
Age[a]
Smoking (current or past history)[a]
Total cholesterol[a] and HDL-C
Uric acid
Diabetes[a]
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)

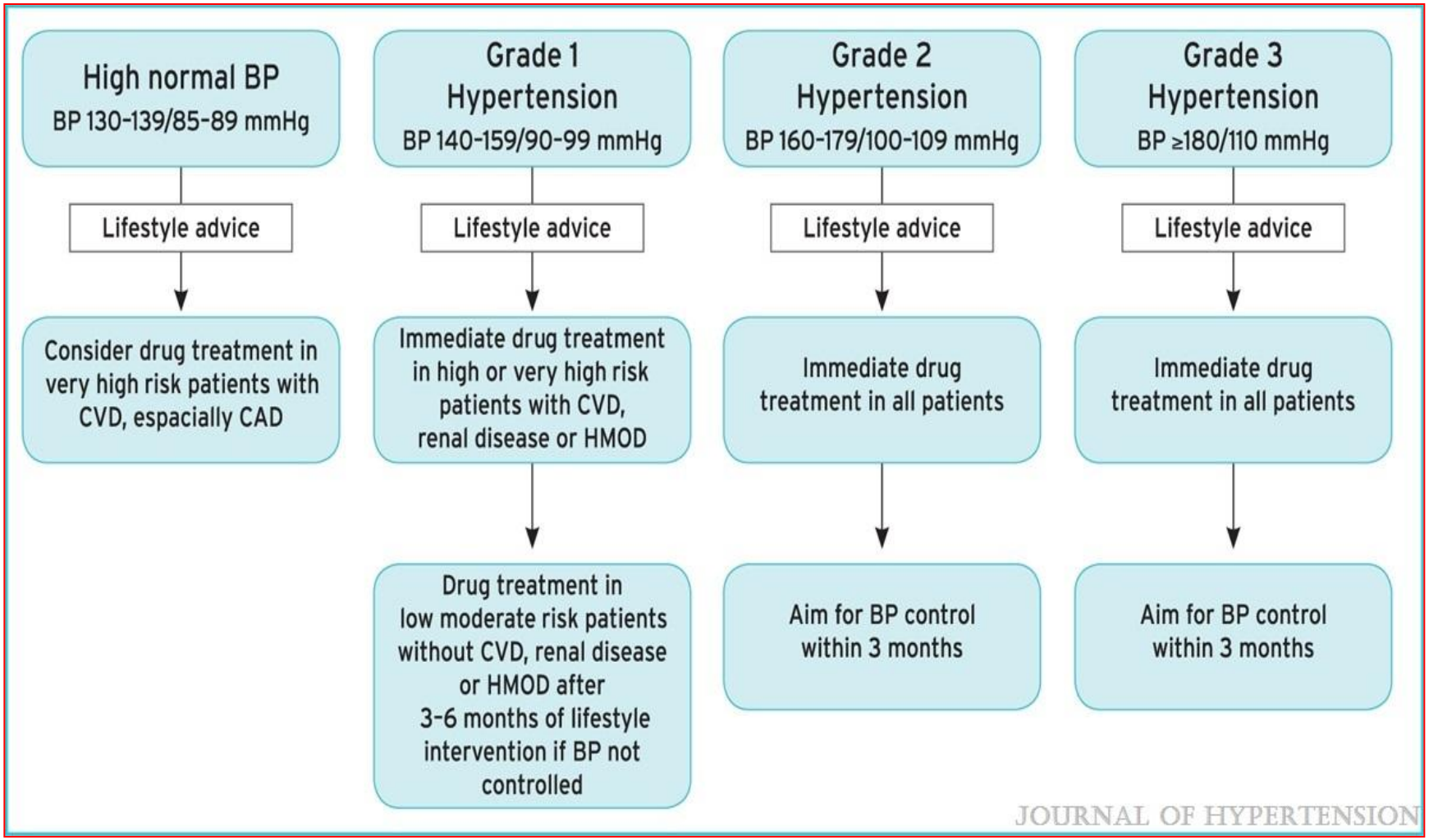
Factors influencing cardiovascular risk in patients with hypertension (2)

Asymptomatic HMOD
Arterial stiffening: Pulse pressure (in older people) ≥60 mmHg Carotid–femoral PWV >10 m/s
ECG LVH (Sokolow–Lyon index >35 mm, or R in aVL ≥11 mm; Cornell voltage duration product >2440 mm.ms, or Cornell voltage >28 mm in men or >20 mm in women)
Echocardiographic LVH [LV mass index: men >50 g/m$^{2.7}$; women >47 g/m$^{2.7}$ (height in m$^{2.7}$); indexation for BSA may be used in normal-weight patients; LV mass/BSA g/m^2 >115 (men) and >95 (women)]
Microalbuminuria (30–300 mg/24 h), or elevated albumin–creatinine ratio (30–300 mg/g; 3.4–34 mg/mmol) (preferentially on morning spot urine)[b]
Moderate CKD with eGFR >30–59 mL/min/1.73 m^2 (BSA) or severe CKD eGFR <30 mL/min/1.73 m^{2} [b]
Ankle-brachial index <0.9
Advanced retinopathy: haemorrhages or exudates, papilloedema

Factors influencing cardiovascular risk in patients with hypertension (3)

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

Maneig HTA (1)


High normal BP
BP 130-139/85-89 mmHg
Lifestyle advice
Consider drug treatment in very high risk patients with CVD, espacially CAD
Grade 1 Hypertension
BP 140-159/90-99 mmHg
Lifestyle advice
Immediate drug treatment in high or very high risk patients with CVD, renal disease or HMOD
Drug treatment in low moderate risk patients without CVD, renal disease or HMOD after 3-6 months of lifestyle intervention if BP not controlled
Grade 2 Hypertension
BP 160-179/100-109 mmHg
Lifestyle advice
Immediate drug treatment in all patients
Aim for BP control within 3 months
Grade 3 Hypertension
BP ≥180/110 mmHg
Lifestyle advice
Immediate drug treatment in all patients
Aim for BP control within 3 months
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Maneig HTA (2)

Recommendations	Class[a]	Level[b]
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 [2,8].	I	A
In patients with grade 1 hypertension: • Lifestyle interventions are recommended to determine if this will normalize BP [219].	II	B
• 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 a period of lifestyle intervention[c] [211,212].	I	A
• 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 [211,212].	I	A
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 [210,220,221].	I	A
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 [212].	I	A
Antihypertensive treatment may also be considered in frail older patients if tolerated [215].	IIb	B
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 [213].	III	A
In patients with high–normal BP (130–139/85–89 mmHg): • Lifestyle changes are recommended [17,35].	I	A
• Drug treatment may be considered when their cardiovascular risk is very high due to established CVD, especially CAD [217].	IIb	A

BP, blood pressure; CAD, coronary artery disease; CVD, cardiovascular disease; HMOD, hypertension-mediated organ damage.
[a]Class of recommendation.
[b]Level of evidence.
[c]In patients with grade 1 hypertension and at low–moderate-risk, drug treatment may be preceded by a prolonged period of lifestyle intervention to determine if this approach will normalize BP. The duration of the lifestyle intervention alone will depend on the level of BP within the grade 1 range, that is the likelihood of achieving BP control with lifestyle intervention alone, and the opportunities for significant lifestyle change in individual patients.

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Quan cal plantejar tractament ?

Table 19 Summary of office blood pressure thresholds for treatment

Age group	Office SBP treatment threshold (mmHg)					Office DBP treatment threshold (mmHg)
	Hypertension	+ Diabetes	+ CKD	+ CAD	+ Stroke/TIA	
18 - 65 years	≥140	≥140	≥140	≥140[a]	≥140[a]	≥90
65 - 79 years	≥140	≥140	≥140	≥140[a]	≥140[a]	≥90
≥80 years	≥160	≥160	≥160	≥160	≥160	≥90
Office DBP treatment threshold (mmHg)	≥90	≥90	≥90	≥90	≥90	

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BP = blood pressure; CAD = coronary artery disease; CKD = chronic kidney disease; DBP = diastolic blood pressure; SBP = systolic blood pressure; TIA = transient ischaemic attack.

[a]Treatment may be considered in these very high-risk patients with high–normal SBP (i.e. SBP 130–140 mmHg).

Objectius de control

Table 23 **Office blood pressure treatment target range**

Age group	Office SBP treatment target ranges (mmHg)					Office DBP treatment target range (mmHg)
	Hypertension	+ Diabetes	+ CKD	+ CAD	+ Stroke[a]/TIA	
18 - 65 years	**Target to 130** *or lower if tolerated* Not <120	**Target to 130** *or lower if tolerated* Not <120	**Target to <140 to 130** *if tolerated*	**Target to 130** *or lower if tolerated* Not <120	**Target to 130** *or lower if tolerated* Not <120	70–79
65 - 79 years[b]	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	70–79
≥80 years[b]	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	**Target to 130-139** *if tolerated*	70–79
Office DBP treatment target range (mmHg)	70–79	70–79	70–79	70–79	70–79	

CAD = coronary artery disease; CKD = chronic kidney disease (includes diabetic and non-diabetic CKD); DBP = diastolic blood pressure; SBP = systolic blood pressure; TIA = transient ischaemic attack.

[a]Refers to patients with previous stroke and does not refer to blood pressure targets immediately after acute stroke.

[b]Treatment decisions and blood pressure targets may need to be modified in older patients who are frail and independent.

Objectius de control

Figure

Recommendations	Class[a]	Level[b]
It is recommended that the first objective of treatment should be to lower BP to < 140/90 mmHg in all patients and, provided that the treatment is well tolerated, treated BP values should be targeted to 130/80 mmHg or lower in most patients [2,8].	I	A
In patients < 65 years receiving BP-lowering drugs, it is recommended that SBP should be lowered to a BP range of 120–129 mmHg in most patients [2,215,229].[c]	I	A
In older patients (aged ≥ 65 years) receiving BP-lowering drugs:		
• It is recommended that SBP should be targeted to a BP range of 130–139 mmHg [2,235,244].	I	A
• Close monitoring of adverse effects is recommended.	I	C
• These BP targets are recommended for patients at any level of cardiovascular risk and in patients with and without established CVD [2,8].	I	A
A DBP target of < 80 mmHg should be considered for all hypertensive patients, independent of the level of risk and comorbidities [226,235].	IIa	B

BP, blood pressure; CVD, cardiovascular disease; DBP, diastolic blood pressure; SBP, systolic blood pressure.
[a]Class of recommendation.
[b]Level of evidence.
[c]Less evidence is available for this target in low–moderate-risk patients.

Lifestyle

Recommendations	Class[a]	Level[b]
Salt restriction to < 5 g per day is recommended [248,250,255,258].	I	A
It is recommended to restrict alcohol consumption to: • Less than 14 units per week for men. • Less than 8 units per week for women [35].	I	A
It is recommended to avoid binge drinking.	III	C
Increased consumption of vegetables, fresh fruits, fish, nuts, and unsaturated fatty acids (olive oil); low consumption of red meat; and consumption of low-fat dairy products are recommended [262,265].	I	A
Body-weight control is indicated to avoid obesity (BMI > 30 kg/m^2 or waist circumference >102 cm in men and > 88 cm in women), as is aiming at healthy BMI (about 20–25 kg/m)^2 and waist circumference values (< 94 cm in men and < 80 cm in women) to reduce BP and cardiovascular risk [262,271,273,290].	I	A
Regular aerobic exercise (e.g. at least 30 min of moderate dynamic exercise on 5–7 days per week) is recommended [262,278,279].	I	A
Smoking cessation, supportive care, and referral to smoking cessation programs are recommended [286,288,291].	I	B

BMI, body mass index; BP, blood pressure.
[a]Class of recommendation.
[b]Level of evidence mostly based on the effect on BP and/or cardiovascular risk profile.

Drug treatment strategy for hypertension

Recommendations	Class[a]	Level[b]
Among all antihypertensive drugs, ACE inhibitors, ARBs, beta-blockers, CCBs, and diuretics (thiazides and thiazide-like drugs such as chlorthalidone and indapamide) have demonstrated effective reduction of BP and CV events in RCTs, and thus are indicated as the basis of antihypertensive treatment strategies.[2]	I	A
Combination treatment is recommended for most hypertensive patients as initial therapy. Preferred combinations should comprise a RAS blocker (either an ACE inhibitor or an ARB) with a CCB or diuretic. Other combinations of the five major classes can be used.[233,318,327,329,341–345]	I	A
It is recommended that beta-blockers are combined with any of the other major drug classes when there are specific clinical situations, e.g. angina, post-myocardial infarction, heart failure, or heart rate control.[300,341]	I	A
It is recommended to initiate an antihypertensive treatment with a two-drug combination, preferably in an SPC. Exceptions are frail older patients and those at low risk and with grade 1 hypertension (particularly if SBP is <150 mmHg).[342,346,351]	I	B
It is recommended that if BP is not controlled[c] with a two-drug combination, treatment should be increased to a three-drug combination, usually a RAS blocker with a CCB and a thiazide/thiazide-like diuretic, preferably as an SPC.[349,350]	I	A
It is recommended that if BP is not controlled[c] with a three-drug combination, treatment should be increased by the addition of spironolactone or, if not tolerated, other diuretics such as amiloride or higher doses of other diuretics, a beta-blocker, or an alpha-blocker.[310]	I	B
The combination of two RAS blockers is not recommended.[291,298,299]	III	A

ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blocker; BP = blood pressure; CCB = calcium channel blocker; CV = cardiovascular; RAS = renin-angiotensin system; RCT = randomized controlled trial; SBP = systolic blood pressure; SPC = single-pill combination.

[a]Class of recommendation.

[b]Level of evidence.

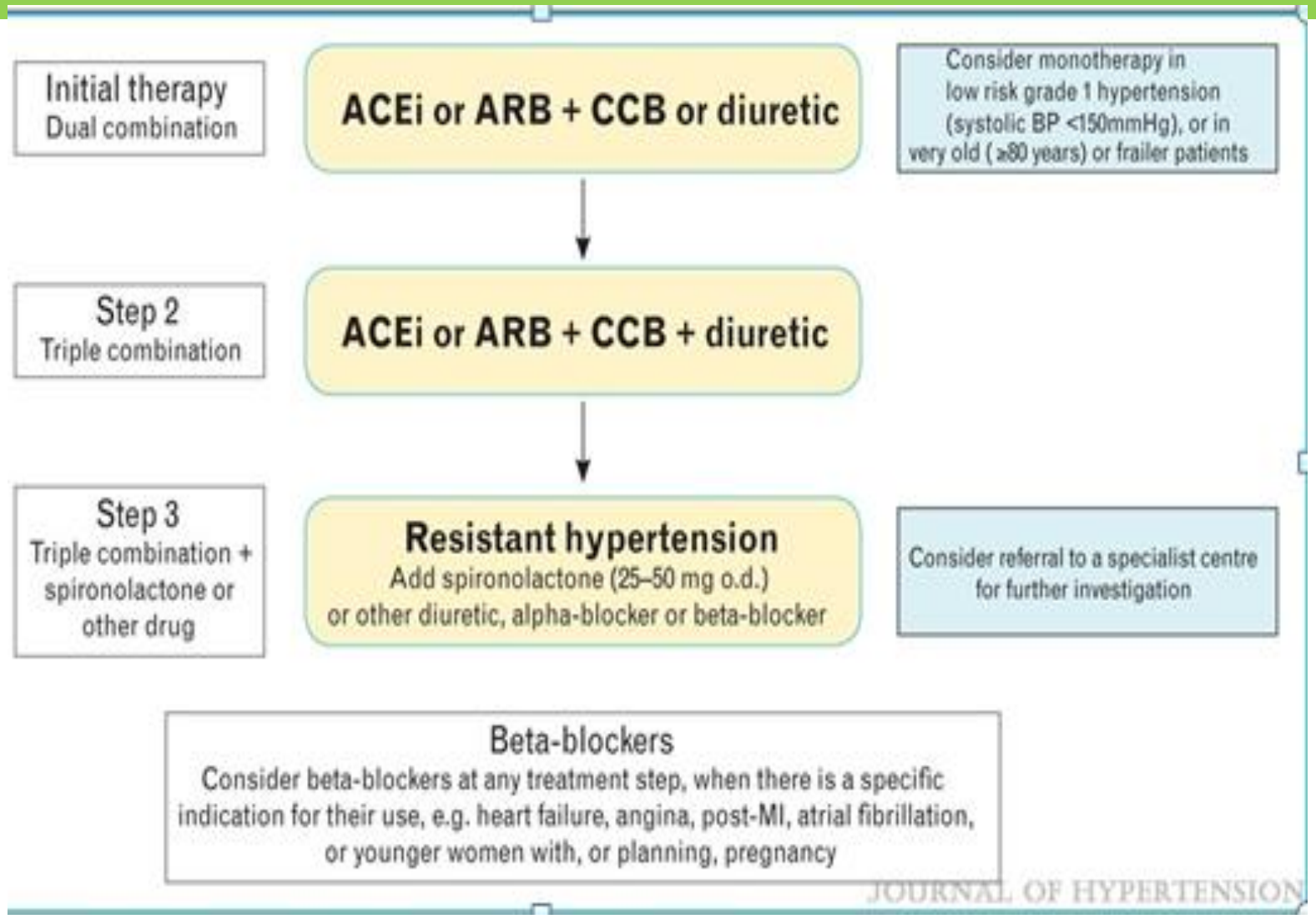
[c]Adherence should be checked.

Table 20 Compelling and possible contraindications to the use of specific antihypertensive drugs

Drug	Contraindications	
	Compelling	Possible
Diuretics (thiazides/thiazide-like, e.g. chlorthalidone and indapamide)	• Gout	• Metabolic syndrome • Glucose intolerance • Pregnancy • Hypercalcaemia • Hypokalaemia
Beta-blockers	• Asthma • 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 dysfunction (LV ejection fraction <40%) • Bradycardia (heart rate <60 beats per min)	• Constipation
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.

Tractament farmacològic



Fàrmacs

- Clortalidona 25-50mg/dia o enalapril 5-20mg/dia
- Enalapril +Clortalidona
- Enalapril + Amlodipino 5-10mg/dia

- Enalapril+Clortalidona + Amlodipino

- Enalapril+Clortalidona + Amlodipino + **Espironolactona** 25-50mg/dia (amilorida o eplenerona) o Bisoprolol 2,5-10 mg/dia o Doxazosina 2-8mg/dia

  Fer MAPA (i valorar atenció especialitzada)

- **Eficàcia, seguretat (toxicitat), experiència d'ús, comoditat i preu**

Strategies for treatment of hypertension in Chronic Kidney Disease (CKD)

- **Reduction of albuminuria** has also been considered as a therapeutic target....whether reducing albuminuria *per se* is a proxy for CVD prevention remains unresolved.
- **Patients with CKD** should receive lifestyle advice, ***especially sodium restriction.***
- **Loop diuretics** should replace thiazide diuretics when the estimated GFR is < 30 mL/min/1.73 m^2.
- Because BP lowering reduces renal perfusion pressure, it is expected and **not unusual for eGFR to be reduced by 10–20%** in patients treated for hypertension.
- Careful monitoring of blood electrolytes and eGFR is essential.

Therapeutic strategies for treatment of hypertension in CKD

Recommendations	Class	Level
In patients with *diabetic or non-diabetic* CKD, it is recommended that an **office BP of ≥ 140/90** mmHg be treated with lifestyle advice and BP-lowering medication.	I	A
In patients with diabetic or non-diabetic CKD:		
• It is recommended to lower **SBP to a range of 130 to < 140 mmHg.**	I	A
• **Individualized** treatment should be considered according to its tolerability and impact on renal function and electrolytes.	IIa	C
RAS blockers are more effective at reducing albuminuria than other antihypertensive agents, and are recommended as part of the treatment strategy in hypertensive patients *in the presence of microalbuminuria or proteinuria.*	I	A
A combination of a RAS blocker with a CCB or a diuretic is recommended as initial therapy.	I	A
A combination of two RAS blockers is not recommended.	III	A

Treatment strategies in people with diabetes

It is recommended to initiate treatment with a combination of an RAS blocker with a CCB or thiazide/thiazide-like diuretic. (**I A)**

Simultaneous administration of two RAS blockers, e.g. and ACE inhibitor and ARB, is not indicated. (**III A)**

HTA i gestació

Recommendations	Class[a]	Level[b]
In women with gestational hypertension, pre-existing hypertension superimposed by gestational hypertension, or with hypertension and subclinical organ damage or symptoms, initiation of drug treatment is recommended when SBP is ≥ 140 mmHg or DBP ≥ 90 mmHg.	I	C
In all other cases, initiation of drug treatment is recommended when SBP is ≥ 150 mmHg or DBP is ≥ 95 mmHg.	I	C
Methyldopa, labetalol, and CCBs are recommended as the drugs of choice for the treatment of hypertension in pregnancy [447,448].	I	B (methyldopa)
	I	C (labetalol or CCBs)
ACE inhibitors, ARBs, or direct renin inhibitors are not recommended during pregnancy.	III	C
SBP ≥ 170 mmHg or DBP ≥ 110 mmHg in a pregnant woman is an emergency, and admission to hospital is recommended.	I	C
In severe hypertension, drug treatment with i.v. labetalol, oral methyldopa, or nifedipine is recommended.	I	C
The recommended treatment for hypertensive crisis is i.v. labetalol or nicardipine and magnesium.	I	C
In pre-eclampsia associated with pulmonary oedema, nitroglycerin given as an i.v. infusion is recommended.	I	C
In women with gestational hypertension or mild pre-eclampsia, delivery is recommended at 37 weeks [453].	I	B
It is recommended to expedite delivery in pre-eclampsia with adverse conditions, such as visual disturbances or haemostatic disorders.	I	C

ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker; CCB, calcium channel blocker; DBP, diastolic blood pressure; i.v., intravenous; SBP, systolic blood pressure.
[a]Class of recommendation.
[b]Level of evidence.

JOURNAL OF HYPERTENSION

Resistant hypertension

Characteristics of patients with resistant hypertension	Causes of secondary resistant hypertension	Drugs and substances 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. decongestants 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 isolated systolic hypertension	**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 ma huang)

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

Resistant hypertension

Recommendations	Class	Level
It is recommended that hypertension be defined as resistant to treatment (i.e. resistant hypertension) when: •Optimal doses (or best-tolerated doses) of an appropriate therapeutic strategy, which should include a diuretic (typically an ACE inhibitor or ARB + CCB + thiazide/thiazide-type diuretic), fails to lower clinic SBP and DBP values to < 140 mmHg and/or 90 mmHg, respectively; and •The inadequate control of BP has been confirmed by ABPM or HBPM; and •After exclusion of various causes of pseudo-resistant hypertension (especially poor medication adherence) and secondary hypertension.	I	C
Recommended treatment of resistant hypertension is:		
Reinforcement of lifestyle measures, especially sodium restriction.	I	B
Addition of low-dose spironolactone to existing treatment.	I	A
Or the addition of further diuretic therapy if intolerant to spironolactone, with either eplerenone, amiloride, higher dose thiazide/thiazide-like diuretic, or a loop diuretic.	I	B
Or the addition of bisoprolol or doxazosin.	I	B

Management of white-coat hypertension		
Recommendations	**Class[a]**	**Level[b]**
In white-coat hypertensive patients, it is recommended to implement lifestyle changes aimed at reducing CV risk as well as regular follow-up with periodic out-of-office BP monitoring.	I	C
In patients with white-coat hypertension: • Drug treatment may be considered in people with evidence of HMOD or in whom CV risk is high or very high.	IIb	C
• Routine drug treatment is not indicated.	III	C
Management of masked hypertension		
Recommendations		
In masked hypertension, lifestyle changes are recommended to reduce CV risk, with regular follow-up, including periodic out-of-office BP monitoring.	I	C
Antihypertensive drug treatment should be considered in masked hypertension to normalize the out-of-office BP, based on the prognostic importance of out-of-office BP elevation.	IIa	C
Antihypertensive drug uptitration should be considered in treated patients whose out-of-office BP is not controlled (i.e. masked uncontrolled hypertension), because of the high CV risk of these patients.	IIa	C

BP = blood pressure; CV = cardiovascular; HMOD = hypertension-mediated organ damage.
[a]Class of recommendation.
[b]Level of evidence.

Conclusions 1

- **Diagnòstic :**

PA ≥ 140 i/o 90 mmHg (≥ 80anys ≥ 160/90)

Mesures repetides a la consulta - MAPA-AMPA

Tècnica correcta

- **Avaluar Risc cardiovascular i LOD i HTA secundària**
- **Objectiu :**

PAS < 140 mmHg (PAS 120-130 mmHg si es tolerada)

>65 anys i/ o malaltia renal crónica: PAS 130-139 mmHg

PAD = 70-80 mmHg

Conclusions 2

- Considerar qualitat de vida , preferències pacient i tolerància a la medicació
- Importància mesures estil de vida
- Tractament farmacològic :

  HTA grau II i grau III

  HTA amb LOD

  HTA > 65 anys

  PA normal-alta (130-139/85 mmHg) en prevenció secundària, especialment cardiopatia isquèmica

  HTA de grau I (PAS 140-159 mmHg) sin LOD ni ECV si en 3-6 mesos no disminueix
- Comprovar adherència al tractament
- Inici de tractament amb una combinació farmacològica (excepte en HTA lleu)
- IECA /ARA II amb BCC o diurétics tiazidas like (clortalidona/indapamida)
- BB: HTA gestacional i malaltia cardíaca
- En HTA resistent, recomanar primer la reducció de sal i espironolactona si cal

Per definir patró
Quan un dels valors és inferior a 10 % parlem de patró NO DIPPER (NO REDUCTOR)

PA mitjana periode activitat

PA mitjana periode descans

Resumen MAPA (02/03/2018 10:40 - 03/03/2018 10:40)				
periodo	**Global**	**Mañana**	**Día**	**Noche**
rango de tiempo	Global	09:00 - 09:00	09:00 - 00:30	00:30 - 09:00
PAS/PAD límite superior	~127/77~	-/-	135/85	120/70
PAS/PAD Promedio ponderado	145/82	-/-	147/84	140/78
Pulso Promedio ponderado	78	-	83	71
lecturas	55	-	39	16
Relación % correcta	86	-	83	94
índice % PAS/PAD D/N	5/7			
Elevación matinal de PA	25			

Valors referència

Valors pacient

FC

% LECTURES CORRECTES (>/70%)

>25% (patològic)
% de ↑ de la lectura més alta de la 1ª hora del matí respecte al promig; orienta sobre el ↑ del risc si hi ha un pic matinal fort

PAS nocturna mitjana / PAS diürna mitjana	
<0,8	*dipper* extrem
0,8 a 0,9	*dipper*
>0,9 a 1	*no-dipper*
>1	*riser*

Ritme circadià = PAS nocturna mitjana / PAS diürna mitjana
ex: 140/147= 0,95
(>0,9: No dipper no reductor)

Descens fisiològic en període de descans

Descens >10%	10-20%	Dipper
	> 20%	Dipper extrem
Descens < 10%	0-10%	No dipper
	Valors superiors al període d'activitat	Riser

- **Patró dipper**: relacionat amb un millor pronòstic cardiovascular (CV)
- **Patró No dipper** o **Riser** : pitjor pronòstic cardiovascular. Si es confirma aquest patró , s'ha de descartar coexistència de síndrome d'apnea-hipoapnea obstructiva del son (SAHOS).
- **Patró dipper extrem**: es desconeix el seu paper en el pronòstic CV. Valorar tractament antihipertenssiu (excessiu o mal implementat)